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Hell and High Water
 WWOZ studios are back in town
 after the wrath of Katrina.

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 Kim Andrew Elliott says
 VOA may not be able to
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Radio World

\$2.50

The Newspaper for Radio Managers and Engineers

May 10, 2006

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nake or break time soon Radio.

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Got a Workbench tip?
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FIRST PERSON

Audio Stores, Where Are the Radios?

In Santa Clara, Good Luck Trying to Find Receivers, Much Less Antennas

by Joe Milliken

In late February, FM stations KFOG/KFFG, which serve San Francisco, Los Altos and San Jose, Calif., began a rotation of HD Radio promotions on their analog signals. So I decided to see how up to speed our local and national audio chains were on HD Radio.

Having kept tabs on the radio industry over 30 years, I might be expected to have a bit more knowledge than the store personnel, so I went in as "Joe Six Pack," an everyday guy, checking out the mobile section, if one was available, and then the home section.

I rated stores from A for excellent to F for failure. My criteria for ratings took several factors into account, including:

- Home and mobile units in stock and ability to demonstrate HD Radio;
- The salesperson's knowledge of HD-R and
- Whether the store had promotional displays on HD-R.

As this article was prepared for press, the HD Radio Alliance announced that Tweeter and ABC Warehouse/Detroit will begin carrying HD Radios and Crutchfield would increase its inventory. Radio Shack also said in April it intends to carry the Boston Acoustics Receptor HD in some stores, perhaps by May. So consider this a first-semester report card. Perhaps the grades will improve next time.

See STORES, page 29 ▶

INTEGRATED MEDIA

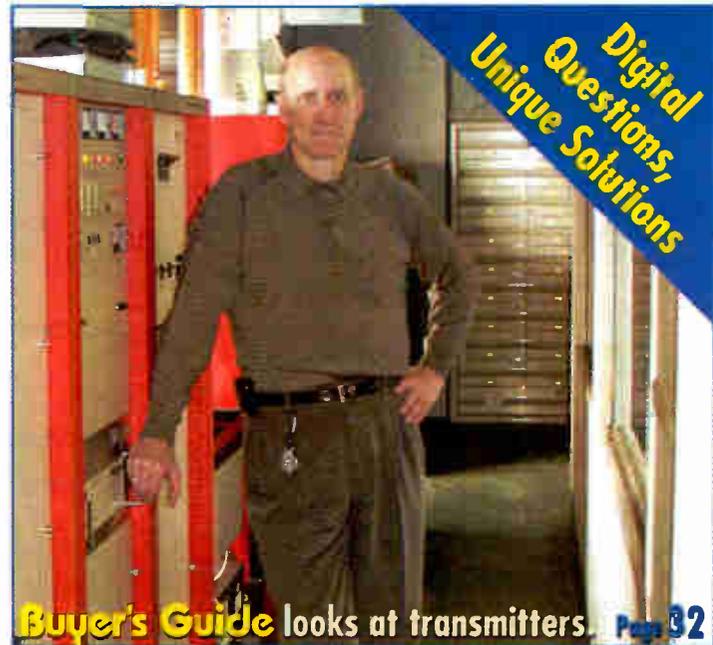
When Public Radio Becomes Richer Media

by Dan Mansergh

SEATTLE Ten years ago, many broadcasters were making their first forays into the wild and chaotic World Wide Web, realizing the possibilities and challenges of using the new medium to complement and expand their over-the-air businesses.

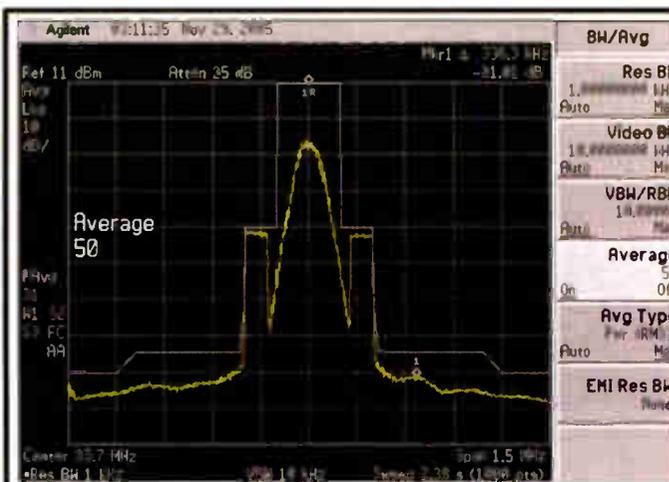
Now that the promise of rich media experiences on the Internet is being realized through the expanding deployment of broadband, broadcast managers are taking the opportunity to look back at their Internet strategies to see if the investment of

See MEDIA, page 3 ▶



Buyer's Guide looks at transmitters. Page 32

Shown: Paul Byers of WOED(FM)



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◆ NEWSWATCH ◆

The Shack to Sell HD Radios

FT. WORTH, Texas RadioShack confirmed it will carry HD Radios in some locations, possibly as soon as this month.

The retailer announced earlier it plans to close some locations and replace old, slower-moving merchandise with new, faster-moving merchandise in higher growth categories in a plan to boost profits.

HD Radios will be among those product offerings "in select markets," a

spokesman said. RadioShack plans to carry the Boston Acoustics Receptor HD and is evaluating options beyond that.

In February, RadioShack said it intends to close 400-700 stores out of nearly 7,000 total retail locations.

More Retailers, More Ads

ORLANDO, Fla. Tweeter and ABC Warehouse/Detroit have committed to carrying HD Radios, while Crutchfield is increasing its product offerings. In-

store and online programs have launched in 30 markets and more than 100 stores to meet increasing consumer demand, said Peter Ferrara, president/CEO of the HD Digital Radio Alliance.

The announcement coincided with the second wave of the \$200 million alliance on-air advertising campaign. This round of commercials, representing donated inventory from alliance station members, features ABC Warehouse, Tweeter and Crutchfield.com. Now that more HD Radios are available, the alliance expects to end the lengthy waiting lists for receivers that consumers are experiencing in the top

30 markets.

Tweeter said it is carrying HD Radios in all of its markets, supported by online information for consumers, in-store signage and point-of-purchase displays and special training for salespeople, the alliance says. The retailer also will launch an ad campaign to raise awareness among consumers.

Crutchfield will carry more models of HD Radios in its catalog and online site and include assistance for Spanish-language customers and salesperson training. Ads for the retailer are airing on some 260 alliance stations.

ABC Warehouse will carry HD Radio products in multiple markets in the Midwest and add online information and store listening stations; customized ads are running in the Detroit market.

Gen 2 HD-R Reference Design Available

COLUMBIA, Md. Tabletop and home receiver makers now have an updated reference design from Ibiqity Digital.

The IBOC developer says the design is a base from which manufacturers can craft their products to speed time to market and lower costs. Version 2.0 is optimized for heightened AM/FM sensitivity and reduced bill-of-material costs for consumer electronics manufacturers looking to integrate HD Radio technology into AM and FM radio product lines, said the supplier.

The module is available to all HD Radio licensees.

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Media

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time and resources of the intervening decade has paid off and where they should be moving next.

This was the focus of the 2006 Integrated Media Association Conference in Seattle this winter. Approximately 400 representatives of public radio and television stations gathered to debate the central questions facing all broadcasters — non-commercial and commercial — as competition and opportunity abound.

If conference turnout is any indication, integrated media are getting a great deal of attention from senior public broadcasting officials, driven in large part by the rise of podcasting and downloadable content-centered Web sites in the past year, and the risk of ignoring disruptive technologies that have the potential to reshape content delivery businesses in a short time.

Podcasting wasn't even discussed at last year's IMA conference.

Getting it

The rapid adoption of podcasting, the rise of downloadable audio and video on sites such as iTunes and AOL and the success of portable media players have shifted the focus of content delivery from purely streaming-based services to a blend of streaming and downloadable content.

How to balance the two — as users clamor for portability while producers struggle with issues of control and legal rights — was a key theme at this IMA conference.

A number of content aggregators and distributors were featured in conference sessions to present their vision of the content distribution future. Established players such as Google and Audible, along with backend-oriented service providers like The Platform, pitched the merits of their services for managing and aggregating content.

Many conference attendees were excited to hear about Open Media Network, a non-profit content distribution service built using the secure Kontiki grid peer-to-peer backbone, promising faster downloads and significantly reduced bandwidth costs for program producers.

After developing and deploying the iMP (Integrated Media Player) for the BBC with Kontiki, OMN founder/CEO Mike Homer said he saw a similar need for a low-cost way to deliver high-quality public media over the Internet to users in the U.S. and created OMN and its non-profit parent Open Media Foundation to do that.

The service is free to users and producers of free content; fees will be charged on content that is sold through the service, he said.

An interesting trend is that many aggregators and distributors, with the exception of Audible, which is an audio-only provider, are building their services to support both audio and video content since, from the distributor's point of view, the content is all just data.

Conference panelists urged producers of primarily audio content to recognize this reality by factoring it into their marketing and positioning strategy for each of the various content providers.

Including tailored graphic imagery or even some video content, as Los Angeles-area station KCRW(FM) has done with video podcasts of some of its recording sessions, may be necessary to stand out on some of the more video-centric interfaces.

Deciding how and when to charge for online content and navigating the morass of licensing rights continue to be the thorniest issues for producers of public media, and although these were key themes at the conference, panelists and attendees agreed that there are still no easy answers.

Paying for it

Balancing the mission-driven objectives of wide distribution and public service with the economic realities of paying for the production of quality content were challenging on the nascent World Wide Web, circa 1996, and are no less so 10 years later, with prevalent broadband and hundreds of ways for users to get their media.

Although many in the Internet community value free content and disdain overt commercialism, the distinction between commercial and non-commercial media will become less important to most users, said conference keynoter Andrew Blau, a media specialist with strategic planning firm Global Business Network.

Blau argues that non-commercial media organizations need to ensure distribution for their content in an environment where the finite resource is users' attention and material is coming at them from all directions. He believes that funding sources and revenue models need to change to accommodate new distribution realities.

This requires a willingness to experiment and collaborate, a new way of thinking for many organizations used to taking the safest path and going it alone, he said.

The success of the NPR/Station Podcasting Partnership in aggregating content and generating revenue as a result of centralizing the content and underwriting management was an often-cited example of collaboration and was brought up in many of the revenue-oriented discussions.

According to Maria Thomas, NPR's vice president and general manager of NPR Digital Media, the ability to attract marquee sponsors for the project was tied directly to the fact that it was a partnership, including stations, NPR, PRI and American Public Media. This ensured that the effort would have wide distribution and promotion, and enabled NPR to gain underwriting support for an eclectic mix of locally and nationally produced content.

NPR will continue to develop and refine the aggregated podcast directory, adding new podcasts (including new podcast-only content under the *alt.npr* name), working with the partners to experiment with new revenue opportunities, she said.

Connecting with it

A third big theme at the IMA was the rise of collaborative user-centered online experiences, and how public broadcasters fit into the emerging landscape of online "Communities of Content."

Commonly rolled up in the catch-all heading of "Web 2.0," interactive applications such as Weblogs, user-generated and -organized media archives like flickr and YouTube, and broadly distributed information tools like Google Earth invite users to be a part of the content creation process and the community that arises from it.

From high-profile ventures such as American Public Media's Gather, a community-building site targeted at the public radio listener demographic, to relatively modest efforts, such as user comments invited on individual station blogs, broadcasters are experimenting with ways to further invite audiences into the content.

See MEDIA, page 6 ►

IMA 2006 at a Glance

Many broadcasters have never heard of the Integrated Media Association, but if they're at all interested in the future of radio, they may want to take a closer look.

The Public Radio Internet Station Alliance was founded by a handful of public radio stations and statewide networks as a research and development project in 1997. It took its new name and an expanded role in 2002 when it grew to include public TV stations in its membership.

Shortly thereafter, IMA welcomed representatives from National Public Radio, Public Radio International and the Public Broadcasting System on its board, ensuring that its efforts would represent all of public broadcasting's stakeholders.

The IMA has become increasingly influential as its membership has continued to grow and through its work on a number of collaborative new media projects across the public broadcasting system, but perhaps no greater sign of the IMA's growing importance to public broadcasters can be found than the record attendance at the 2006 IMA conference.

The third annual gathering attracted more than 400 attendees, blowing past



last year's conclave of 300 in San Francisco and forcing conference organizers to cap registrations to avoid overcrowding, according to the IMA.

Even so, the assembled masses packed the conference rooms and hallways of the W hotel in Seattle; many sessions were standing room only, and the elevators shuttling attendees between the two floors of conference rooms were in constant use.

The attendee makeup of the gathering was different this year as well. While in past years attendees primarily worked within the online or new media units of their organizations, many more public broadcasting senior executives were at the 2006 IMA, drawn to a new special management-oriented strategy seminar held during the first two days of the conference.

— Dan Mansergh

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Radio Finally Starts to Go Def

As it does seasonally every year, the river of announcements that pours daily through Radio World's e-mail box rose to high levels in the weeks leading up to the NAB convention.

Newsworthy items are covered in our online NewsBytes and in our pre- and post-show issues. But some of the releases caught my eye as indicators of how the digital rollout is progressing.

Clear Channel Radio announced it had assigned its Creative Services Group to come up with ads promoting HD Radio. The company made those spots available to competitors that are members of the HD Digital Radio Alliance, which promotes adoption of the technology.

Clear Channel honcho John Hogan called the spots a "particularly important collaboration" given his company's commitment to HD Radio. It's certainly a good use of its Creative Services Group, which focuses on "improving the radio listening experience" and increasing value to advertisers through better spots.

The HD Radio spot campaign is called "Are You Def Yet?" It plays around with the word "def" — as in "high definition" as well as the hip-hop slang for "very good." Programmers hope to be contemporary and edgy, going after younger demos and more urban listeners.

This strategy may make sense in some formats, though I can't imagine my dad responding favorably to a technology promoted with a radio ad that seems to ask "Are you deaf yet?" Nor do I think this message will resonate with close friends of mine who listen to country.

Unfortunately I can't tell whether the spots for those demographics will be more suitable; as of this writing, the campaign's Web site, promising spots in a half-dozen formats, had only posted content for two. And not all of those succeed. Nevertheless the spots already up make me eager to hear more.

Some play up the "newness" factor and the lack of a subscription fee. For rock/CHR stations, a 15-second promo — in the breathy, "we're-cooler-than-you are" voice style that CHR programmers love but I detest — asks: "Did you know

(pause) that there are secret radio stations (pause) that you can only hear (pause) with a high-def HD Radio? These stations (pause) are all free. Go to hdradio.com for details."

In another, to the rhythm of slapping skin, a male hillbilly voice performs a new kind of music called "rural rump slap," including the lyric "I'm white trash and I slap you in the ass, I just slapped your mamma in my GED class." Says the announcer, "Rural rump slap rap: You can't hear that on regular radio. But you can on HD."

Some make you laugh while playing on your sense of cool: "You still drink the milk right from the container cuz your mom always told you not to. (SFX: belch). If you're such a bad ass, why aren't you listening to this on an HD Radio?" In another, a twerpy teacher asks the class to define high definition. We hear an oafish kid stand and say, "Duuuh, teach, that's like multiple channels, all kinds of cool music, anytime you want it." A Latino student imagines himself listening while out driving: "It's Friday night, we're cruisin' down the boulevard and we're gettin' high ... definitely." To which the teacher can only say, "Uh, thank you."

Among the spots for news/talk stations, several emphasize the benefits of digital on AM. They include funny clips of talk-show callers and hosts followed by the line, "America, we know you want to hear it all, so we've made sure you can! HD High-Definition AM Radio." One features Sean Hannity "stickin' it to the libs." Another portrays an aide struggling to help George Bush pronounce "high definition" properly.

(I recalled the pains Ibiqutiy took in the early days to emphasize that the letters in "HD Radio" specifically did not refer to "high definition." Those cautionary words seem long forgotten.)

I hope more groups will put their creative experts to work on the HD Radio marketing challenge. This is exactly the kind of effort broadcasters need to put out if consumers are to understand and get behind digital.

Also welcome is the attention given at NAB2006 to new media possibilities by some big exhibitors. Broadcast Electronics calls these "emergent, personalized radio services." The company used the show to talk up its "Pavilion of New Technologies" in partnership with several organizations including NPR Labs, Traffic.com, Mozes and FM411.

The manufacturer's Allen Hartle cites an "explosion of interactive radio opportunities for broadcasters."

BE featured radio text services for the hearing impaired using RDS/HD Radio data channels and audio services for the visually impaired using HD2 multicasting channels. It showed personalized radio applications for mobile phone and Web users including a music alert system from FM411 and Mozes' application for bookmarking songs played over the air.

BE also promoted the business opportunities of RDS/HD Radio electronic signs; promotional outdoor billboards or small indoor LED signs displaying station Now Playing information; and traffic data "tunneled" to in-car systems over HD Radio channels.

It's exciting to see these specialized interactive applications that use existing or newly available data channels.

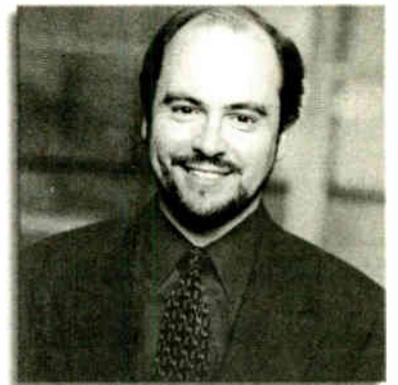
Emphasizing services for the hearing and visually impaired was Harris Corp. Its Broadcast Communications Division and NPR Labs set up a display demonstrating how HD Radio can offer radio service to such listeners via the Advanced Audio Services data stream.

The display showed captioned radio text for the hearing impaired and extended hybrid mode operation of radio reading services for the visually impaired sent via the HD Radio air chain.

Harris called this a "proof-of-concept design" that used its transmission equipment for insertion of program material in the multicasting stream, and Kenwood and Boston Acoustics radios to receive the reading service channel and a radio captioning display of an NPR program.

I'm very pleased to see this kind of

From the Editor



Paul J. McLane

attention to the needs of the visually impaired. I'm a former volunteer reader for the Delaware Association for the Blind and a former public director on the board of the International Association of Audio Information Services. Harris manager Hal Kneller currently sits on that board. As the manufacturer pointed out in its announcement, many NPR member stations broadcast reading services to approximately 1 million weekly listeners.

As Mike Starling of NPR Labs noted, some 32 million Americans qualify as visually or hearing impaired, "with that number growing significantly as baby boomers reach retirement age." Discussion of their needs at the NAB convention is a welcome addition to the talk of commercial benefits of digital.

And the HD Digital Radio Alliance announced in April that three retailers — Tweeter, Crutchfield and ABC Warehouse/Detroit — are "joining the radio industry in supporting consumer demand for HD digital radio."

The retailers will be offering HD digital radios in their stores and they have announced marketing and education campaigns to support customers.

It's welcome news. But as the first-person account by Joe Milliken on page 1 of this issue suggests, we need many more such announcements. When XM and Sirius were launching, not that long ago, the river of press releases and partnership announcements that streamed through my e-mail box reached flood stage. 🌐

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GUEST COMMENTARY

VOA: Less Shortwave = Less Global

Sites Like the IBB Shortwave Facility At Kavala, Greece, Will Be Missed

by Kim Andrew Elliott

The Broadcasting Board of Governors, which oversees U.S. government funded international broadcasting, has decided to shift resources to newer media, such as satellite-delivered televi-

to do so.

Shortwave can also be blocked, by way of jamming, but rarely with complete success. This is because shortwave is the only medium of international broadcasting granted immunity from interdiction by the laws of physics.

workers abroad, international students, Peace Corps and other volunteers, NGO employees, missionaries, seafarers, diplomats, military personnel and so on. This is perhaps the most influential audience in the world, and they make the effort to be well informed.

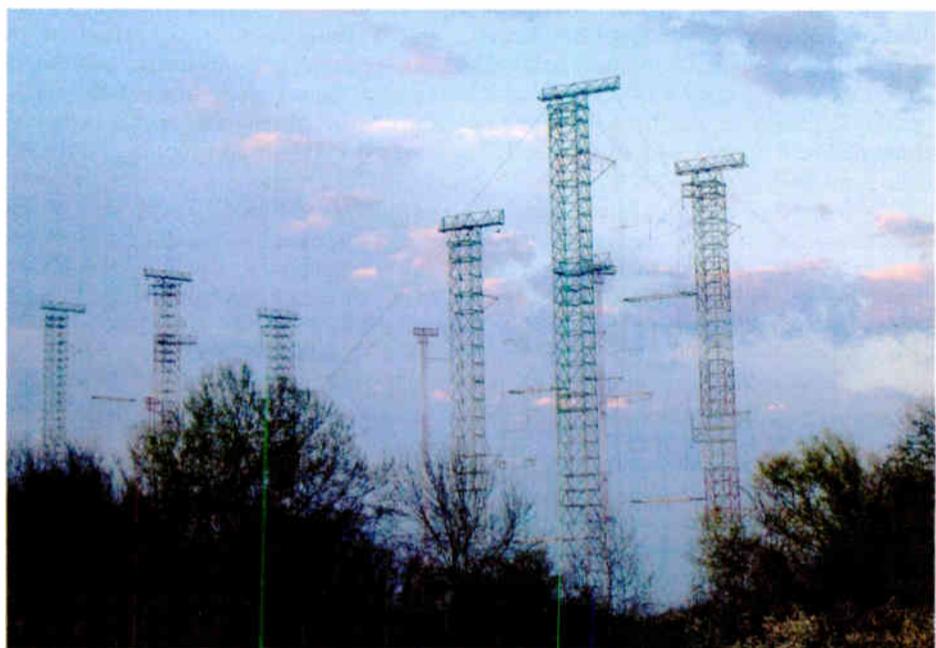
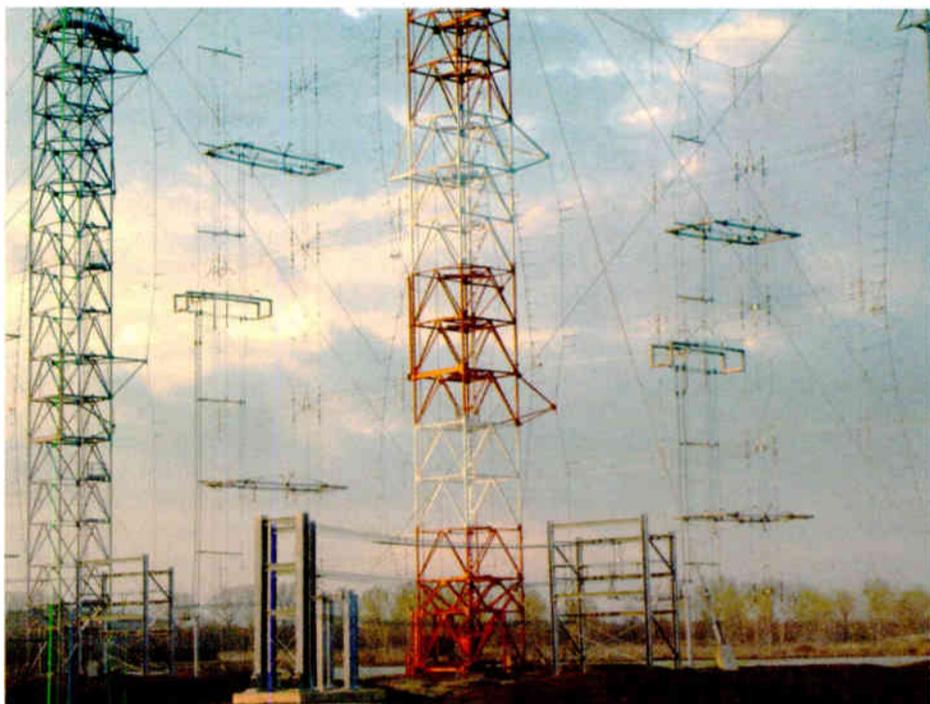
Many of these people live or travel in areas where CNN International or BBC World are not available on the local cable television system, or where

Internet access is unsatisfactory. And so they carry along their shortwave radios.

