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$2.50 The Newspaper for Radio Managers and Engineers August 3, 2005

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Prestige — and Long Hours — at the Top

Covering the West Wing for Radio Is Not Quite as Glamorous as You Might Think

by Randy J. Stine

WASHINGTON There is a saying that a reporter's time on the White House beat is counted in dog years. "For every year you're there, it counts as seven," some say.

Correspondents here admit this is a beat with a high burnout rate because of long hours and travel. Yet a handful of men and women endure the schedule and call the White House their radio home.

These skilled correspondents have what many consider to be one of the most coveted reporting jobs in the world, covering the biggest newsmaker. They travel the world; their reports typically find their way into top-of-the-hour network newscasts.