This audience can't be served by VOA if the broadcaster does not have a global English service. VOA may not be able to deliver programming to the global English-speaking community, nor to future overseas hotspots, if it has a gaping hole in its global shortwave network.

Kim Andrew Elliott, here expressing his own views, is an audience research analyst for the International Broadcasting Bureau. His Web site is kiman-drewelliott.com.

RW welcomes other points of view.



Part of the Kavala Shortwave Curtain Antenna System

sion, and to languages associated with the war on terror.

The BBG intends to close Voice of America's News Now, its global English service, along with five other language services and radio, while keeping television, in six additional languages. International Broadcasting Bureau relay stations in Greece have already shut down.

The cuts are part of the proposed fiscal 2007 budget of \$671.9 million for U.S. international broadcasting. It has not announced a specific date for the closure of VOA News Now, however it would probably happen by Oct. 1, when the new fiscal year begins.

When the power is cut

These days, international broadcasters achieve their largest audiences by placing programs on television or FM stations inside the target country. For cross-border delivery of detailed news and current affairs reports, a Web site is the most efficient means.

But in closed societies, and in more open societies when they descend into crises, these local television and FM relays are not available, and Web sites are blocked.

Some recent examples: The State Department's human rights report for Togo reported that in February 2005 "the Voice of America affiliate in the northern city of Sokode, Radio Tchaoudjo, had its power cut just before each VOA news segment.

Power was always restored 30 minutes after the scheduled start of the thrice-daily broadcasts. Togo would turn off electricity to the local FM station during the half hour it rebroadcast." In February 2006, according to Reporters Without Borders, Uganda joined the expanding list of countries blocking Web sites, the first sub-Saharan country

Signals from distant broadcasters are often heard with stronger signals than closer jamming transmitters. A shortwave broadcaster can usually overcome jamming by transmitting on as many frequencies as possible, from as many locations as possible.

For VOA, this is becoming less possible.

The United States needs the ability to deliver a strong shortwave signal into any part of the world at any time.

This is why the IBB shortwave facility at Kavala, Greece, will be missed. The site — off the air as of March 26 — was an amazing performer.

On my VOA program "Communications World," which ran from 1995 to 2002, it was not uncommon for me to be heard by listeners from New Zealand to North America, who were listening on the same Kavala frequency at the same time. Kavala is strategically located one or two ionospheric hops away from countries where domestic media are suppressed, or could be in the future.

Global shortwave coverage?

Without Kavala, or some replacement facility in the same region, VOA's global coverage is in question. The IBB is left with no major shortwave site between Morocco and Sri Lanka.

VOA's shortwave transmitters may be needed in the future for languages now most effectively served by local television and FM rebroadcasts, when those relays are taken off the air because of a crisis or a new dictator in the target country. For now, these shortwave transmitters can usefully be occupied with a global English service.

The global English-speaking community consists of the elites of virtually every country, as well as expatriates of the United States and other countries,

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◆ NEWS WATCH ◆

TSL Drop Hits Satellite Radio

GLENDAL, Calif. Radio's average time spent listening is declining due to the impact of digital music devices. Now so is listening for satellite radio, according to a study from Bridge Ratings.

According to a report that compares TSL for traditional radio, satellite radio, Internet radio and MP3 players, terrestrial radio's 12+ weekly listening has dropped from 19 hours and 15 minutes to 18:45 since the second quarter of 2005. Satellite radio, impacted as well by a multitude of entertainment options, saw its weekly TSL slip from 16 hours per week to 12:36.

"What we're beginning to see is that traditional radio is no longer isolated as the only audio medium that is competing for ears, according to Bridge Ratings President Dave Van Dyke.

News Roundup

MORE THAN 20 radio manufacturing companies based in Asia are developing HD Radio products, Ibiqity said. The list includes companies such as Kiryung Electronics, RockRidge Sound Company Ltd., Orient Power, City Electronics, OPUS Art and Technology Co. Ltd., Sangean and Jazz Hipster.

FCC CHAIRMAN Kevin Martin thanked newspapers for their coverage of Hurricane Katrina during an appearance before the Newspaper Association of America. He used the occasion to call for revision of the newspaper/broadcast cross-ownership ban. He said the media landscape has changed substantially since the rule's inception in 1975, when there were about 7,500 radio stations, compared to nearly 14,000 today.

The commission eliminated the rule in 2003 under Chairman Michael Powell, but a federal court overturned the changes and sent the matter back to the agency for revision, along with most of the other changes to the media ownership rules the FCC had voted to adopt that year. Once the commission gathers new comments on media ownership, it can decide whether to handle cross-ownership separately or to bundle it with all of the other media ownership rules, he said.

THE LONG-STANDING battle of pirate station Radio Free Brattleboro in Vermont vs. the FCC seems to be over. A federal court upheld the commission's previous decision and ruled the station can't resume broadcasting without a license; the station's attorney said an appeal is not likely. The case is unusual because the pirates won the support of the town to broadcast.

A FEDERAL COURT in New Jersey

ruled that a flea market is liable for copyright infringement for selling pirated CDs and cassettes. In a case brought by the Recording Industry Association of America, a U.S. District Court ruled in favor of music companies against the owners of the market. Damages will be determined at a later date; they could range from more than \$500,000 to \$125 million under copyright laws.

COX RADIO EVP Dick Ferguson will retire at the end of May. The 30-year

radio veteran will consult the company on acquisitions and station upgrades.

Ferguson has been with the company since April 1997, when Cox Radio acquired NewCity Communications, a company he co-founded and headed as president and chief executive officer. Previously, Ferguson was president, chief executive officer and a director of NewCity Communications, Inc. since its organization in 1986. Ferguson is a past chairman of the NAB Joint Board and a member of the Radio Operators Caucus.

Media

► Continued from page 3

But where and how these experiences should be made available to audiences is an open question.

Many conference attendees expressed the opinion that public broadcasters already have established communities of content, albeit somewhat geographically limited, and the opportunity exists now to bring these communities online and strengthen connections to users who have a natural interest in being more deeply engaged on the content of their local station, primarily through local station sites.

Equally common was the concern that this strategy recalls the original justification for developing individual station Web sites and that now, 10 years and, by one

estimate, \$50 million later, little of that early promise has been realized. Now is the time, these attendees urged, to collaborate and pool resources across stations and networks to realize the promise of the Internet through investments in common digital content and community tools.

This critical debate between proponents of more or less online collaboration across the public broadcasting system may well become the legacy of IMA 2006, with the potential to reshape how online resources are distributed and managed.

This may be just what the system needs, according to IMA Executive Director Mark Fuerst, who recently wrote, "Only with a radical change can we unleash the intense creativity and sense of ownership that so many of us felt as we were building the public radio system."

The next 10 years are off to an interesting start. ●



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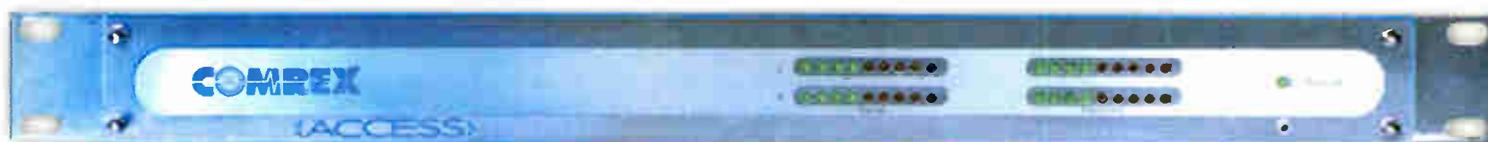


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COMREX

Radio's Command PERFORMance

More Legislation Has Been Proposed to Stop Record Industry Bleeding, But Is It the Best Solution?

by Skip Pizzi

Although we rarely acknowledge it today, the process of sound recording must have seemed almost magical when first introduced. The ability to capture and replay temporal experience was akin to the fictional time machine — yet it was real. Of course, early recordings were of low fidelity, but it hardly mattered. (If your dog started talking, no one would complain that he used poor grammar, at least not at first.)

Since those early times, myriad improvements and breakthroughs have occurred, each bringing improved fidelity and usability. This process had broad additional resonances, however, with impacts ranging from the creation of superstar recording artists to the development of royalty-collection businesses.

As the involved technologies progressed, the business side of the industry had to keep up and adapt itself to new models of distribution. Like other

such processes, new techniques are modeled on the old, just as the first fonts for Gutenberg's printing press looked like handwritten calligraphy.

What today seems like an arcane process for music royalty payments resulted from this incremental modeling, with its roots based on compensation schemes for live musical performances and sheet music sales. But it's always a challenge for business and government to keep up with the pace of technological change.

A different world

Music distribution certainly has gone through a lot of changes in the last few

The Big Picture



Photo: Gary Hayes, BBC

by Skip Pizzi

years. Unfortunately, some of the technologies used had the unintended consequence of allowing musical content to be distributed with little or no compensation flowing to the musicians and other rights holders. This has created a climate in which the music industry now acts with extreme caution in any new media licensing negotiations, while stressing the need for reliable content protection technologies in any new distribution modes.

It has also engendered a process by which the music industry is attempting to correct past lapses via litigation and enactment of new regulation and legislation.

One such legislative approach that has recently been introduced is called the Platform Equality and Remedies for Rights Holders in Music Act of 2006 — the PERFORM Act, for short — the

The proposal is aimed at curbing the abilities of new satellite radio recording devices; but if adopted, it could easily be extended to apply more broadly.

draft bill for which was proposed by Sen. Dianne Feinstein (D-Calif.).

It is aimed specifically at curbing the abilities of new satellite radio recording devices; but if adopted, it could easily (and some feel is quite likely to) be extended to apply more broadly.

The bill has three primary points:

1) Satellite radio recorders would be limited to real-time recording of complete programs or blocks of time, and could not be programmed to record only music from specific artists, albums, genres, etc.

2) The devices could not edit the recordings or otherwise selectively playback (or even change the order of) individual songs from the recordings made off the air.

3) Satellite radio operators could be required to pay additional royalties for music if recorders did not observe these restrictions — or possibly even if they did, if it could be shown that recordings were reducing sales.

See PERFORM, page 12 ►

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Code Violations Can Be Costly

by John Bisset

Dwight Morgan, CE for KOOL (FM) in Phoenix, commented on a previous topic, the cost-savings of using a shipping container for a transmitter building.

He knows of several radio tower sites that will not allow these “dumpsters” on-site. Check local regulations before you invest.

Dwight’s not a big fan of these anyway. They are narrow; further, he says they are not very safe if you put a large transmitter in them. If you lose air conditioning, the container can become a “hot box” quickly. Dwight ought to know; Phoenix gets a lot of sunshine.

His advice: Before your general manager starts counting the pennies saved, think about what you have to live with and work in before you nod your engineering head up-and-down. Good thoughts, Dwight.

As with any building (or container), have a backup ventilation plan. Look ahead for what could go wrong. Perhaps the answer is to install a pair of Bards or similar brand of wall-mount air conditioners, or a louvered exhaust fan with filtered air intake.

As for the width of the building, don’t forget to consider swing space for the doors on the transmitter and the rack; that’s easy to overlook. Designate cable runs.

You can make any building nice or sloppy; the choice is yours. Dwight Morgan can be reached at dcmorgan2@cbs.com.

★ ★ ★

For additional “container” pictures of the Alex Langer 890/1060 site, head to the following link: <http://gallery.bostonradio.org/2005-06/boston/>.

Garrett Wollman writes in with the link, which, in



Fig. 1: A container building will be as nice as you make it.

addition to the container pictures, has some great pictures of a variety of New England transmitter/studio sites.

★ ★ ★

Contract engineers come across interesting things in their travels. One engineer opened the spare tube box and was greeted by the sight in Fig. 2.

Yes, have a fresh set of spare tubes; but when was the last time you opened the box to see what was inside?

This is an especially good idea for new contract clients. What may look like boxes of new tubes may be — empty.

Protect yourself when working with a new client by taking a photo inventory. You can even charge for this.

When you first visit a site, bring along a camera and take pictures of everything: equipment in racks, condition of rack wiring, spare tubes and parts. The client can use this photo inventory for insurance purposes; and if

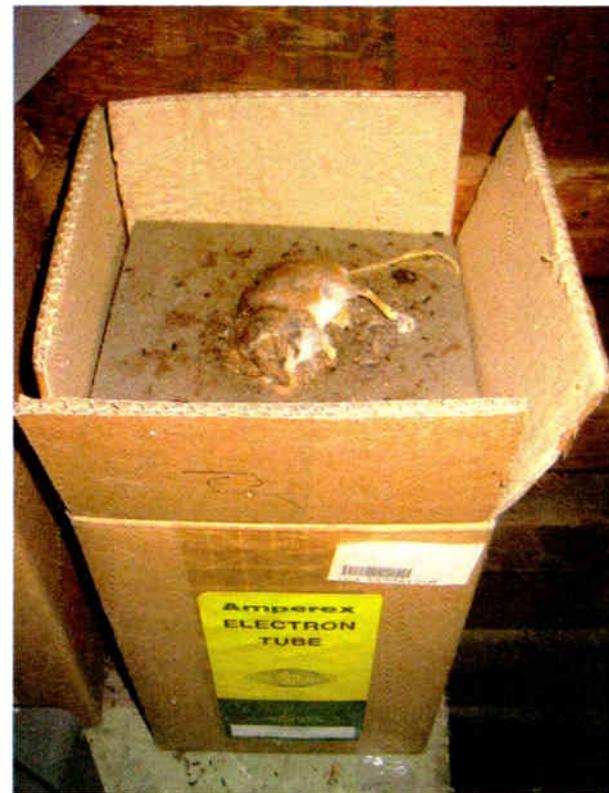


Fig. 2: If your spares have been on the shelf for a while, check 'em occasionally. Yuck!

there’s ever an issue later — missing equipment, accusations of sloppy wiring — you’ve got the picture evidence to exonerate you.

★ ★ ★

Speaking of contract engineers, we heard from one who wrote that he saw the “reset relay on the breaker” and shivered. He had seen the contraption before, using a cart machine solenoid mounted on the transmitter. (So that’s what you do with old ITC-SP cart machines!)

This engineer, who asked not to be identified, had several other FM clients at the same site, so these occasional “breaker trips” gave everyone some site time. An interesting way of looking at a problem.

However, this engineer, like others cautioned that if you install this kind of modification, be very careful, as

See BACK TO BACK, page 12 ►

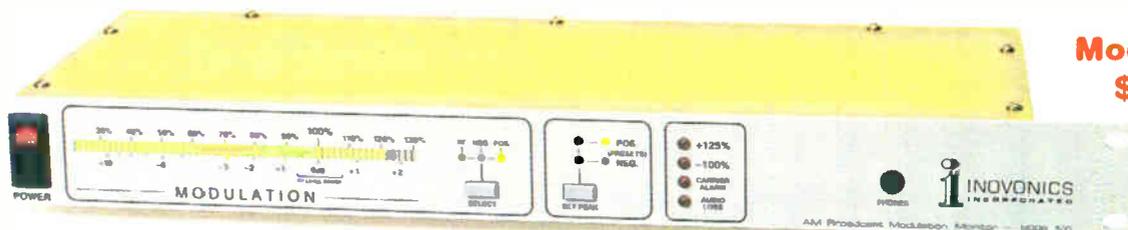
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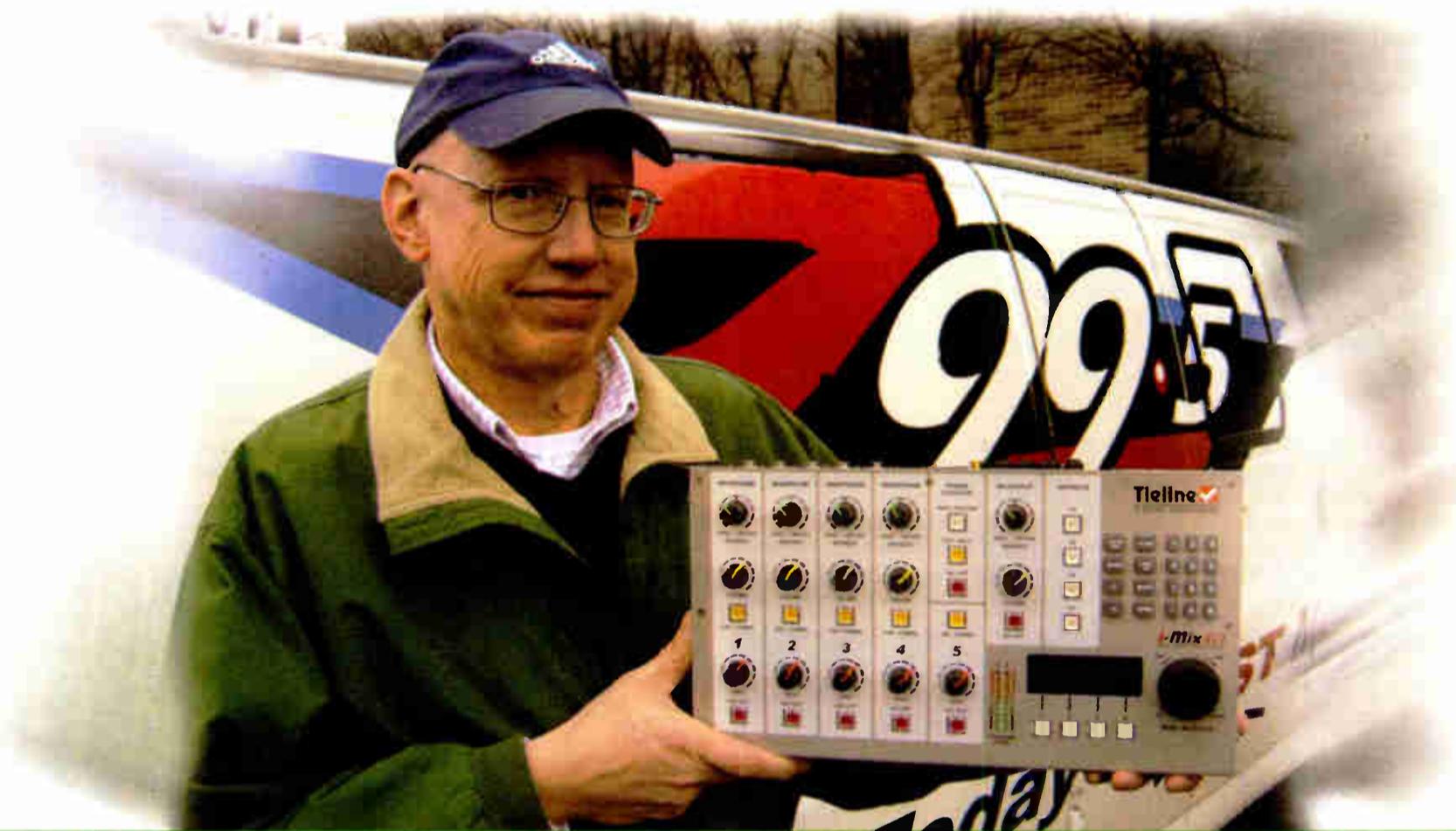


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PERFORM

► Continued from page 8

Note that unlike terrestrial radio, satellite radio already pays performance royalties to record companies for broadcasting music, so point 3 above would involve a second royalty payment to allow consumers' unrestricted recording.

Swift reaction

The Consumer Electronics Association and others have responded quickly to this draft proposal with vociferous denunciation. The CEA has made its usual points rejecting any attempt by the content industry to dictate how its members' products must be designed, and defending consumers' fair-use rights to record music freely for personal use.

These critics of the bill have also noted that recording from satellite radio — even with an advanced recording device — is not equivalent to a music download service. It is not interactive (i.e., consumers cannot "order" a particular song to be played), and the audio signal typically is subjected to additional audio processing and a higher degree of data compression than the typical music file download, so audio fidelity may be inferior to what a consumer would receive from a music

download service.

Further, CEA cites that satellite radio recording devices are still constrained devices, which do not allow songs recorded off the air to be digitally transferred to CDs or other devices. Thus the content also cannot be easily retransmitted via the Internet.

The bill would also allow royalty collection agencies to monitor satellite radio services without paying subscription fees — a small but particularly galling point to those with opposing views.

Finally, the CEA points out that the industry already is working toward private agreement on the issue, so government intervention is particularly unwelcome and unnecessary at this time. For example, Sirius recently proposed that a flat fee would be paid to record companies (to be fairly divided among them) for each sale of a receiver that included satellite radio recording capabilities. This would shift the royalty from a per-song to a per-device basis — a different but potentially workable approach, and not unlike the recorder royalties already paid by these and other consumer recorders under the Audio Home Recording Act of 1992 (AHRA), or the blank tape royalties levied in other countries.

The fact that these negotiations are now taking place with the threat of impending legislation on one of the parties provides an unfair basis for the dis-

cussion, CEA claims.

If the PERFORM Act or similar legislation is enacted, it could set a precedent that might be extended to cover future recording devices for terrestrial digital radio. This could force terrestrial radio to pay performance royalties on broadcast music — something it has never had to do.

Clearly the music industry has been burned by its experience to date in the digital distribution domain, so it is now acting with an excess of caution and a

proactive lobbying stance. This is clouding the waters of progress and innovation for broadcasters and other music distributors, and possibly chilling innovations that would otherwise be under development or on the shelves.

Naturally, the PERFORM Act is yet another item broadcasters will want to track carefully as it makes its way through the halls of Congress.

Skip Pizzi is contributing editor of Radio World.

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it could lead to cleaning up a big mess with the release of captured smoke within all of the components.

Read on for a similar opinion.

★★★

★★★

Nick Markowitz has worked as a broadcast engineer for over 25 years. He says the transmitter remote breaker reset we showed in the Feb. 1 issue is a total violation of the National Electrical Code, NFPA-70, which all stations must follow.

From the Urban Myth Department:

I've always heard about STL "beam-benders" but had never seen one. A beam-bender is a passive, "back-to-back" mounting of STL antennas to change directions of the STL path to overcome



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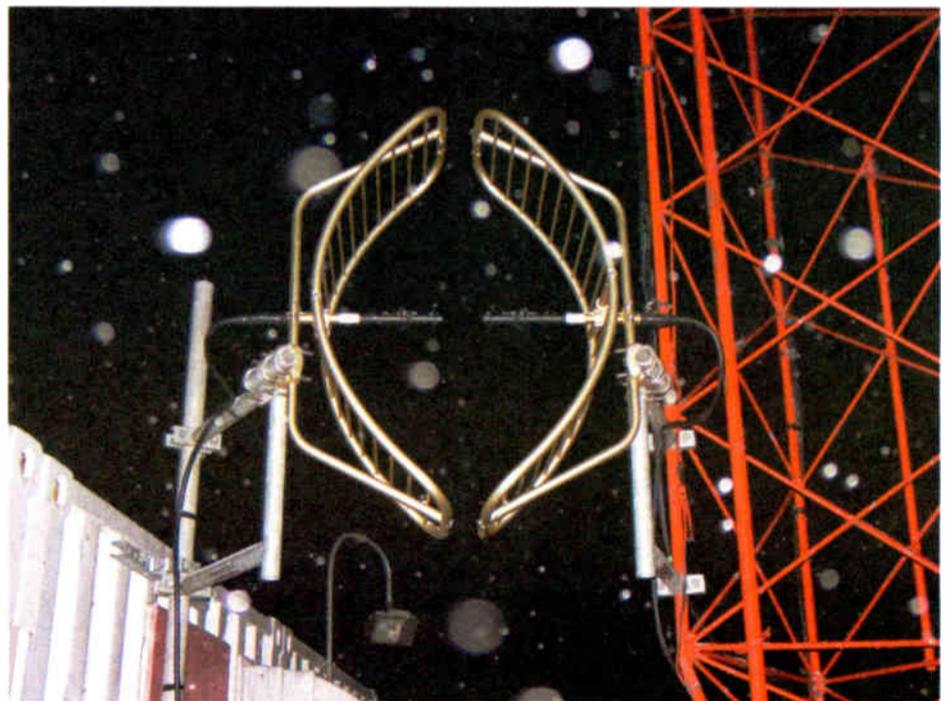


Fig. 3: A space-diversity STL isocoupler!

He said stations fail to follow this code, and many engineers do not even realize they must follow this, along with ICC.BOCA, and other codes, where appropriate.

Nick is also a fire investigator, and says that if there were a fire at a transmitter site where this contraption was present, there is a good chance the insurance carrier would deny or greatly cut back a claim payment seeing such disregard for codes.

The first question Nick sees on investigation letters is whether the site meets all applicable codes.

Also, Nick writes that the remote reset is dangerous. Although the utility companies use self-resetting breakers, they are designed for this application. Not being on-site and resetting a breaker could result in a catastrophic short circuit. Fire could easily result.

For these reasons Nick strongly discourages the use of a remote reset. No one is on site to take appropriate emergency shut down measures should the breaker stick "on" while a fault is still present.

an obstacle, usually a building.

Here's a twist. When Loud and Clean Engineer Grady Moates lost an STL isocoupler at a client's stations, he used back-to-back Scala Miniflectors to get across the base insulator of the AM tower, as shown in Fig. 3. Guess the urban myth isn't so mythological after all. Yes, that's snow in this nighttime photo.

Grady Moates can be reached at grady@loudandclean.com.

John Bisset has worked as a chief engineer and contract engineer for more than 30 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.

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“Of course we were a little skeptical — how often is the least expensive solution actually the best?

“Then we learned that Axia’s Ethernet backbone scales, like a computer network. All we’d have to do to grow is connect



more nodes and surfaces, maybe add another Ethernet switch. We didn’t have to commit to buying equipment for all of our studios at once .

“So we built one studio using Axia, and *it worked great*. Went together fast and smooth. A few



wrinkles during installation were ironed out by Axia support right away. Those guys were amazing. It was like their entire team was there to make sure I was happy.

“We liked Axia so much we installed a second studio. Then a third. Then a whole second cluster.



My colleagues are so impressed with how well Axia works, they want it in their stations, too!”

— Jorge Garza, Univision Radio, McAllen, Texas



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Product Guide



Inside

Radio World

Resource for Radio On-Air, Production and Recording

May 10, 2006

TECH TIPS

Training Helps Users Reach Potential

Hands-on Instruction at 'Supplier School' Teaches Product Operation, Features, Tips, Troubleshooting

by Tom Vernon

To install and maintain today's broadcast gear requires a level of skill that in some cases is best acquired with factory training. Several companies are addressing these needs by providing classroom instruction on their equipment. Who is offering these classes, and who is taking them?

Back to school

V-Soft Communications is a developer of software for propagation prediction, frequency searches and path profiling. It holds yearly day-and-a-half classes, which coincide with the NAB show in Las Vegas.

"Classes are highly recommended for those using our software," said Kate Michler, technical consultant for the company, "so they can get the full potential of the product."

She said the classes also are a great networking opportunity, where users with similar interests and concerns can meet face-to-face. The format of classes is hands-on instruction. Users bring their own laptops and work on projects.

Classes can be customized to meet the needs of a group with special interests. Michler said this year's session was set

up with a focus on non-commercial FM issues, including Channel 6 protection. The cost for the pre-NAB session from V-Soft is \$450, which includes meals.

Lecture and lab

Various training options are available from Prophet Systems Innovations, makers of broadcast software systems for radio content management.

Marketing Manager Diana Stokey said customers who purchase the installation option from Prophet receive basic instruction on operations and engineering from the installer. The system is easy to use, she said, but the ability to manipulate the system to create your station's image takes a little training.

Additional detailed instruction on NexGen Digital automation software is provided through its Academy training. Two tracks are offered: Master User and Engineer. The three-day course is presented in lecture and lab format. The program may be delivered on-site, but there is a shift to presentation via WebEx, where customers and trainers meet in cyberspace.

Stokey said laboratory exercises are part of the Web-based learning experience. The cost for three days of Academy training is \$1,000; users have the option

of adding a fourth day of engineering instruction for an additional fee. While the Academy focuses on NexGen Digital, Prophet can provide instruction on its other products.

Stokey said Prophet provides considerable education for its own installation and customer service personnel by holding weekly training sessions. Session topics cover installation, configuration, enhancements, hardware and troubleshooting.

Classroom format

At the Littleton, Mass., headquarters of Burk Technology, the company holds daylong training sessions on the compa-

ny's transmitter remote control systems, software and accessories. Burk says its next session is June 5. It plans at least one more spring session "because lots of people are interested," said marketing rep Nathan Burk.

General Manager Anita Russell says the response has been enthusiastic: "We limit the class size to 10 people, and so far 30 have signed up, so more sessions are being added."

The training is targeted to broadcast engineers, contractors and managers responsible for coordinating operations at transmitter plants, as well as to dealer representatives. Sessions are conducted in a classroom format with a Q&A session at the end.

Attendees receive expert knowledge of Burk's transmitter remote control

See SCHOOL, page 16 ▶



Students attending BE's AVU. From left: David Ames, CKPC; Kyle Vidrine, Regent Communications; Michael Koolidge, WRHL(AM-FM), Rochelle Broadcasting Co.; Seth Price, KUT-FM, University of Texas; and BE Customer Service Engineers Tim Terrell and Gene McAneny.



Senior Technical Instructor Doc Daugherty teaches at the on-site HD Radio class for the Cox Radio group, Orlando, Fla., in March.

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School

► Continued from page 14

systems. There is a special focus on software tools and TCP/IP connectivity to complement a station's existing control and monitoring procedures. Attendees also gain insight into new system capabilities as well as "tips and tricks" to save time and increase operating efficiency.

Russell said participants especially enjoy the one-on-one sessions at the conclusion of classes, where they can get help with specific problems or issues. The event is free, and Burk provides breakfast and lunch on the day of the training.

Get an education

Croatia-based RIZ Transmitter Co. manufactures and sells FM, MW and SW transmitters worldwide. Štefica Mahalup, a company spokeswoman, said that training is integrated into customer service, and is strongly recommended even if the customer has a familiarity with broadcast transmitters.

Several options are provided. Customers may receive factory training in Zagreb on the transmitter(s) they are purchasing, or they can elect on-site training following installation and acceptance testing any time during the guarantee period.

Factory and on-site training typically take one week for MW transmitters and two weeks for shortwave transmitters



Graduates of a recent Burk training session, from left: Brian Marshall, Vermont Public Radio; Robert Shotwell, Spectrum Investigative Services; Jeff Gerry, Clear Channel; Nathan Cherveck, New Hampshire Public Radio; Ron Baker, contract engineer; Brad Parsons, WWZN(AM) Sporting News Radio; Art Pepin, Clear Channel; Brian Edgerton, WHDH(TV); Grady Moates, Loud & Clean Broadcast Science. Not pictured: Dennis Sloatman, Cox.

where analog AM operation is planned. For MW and SW transmitters using both AM and DRM modes, RIZ recommends that customers receive an additional week of instruction.

Language options are available. Mahalup elaborates: "Training is organized and presented by a RIZ engineer who is an expert for the subject matter in English, French or German depending on the customer. All relevant documentation for training is prepared in the same language."

Sessions are divided into theory and practice, including metering/remote control, troubleshooting, repair and maintenance. The training package can be customized to meet the experiences and needs of customers.

Fundamentals

Harris Corp. provides training on its transmitter products, including the 3DX, DX and DAX lines of AM transmitters, as well as the Z, ZHD and Quest series of FM transmitters. Additional classes include RF Transmission Fundamentals 1 and 2, RF 101 and High-Definition Digital Radio.

Most of the attendees have purchased or are about to purchase Harris products. But Dave Kobe, manager of the Harris Training Department, said some courses fill a unique need.

"We see a lot of people taking the RF 101 class because there are few places you can get an education in RF fundamentals," he said. "College electronics courses tend to give more attention to digital topics at the expense of RF."

He said many "hands-on" managers take the High-Definition Digital Radio class to get an overview of HD Radio.

Most classes are conducted in the training center at Harris' Mason, Ohio,

although classes also are given at customer sites as the situation demands. Thirty-five classes are given yearly at Mason, and are scheduled so they are available twice a year.

Classes last 4-5 days and are 60 percent lecture and 40 percent laboratory instruction. Kobe said that the training center is equipped with test equipment, dummy loads and transmitters for simulation of tuning and troubleshooting situations. There is a 12-person limit to classes with labs.

Attendees receive notebooks with equipment documentation and class handouts. Costs range from \$895 for four-day classes to \$1,295 for five days of instruction.

In the Vault

Customers who purchase automation and programming systems from Broadcast Electronics may attend AudioVault University (AVU). The five-day program typically is conducted in the training center at the company's Quincy, Ill., headquarters, although options for on-site instruction are available.

Jeff Wilson, service manager for studio product, said, "Classes are limited to 12 participants, and include both classroom and hands-on experiences. The intended audience is administrative and engineering personnel."

During the final day of classes there is a Q&A session with AV software developers. AVU costs \$795, which includes a dinner at the end of the session; and a notebook with AV set-up, configuration and operation instructions along with a CD containing slideshows, help files and other instructional materials. AVU graduates and AV customers have access to a password-protected Web site with additional training and help information.

Broadcast Electronics also provides training on its transmitters and RF products, although there is no formal schedule for delivery. Classes are delivered as needed in Quincy, or at the customer's location. The company also offers day-long sessions on HD Radio technology for consulting engineers at no charge.

If your company offers a product-training program, tell readers about it. Contact us at radioworld@imasp.com.

Tom Vernon is a frequent contributor to Radio World.





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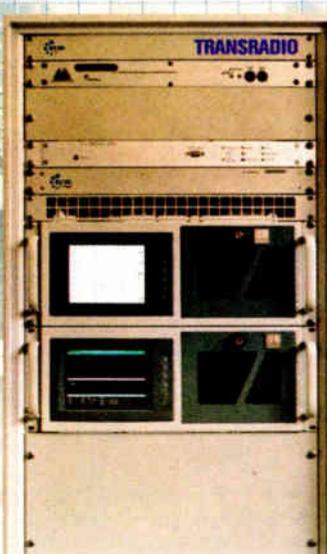
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PRODUCT GUIDE

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Audemat-Aztec says Ibiqity Digital Corp. has certified its Navigator HD FM mobile FM and HD Radio unit.

The unit integrates an HD FM receiver as well as an FM/RDS analog receiver, and measures level, time and phase alignment between the analog and the digital signals. In FM analog-only mode, the Navigator HD enables multi-station RF surveys and the monitoring of modulation, Pilot and RDS SCA injection level.

"The unit has been designed with the same concept as the Navigator 100 or the FM_MC4," said Nicolas Boulay, technical director for Audemat-Aztec. "The goal is to provide accurate ... information concerning the coverage area of the HD signals."

"The Navigator HD complements the Goldeneagle series and will help broadcasters in their HD rollout by measuring HD Radio coverage in their markets."

For more information, visit www.audemat-aztec.com.



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WWOZ Preserves Big Easy Jazz Heritage

With the Help of Louisiana Public Broadcasting, Station Is Back on the Air After Katrina's Wrath

by Ken R.

The WWOZ(FM) music library represents nothing less than an audio history of the unique roots music heritage of New Orleans. That history was almost wiped out by Hurricane Katrina.

On the morning of Aug. 29, 2005, the storm slammed into the Gulf Coast, still a monster at Category 4 strength. WWOZ, a public station in the fabled Treme section of the city, sustained a lot of water damage.

Tucked away on the second floor of the station's Armstrong Park headquarters was a rich repository of albums and CDs. Other historic 78 rpm records, DAT tapes and reel-to-reel recordings of live concerts were stored off-site. Combined, these archives represented the history of the indigenous music of the region.

"We had a 30-foot-by-30-foot section of our roof tiles blow off," said General Manager David Freedman. "The tarp held, but the whole collection was exposed to rain, so we put visquene on the roof. The city wouldn't give us a permit to re-enter New Orleans, so we had to use 'unorthodox methods' to squire our roofer into town.

"Eventually we saved our 25,000 CDs and other recordings, which now safely reside temporarily with Louisiana Public Broadcasting and in the Louisiana State Archives in the state capital of Baton Rouge." Roughly eight months after Katrina, only 60 percent of the volunteer on-air staff were back in New Orleans.

Operating in triage mode

"Our studio took on some water, but the main thing is that we had no electricity," said Freedman. "We had mold in the building, we couldn't get mail and New Orleans was like a third-world environment. All the things we took for granted weren't there."

Freedman looked to Baton Rouge, about 80 miles away, where Louisiana Public Radio provided space in their facility for a temporary studio.

At first WWOZ — a Class A station operating at 4,000 watts on 90.7 MHz — came back to life with the help of Ken Freedman, the general manager of WFMU(FM), Jersey City, a sister community radio station but no relation to David. Drawing on WFMU's MP3 files of New Orleans-based music, airchecks sent in by WWOZ fans and announcements recorded over the phone by David Freedman, "WWOZ in Exile" was on the Internet within five days of the disaster.

Soon WWOZ began to send its own local programming via satellite from Baton Rouge to the transmitter site in New Orleans. But the transmitter was perched atop a 25-story building on Canal Street that still had no power.

"That meant we had to run a very long extension cord from the roof to the generator on the ground," said Freedman. "That was dicey because every 10 days

we'd have to service it and there were no working elevators so our engineer would have to walk up 25 stories to reboot. Sometimes there were high winds so our dish got blown askew and that would knock us off the air. Meanwhile, the building was still surrounded by toxic, bacteria-laden waters."



WWOZ's David Freedman (front) and volunteer show host A.J. Rodrigue at work in the station's temporary home, provided by Louisiana Public Broadcasting.

The station engineer is Damond Jacob. Freedman said Jacob played an essential role in the station's survival.

"We had a team of engineers including one from the NPR affiliate in town, our consulting engineer Tony Guillory and a few others. We had a 'think tank.' Damond was the chairman of the think tank and brought it all together.

Antedeluvian reminder

The station broadcast in fits and starts until VoodooFest, a local music festival held at Halloween. VoodooFest was moved to Memphis after the flood but event organizer Steven Rehage opted to bring one day of the show back to New Orleans. True to its mission, come hell and high water, WWOZ was there to broadcast the event live.

"The event always takes place in New Orleans, and the producers couldn't do a for-profit in New Orleans after the hurricane; so it was mostly held in Memphis," said David Freedman. "They still decided to throw a one-day event in New Orleans.

"It was very important because things were so grim and we needed a reminder of what life used to be like before the flood," he said.

"You have to give credit to the festival organizers because it was not good for them economically to produce VoodooFest in New Orleans," Freedman said. "But it was a great morale booster."

The station had lost its remote truck in the flood, but Louisiana Public Broadcasting helped get them back on the air and the Corporation for Public Broadcasting sent them enough money to get by.

"Louisiana Public Broadcasting opened their arms to us and gave us great

support in engineering, studio space and financial help, too," said Freedman.

On Dec. 12, Freedman finally was able to move his studio back to New Orleans, though not into the original building, which remained without electricity (and still has no power as of press time). He found a temporary home in an office building in the heart of the Vieux Carre at the French Market, overlooking the Mississippi River.

WWOZ on the Air

"Regarding automation, we were using an OMT iMediaTouch," says engineer Damond Jacob of the station's current equipment situation. "We're currently not using any automation. It has been down since Katrina. We use a used Audioarts console, manufactured by Wheatstone; we use a Moseley SL9003Q Starlink STL.

"We have to replace our antenna [the station was in the process of doing so of press time]. Shively is the old one, a three-bay antenna. We're replacing it with the same and changing the transmission lines as well."

The station feeds its signal from a temporary studio via the Moseley STL to a Broadcast Electronics 6 kW transmitter.

"Our mobile studio truck has a complete 48-track digital recording studio for concerts. We use an Alesis HD system for tracking (recording), then dump to Pro Tools to edit. The original truck didn't survive the storm. It was lost and we recently acquired a new one."

a digital format may run to \$500,000," said Freedman. "So on top of rebuilding our station, keeping our operations on firm financial footing and providing community information, we have this project too."

Freedman said the flood was a wake-up call that all broadcasters should heed.

"We knew in our bones we had to digitize, but this just pushed us ahead of the rest of the country," he said. "Next time we have a hurricane we won't have to grab our entire collection. We can just grab a handful of hard drives and head out of Dodge."

The storm also forced other changes in the station.

Internet tail wags the dog

Freedman kept his Internet presence at www.wwoz.org, and that helped the station raise over \$500,000 in contributions in a recent pledge drive.

"Most radio stations have a Web site," he said. "In the future, most Web sites will have a radio station. The majority of our audience now hears us via live streaming. We are no longer a traditional community station because the New Orleans community can now be anywhere, including outside our broadcast coverage area."

While Arbitron had to skip surveys in New Orleans, Internet hits remained measurable; and they are increasing.

"Via the Internet, our 'community' listeners may now be in Brisbane, Australia or Chalmette, a town below New Orleans that was almost entirely wiped out," said Freeman. "This is a cautionary tale for Internet broadcasters. People in radio need to think about what they can provide that is unique. They should think about what community they're going to serve around the globe."

Freedman is still concerned that a large number of local musicians as well as the population at large have moved away from New Orleans forever.

"It's not just about building our community radio station," he said. "We are now faced with rebuilding the very community served by WWOZ. We have to renew, reinvent or restore the lines of cultural transmission in this city. We have to make sure New Orleans does not lose its soul." 🌐

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PRODUCT EVALUATION

WorldNet Ohio Delivers Audio Over T1

by Rich Rarey

When shopping for audio transmission equipment, the choices and selections can be pleasing and daunting all at once. We at NPR had such a selection to make recently. We needed equipment to deliver a dedicated audio program service reliably from a remote location over a T1 circuit. The equipment also needed a built-in backup scheme that it would smartly manage when (not if) the circuit failed.

APT offered us a look at its WorldNet Ohio model codec.

Heart of Ohio

APT's proprietary apt-X 4:1 compression algorithm allows the user to choose a 16-bit, 20-bit or 24-bit word resolution, and apply that resolution to an appropriate transmission bitrate from 56 kbps to 576 kbps. A nice byproduct of the lossless algorithm is a published end-to-end delay of only 5 milliseconds.

Because the Ohio presents its data at a rear-panel DB-15 connector in the X.21 Data Protocol, an external Service Unit/Channel Service Unit (DSU/CSU) is needed between the Ohio and the dedicated T1 (or fractional T1) circuit.

For most North American interface equipment, the X.21 interface is converted easily to a V.35 data interface by a simple wiring change in the cable between the Ohio and the CSU/DSU. The Ohio has analog and AES/EBU digital I/O, with simultaneous audio output on digital and analog connectors. An internal sample rate converter transparently manipulates the digital input's sample rate, as needed, to match the data network.

When trouble happens, the Ohio selectively triggers its alarm SPDT relays to show where the fault lies.

For backup of the primary circuit, the Ohio supports a single ISDN that can be ordered with an S/T interface for Europe or a U interface for North America. The ISDN rate is 128 kbps maximum, and the Ohio can be configured to dial the remote Ohio's ISDN line automatically when the T1 circuit fails. When the T1 circuit is restored and stable, the Ohio switches to it and hangs up the ISDN call.

When trouble happens, the Ohio selectively triggers its alarm SPDT relays to show where the fault lies. The fault triggers are X.21 failure, Speed Dial ISDN call failure, AutoSync failure or audio silence sense. The fifth relay is a Summary Alarm, and triggers when any of the first four alarms are triggered. A front-panel LED also indicates a Summary Alarm.

Frequently, users want to send and receive triggers between local and remote sites, and the Ohio accommodates this by repurposing its first four



alarm relays for signaling. The remote Ohio's relays are selectively closed or opened by pressing the front-panel buttons on the local Ohio unit, or more impressively, feeding a mix of up to four DC (+5 to -30 volts), or Normally Open or Normally Closed contacts into a rear-

panel DB15 connector.

In actual use, I made two evaluations: one evaluation tested a pair of Ohios on the bench, using a crossover cable to simulate the T1 connection. The second evaluation was made connected to a T1 with the remote Ohio 150 miles away. For

both evaluations we paired the Ohio codecs with an Adtran TSU ACE CSU/DSU, and plugged the T1 (or crossover cable) into the Adtran.

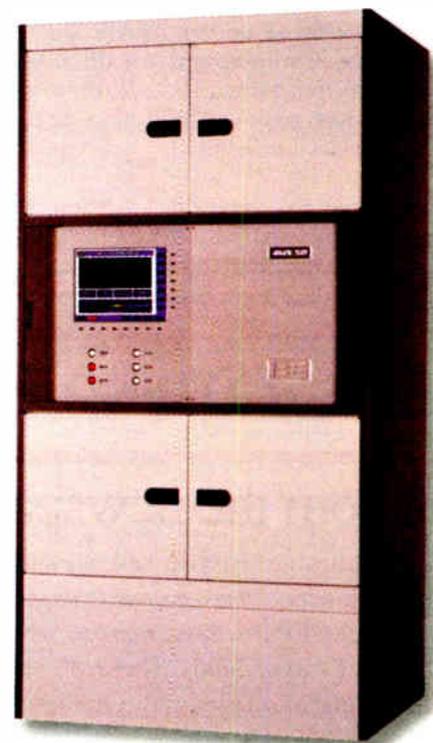
One configuration that isn't obvious, but is absolutely necessary, is configuring the CSU/DSU so the number of 64 kb channels it uses exactly matches the Ohio's Network bit-rate setting. Since this rig would be connected to a T1, I set the number of 64 kb channels to nine, and set the Ohio to 576 kbps (9 multiplied by 64,000 = 576,000), and selected Enhanced apt-X 24-bit as the coding algorithm.

If you wanted to reclaim the remaining T1 bandwidth for other uses, substitute both local and remote Adtran TSU ACEs with another CSU/DSU that had multiple V.35 ports, and plug your other equipment into those additional ports.

See OHIO, page 22 ▶

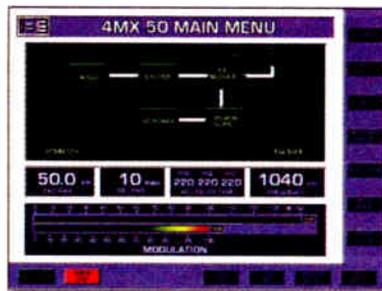


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PRODUCT EVALUATION

EV Blue Offers Stylish Cardinal, Raven

Electro-Voice, Blue Microphones Collaborate on Condensers, Dynamics for Live Sound & Studio

by Ty Ford

It's been a long time coming for these two mics.

The Cardinal and Raven are, respectively, condenser and dynamic mics under the Electro-Voice label, the result of a collaboration with Blue Microphones, which offers mics with names such as Baby Bottle, Dragonfly and Kickball.

The luxurious thumbscrews that adjust the mic angle are embossed with a combined "EV BLUE" logo. Reminiscent of the Electro-Voice RE 38 N/D dynamic body — which apparently no longer exists — or a sexed-up version of the ND 468, the Cardinal and Raven each strike a stylish pose that guarantees them visual recognition. The double swivel-mounted design helps to position the mic.

The body of the Cardinal cardioid condenser is fabricated of wood with a red finish. Both are connected to a sturdy metal yoke. Adjusting the tightness

of the swivel requires an Allen wrench. Although both mics are pretty much the same shape, the Raven has a more demure flat black metal finish.

Oddly, specifications don't seem to be available for either mic other than simplified polar patterns and frequency response graphs. As compared to a Neumann TLM 103, the Cardinal is about 6 dB less sensitive than the TLM 103 and exhibits more self-noise. That's not difficult to believe given the Cardinal diaphragm is about a half-inch in diameter vs. the Neumann's one-inch. The Cardinal is not as bright, but sounds a bit thicker. The Audio-Technica AT2020 is brighter than both and about 4 dB less sensitive than the TLM 103. Without its foam pop filter, it sounds more aggressive.

The Cardinal starts showing proximity effect at about 1-1/2 from the grille. Although there is a foam pop filter behind the triple layer, metal wind-screen, that's not enough to prevent popping when a voice cozies up to the

mic to take advantage of the proximity effect. Perhaps an additional screen mounted inside the spacious headgrille would prevent the need for an additional exterior pop screen. After all, it's a handsome mic. Why obstruct the view?



EV Blue Cardinal

The Cardinal's sensitivity falls off more rapidly with distance than the TLM 103, which may make it a better choice in a noisier environment. It's also quite good at rejecting sounds from the side and rear. The TLM 103 has a wider pattern.

The dynamic Raven also loses sensitivity quickly with distance and has a tighter pattern similar to the Cardinal. Being a dynamic mic, the Raven is less sensitive than the Cardinal. It's also not as aggressive as the Cardinal although it is tweaked for a rising frequency response between 1 kHz and 15 kHz. The Raven has similar popping issues. There appears to be plenty of room under the headgrille to add another pop screen above what looks like a one-inch diaphragm.

Product Capsule:
EV Blue Cardinal and Raven Broadcast Mics

Thumbs Up

- ✓ Unusual, stylish look
- ✓ Small package doesn't block copy or weigh down boom

Thumbs Down

- ✓ Some popping issues
- ✓ Cardinal shows proximity effect at 1-1/2 inches from grille

PRICE: Cardinal \$269; Raven \$199

CONTACT: Telex Communications in Minnesota at (952) 884-4051 or visit www.electrovoice.com.



EV Blue Raven

copy stand, or put a lot of weight on the boom. Because of their unusual look and because they don't obstruct the view of the vocalist, you may also see them pop up in music videos as vocal mics. If that happens with anyone even semi-

The double swivel-mounted design helps to position the mic.

As compared to an EV RE 27 N/D, the Raven is less aggressive. If you think the RE 27 N/D sounds too processed, you might like the more neutral sound of the Raven. The RE 27 N/D was much more pop-resistant. Both the Raven and RE 27 N/D are similarly sensitive, but much less sensitive than the condenser mics. I would like to have tossed a Shure SM7 into the comparison, but one was not available.

One of the benefits of both the Cardinal and Raven is that their small package doesn't get in the way of the

famous, you'll probably see a run on these mics.

If you'd like to hear a comparison, there are WAV and MP3 files of the mics in a folder called EV Mic Clips in my Articles Archive at www.tyford.com. I recorded the mics without changing gain on the preamp so as to allow their different sensitivities to be more obvious. No pop filters, EQ or processing was used.

Ty Ford has been a Radio World contributor since 1986. Reach him at www.tyford.com.

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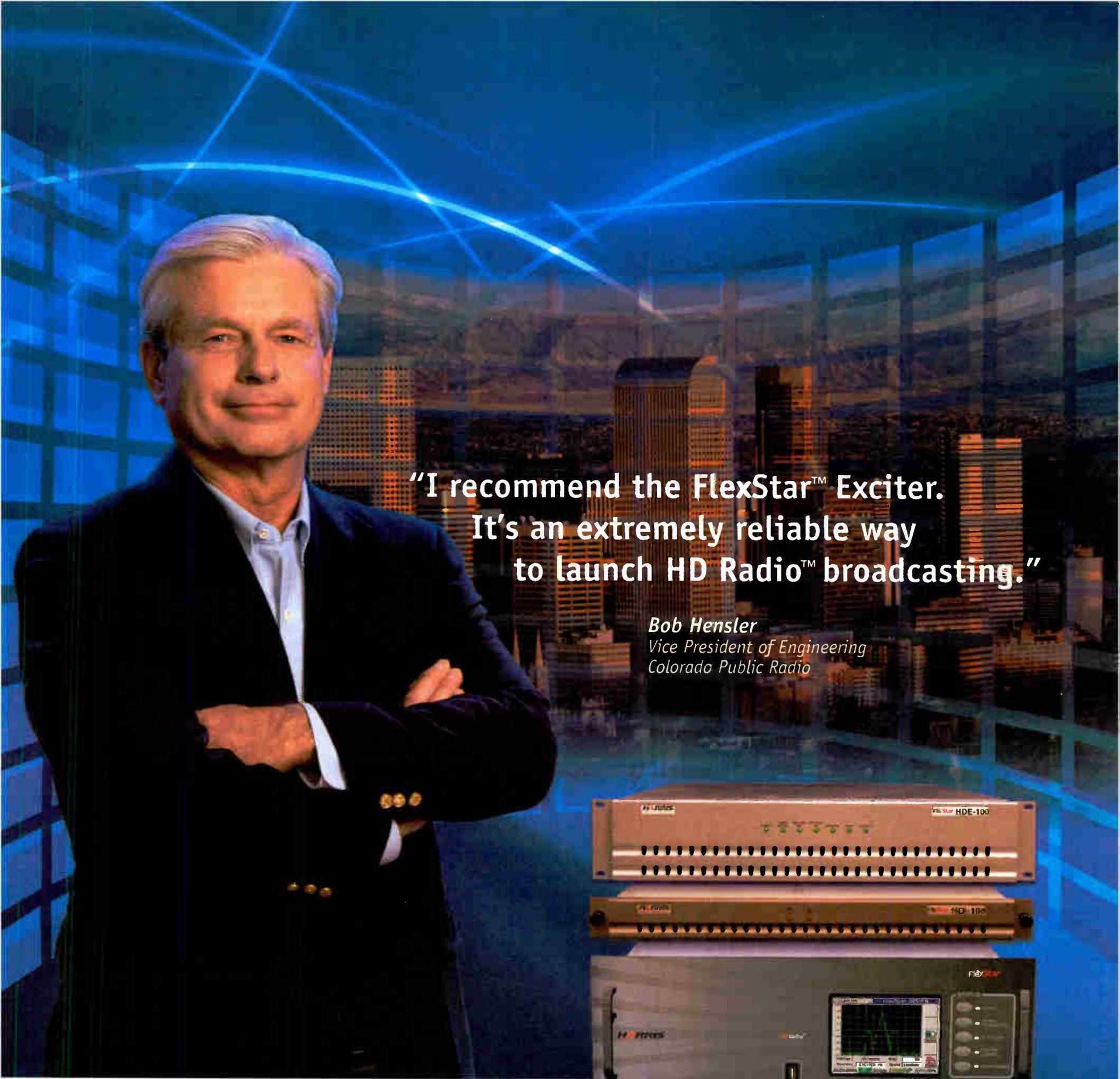
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Ohio

► Continued from page 19

On the bench, I configured the remote Ohio to the following:

- Slave Ohio (WXPN) MENU.AUDIO.Algorithm set to Eapt-X24
- Slave AUDIO.X21 NETWORK SETUP rate is 576 kbps 20 kHz Stereo
- Slave MENU.USER.Audio Mode is Stereo
- Slave MENU.USER.Unit Mode is Codec-EXT.X21
- Slave MENU.USER.Unit Mode.X21 NETWORK SETUP rate (again) is 576 kbps 20 kHz Stereo
- X21 BACKUP MODE is Slave

I configured the local Ohio similarly:

- Master Ohio (NPR Master Control) MENU.AUDIO.Algorithm set to Eapt-X24
- Master MENU.USER.Unit Mode is Codec-EXT.X21
- Master MENU.USER.Unit Mode.X21 NETWORK SETUP rate is 576 kbps 20 kHz Stereo
- X21 BACKUP MODE is Master
- The phone directory entry 0 is selected.
- I programmed entry 0 with the remote ISDN numbers and ensured it had the following properties:
 - Name: WXPN
 - Speed: 64 kbps
 - Eapt-X24
 - Stereo

- 1) (first remote ISDN number here)
- 2) (second remote ISDN number here)
- Master MENU.USER.SD Redial = 5

The Algorithm settings for the ISDN backup may appear nonsensical, as Eapt-X24 cannot be carried on a 128 kbps ISDN circuit. But the settings, taken from the Operation Manual, are correct; the Ohio automatically drops to 16-bit Enhanced apt-X on ISDN calls.

Other settings pertain to the ISDN line itself, configuring the SPIDS and Local Dial Numbers and the number of tries the Ohio will make to connect to the remote Ohio (can be set from "none" to "infinite" number of tries). I set the auxiliary data rate to 9600 bps, even though I didn't need to send text between the two Ohios.

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Product Capsule:

APT WorldNet Ohio Codec

Thumbs Up

- ✓ The apt-X algorithm uses low data compression, high quality
- ✓ Quickly responds to circuit outage by ISDN backup
- ✓ Comprehensive set of alarms, including silence sense
- ✓ Hangs up ISDN lines when transmission circuit is stable
- ✓ 1 RU; easy-to-read display

Thumbs Down

- ✓ Glitch as Ohio transitioned from ISDN to T1

PRICE: \$4,925

CONTACT: Audio Processing Technology in New Jersey at (800) 955-APTX (2789) or visit www.aptx.com.

I also set the internal silence sensor threshold to -48 dBFs on a 10-second delay. This threshold is front-panel programmable for levels between -48 dBFs and -24 dBFs, and time-before-alarm settable between 4 and 99 seconds.

After those button presses, the units framed and audio flowed between the codecs.

Full fidelity

The bench evaluation worked well, so we shipped one Ohio and Adtran TSU to the remote site and plugged it into the T1 circuit. Almost instantly, the units framed and audio flowed.

I was curious: how quickly could the ISDN backup work? I unplugged the T1 from the Adtran and watched the Ohio's red LED Summary Alarm light and heard the audio mute without glitch. The easy-to-read LCD display flashed X.21 circuit alarm text and showed rapid dialing of the ISDN line. Within 20 seconds the Ohios had sensed an X.21 failure, called the remote Ohio and framed at 128 kbps, and again audio flowed.

A nice feature of APT products in general is the speedy dialing of ISDN numbers. When two ISDN "B" channels can be made to dial long-distance numbers within milliseconds of each other, there's more chance the telephone network will route the calls similarly, so the two "B" channels won't have timing problems associated with physically routing one "B" channel call through, say, Athens, Ohio and the other call through Columbus, Ohio.

When I plugged the T1 back into the Adtran, the Ohio sensed the circuit had returned but wisely waited 20 seconds to be sure. When the delay timed out, there was a momentary silence and the full-fidelity audio — up to 20 kHz — flowed again.

Make no mistake; the apt-X algorithm sounds best at higher bit rates; the stereo audio bandwidth at 128 kbps is only 7 kHz. Although the 128-kbps mono bandwidth is 15 kHz, I heard a noticeable glitch as the Ohio transitioned from ISDN (audio set to mono) to T1 (audio set to stereo).

APT says this is a function of using low-delay coding technology; the company can insert a buffer to overcome this if the broadcaster can withstand a delay of 50 mS.

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

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PRODUCT EVALUATION

Brauner Phantom AE Is 'Sonically Pure'

by Doug McLeod

Some of broadcasting's most revered microphones got that way because of their unique characters. Clean-eared enthusiasts can tell right away whether they're listening to an RCA 44 or a Sennheiser 421. Some microphones actually change character depending upon how they're used. A crisp-sounding dynamic can become a boom box when used close-up. An intelligent-sounding cardioid can become an ignoramus when the sound wanders out of its sweet spot.

But, really, wouldn't you rather tell the mic how to sound rather than the other way around?

To make that happen, you need a microphone that reproduces sound with complete honesty and clarity. Then you have options.

It's fair to say that the Brauner Phantom Anniversary Edition does not have a "signature" sound, per se. That is one of its great strengths. With a mic that reproduces so much of what it hears so clearly, you have options that the so-called "signature" sounds cannot give you.

Dick Brauner began handcrafting microphones in Germany in the early 1990s and established a reputation for creating extremely low-noise tube mics.

In honor of its 10th anniversary Brauner Microphones produced a limited edition version of its flag-waver, the Phantom. If you get your hands on one, you're in elite company. There are only a thousand of them in the world. The one I was sent for review carried serial number 241.

The gold-lettered, black-bodied, silver-grilled Phantom begs to be shown



off. It looks great just hanging from a boom. Even the accessories are cool: a ribbed silver aluminum case that could have been crafted from a streamlined passenger train car and the company's newly-developed VOVOX "sound conductor" cable.

Every Phantom includes a certificate of authenticity signed by company founder Dick Brauner.

The Anniversary Edition is the "C" (cardioid) version of the production Phantom, which, in its regular version, is also manufactured in a "V" (variable) version with three switchable coverage patterns.

'Giving space to the sound'

While the aesthetics of the Phantom Anniversary Edition are appealing, it's the innards that matter.

The capsule is based on the VM1, which was the capsule that started the Brauner microphone line. Dick Brauner designed and built the first VM1 capsule for himself before he was even in the microphone manufacturing business. The company calls it "the only real further development in German capsule designs."

The impedance converter is identical to the high-performance converter developed for Brauner's ASM5 adjustable surround microphone system. The company says it searched worldwide for half a year before finding a suitable FET transistor, which it discovered in RF satellite transmission technology. The upshot: claimed specs of 9 dBA equivalent noise, an 85 dB S/N ratio and frequency range of 20 Hz to 22 kHz.

So how does it work? Depends on

If you want the sound exactly as picked up, you can leave it alone. If you want it colored in some way, you can do that with processing, never having to fight a particular mic's 'sound' to get what you want.

what you want to do with it. Placed correctly (the company is particular about this, even hosting a series of Microphone Placement Seminars at the 2004 AES Convention in San Francisco), these mics are designed to reproduce sound with great accuracy, even purity. Brauner calls this "giving space to the sound."

If I were a music-recording engineer I would love to try a few Phantoms with a symphony orchestra. As anyone who has ever recorded live music knows, you can put \$30,000 worth of microphones in front of musicians and have them sound appalling, or two and have them sound sensational. Depends on the positioning — and the mics.

Of course, one of the wonderful things about a pure-sounding condenser like the Phantom is that if you want the sound exactly as picked up, you can leave it alone. If you want it colored in some way, you can do that with processing, never having to fight a particular mic's "sound" to get what you want.

I am by trade (or affliction) an announcer, however, so I tested the

Product Capsule:
Brauner Phantom
Anniversary Edition

Thumbs Up

- ✓ Quiet, pure sound reproduction
- ✓ Quality engineering, handcrafted manufacture
- ✓ Reproduces wide range of sound without "coloring"
- ✓ Elegant Anniversary Edition design

Thumbs Down

- ✓ No wind or pop protection
- ✓ Shock mount doesn't shield from handling noise

PRICE: \$1,500 MSRP

CONTACT: SEA Distribution representative
Neil Ziesing of Group 55 Technology
Consulting at zeising@earthlink.net.

Phantom Anniversary Edition in my world. I found it to be crisp, accurate — and lively. By that I mean that in a restricted environment such as a voiceover booth or radio studio you have to be careful how you use it. Again, it's a matter of placement.

The ultimate question for radio users is, will the Phantom be useful in everyday applications? I doubt it. If I were recording a symphony orchestra, this would be a go-to- mic. Its specs are world-class but also are overkill for most radio needs. Also, the need for careful placement and the susceptibility to handling noise make it way too sensitive for use in any control room or production studio I've ever worked in. The Anniversary Phantom C's MSRP of \$1,500 puts it way out of reach for most

radio users, too.

Would I buy the Phantom Anniversary Edition for myself? Cash flow notwithstanding, yes. I haven't heard a quieter, more sonically pure, more elegantly engineered microphone.

Would I use it as my every day mike? Good question. I have other mics for routine voice work. Brauner's Phantom requires special consideration in placement and usage so perhaps it is not a voiceover workhorse. But it would be terrific to have a mic of this quality to call on for that special project. Besides, the Phantom was made for grand things and until I need it for those projects, I wouldn't mind just looking at it.

The Brauner Phantom AE is available until the end of this year. Distribution for the U.S. will be handled by SEA Distribution in Germany, which is setting up a distribution network in the U.S.

Doug McLeod is the TV play-by-play voice of the NHL Colorado Avalanche. He also voices local, regional and national commercials in his studios in Boulder, Colo., and Scottsdale, Ariz.

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World Radio History

Receptor Gets Another Antenna

Early NPR Labs Data Favor Passive HD-R Receiver Antennas

by Leslie Stimson

WASHINGTON Folded FM dipoles are among the passive antenna types suitable for optimal reception of the digital signal with the Boston Acoustics Receptor Radio HD.

That's the conclusion of early test results from NPR Labs personnel, who are conducting coverage and signal strength tests of antennas for use with that radio.

NPR Labs focused on that model because it's the only lower-priced tabletop HD Radio available. Also, the network has helped member stations purchase quantities of that receiver at favorable rates; and it wants consumers to have a good experience with their HD-R radios, said John Kean, head of Labs Measurements and Research for NPR Labs.

"Because of the cliff effect of digital, we did hear comments from some stations and listeners through stations that couldn't get the FM to work on HD," he said. NPR Labs is the networks' research arm providing data to public radio stations.

'Rat tail'

Meanwhile, Boston Acoustics in April addressed complaints in that area. The receiver maker told Radio World it would begin packaging a second FM antenna, a stronger conventional dipole, with its units to improve reception, especially in fringe areas.

Prior purchasers can contact the supplier to request the antenna at no cost.

The Receptor experience is being watched closely by an industry eager to know how HD Radio will be perceived by consumers.

Receptor Radio HD models will have the additional antenna included, so the

units now will come with four: an internal AM, an external AM, the pre-attached short wire or so-called "rat-tail" FM antenna and the new FM dipole. Radio professionals and consumers can call (978) 538-5000 and ask for parts and ser-

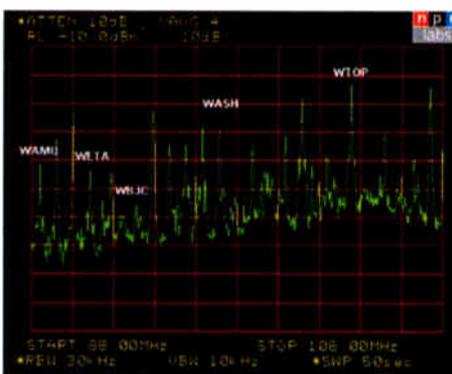
vice to obtain an antenna for a radio they purchased earlier, said Boston Acoustics spokeswoman Colleen Cronin.



think the dipole is ugly." For that reason, most consumers don't fully stretch out the dipole but leave it in a clump on the floor, he said, which argued against including such an antenna. Also, he said, the product performed well in field-testing with the rat-tail antenna.

The new FM dipole included with the radio "is very thin," said Cowan

BA still leaves the rat-tail antenna



Spectrum plots from NPR Labs show an example of the performance difference between a 75-ohm folded dipole antenna, left, and an active FM-only antenna.

Several engineers had complained to the company and grumbled in online technical postings that the original 18-inch, single-wire FM antenna did a poor job of detecting digital signal in fringe areas. These engineers generally commented that BA had made a good radio but supplied an inexpensive antenna.

To that criticism, Jeff Cowan, director of training and product support said, "The decision to include that antenna was not driven by cost," but rather by determining whether the product met performance criteria with the least intrusive antenna.

"T-shaped wires end up not being used in many homes," Cowan said. "People

attached to units it ships; it thinks most consumers will continue to use that antenna. The company is including the FM dipole in the receiver packaging and had it manufactured to fit the 75-ohm connector on the back of the Receptor HD, so it wouldn't require a big connector. Most dipoles are built to fit a larger, 300-ohm connector, Cowan said.

Cowan said BA has gone to "considerable expense" to make the antennas available and compatible with smaller connectors.

But, he said, most consumers are happy with the product and demand is high, and the majority of complaints seemed to come from radio industry professionals listening in offices with steel construction, he said. BA had field-tested the Receptor

HD in homes with wood construction.

One commercial radio group engineer commented to Radio World, "The BA Radio sensitivity is an issue, and it's not just in commercial buildings, although those are probably worst-case. A table radio lives a tough life and generally has a non-optimum antenna; most analog FM sets use the power cord."

The table on which a radio sits is "almost always inside a structure of some sort that nicely attenuates the signal before the poor receiver even gets to sample it," said the engineer, who added, "Obviously that attenuation is worse in a commercial structure, which generally offers a lot more signal attenuation than, for instance, a typical house." He said the new antenna likely would improve the digital reception.

Cowan said digital radio's lower signal strength, 20 dB below analog, is probably a factor as well.

NPR Labs said that, in some cases, analog reception of hybrid stations has been adequate but HD Radio reception has dropped in and out or been nonexistent.

'Learning curve'

Some engineers also had complained privately to Radio World that they had to supply stronger antennas for the use of station employees. Whether consumers would go to the trouble of buying additional antennas to support this model has raised concern among the engineering community, who worried about an early negative consumer reaction to the digital radio experience.

Industry observers told Radio World they were glad Boston Acoustics made the change.

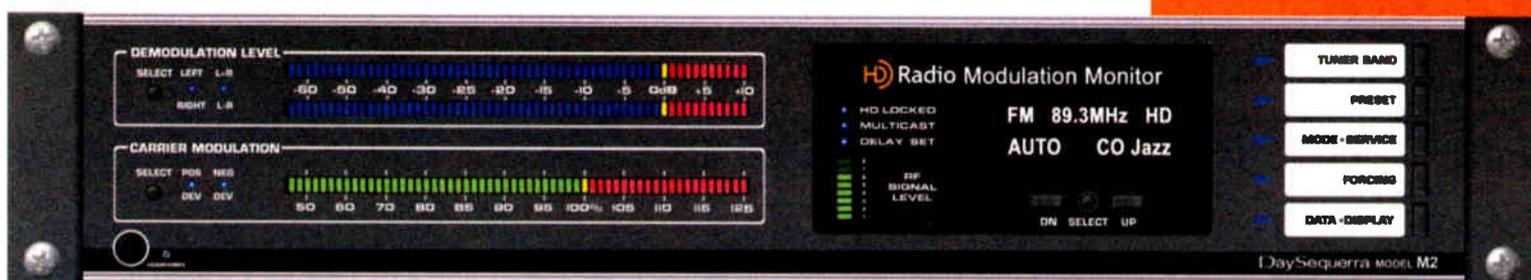
Mike Bergman, vice president, New Digital Technologies, Kenwood USA, said there's extra scrutiny from early adopters and industry professionals on Boston Acoustics because it developed the first HD tabletop model.

Although, he added, "The early adopters tend to be more forgiving than the

See RECEPTER, page 28 ▶

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Radio World's HD Radio™ Scoreboard

The HD Radio Scoreboard is compiled by Radio World using information supplied by iBiquity Digital Corp. and other sources. The data shown reflect best information as of April 5. This page is sponsored by Broadcast Electronics. HD Radio is a trademark of iBiquity Digital Corp.

HD RADIO AT UNIVISION

Station	Freq.	Format	Market	On Air
KINV(FM)	107.7	Span/Mexcn	Austin	Yes
WRT0(AM)	1200	Spn/Tlk/Nws	Chicago	Yes
W0J0(FM)	105.1	Span/Mexcn	Chicago	Yes
KFLC(AM)	1270	Spn/Nws/Spt	Dallas-Ft. Worth	No
KESS(FM)	107.9	Span/Mexcn	Dallas-Ft. Worth	Yes
KLLE(FM)	107.9	SpA/Reg/HHp	Fresno	No
KPTY(FM)	104.9	Hip Hop	Houston-Galveston	Yes
KTNQ(AM)	1020	Spn/Nws/Tlk	Los Angeles	Yes
KSCA(FM)	101.9	Span/Mexcn	Los Angeles	No
KLVE(FM)	107.5	Span/AC	Los Angeles	Yes
WRT0(FM)	98.3	SpnAC/Trpcl	Miami	Yes
WQBA(AM)	1140	Spn/Nws/Tlk	Miami	Yes
WAMR(FM)	107.5	Span/AdCHR	Miami	Yes
KSQJ(FM)	99.1	Span/Mexcn	Monterey	Yes
WZAA(FM)	92.7	Reggaeton	Nassau-Suffolk	Yes
WCAA(FM)	105.9	SpnAC/Rhymc	New York	Yes
WADO(AM)	1280	Spn/Nws/Spt	New York	Yes
KQMR(FM)	100.3	Span/Oldes	Phoenix	Yes
KXTN(FM)	107.5	Tejano	San Antonio	No
KBBT(FM)	98.5	HpHop/RhyB1	San Antonio	No
KVVZ(FM)	100.7	SpnAC/Rhymc	San Francisco	No
KVVF(FM)	105.7	SpnAC/Rhymc	San Jose	Yes
KLOK(AM)	1170	Span/Trpcl	San Jose	No

The HD Radio Bottom Line

Total Licensed

On the Air

1,240

760

Last Month

Total Licensed

On the Air

1,218

740

Market Penetration United States

13,660 AM & FM Stations
(excludes LPFMs)

Number of
FM Stations
Multicasting:

214



Licensed by Ibiqity and on the air

Licensed by Ibiqity and not on the air

Recepter

► Continued from page 26 mainstream consumer. The professionals know way too much to let anything go."

He applauded the company for including the extra antenna.

"People don't realize how difficult and expensive it is to step up to the plate like this. I suspect the early adopters of a technology like HD Radio may be more willing to go the extra step to install a dipole antenna."

NPR, like other broadcasters, had purchased a large number of units, and a BA spokeswoman said, "there has been a lot of dialogue between NPR and BA" on this topic.

"There's been a learning curve for all involved with this new format, including broadcasters and Ibiquity, which provided

Meanwhile, NPR Labs conducted test results from five Washington/Baltimore-area stations and continues to gather data to support NPR's HD-R receiver certification process. It hopes to issue a report later this year.

NPR Labs has been testing the Kenwood, JVC and Panasonic aftermarket car radios for performance. It's also planning to test the DaySequerra HD Broadcast Reference tuner and the Belar HD-R monitor later this year.

Initial results were released in a field service bulletin "IBOC Field Service Bulletin No. 02," intended to help stations and consumers choose antennas that are effective in improving reception. The bulletin is available on the NPR Labs Web site www.nprlabs.org under the Field Service Bulletins tab.

NPR Labs obtained several amplified and passive FM receive antennas to evaluate performance with HD Radio signals on

Several engineers had complained to the company and grumbled in online technical postings that the original 18-inch, single-wire FM antenna did a poor job of detecting digital signal in fringe areas.

the specs Boston used to develop the radio," said Cronin.

Mike Starling, NPR's chief technology officer and head of NPR Labs, said of the certification test results, "The Boston Acoustics Recepter HD measures at NPR Labs as having very good inherent FM HD sensitivity, but it's no surprise that the short supplied antenna does not perform as well as other separate antennas in challenging indoor locations.

Testing

"There has been some suggestion that amplified antennas work better in such locations, but our NPR Labs measurements show the best results come when using relatively inexpensive passive antennas where needed."

the Recepter HD: Folded dipole, compact amplified FM-only antenna, compact amplified FM/AM antenna and rabbit-ear FM antenna.

"Preliminary testing shows a clear advantage to passive antennas, such as folded dipole and rabbit-ear types, over low-cost active antennas," states NPR in the bulletin.

The five FM stations used in the tests are WAMU 88.5 MHz, Washington; WETA 90.9 MHz Washington, transmitting from its Arlington Va. transmitter; WBJC 91.5 MHz Baltimore; WASH 97.1 MHz Washington and WTOP 103.5 MHz Washington.

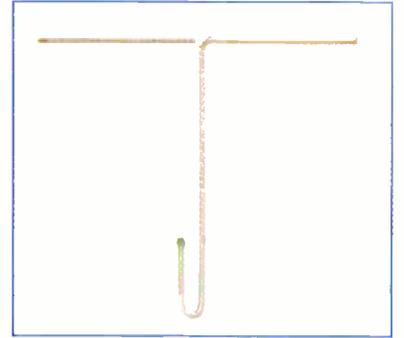
WAMU, WETA and WBJC are non-commercial stations while Clear Channel Radio owns WASH and Bonneville

More Antennas

Suggested passive antennas NPR Labs found to perform well with the Boston Acoustics Recepter HD:

FM Reflect Antenna (shown)
C. Crane
\$24.95

Budget TV Antenna Model 151874
Radio Shack
\$9.99



International owns WTOP.

The spectrum plots that accompany this article (page 26) show an example of the performance difference between a 75-ohm folded dipole antenna and an active FM-only antenna. These figures show the spectrum measured from 88 to 108 MHz at the NPR's Washington headquarters. The antennas were placed on a large empty nonconductive cardboard box approximately 5 feet from a north-facing, fifth-floor window.

"The spectrum of the folded dipole shows most FM station signals ranging between 30 dBm and 50 dBm (measured with a 50-ohm spectrum analyzer input). WBJC, a Baltimore station, is shown at approximately 69 dBm," states NPR Labs in the bulletin. "The noise floor, which is a combination of analyzer internal noise and low-level FM signals, is below 90 dBm."

NPR Labs goes on to state in the bulletin: "The gain control of the active FM-only antenna was adjusted so that the level of FM signals near the middle of the band were approximately equal to the levels measured with the folded dipole. This occurred at a rotation about 1/3 clockwise from minimum. It is apparent that gain of the antenna unit is not flat across the band. The reserved band

(88–92 MHz) stations are at least 10 dB lower with the active antenna.

"The WTOP signal is approximately 20 dB higher than it was with the folded dipole. However, this signal increase is accompanied by a noise floor increase of nearly 30 dB so the net signal-to-noise ratio is decreased by approximately 10 dB. The signal-to-noise ratio for the reserved band stations is even worse; note that weak WBJC is almost lost in the noise."

This performance was typical of other amplified antennas tested that sell for under \$70, according to NPR Labs, which also notes, "The source of noise in amplified FM antennas is likely to be third-order and fifth-order intermodulation products generated by the internal amplifier. Adjustment of the gain control lower will reduce the IM product levels, but also reduces the signal levels below that of the sample dipole antenna."

NPR purchased a number of Recepters for its member stations and Starling noted the buy was "fully subscribed in just a few days last November." Since then, the network has received requests from a number of stations looking for more receivers as soon as they can get them, he added.

DIGITAL ROUNDUP

A CPB DEADLINE for public broadcasters to apply for the latest round of digital conversion grants is May 26. CPB approved \$13 million to fund the fiscal 2006 Digital Radio Conversion fund and hopes to announce recipients in summer. A qualified licensee may apply for up to \$75,000 per transmitter converted, up to 70 percent of the total eligible digital conversion cost. Minority and rural rules differ slightly. To date, CPB has distributed nearly \$33 million to 457 radio stations for IBOC equipment.

BROADCAST ELECTRONICS installed an HD Radio system for a public radio network targeting mass transit commuters in Bangkok, Thailand. Radio of Thailand authorized the system as the country's first introduction to HD Radio, the supplier said.

Separately, BE said it installed an FM HD Radio system on an independent station in Paris — the first station operating a full-time IBOC system in France, the supplier believes. Towercast, in partnership with broadcast syndicate SIRT1 and NRJ Group, began broadcasting using a BE low-powered transmission system.

SCMS is holding a digital engineering conference June 1 in Charlotte, N.C. Multicasting is one of the topics to be discussed. Several suppliers will take part and Broadcast Electronics plans an educational HD Radio seminar as part of the event. Bus tours of non-commercial WFAE(FM), which is broadcasting two supplemental channels in addition to its main digital channel, are part of the conference.

The conference is free to broadcasters. For info: e-mail scmsconference@laurenorignals.com

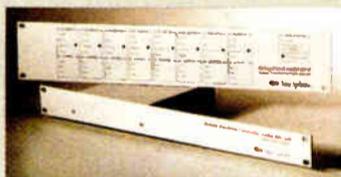
HD2 BASEBALL is on a CBS station in Los Angeles. The Dodgers, already heard on KFWB(AM), can also be heard on "Free 2 HD," the multicast station of KLSX(FM). Since 2003, KFWB has been the flagship of the Dodgers and Hall of Fame Broadcaster Vin Scully on the radio.

RAB has revised its HD Radio White Paper, written for non-techies who know little about the topic. The three-sheet paper is a quick read meant to get a potential advertiser, for example, up to speed quickly about IBOC. This is the RAB's second update to the RAB Radio White Paper, which the organization says is a "clear indication of how quickly radio is moving into the digital space."

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Stores

► Continued from page 1

CIRCUIT CITY Stevens Creek, Santa Clara

Car Stereo: I found one Fujitsu Eclipse unit "HD Ready," without the HD module available; the salesperson informed me to check back in May. The individual did not know what the module looked like or that it was even a module, however he was able to go to the unit on the display panel. But without the HD module, he could not demonstrate the unit.

Home Stereo: When asked, the sales associate said he had heard of HD Radio, but that was the extent of his knowledge, and he did not know when they would be in. There was no offer to find out.

Promotional Material: None for HD, but very nice displays for XM Satellite Radio and Sirius Satellite Radio, and the home stereo section had the Polk Audio XM unit up and running.

Overall score: D

BEST BUY Stevens Creek, San Jose

Car Stereo: This store had one Kenwood unit "HD Ready," without the module or one available. The salesperson did not know the unit, or anything about HD Radio, so she went to ask her supervisor.

When she returned, I was informed that HD Radio required a subscription to activate! I informed her that XM and Sirius required subscription, but that HD Radio was provided by an "over the air" signal, and was not a subscription service.

She shrugged and told me that was what the supervisor had told her. I thanked her for her time.

Home Stereo: I checked out each unit that was on display, but after 10-15 minutes of waiting, I never got to talk to an actual salesperson. None of the home theater receivers was hooked up, and none of the point-of-sale information mentioned HD Radio.

Promotional Material: None on HD Radio, very little on XM/Sirius.

Overall score: F

MAGNOLIA HI-FI Winchester Blvd., San Jose

They don't carry car stereo, and only had the Boston Acoustics Receptor Radio HD table unit. The unit was hooked up, but analog FM reception was poor in a concrete and steel building.

I unraveled the antenna, and got a little better reception, but the HD signal of a local San Jose Class B FM was intermittent. The transmitter site is "line of site" with the store, less than 10 miles as the crow flies.

Although the price had changed from \$499 to \$299 two weeks prior to my visit, the store had yet to change the price. Only because I mentioned it, they removed the old tag to update it.

The Boston Acoustics unit is a pricey

table radio, without a CD player, using a factory-attached FM wire. The 3-inch speakers on the unit cannot be expected to provide HD Radio quality. [Boston Acoustics now plans to include a dipole FM antenna. Story, page 26.]

Promotional Material: No POS information on the unit. The salesperson had limited product knowledge of the BA unit.

Overall score: C

COMPUSA/GOOD GUYS Stevens Creek, San Jose

They merged the two companies, and the store is overstuffed for its size. They do not carry car stereo, but they carry the Yamaha Home Theater model RXV4600

that retails at \$1,800 and has the HD Radio logo. On my first visit, the unit was hooked up to demonstrate Home Theater Surround Sound, but there was no hookup for the receiver section and therefore FM or AM HD-R couldn't be demonstrated.

The first salesperson didn't know anything about HD-R, but to his credit, he got someone who did. That salesperson was able to take me directly to the unit, and said the store would work on having the antenna inputs hooked up so that HD-R could be demonstrated to the public.

On my return in early March, the Yamaha RXV4600 was the only Home Theater receiver that I could find in my search. The unit's antenna terminals were not hooked up. The unit was part of a wall display of home theater receivers such as Pioneer Elite and Denon. It was

not hooked up as a demonstration unit and ran on only AC power.

Upon my request, the store was able to find an AM loop antenna, but no FM dipole antenna. None of the "active" home theater receivers had attached FM antennas, since surround sound is the primary reason for a system demonstration, and radio broadcast reception is an afterthought, if it is thought of at all.

I MacGyver'ed an FM antenna, and was able to tune in KUFX 98.5 MHz, and KFFG 97.7 MHz.

Upon tuning, the station moved from monaural, to stereo, and after a brief pause, to digital, displaying the call letters, then HD1. The stereo light switched off and was replaced with an HD-R readout.

Since the receiver was not connected
See STORES, page 30 ►

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Stores

► Continued from page 29

to the switchbox, and all the speakers connect to the switchbox, I used a pair of Sennheiser headphones to listen. The KFFG HD-R signal was very clean, and provided a greater clarity than the analog signal.

I found increased separation and greater definition with the HD Radio signal. The RXV4600 is a very nice 7.1 Surround Sound home theater receiver, but at \$1,800 for the unit, what else would you expect?

The staff at CompUSA/Good Guys was friendly, knew about HD Radio and at least let me connect some form of antenna to receive the digital signal. The loop antenna did allow me to receive KCBS and HD-R was activated, but the reception was spotty at best in a concrete and steel building.

Yamaha has gone through the trouble of paying the license fee, included the HD Radio logo on the front of the RXV4600, and even included a paragraph describing HD-R on the point-of-sale information card under the receiver. The store did not include any data on HD Radio on the brief description next to the unit.

In a subsequent visit in April, the Yamaha was still in the same spot, with the AM antenna still attached. It had been over a month. Nothing else changed. It remained a static unit, without connection to the demonstrator switch box, with no FM antenna. I guess "out of sight, out of mind" does apply.

Without hooking up the receiver to the demonstrator switchbox, or having an FM antenna attached, how can we expect a consumer to get interested or excited about HD radio? At the end of both of my previous visits, I had been assured by the salesperson and the store manager that the "hook-up" issues with the Yamaha — the antenna and connection to the demonstrator box — would be addressed and corrected. Over a month later, it had not happened. Yet another store committed to HD Radio.

Promotional Material: "Pull Out Information sheet" under the Yamaha unit, the only promo piece found in my search.

Overall score: C-

FRY'S ELECTRONICS Campbell, Calif.

Car Stereo: They had five XM car stereo units hooked up for demonstration and demoed XM for me. "No, I requested HD Radio, not XM."

They did not know what HD was, nor did they care. The first salesperson had to ask a second; he too, did not know about HD Radio.

I noticed that a majority of the units did not have antennas on them, preventing them from demonstrating analog FM as well.

Home Stereo: No receivers with HD,

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Store	Product In Store	Home HD	Mobile HD	Demonstration Available	Product Knowledge	Grade
Circuit City	Yes	No	Yes	No	Limited to mobile	D
Best Buy	Yes	No	Yes	No	Poor, misinformation given	F
Magnolia	Yes	Yes	N/A	Yes	Limited, priced wrong (old retail), poor reception	C
CompUSA/ Good Guys	Yes	Yes	N/A	No	Fair to good, Unit not connected	C-
Fry's	No	No	No	No	None	F
Radio Shack	No	No	No	No	None	F
Digital City	No	No	No	No	Special order only -Mobile	F
Century Stereo	No	No	N/A	No	Very high, no product currently available.	B-

N/A - Store does not carry Mobile audio.

An early HD Radio report card. Joe Milliken as 'Joe Six Pack' visited consumer electronics stores in and around Santa Clara, Calif., population about 1.5 million.

and neither the salesperson nor his supervisor knew about HD Radio.

Promotional Material: Nice POS on XM and Sirius on the display units, a whole section devoted to those services.

Overall score: F

RADIO SHACK Bascom Ave., San Jose

They had nothing, no home receivers, nothing. They dropped mobile audio a number of years ago. [The company told *Radio World* in April it plans to carry the Boston Acoustics Receptor Radio HD in some locations soon.]

Overall score: F

DIGITAL CITY El Camino Santa Clara (By telephone)

This is a good-size independent store carrying home theater receivers, televisions and mobile audio with installation.

Car Stereo: They had one Kenwood unit for special order only. No display unit was available for demonstration.

Home Stereo: No home units at this time.

Overall score: F

CENTURY STEREO San Jose (By telephone)

Home Stereo: This is an old-line high-end retailer. They know of HD Radio and are listed as a dealer for Rotel. They have yet to be shipped an HD tuner, with the release date getting pushed back by the manufacturer. They too, have heard the promotions on Bay Area radio stations and are frustrated by their inability to get HD tuners or receivers.

Overall score: B-

So what?

The results were not encouraging. I found four HD-R receivers — two mobile, one table and one home theater — in a total of eight stores. The two mobile units were missing the HD module and could not be demonstrated. The table radio worked, but the reception was poor. And the home theater receiver was not connected and could not be demonstrated.

Until retailers have product in the

stores and knowledgeable people to demonstrate them, HD Radio will not be a factor in any market.

XM and Sirius have home, car and now portable units available. They are recognized names to the consumer and have point-of-sale displays in a majority of the stores visited.

This problem, along with the popularity of iPods, may prevent HD Radio from reaching the "critical mass" needed to be an accepted form of entertainment.

I know that HD Radio and especially HD2 are in their "baby steps" mode. But unless stations improve the programming content, and receiver makers increase the number of available radios and provide them at a reasonable price, and unless retailers increase their sales staffs' awareness and understanding, HD Radio is doomed to fail.

Is it fair to place the onus on the stores and salespeople? Yes and no.

The pressure should have come from large retailers to the receiver manufacturers to have the receivers in the stores now. They missed the last Christmas season; will they miss the next one as well? Why are some of the big names like Sony or Pioneer still on the HD sidelines?

On the alliance Web site, HD in some

mobile units is listed as available "now," but while a large retailer may have the head units, they don't have the HD modules, or any knowledge about them, making "now" meaningless.

And as far as promotional material, only the Yamaha RXV4600 had a placement card under the receiver to pull out and read the "selling points" about the receiver. No other store I visited had any printed information such as signs, banners, and handout literature for in home or mobile.

I walked around each store looking for anything with the HD Radio logo on it. If it was there, I could not find it. In-store HD-R promotion is a well-kept secret. At least three years ago the XM display at a Best Buy was up and running, with "tear-off" sheets to take with you.

Stations have been broadcasting HD Radio for at least a year, and manufacturers have been promising the receivers once stations started broadcasting in HD.

Well, the stations are broadcasting. Where are the radios?

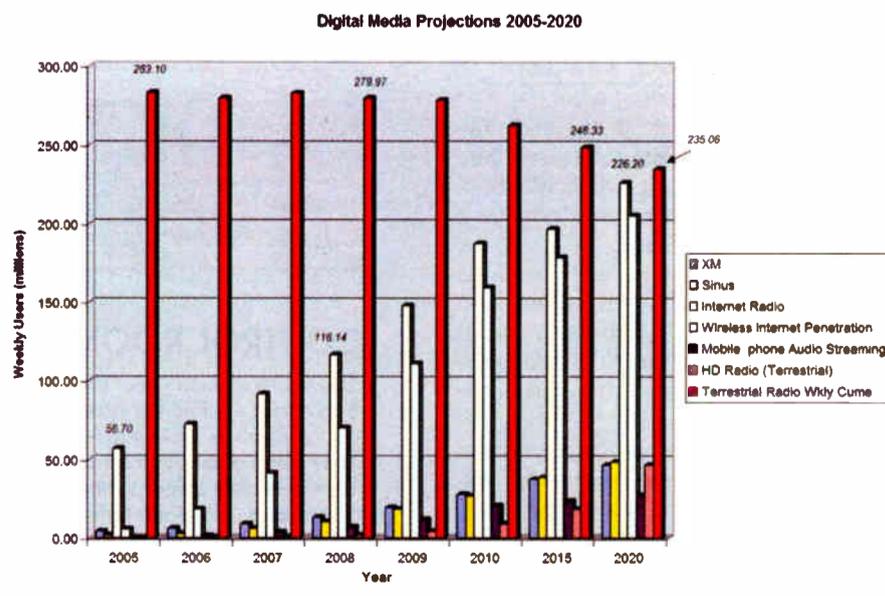
The author is a former station owner now living in Santa Clara, Calif. RW welcomes other points of view.

Share your own experiences with shopping for HD Radios. Write to radioworld@imaspub.com.

DIGITAL NEWS

BRIDGE RATINGS, in its first projections for HD Radio listening, said this winter it believes 8 million people will be listening to terrestrial digital radios in 2010, while listening to satellite radio is estimated to total 54 million by that time (see chart).

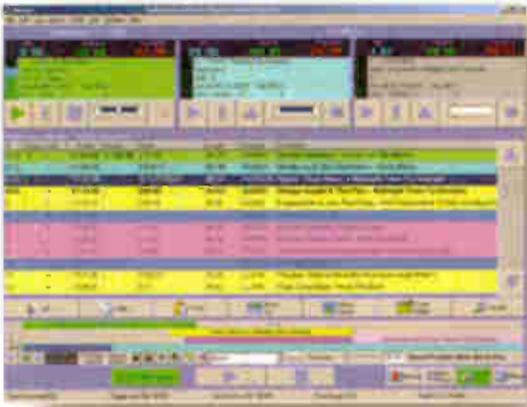
The new HD Radio digital format is growing "slower than previously thought," Bridge stated. Still, the technology has the potential eventually to rival satcasters in receiver penetration, the company believes. Bridge found that though market penetration is small — expected to be around 555,000 by the end of this year — it thinks HD Radio could improve to 46 million by 2020.



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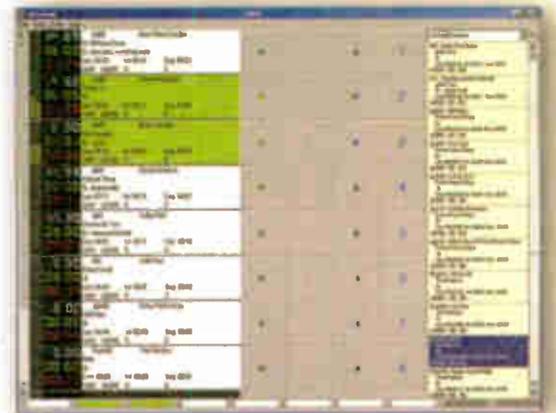
Simian - radio automation and digital playout system.

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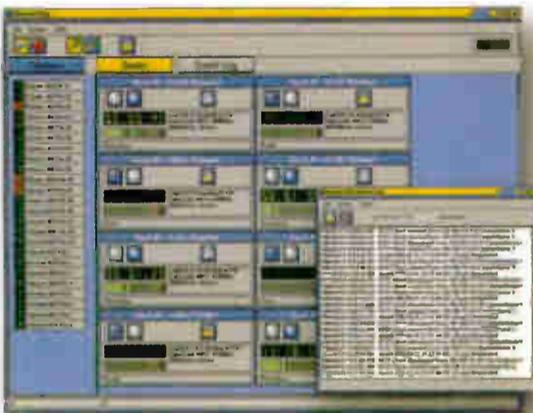
Stinger - Instant Access to 288 'rapid-fire' audio files.

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WaveCart - the original on-screen cart machine replacement.

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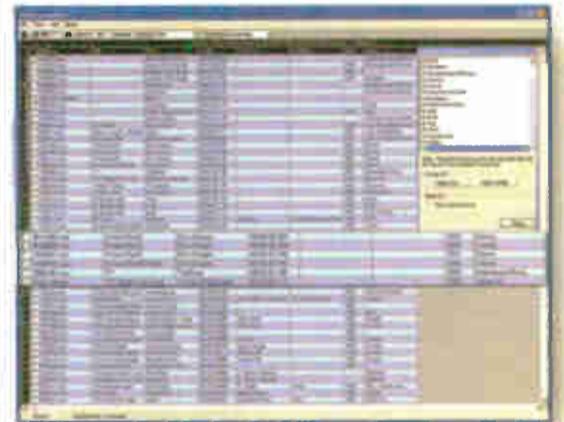
SkimmerPlus - skimming and audio logging with web playback.

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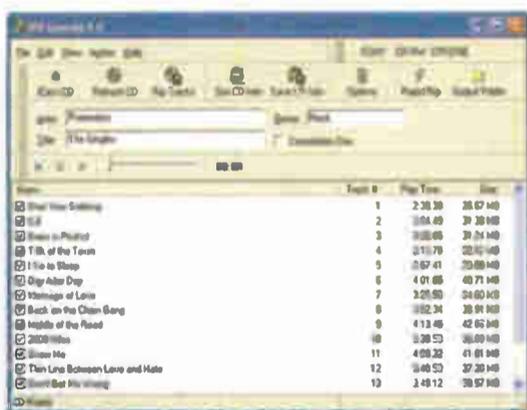
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Buyer's Guide



Radio World

Transmitters

May 10, 2006

USER REPORT

WQED Replaces 816R With 816HDs

Long-time Classical Station Goes HD Radio, Picks Two Continental 816HDs

by Paul Byers
Director of Engineering
WQED(FM)

PITTSBURGH WQED Multimedia owns and operates television stations WQED, WQED-DT, WQEX and WQEX-DT, and radio stations WQEX(FM) in Johnstown, Pa., and WQED(FM) in Pittsburgh. WQED is the nation's oldest community-owned public television station, having signed on in April of 1954.

Since 1972, WQED(FM) has been the only all-classical music station in the region, serving the tri-state area of western Pennsylvania, northern West Virginia and eastern Ohio. WQED(FM) broadcasts 24 hours a day on channel 207 at a frequency of 89.3 MHz with an effective radiated power of 28 kW (CP) and a height above average terrain of 199 meters.

About two years ago, we decided it was time to replace our 17-year-old Continental Electronics 816R-5B transmitter.

Taking bids

When we originally installed the 816R in 1987, we were transmitting through a six-bay side-mount antenna, which allowed us to set the transmitter power output at approximately 15 kW. At this power level we were able to operate the same YC-130 tube for nine years.

Then in 2001 we installed a two-bay, four-around panel antenna to help increase the circularity of our coverage. Our coverage pattern improved dramatically but we also had to increase our TPO to 24 kW. At that point the YC-130

tube had difficulty making power and we switched to a 4CX-15000J.

We had reasonable success with the 4CX-15000J and even better luck with the 4CX-15000A, but we were never able to approach the tube life we had gotten when operating at the lower power level. This prompted us to begin the search for a new transmitter.

We originally began looking exclusively at solid-state transmitters, but soon realized that no one made a one-box solution that would accommodate our 24 kW TPO in a solid-state transmitter. The cost of adding a second solid-state cabinet was prohibitive for our budget, so we turned our attention back to tube-type transmitters.

Change in plans

Over the next year we solicited bids from every major manufacturer of tube-type FM transmitters and we thought we were ready to make our decision.

Then along came IBOC/HD Radio and we had to go back to the drawing board to make room for another transmitter. At that time there were basically three choices when planning to add an HD Radio signal to the plant, and all of them involved separate analog and HD transmitters, high-level combining, low-level combining and split-level combining.

High-level combining was straightforward but inefficient from an operational standpoint and required an oversized analog transmitter. Low-level combining allowed improved operational efficiency but required a second transmission line and antenna. Split-level combining looked intriguing with its



Paul Byers leans on one of WQED's 816HDs.

HD Radio power through an efficient, internal low-level combining system. The added benefit of this approach is that, because we only need 24.24 kW of TPO, we can run each cabinet at approximately 12 kW, thereby maximizing the useful life of the 4CX-20,000E tubes. Also, should we need to take one cabinet offline for maintenance, we can operate on the other cabinet at nearly full power.

The installation of the transmitters could not have been easier. Prior to delivery, the Continental engineering team, headed by Dan Dickey, set up the transmitters and had them running at its Dallas facility to make sure they were performing as specified. When the transmitters arrived on-site, all that had to be done was to make final electrical and HVAC connections and we were ready to go. Continental even bought back our old 816R transmitter.

Rich Garrett and Dave Hultsman from Continental came in to help us with power calibrations and mask filter adjustments for the HD Radio transmitter and to verify all of the performance parameters. In less than a day-and-a-half we had a crystal-clear digital signal and a super-clean analog signal on the air.

All things considered, we are happy with our decision to purchase the Continental 816HD transmitters. The experience (sales, engineering, customer service, installation) exceeded our expectations.

We consider this a unique solution for implementing our analog and digital broadcasts without the need for a second IBOC transmitter, separate HD antenna or lossy combiner. It uses a simple RF path and did not require expensive tower or HVAC modifications, providing us with an easy transition to HD Radio broadcasting as well as a solid foundation for our analog signal.

For more information, contact Continental Electronics in Dallas at (214) 381-7161 or visit www.contelec.com.

promise of higher overall efficiency plus the elimination of the FM headroom requirement, but was complicated by the need to inject a small fraction of a properly phased FM signal at the coupler port. What to do?

The answer was to purchase the Continental Electronics 816HD analog FM and HD Radio transmitter. For less than the cost of a single solid-state analog transmitter we were able to acquire two 816HDs connected by a Continental 377D switchless combiner.

The two transmitters in parallel are capable of producing 40 kW of analog and

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USER REPORT

Crawford Converts to HD With Nautel

by **Cris Alexander**
 Director of Engineering
 Crawford Broadcasting Co.

DENVER At last year's NAB convention, we made the decision and commitment to convert the majority of Crawford Broadcasting Co.'s AM stations to HD Radio. We had already converted our FMs. At that time, we had not converted even a single AM, and we really didn't understand much about AM HD Radio, so it was with some apprehension that we began looking at our options.

The vast majority of our AM transmitters are Nautel. We began a relationship with Nautel with similar apprehension way back in 1989, taking a big chance on what was then a relatively new technology. The reliability, efficiency and great sound of those first transmitters convinced us we had not made a mistake. Seventeen years later, we find ourselves rotating out those first units and replacing them with current-generation Nautel gear.

And so we turned to Nautel when the time came to convert to HD Radio. The company's Kevin Rodgers took a look at our entire complement of transmitters and presented me with a list of the required parts and equipment to convert each station. Each list was comprehensive and included an exact price. This made the budgeting process easy. So we set a schedule, cut purchase orders and placed orders.

Conversion and adjustment of the ND-5 and NE-IBOC took the better part of a full day, but it went well and we were getting decent digital lock times in short order.

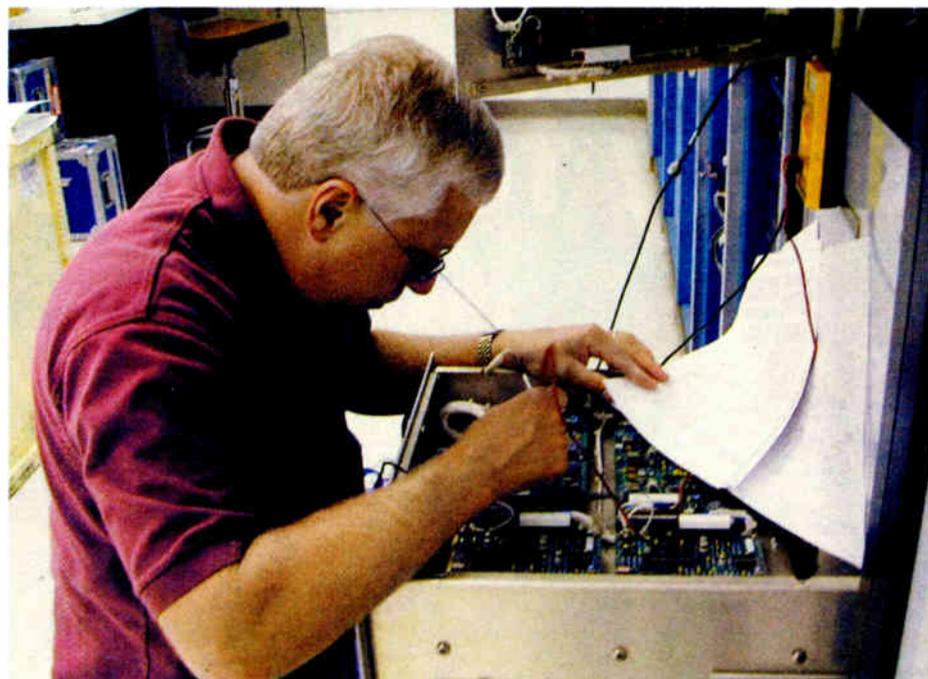
Because our market chief engineers and their staffs would be doing the conversions on their AM stations without the benefit of any previous experience, I elected to do the first conversions myself, hopefully learning all I could about the process and providing the benefit of my experiences to them. That turned out to be a good move, as I learned a great deal during the two conversions I personally did.

Conversion, adjustment

At the heart of any AM HD Radio conversion is the HD or IBOC generator. Nautel's HD generator is called the NE-IBOC. This unit, like those of other manufacturers, is really a wrapper for the Ibiqity Digital Up-Converter, or DUC. It contains a PC motherboard, RAM, hard drive, expansion slots, power supply, audio boards, serial and USB ports, touchscreen and external signal ports.

If this sounds a lot like any computer, you're right. It really is an industrial, rack-mount PC that soaks up 5 RU and about 24 inches in rack depth. A companion 2 RU box, called the EASU, goes with the NE-IBOC and contains an AES sample rate converter and GPS receiver. Its outputs include 1 pulse-per-second and 10 MHz GPS-locked reference signals required by the NE-IBOC.

The first conversion I did was at



The author follows Nautel's step-by-step instructions in converting the ND-50 for HD Radio.

KLZ(AM) in Denver, which uses a 1999-vintage ND-5 5 kW transmitter. The HD Radio conversion package arrived in a couple of crates, one containing the NE-IBOC and EASU, and the other containing 13 power modules, RF driver boards, mod driver boards and the IBOC interface board.

A transmitter-specific modification instruction pamphlet was provided that walked me through replacement of the

points within the system to allow performance/confidence monitoring of the various paths. A 400 Hz tone also can be output from this connection for testing/setup. If you don't have an AES tone source handy for the setup process, this will do nicely — it's what I used.

One other side note: the EASU provides multiple outputs of the GPS-derived 1 pps and 10 MHz reference signals that can be used for any desired purpose. We used the 10 MHz to lock the oscillator in a collocated station's transmitter, ensuring it will be dead-on frequency all the time.

The only other NE-IBOC connections are RJ-45 CAT-5 connections for magnitude and phase. These connect directly to the corresponding ports in the transmitter on the IBOC interface board. Cables are supplied, but the factory-supplied eight-foot cables were found to be too short in every installation we have made to date; we had to make our own cables.

Ordinary CAT-5 cables worked fine in every one of our installations except one, a high-end (1540 kHz) 50 kW station where the equipment rack and NE-IBOC were a good distance from the mag/phase connection points on the transmitter. RF gave us fits in that one case and shielded CAT-5 had to be used. Other high-power installations gave us no grief.

Getting to know you

The NE-IBOC touchscreen is easy to use. Station information, frequency and call sign came pre-loaded from the factory. What remained were the spectrum adjustments (mag offset and mag delay), analog diversity (audio) delay and default program-associated data (PAD) information.

The touchscreen interface provides a PDA-style "keyboard" that works like any PDA "keyboard," but we found it was easier to plug in a keyboard and mouse for input. This also provided us with certain punctuation characters for the default PAD that were not available in the touchscreen interface. We also found it useful to buy a PDA stylus and attach it to the front of the unit with a string so it is always handy for quick adjustments.

Spectrum optimization — setting/bal-

ancing the primary digital carrier levels, minimizing "spectral regrowth" and optimizing digital lock time and robustness — is an iterative process that takes a good bit of time, patience and a good spectrum analyzer with an averaging function. Describing the process is beyond the scope of this user report, but I will say that it is not particularly difficult. It just takes awhile.

Setting the analog diversity delay to time-align the demodulated analog and digital signals is likewise an exercise in patience. The NE-IBOC allows one-sample adjustment resolution, which is a miniscule amount. We have found that about 50 mS coincidence is close enough to not be objectionable. We also have noticed that not all HD Radio receivers are created equal — the analog/digital time alignment may be dead-on in one receiver and noticeably off in another.

And keep in mind that adjustments to the analog (AM) audio processing, modulation depth, etc. take 8.4 seconds to show up in the real world. Don't make the mistake of thinking that nothing happened and overcorrecting.

Overall, the conversion and adjustment process was fairly easy. The instructions were relatively clear and I had no trouble following them. Conversion and adjustment of the ND-5 and NE-IBOC took the better part of a full day, but it went well and we were getting decent digital lock times in short order.

A few weeks later, the stuff arrived for 50 kW KLTT(AM), which uses a 1996-vintage ND-50 transmitter. I knew I was in for it when the truck arrived with six big crates containing 121 power modules, NE-IBOC, EASU and all the other conversion items. Just getting all the crates into the building was a job.

And yet the conversion process, while time-consuming and somewhat physically demanding, went well. The ND-50 was a two-day conversion, but it gave no more problems than the ND-5. Being well-versed in ND-IBOC operation by then, setup was a snap.

I did learn a great deal in those first two conversions and was able to share what I learned with our market chief engineers. Some of our conversions have gone as smoothly as these first two, and others have been more of a challenge. But it was Nautel's attention to detail and quality as well as its customer support that made each conversion a success.

The NE-IBOC, while mostly an Ibiqity Digital Corp. product at its core, is a quality piece of equipment with Nautel standing behind it.

For more information, including pricing, contact Nautel in Maine at (902) 823-2233 or visit www.nautel.com.

Write to RW

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Include your name, address and contact information, as well as your job title and company if appropriate.

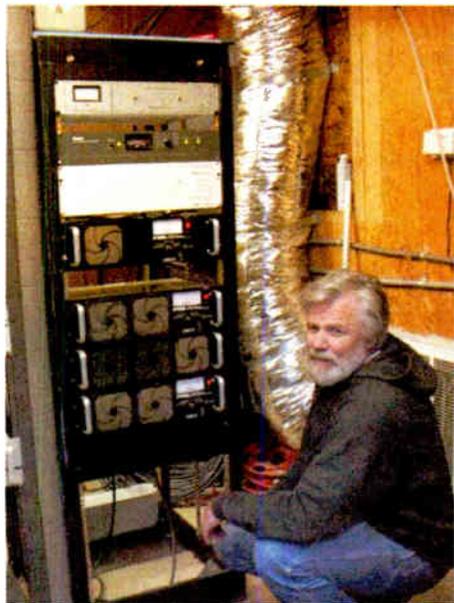
USER REPORT

Small-Market Station Taps PTEK

by **Dino Corbin**
General Manager/Partner
Deer Creek Broadcasting LLC

CHICO, Calif. At Deer Creek Broadcasting, the PTEK 1 kW power amplifier system has powered our KHHZ(FM) 97.7 since 1997. In 2005, we replaced that system with the PTEK 2XFM500+com combiner and the PTEK 25W FM25E exciter.

We once again chose the same PTEK combination when we signed on station KRER(FM) 101.7 because of the versatile configuration, sound construction, quality signal and straightforward design. And the people at PTEK took great care of us.



Deer Creek Broadcasting
 CE Mark Miller

During my 35 years in local broadcasting, I've used many of the big-name transmitters in both radio and television, and they've all worked to my satisfaction. But for our latest radio applications, PTEK was chosen for different reasons.

Nightmare before Christmas

We're in a small radio market that covers essentially the northern California valley. Our transmitter sites are located in the Sierra Nevada mountain range where weather conditions can be extreme. The terrain around our operations is, in some cases, very sloped and difficult to get to, even on a good day. For this reason, ease of operation and portability are important.

I have first-hand experience dealing with an "off-the-air" transmitter site, which most general managers don't get. Three years ago, the week before Christmas, we had a massive storm, which resulted in power failures and caused electrical problems that damaged some of our equipment.

Because of the widespread effects of the storm over four of our transmitter sites, I had to go to the KHHZ site in three feet of snow, in the dark, with a staff member, and deal with the problem while our other engineer was dealing with storm issues at other sites. The power spikes surpassed our protection devices and damaged some of our processors and STL receivers. But the PTEKs survived. We just replaced the fuse on the unit and they were up and running.

Unfortunately, the other pieces of equipment did not survive and had to be replaced. Because of the simplicity of the

PTEK installation, and metering on the front of the units, we were able quickly to reconfigure the PTEKs, swap out some equipment, reset the power levels and get the station back on the air.

Versatility of the PTEK installations is key at our KHHZ and KRER stations. When a problem does arise with a transmitter component, our engineer — or even I can do this — can remove the offending unit and swap it out with the backup PTEK 500 watt amp.

In a worse-case scenario, we also can operate at 500 watts by bypassing the combiner and obtaining an ERP of 600 to 700 watts, depending on the antenna,

until the other unit can be repaired. This results in only a slight decrease in signal coverage.

Should we have to bring one of the PTEK 500 watt units off the mountain and send it to PTEK, its weight and portability make carrying the unit up and down the side of the mountain easy for one person. In addition — and as a GM I really like this part — the low cost of the unit allows us to keep a spare on hand for use at either transmitter site.

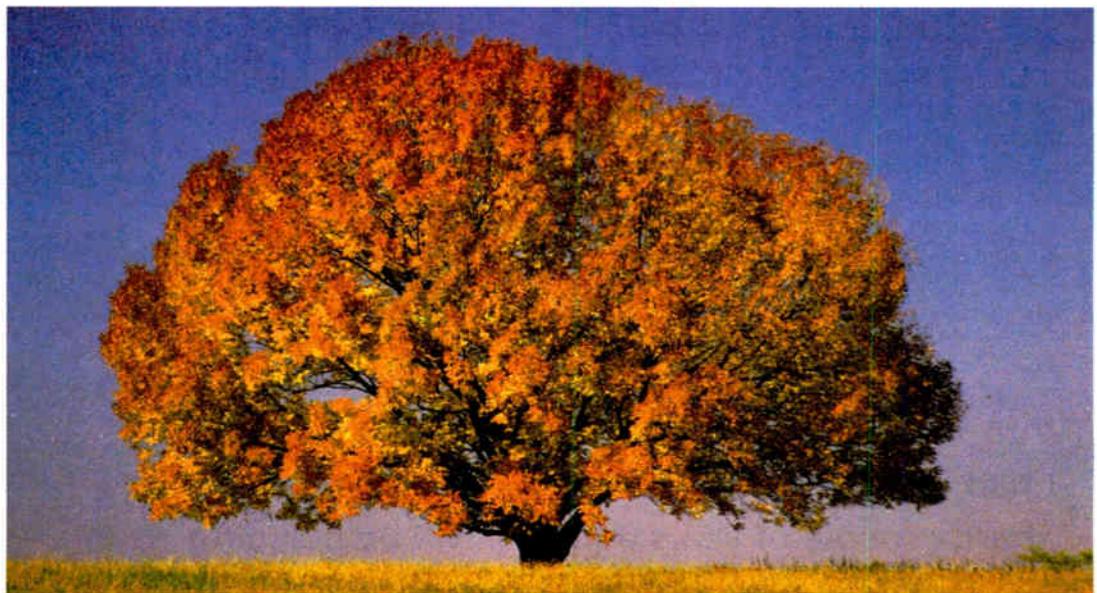
The dimensions of the unit are compact at 19 x 5 1/4 x 12 inches. This is a big plus, as many of our sites are small and the PTEK units stack nicely in a standard

broadcast rack.

Documentation is available online, and a PTEK technician was available to me by telephone. On the rare occasion we did send a unit to PTEK, turnaround was fast.

Our KHHZ and KRER PTEK 2XFM500+com transmitters power Jampro antennas with 7/8-inch foam dielectric transmission cable. The output of the PTEK units gives us great coverage over the five-county northern California valley. It interfaces beautifully with our Sine System remote control with the +com feature. Our on-air talent have found the transmitters responsive and easy to operate.

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USER REPORT

College Goes HD With BE

by Fred Krampits, CSRE, CBNT
Chief Engineer
WTCC(FM)

SPRINGFIELD, Mass. WTCC(FM) is the first community college radio station in New England — and one of the first on the East Coast — to start broadcasting HD Radio. The station is licensed to Springfield Technical Community College and operates with an ERP of 4,000 watts from the STCC campus. The station provides a variety of ethnic programming, music, talk and news to Springfield and the surrounding cities and towns.

For years, I have read articles in Radio World on this station or that station upgrading to the newest and latest technology, never imagining that someday I would be writing an article about how WTCC upgraded to some new technology.

Back in 1976, the station went to 4,000 watts on 90.7 MHz; aside from a replacement of the audio processing and the exciter back in the mid-'80s, the RF portion has remained virtually unchanged for 30 years ... until now.

PFTP

In 2004, STCC was awarded a federal matching grant from the Department of Commerce Public Telecommunications Facilities Program. Besides upgrading and replacing our studios, we also were able to replace the transmitter and antenna.

Because the analog power level required was just over 3,000 watts, we wanted to go with a solid-state FM transmitter that could perform low-level combining. We originally were not looking for an FM+HD transmitter, but one that was HD-capable. All I wanted to do was add the HD signal generator and not have to replace the



Fred Krampits

to include both FM-only and hybrid quotes. We also wanted the transmitter/antenna project to be turnkey.

Of the three transmitter models listed, one was the Broadcast Electronics FMi 402, which we selected after reviewing the bids. The price for an FM+HD transmitter was just under what we had been awarded by PTFP for an FM-only transmitter. We went ahead and purchased the FM+HD version. I had previous experiences in dealing with BE, and had been satisfied with their service in the past, so I had no reservations about purchasing one of its transmitters.

Increasing awareness

The local NPR affiliate in Amherst, Mass., is broadcasting HD and so is the Clear Channel cluster here in Springfield. Stations from Hartford, Conn., easily can be

With so many HD signals receivable in Springfield, I had a much better comfort level with going HD than a couple of years ago. We will be pursuing multicasting in the next year or two.

exciter or extensively modify it. I also did not want to exchange amplifier modules for re-biasing to run HD.

After research, site visits and talking to many engineers, I put together a competitive bid spec based on what would meet our criteria. The transmitter bids were

heard in the Springfield area, and many of them are broadcasting HD signals. With many of those stations running announcements to promote HD Radio, the listening public is becoming more aware of what HD Radio is.

With so many HD signals receivable in Springfield,

TECH UPDATE

Armstrong Translators Speak HD

Armstrong Transmitter introduced the TRX-HD series of FM translators suitable for HD operation. The company says the translators are designed to transition with a station as it moves from analog-only broadcasting to the digital hybrid mode and eventually to broadcasting in digital.

The TRX-HD receives an FM station's signal payload over the air, including its HD Radio digital component. The signal content is transferred to the TRX-HD transmit side for retransmission on the translator frequency.

"The TRX-HD Series allows stations to operate their translators within the confines of their HD Radio licensing agreement because it does not take signal back down to base-band audio," said Sales and Marketing Manger Ernie Belanger.

The translators are available at three power levels. The TRX-HD10 provides 10 watts in the Hybrid Digital mode, while the TRX-HD50 provides 50 watts and the TRX-HD100 is a 100-watt translator. Higher hybrid power levels are achieved by adding an Armstrong solid-state amplifier to the TRX-HD10.

The translators also can be used as analog-only translators at 30, 150 and 300 watts respectively for stations that have not yet begun broadcasting an HD component. Armstrong begins shipping the TRX Series in June.

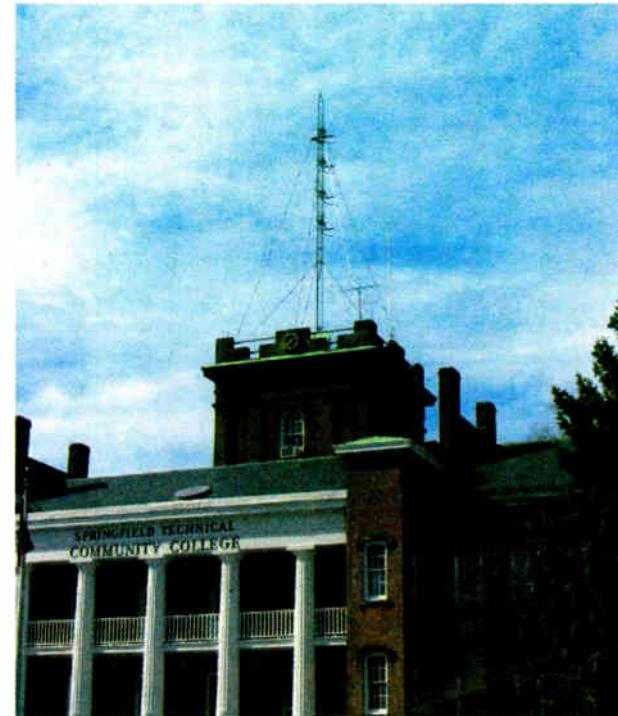
For more information, contact Armstrong in New York at (315) 673-1269, or visit www.armstrongtx.com.



I had a much better comfort level with going HD than a couple of years ago. We will be pursuing multicasting in the next year or two. It provides some exciting options, such as a second "station," time-staggered programming, etc.

There were a few challenges to the project. For instance, the building on which the antenna sits is part of a national historic site, the Springfield Armory, constructed in 1820. There are no elevators near the transmitter room. The original transmitter was delivered via crane through a window in the transmitter room on the fifth floor and after measuring the various doorways and staircases, the new transmitter (which is much smaller than the original transmitter), would also have to come in via window.

We had various project meetings with electrical and HVAC contractors, architects, campus facility engineers, transmitter installer and college administrators. The plan was to do as much of the electrical and HVAC as possi-



WTCC operates with an ERP of 4,000 watts from the STCC campus.

ble prior to the delivery and installation and then do the transmitter and antenna installations at the same time.

John Bisset, BE Northeast regional sales manager (and RW columnist), attended the major meetings, explained the requirements of the transmitter to the contractors and answered questions about the transmitter.

BE had Ed Bukont/Comm-Struction as its authorized installer. There were a couple of glitches during the install, but with the all the various contractors working in the room simultaneously, it went very well overall. A couple problems came up after the installers had left, but a call to BE tech support got me the info and the parts I needed.

One of the major features of the FMi 402 is that it is a modular transmitter. There are 10 RF amplifiers in a splitter combiner arrangement, so there are no single points of failure in the amplifier chain. Five power supply modules, which also are summed together, provide the DC voltage for the amps. The FMi 402 is essentially BE's FM-5C transmitter with the FXi 250 exciter and the FSi 10 signal generator installed.

The company's FXi 250 exciter has excellent clarity. It has 250 watts, so it also can be used as an emergency transmitter. The FSi 10 can be upgraded to an XPi 10, which allows it to be located at the studio. Both units have a variety of analog and digital inputs and outputs to support any kind of FM/HD configurations.

I would recommend putting both units on a UPS. We had a problem that pointed to the FSi 10 and were getting ready to have a replacement sent. By accident, the FXi 250 was power-cycled and the problem cleared. After putting the units on a UPS, the problem has not re-occurred.

I like the way the transmitter looks. It has a clean layout and is pleasing to the eye. A transmitter is an expensive investment. Even though no one else besides the engineer may ever see it, it should look nice.

For more information, including pricing, contact Broadcast Electronics in Illinois at (217) 224-9600 or visit www.bdcast.com.

USER REPORT

FX 2000 Lands Role In South Pacific

Christian Radio International Picks Bext Transmitter For Inaugural Installation in Marshall Islands

by Paul Williams
 Technical Director
 Christian Radio International

MAJURO, Marshall Islands

Christian Radio International's mission is to install radio stations in countries outside the United States. Our first installation was on Majuro in the Marshall Islands located in the South Pacific. Being mission stations without a huge budget, we felt it was vitally important to find not only the right price but also a transmitter company willing to work with us on overseas installations.

While consulting with one engineer I kept hearing the name Bext come up in conversation. I had heard of various other brand-name transmitters but also was aware of their prices, so we decided to try the Bext system and contacted its sales department with the specs we would need and decided to purchase its model FX 2000.

We were short on time by the time we had placed the order. Bext quickly put the order together and shipped it out.

Once it arrived at the Marshall Islands we were able to look at the actual transmitter. We were pleasantly impressed.

The Bext model FX 2000 is a strong 2 kW FM transmitter that comes in a compact but solid 19-inch standard rack cabinet and consists of two individual 1,000-watt amplifiers modules driven by a Bext model Lex 30 FM exciter and a combiner. The two 1,000-watt amplifiers work in a combined mode, but each is independent and can be operated by itself if so desired. We can stay on the air with just one of them at reduced power should the other amplifier ever break down.

Each 1000 W section is three rack spaces high and the exciter is a compact one rack space. The cabinet has lots of extra rack space to house other pieces of equipment.

The Lex 30 FM exciter is programmable from the front and easy to operate. The same is true for the rest of the transmitter, which has intuitive controls and readings. The only time it gave us an alarm and folded back its power was for a good reason, an antenna problem.

The transmitter installation was straightforward and the unit was ready to operate right away. But we discovered a problem with the coax cable going to the antenna. It turned out to be a problem from a cable vendor unrelated to Bext, but nevertheless we immediately called Bext via Internet phone on Saturday their time, which was Sunday our time.

The Bext engineering department asked several questions and spent a good deal of time on the phone. We e-mailed pictures and information back and forth,

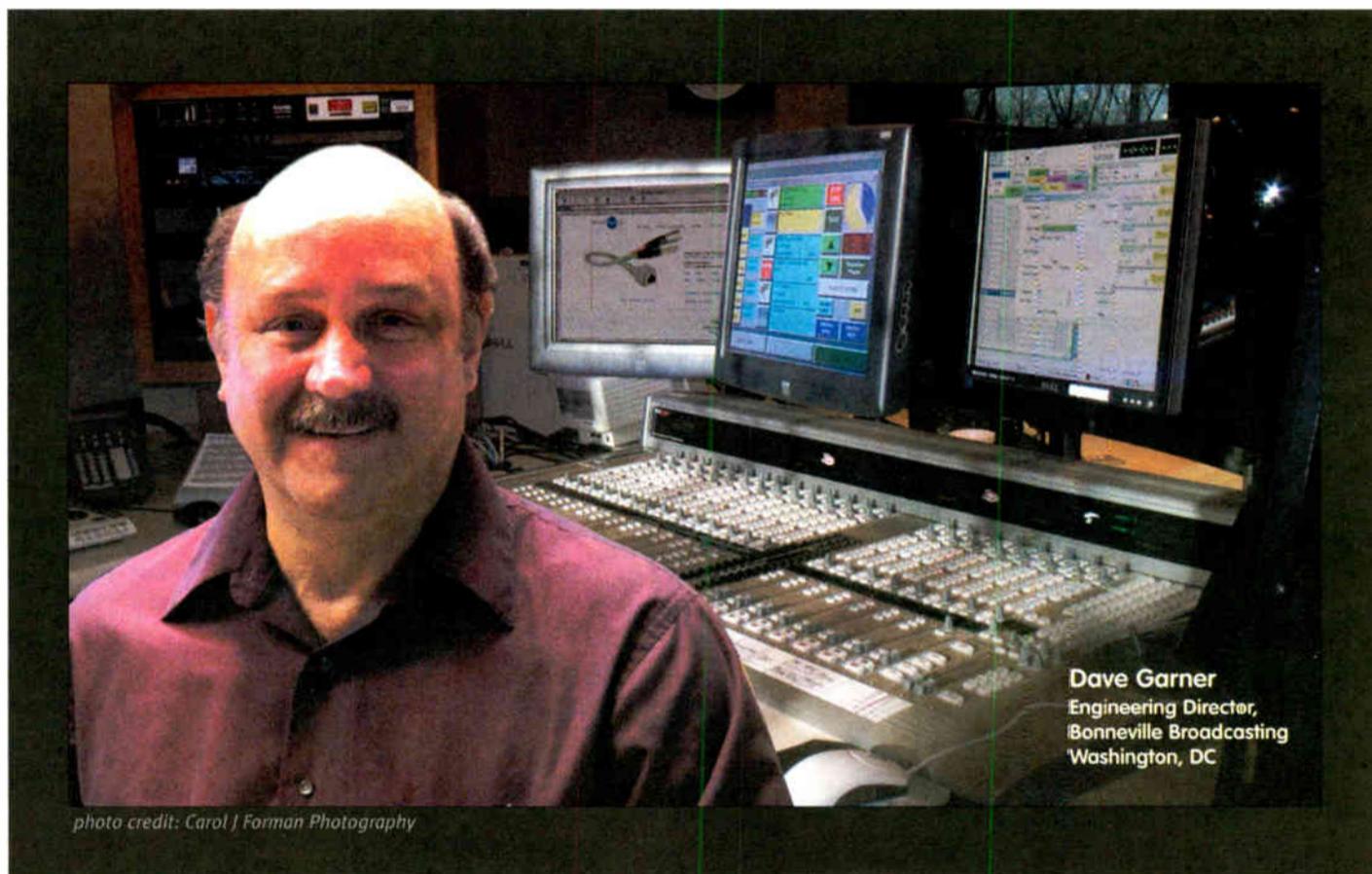
and the engineering team described how to get things rebuilt properly. We were able to install the coax for a test run of the station. V7AA 104.1 was on the air.

We did a test run and after making some adjustments we were able to get a clear, clean signal. The center of power

See FX 2000, page 39 ▶



Art Coburn of V7AA FM shows the Bext FX 2000.



Dave Garner
 Engineering Director,
 Bonneville Broadcasting
 Washington, DC

photo credit: Carol J Forman Photography

STUDIOHUB+ CASTING CALL

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"One nice thing from an engineer's standpoint is that Radio Systems has the ability to pre-make harness cables from our consoles to interface directly to the StudioHub chassis RJ45's. This made installation quite easy."

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A North Carolina public radio station... its FM signal these days. Page 14

August 3, 2005

USER REPORT

Z16HD: On the Air in Cincinnati

Harris' Z-Series Digital Transmitter Provides Over-the-Air HD Radio Signal for Classical WGUC

by Don Danko, CBRE, CBNT
Vice President of Engineering
and Operations
Cincinnati Public Radio

CINCINNATI Cincinnati Public Radio operates two regional stations: WGUC(FM), a full-time classical music station; and WVXU(FM), which offers an approximate 80/20 split of NPR and local programming.

WGUC has been at the forefront of many industry trends. The station was one of the first NPR satellite uplinks, and it was the first Cincinnati-area station to use CD players.

On July 26, 2003, WGUC became the first public radio station in Ohio to broadcast in HD Radio. A Harris Z16HD Z-Series digital transmitter has provided an over-the-air HD Radio signal ever since.

My Generation 3

WGUC has been active in HD Radio multicasting for a year, offering a secondary channel of classical music programming. Recently, the secondary channel programming permanently switched to jazz as a final format. This format switch also signaled an important technological change for WGUC, as the station migrated from a Generation 2 to the Generation 3 "Exgine" HD Radio multicasting architecture.

As a Harris BETA test site, WGUC installed a complete Harris Flexstar system to take full advantage of this advanced architecture.

The Generation 3 Exgine architecture simplifies the end-to-end connection process in many ways. A comparison to the Generation 2 structure outlines the improvements.

First, the Generation 2 architecture required installation of the importer and exciter at the transmission site. The Generation 2 exciter also featured an IT design with an internal exporter. The reliance on computers created problems with audio lock-up that required a lengthy reboot process and often required a trip to the transmission site.

While WGUC initially operated the two HD Radio signals at 48 kHz apiece, the supplementary audio quality was so high that we migrated to 64/32 kHz.

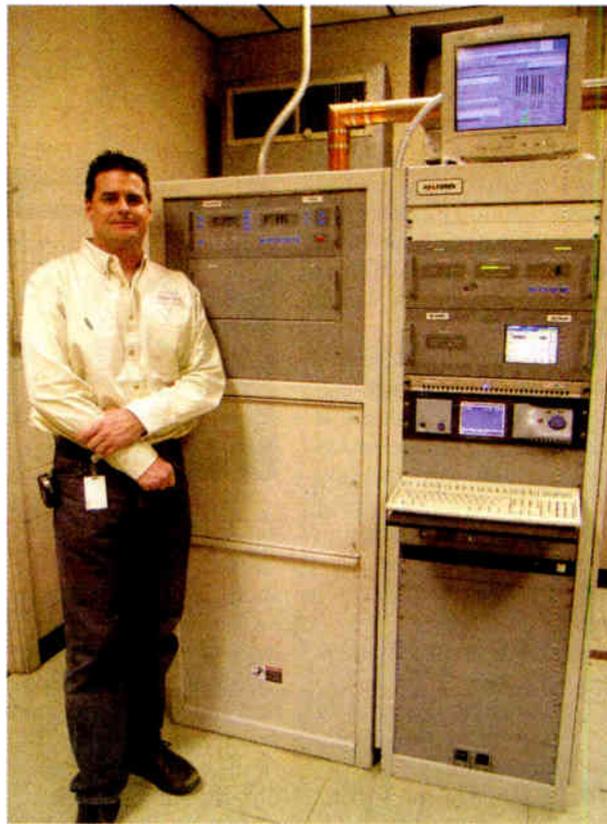
The Generation 3 architecture separates the exporter from the exciter, and in our tests over the three months as a beta site, eliminated all of these lock-up issues. This also allows the engineer to move the importer and exporter back to the studio. The studio relocation of IT-oriented components allows for a daily review of system health, as well as a better climate-controlled environment for computers compared to the transmission site.

More important, this also marks the return of the DSP-based exciter, offering the quick boot-up times favored by broadcast engineers.

Prepare for transmission

The Z16HD transmitter, transmitting at a TPO of 7,100 watts with an ERP of 15,000 watts, operates in common amplification mode. This means that the Z16HD amplifies both the HD Radio and analog FM signals. A Harris Z7.5CD Z-Series transmitter is installed as a backup, but its non-linear design means it can only pass analog unless it is modified for linear operation. Still, WGUC has two highly reliable solid-state transmitters to ensure we're always on the air.

Although the Z16HD ultimately is responsible for the quality and strength of our signal, three key Harris



Don Danko and the Z16HD

components are crucial to preparing our HD Radio multicast for transmission: the Flexstar HDI-100 importer, HDE-100 exporter and HDX-FM exciter. These components, along with Harris Intraplex STL and various processing equipment, comprised the end-to-end chain in our beta tests to deliver WGUC's main and supplementary HD Radio channel programming to area listeners.

While source equipment and studio consoles are part of the complete end-to-end solution, this story

focuses on the equipment from the distribution chain through to the transmitter.

The output of the console first feeds a digital EAS insertion unit into an Orban 8500 HD processor. The HD Radio signal from the Orban was then sent directly into the HDE-100 exporter, while the analog FM signal from the Orban was routed past the exporter and directly into a separate Intraplex STL audio path to the transmitter.

The same Intraplex STL system also features digital cards, set for 192 kbps, which carries the main and supplementary HD Radio channel programming over UDP Ethernet to the Flexstar HDX-FM exciter's Exgine input.

The architecture as described above typically would handle transport of a single HD Radio and analog FM channel. The details are more complex in a multicasting situation. Our supplementary jazz channel, currently received via satellite from WDUQ(FM) in Pittsburgh, Pa., is digitally downlinked and sent into a Neural Audio NeuStar Plus codec preconditioner. This unit preconditions the audio to allow the encoder to more efficiently encode the audio, thus producing a higher-quality audio with fewer artifacts.

While WGUC initially operated the two HD Radio

signals at 48 kHz apiece, the supplementary audio quality was so high that we migrated to 64/32 kHz. The second channel quality is still impressive at these rates.

The NeuStar Plus cleanses the supplementary stream and passes it to the HDI-100 importer, which then passes the signal to the exporter. At this point, both signals are multiplexed within the exporter and prepared for transport over the Intraplex STL digital UDP channel en route to the transmitter.

This clean setup offers one network connection to the transmission site. Eventually, WGUC will marry both HD Radio audio signals with program-associated data information and other sources for transport to the Flexstar exciter.

Another unique WGUC attribute is the use of E1 fiber-optic cables for studio-to-transmitter delivery. E1 private networks are more typical of Europe than the U.S., where T1 connections are far more prevalent. The bidirectional E1 connection provides additional bandwidth for future opportunities.

Currently, the digital output of the exporter sends HD Radio programming over an Intraplex E1 data channel, while a digital output from the Orban system carries the analog FM signal over E1 using Intraplex linear audio cards. WGUC's Radio Reading Services for the Blind programming also is transported to the transmission site using the Intraplex STL connection.

The transmission facility houses an Intraplex hub. The system's UDP digital output was connected to the Exgine input of the Flexstar HDX-FM exciter, which prepared the HD Radio signals for over-the-air transmission. The linear digital audio was passed into the HDX-FM's AES3 input for over-the-air transmission.

The Z16HD transmitter has plenty of bandwidth to handle transmission of all three signals throughout the Cincinnati region. This system also offers plenty of redundancy for broadcasters: The HDX-FM exciter's design ensures the analog FM signal will remain on the air in the event the HD Radio signal goes down.

Generation 3 Exgine multicasting simplifies the connection process and makes life easier for both the engineer and the station. Our first HD Radio system in 2003 was a nightmare to connect. The new architecture is reverting to the simplistic mode of having the exciter and transmitter separated from the encoding and multiplexing functions.

The HDX-FM exciter further eases the process with its dual-input design for analog FM audio and HD Radio audio. The new system is easier and more convenient to connect and maintain.

For more information, including pricing, contact Harris Radio Broadcast Systems in Ohio at (513) 459-3597 or visit www.broadcastharris.com.

FX 2000

► Continued from page 37

on the tower is at 100 feet with the tower being built at just about 3 feet above sea level. The next day we rented a boat and found our signal was reaching over 30 miles — and was still clear.

Shortly after we left, the connection to one of the antennae on the four-bay system burned out, which triggered an alarm on the transmitter. The auto-foldback function on the transmitter reduced the output power to protect itself. Again we called Bext for advice and its engineering team helped us diagnose the problem. A replacement antenna was shipped right away.

The station on Majuro has been running strong since mid-October 2005 and continues strong today.

After seeing the smooth installation in Majuro, we decided to use a Bext transmitter again in our next installation in Baghdad, Iraq. We were able to purchase a Bext model XL 500, a super compact, all-in-one 3 RU 500 W FM transmitter, which we took to Amman, Jordan. After training some Iraqi men on the equipment we did a short broadcast, and then the equipment was repackaged and sent with them to Baghdad. One week later radio station NTBR 102.9 began broadcasting in Baghdad, Iraq.

For more information, including pricing, contact Bext in San Diego at (619) 239-8462 or visit www.bext.com.

USER REPORT

KCGB Rings in Year With SST 1 kW

Station Opts for Third Energy-Onix Transmitter To Replace a Model Hit by Fire in Cabinet

by **Jim Keightley**
Director of Engineering
Columbia Gorge Broadcasters Inc.

HOOD RIVER, Ore. New Year's Eve, 2005, the phone rings at my home at 11:35 p.m. It's never good news at this time of night.

A senior staff member at KCGB(FM) — one of five stations owned by Columbia Gorge Broadcasters — reports that "Curly" (our name for the Sine System remote control) had called to tell him our FM transmitter was off the air. The usual procedure for bringing the transmitter back up by remote control did not solve the problem. He was calling from the station and said the transmitter cabinet was hot to the touch and he could smell hot insulation.

I drove to the station. As I stood on the back steps fumbling for my keys, I could smell the transmitter.

I live some 45 minutes from the station so by the time I arrived, the cabinet was only slightly warm to the touch. I opened the breakers on the front panel and went to the main distribution panel

and checked the breaker for the transmitter. It was tripped. Back at the transmitter, I opened the rear doors and pulled out the shorting bar. The smell that rolled out caused me to pull back. It was overwhelming.

I went about the interior with the shorting bar but got nothing. I am sure by this time the bleeders had done their thing but I'm a scared-y cat when it comes to high voltage; I am the same way about lightning.

The service light showed me the sorry sight. Something in the high-voltage circuit near the feed-through had shorted. It was obvious there had been a fire inside the cabinet. Fortunately, it was steel and contained the blaze. Though the cabinet was pretty well ruined, it had kept the building from being set ablaze.

Damage control

I placed a previously prepared emergency coax from the exciter to the antenna connection so there was a signal of about 30 watts. I then set about surveying the damage to the transmitter.

As I assessed the damage more criti-



Jim Keightley and the SST 1 kW

cally, it was appalling. It appeared the short had not been direct as first indicated, but had created a considerable overload through some high-power resistors (225 watt in parallel) causing tremendous heat in a concentrated area. This took out some sampling and control circuits (hence no alarms or automatic shutdown), some regulator circuits and of course, the rectifier stacks. There were fly ash and soot everywhere inside. I removed the final 3CX3000A and the ceramic was in pretty good shape.

However, the cooling fins were blackened, indicating the air that had been circulating over them had been super-heated and soot-laden. I pulled the 4CX300 driver and it had suffered the same fate. Its tube socket and plate clamp were both ruined by the heat so they would have to be changed. Considering all of the power resistors (five), the rectifier stacks, the final and driver sockets and the other parts that were visibly ruined, I had now tallied more parts, cost and repair hours than the 35-year-old transmitter was worth.

I made the emergency exciter connection a bit more permanent and called it a night. The management and I would confer in the morning.

When we did meet, we concluded the

best course of action would be to replace the transmitter, especially in light of the fact that the transmitter site was going to be relocated to a mountaintop in about 90 days. We would move up the purchase date of the transmitter we intended for that move and use it at this location until the move was completed.

I started shopping. I called a number of sources that I have used in the past and got proposals. I presented the results to the management/owner team and we considered the offers for a couple of hours. In the end, the inclination was toward Energy-Onix.

At this time, we have two of its ECO 6 models in service near the city of The Dalles, Ore. They have been reliable and the few follow-up issues have been quickly addressed.

When we inquired, we were informed that an SST 1 kW could be delivered in around three days, about the time that would be required to get the ruined transmitter removed, AC wiring installed, a rack in place, etc. The order was placed and the deal was inked.

I went to work contacting a cartage company, the electronics suppliers, electricians and everyone else who would be involved in this transition. Getting them coordinated on such short notice was no mean feat.

Eventually, everything was in place and UPS arrived at the expected time with the new transmitter. It was well crated and had made the trip without incident. I prevailed upon one of the air staff to help me wrestle the unit into the rack and within a short time, I was hooking up control wires, making coax connections, AC power connections, etc.

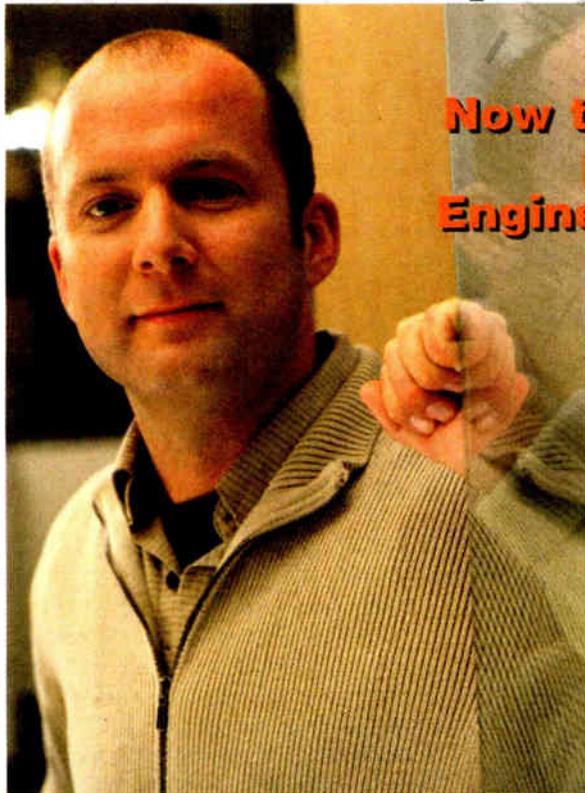
Mike Brown of Brown Broadcasting in Portland came in to assist in order to speed the final connections and minimize the off-air time during the switch over from the old exciter to the new transmitter. Working together, Mike and I were able to keep the air interruptions to about 10 seconds. We never missed a spot.

The new Energy-Onix is purring along at full power; I am delighted to have three of this brand of FM transmitters in the stable.

For more information, contact Energy-Onix in New York at (518) 758-1690 or visit www.energy-onix.com.

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QEI Has HD Modifications For Quantum E, M Series

QEI Corp. has debuted HD-ready modifications to its low-power Quantum E Series, medium-power solid-state Quantum M Series and single-tube FMQ Series of FM transmitters. The company says these transmitters are capable of either analog or digital operation, and with any combining technique.

The amplifiers become available this fall, and will be operational with existing HD exciters, importers and exporters.

The low-power series of FM transmitters will be available in 150 watts analog (40 watts digital), 250 watts analog (65 digital) or 500 watts analog (130 digital) and will be available in a single 5.25-inch rack mount.

The solid-state series of FM transmitters will be available in 2 kW analog (550 watts digital) or 5 kW analog (1,300 digital). They are housed in a small 59-inch-high cabinet.

The single-tube series of FM transmitters will be available in 5 kW analog (1300 watts digital) and 10 kW analog (3500 watts digital). They are housed in a 76-inch high cabinet.

The company says the transmitters are capable of amplifying the complete hybrid HD signal and keeping the modulation mask within the limits prescribed by Ibiqity Corp.

For more information, contact QEI Corp. in New Jersey at (800) 334-9154 or visit www.qei-broadcast.com.

TECH UPDATES

Progressive Concepts Has Four FCC-Certified Broadcast Warehouse TXs

Progressive Concepts said it carries four models of Broadcast Warehouse FM transmitters that have been FCC Type Certified.

The transmitters are the TX25, TX50, TX150 and the TX300. The company says they are appropriate for FM, LPFM, small stations and cable modulators. The stereo transmitters are now FCC Part 73 Certified.

The models include stereo generator and audio leveler/limiter and have a continuously variable RF output. They use an alphanumeric-type LCD frequency readout and selector. The supplier says a "virtual VFO" dual loop PLL system allows audio flatness to below 10 Hz.

The transmitters are SWR foldback-protected. The rear panel has balanced XLR audio input jacks with separate level controls, and two BNC connectors for multiplex (composite) loop-through operation or for external processor/stereo encoder input.

Also included is a 15-pin d-type connector for control and parameter/fault monitoring and external control of RF output via RS-232.

For more information, contact Progressive Concepts in Illinois at (630) 736-9822 or visit www.progressive-concepts.com.



Broadcast Warehouse TX300

Crown FM 10K: 11,000 Watt TPO

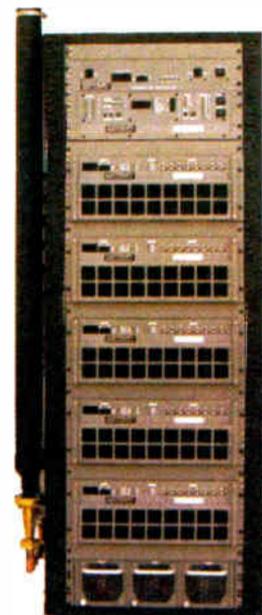
Crown Broadcast's FM 10K features five of Crown's 2 kW amplifiers driven by three 5.6 power supplies. The FM 10K produces 11,000 watts total output power in a footprint the company says rivals the 4 kW units of other companies.

Features include a Crown 250-watt exciter with optional internal Omnia audio processing, and proportional fold-back of the unit in times of excessive VSWR, temperature or over current conditions. It is wideband, so no tuning is needed across the FM band; and it stays on the air at reduced power with the loss of one or more amplifiers.

Crown also has debuted its solution for IBOC and analog translators, which consists of a line of linear amplifiers and an offset receiver, which will take the analog and digital signal and pass them through without demodulation. The company says this means the user will not have to have an IBOC signal generator at each translator site.

Crown also added a line of low-power RF amplifiers in analog and digital configurations. These products will range in output power from 100 to 500 watts analog and from 75 to 300 watts digital, allowing current customers to keep existing exciter equipment.

For more information, contact Crown Broadcast in Indiana at (866) 262-8972, or visit www.crownbroadcast.com.



Crown FM 10k

Transcom Offers Dexstar, ePAL With Harris Z16HDc

Transcom Corp., which offers used AM and FM transmitters, offers a 2005 Harris Z16HDc transmitter, which is suitable for common amplification of both the analog and digital signal and lets broadcasters produce 7 kW of analog and more than 1 kW of digital power from a single source. Z-HD transmitters deliver linear amplification without RF bandpass filters.

A Harris Dexstar exciter and the optional ePAL will be included along with the Harris Digit CD analog exciter. Transcom says it will return the transmitter to Harris Corp. for retuning to the new owner's frequency. While at the factory, it will be tested, with necessary repairs made by Harris factory engineers.

These services and needed parts are included in the purchase price of less than \$80,000 including retuning, testing and warranty.

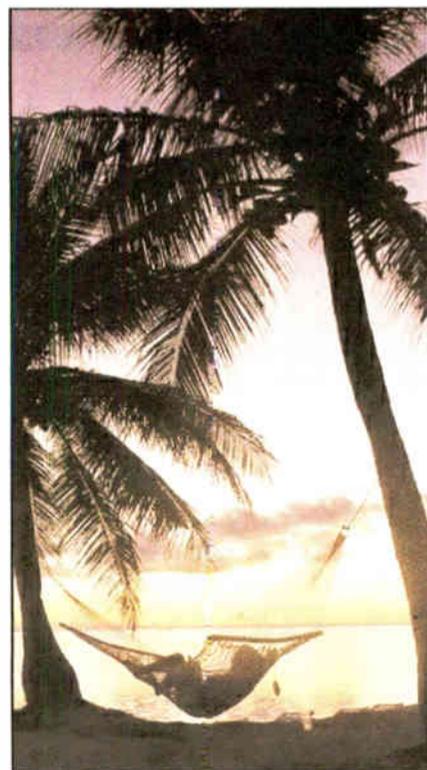
For more information, contact Transcom at (800) 441-8454 or e-mail transcom@fmamtv.com.

Next in Buyer's Guide

Audio Processing	June 7
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Codecs and Telco	August 2
Studio Furniture and Design	September 1
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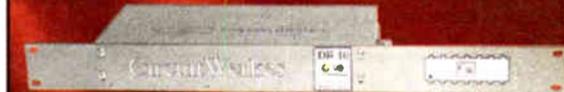
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◆ READER'S FORUM ◆

Playa de Pals

This letter is in response to an item on RW Online, "Radio Liberty Towers at Playa de Pals to Be Destroyed." (The 13-tower array in Spain subsequently was brought down.)

A group of former RFE/RL employees has been following very closely the Playa de Pals story and the destruction of that marvelous station.

Playa de Pals was the flagship station of Radio Liberty, before and after RL was merged with Radio Free Europe in

deal. If that is not bad enough, we now hear the BBG/IBB has decided to close the shortwave station at Kavala, Greece.

There is no station in the U.S. government arsenal of shortwave broadcasting stations more important to the Middle East (Afghanistan, Egypt, Jordan, Lebanon, Iran, Iraq, Israel, Saudi Arabia and Syria) than Kavala. What are they thinking? Are they thinking? Are they being told the truth by IBB engineering? Do they want to know the truth?

It is a sign of our times that the board members who travel abroad on vacations or other junkets at the expense of the

We now hear the BBG/IBB has decided to close the shortwave station at Kavala, Greece.... What are they thinking? Are they thinking?

the mid-1970s. Its shortwave coverage to Moscow and regions beyond the Ural mountains and Siberia in the former Soviet Union was unmatched by any shortwave station in the U.S. government arsenal of shortwave stations around the globe.

An agreement had been signed with the Spanish Government in 1995 to extend the operation of Pals to 2012 and probably even beyond. Sinister forces within the U.S. government, for reasons I never completely understood, had it in for Pals since the International Broadcasting Bureau was created in approximately 1993.

The individuals at the highest levels in IBB, together with their oversight board the Broadcasting Board of Governors, never understood, never tried to understand the strategic importance of the Pals geographic and technical advantages over other shortwave stations in that region.

The BBG comprises influential and patriotic American citizens, presidentially appointed and congressionally approved, who quite simply have a history of listening to the wrong people within the U.S. government international broadcasting community — whether technical or programming.

They have managed to assemble an executive staff in the IBB that does not argue with them — leaving them free to enact their inane policies detrimental to the American citizenry and long-term international goals of the U.S. I saw it up close and personal, as the saying goes, for five years between 1995 and 2000. It is even worse now, I am told.

There are influential and well-meaning members of the BBG who have reportedly said MTV and rock-and-roll music "won" the Cold War.

I do not denigrate the small importance these two cultural phenomena may have had on the ultimate winning of the Cold War. But to give them the importance that they have been given by the BBG is a slap in the face of serious journalists, past and present, of RFE, RL, VOA and others who broadcast daily the truth about America, the world and all communist dictator controlled countries, from the early 1950s to the fall of the Berlin Wall in 1989 to the present.

The decision on Playa de Pals is a done

U.S. taxpayer can never and will never understand the legitimate cultural differences that exist in the world — and how to best accommodate/ameliorate those differences. Such is the history of the BBG since its beginning in about 1993.

*George Woodard
McKinney, Texas*

Quad Error

Just a short note to correct a factual error in John Sunier's letter (*Reader's Forum*, March 1). The San Francisco stations that teamed up for quad broadcasts in the late 1960s were KPEN(FM) and KRON(FM).

Thanks for Radio World. It's still the most relevant publication on our radio broadcast business.

*Bill Brooks
San Francisco*

Searching RW Online

I'm surprised you haven't posted a blurb about the \$13 million up for grabs in the recently announced final round of CPB Digital Conversion grants available for pubcasters.

Deadline to apply for a grant is May 26, and this time they have opened the doors to "hardship" cases and included multicasting equipment as qualified for grant money. The process is on a fast track with awards to be announced this summer. I have been looking for a mention in Radio World Online's Daily News page, which I use as my home page when booting up Internet Explorer.

*Corey Meyer
President, Audiomedia Associates
Covington, La.*

RW replies: A news item ("Window Opens for CPB Digital Conversion Funding") appeared in RW NewsBytes on March 29.

(Readers can now use Google to search within RWOnline.com for past news items as well as selected stories from our print edition. Go to www.rwonline.com and scroll to the bottom of the page.)

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◆ READER'S FORUM ◆

License Revoked

I'd like to add a bit of detail to Charles Fitch's article "The Demise of the First Phone" (March 29).

For a while during the Second World War there weren't nearly enough of these license-holders to operate the nation's stations, so many were away serving in the armed forces. So the FCC temporarily reduced the requirement by allowing people to operate broadcast transmitters with just a Third Class license plus a Broadcast Endorsement.

To get the endorsement you had to pass a written test, but one less stringent than for the First Phone. In fact, the exam was identical to that for the Class-A amateur ticket (roughly equivalent to today's Advanced Class) minus the Morse code requirement.

Of course this special dispensation ended after the war but by then it had enabled a lot of young folks to get an entrée into broadcasting, and many went on to make careers in the business. Also I may be wrong, but I don't recall already possessing a Second Class ticket before taking the exam for my First, back in the summer of 1947.

Thanks for a great article that brought back a lot of memories.

David Richardson
Eastsound, Wash.

An additional aspect of the FCC licensing system was the endorsements one could add. Take an additional test and you could work on radar gear. And many of my colleagues passed the test for the code endorsement. The story — probably apocryphal — was that the Morse code you needed to transcribe was the Gettysburg Address with certain words and numbers changed. "Four score and six years ago ..." I never took that one; I couldn't pass code in Boy Scouts!

The test process issue that Fitch discusses certainly created problems. You could go to a school and get the answers to the questions; or buy an answer guidebook for that matter. But I remember Ray Gill, who taught at Radio Engineering Inc. in Virginia. An extremely knowledgeable man, Gill taught theory better than anyone I have met. His tests included his own questions as well as FCC practice questions. He would work with you until you understood the practical theory and could explain your answer.

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Okay, so you dip the plates and peak the grid — but why? Yes, some guys failed.

But the test set came about because it was easy to process by the FCC. There was a time when, to get your first ticket, you had to hand-draw a plate-modulated transmitter, including the audio section. You can't grade that with an answer sheet and a bureaucrat. You need engineers to look at the schematic and make that call.

It was in the early 1970s when another colleague of mine took and scored 100 on his first element — a perfect score. The engineer on duty told him to take a seat in the corner. A bit later the FCC engineer brought him a piece of paper and a pencil and told him to draw a coupling unit — with approximate values — for an AM modulated tower with a resistance of 75 ohms. After the colleague completed the chore, the FCC engineer said simply, "OK. You pass."

Bill Betlej
Staunton, Va.

Buc Fitch replies:

I had completely forgotten about the essay part of the early exams. My testing in 1960 had a question where you had to draw the block diagram of a direct FM transmitter.

I chose to draw a phasitron type, as it was the transmitter used at the first FM station I worked at (age 13). After the exam, the examiner held me for an interview by the engineer in charge of the office.

He came out and was surprised to find a kid but he played it straight and asked me how a phasitron actually worked. My explanation of it being similar to an electromagnetically deflected TV picture tube must have been acceptable and comprehensible to him, as it did the trick.

In the dim mists of time and my remote youth, I set myself the task of getting all the FCC licenses. I have no idea why, and I suspect I didn't then, either.

I had no use for an Amateur Extra — it conferred no additional privileges. I had no use for a First Class Radio Telegraph license, and certainly not one with a radar endorsement. I don't even think I was old enough to run away to sea without my parents' permission. Nonetheless, they were there, as was the Washington Street FCC office in New York City. I was not to be deterred.

Make or Break Time

The next 12 to 18 months are "make or break" for HD Radio.

During this period, HD Radio will continue to gain momentum and public acceptance, or it will level off and begin to decline. Receivers will begin to proliferate and their prices will continue to come down; or HD Radio receivers will remain hard to find. Consumers will embrace the new technology or they will ignore it.

Broadcasters must recognize that what they do *right now*, at both the management/operations and engineering levels, has a great deal of impact on the success or failure of HD Radio.

If digital is to succeed, engineers must make it the best it can be. That means consistency; good time and level alignment; and excellent technical quality. We must view our HD Radio signals with the same import as we do our main analog signals. When listeners tune in, it must be a positive experience, not a negative one (as is the case with poorly aligned levels and timing, or with inconsistent HD Radio signal presence).

Time alignment may well be the most critical factor, and getting it right may be the biggest challenge broadcasters face. Without proper time alignment, fringe-area HD Radio listeners will likely find a station unlistenable as it transitions back and forth between digital and analog with an 8.4-second jump during each transition.

According to one anecdotal report, BMW dealers found that a number of reported radio reception problems in OEM HD Radio-equipped vehicles are actually time-alignment issues with radio stations. Unless engineers deal with this issue, it is bound to generate negative press and word-of-mouth reports about HD Radio.

We've got to find ways to deal with off-air monitoring, live traffic reporter/remote broadcast monitoring issues and other factors that would keep a station from properly time-aligning its analog and digital signals.

Management, programming and promotions also have a job to do. HD Radio must be *different* and *better* than the same-old-same-old analog. That means different and better programming, different and better sound. And we must have enthusiastic promotions, hammering home the benefits of HD Radio throughout the day in on-air liners and promos, providing live HD Radio demos during remote broadcasts and promotional appearances, and partnering with local retailers to make HD Radio equipment readily available to listeners at reasonable prices.

No doubt about it, HD Radio is the "bling" of terrestrial radio. Some in our industry see it as unnecessary. But let's face it; bling is what sells. It's what the younger generation is looking for. Content, promotion and technical quality are all part of the bling.

The reality is that we only get one chance to get it right. That chance is before us now. Let's not mess it up.

—RW

I have always been excited by radio, by the very notion of long-distance communication without wires. My First Phone let me operate the most popular radio station on earth, WABC in the 1960s. My ham license let me talk, or at least exchange signal reports, with everywhere on earth. My radiotelegraph license (and the Merchant Marine Radio Officer license the U.S. Coast Guard inadvisably issued) would have let me save my ship, if I had had a ship.

Mercifully other life events intervened and I was never able to get the First Telegraph license, which had an in-service requirement. I also wasn't permitted to sit for the Aeronautical Endorsement for the Telegraph License; I don't recall that I was told why but one didn't question the man with the cigar.

Those then-precious documents defined my early adulthood. I don't necessarily lament their passing, and I'm not even certain I could find my final renewals, except for the ham license. Yet looking at the reproductions in the March 29 issue of Radio World brought me a frisson of nostalgia as few things can.

Even though I no longer work in commercial radio, I'm involved with looking for space aliens on the microwave frequencies, and running a moonbounce beacon, no radar endorsement necessary.

I still love AM and FM (and, I admit, my MP3 player). TV? If God wanted pictures to fly through the air, he'd have given them tickets.

Richard Factor
Eventide
Little Ferry, N.J.

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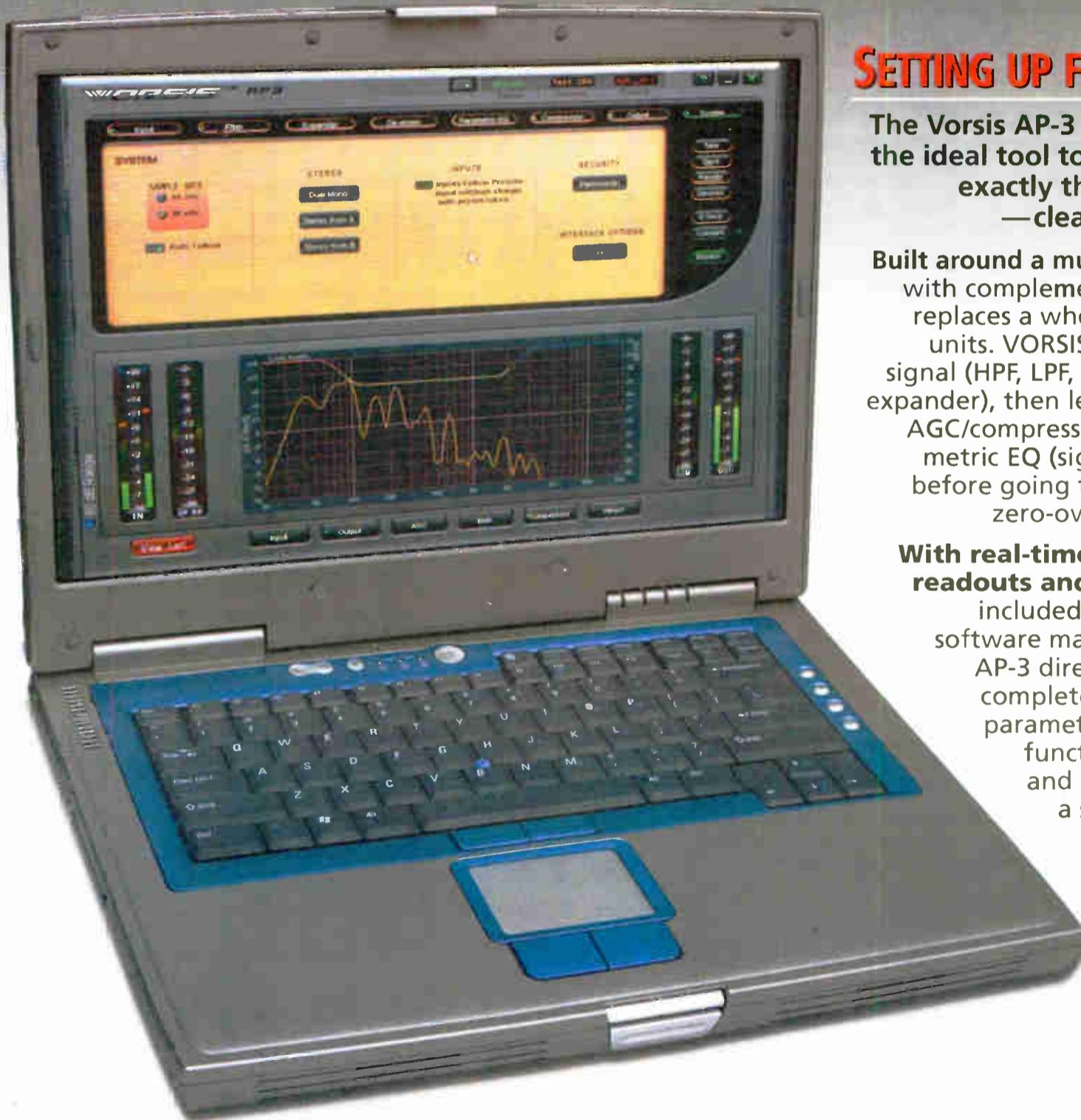
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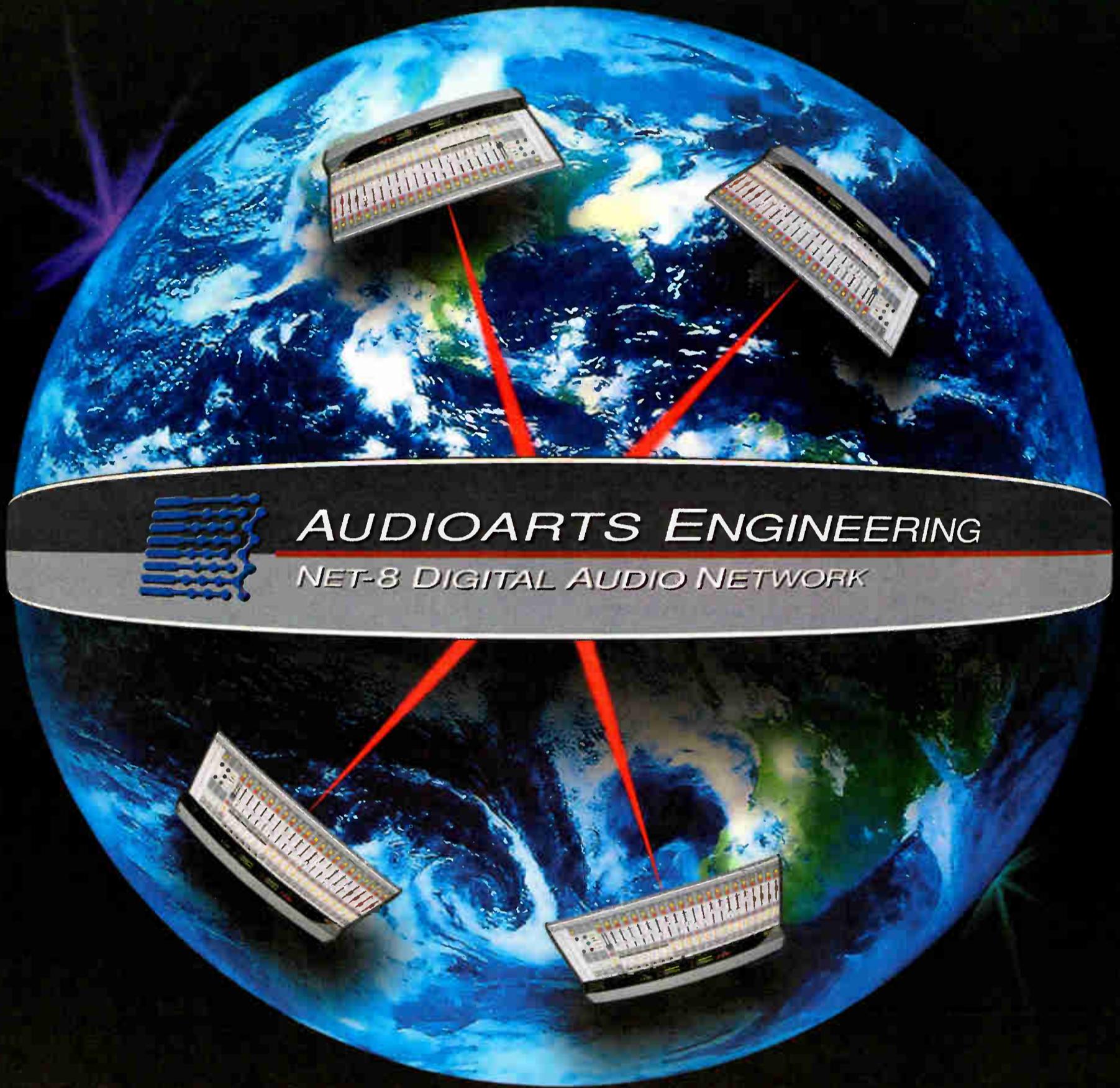
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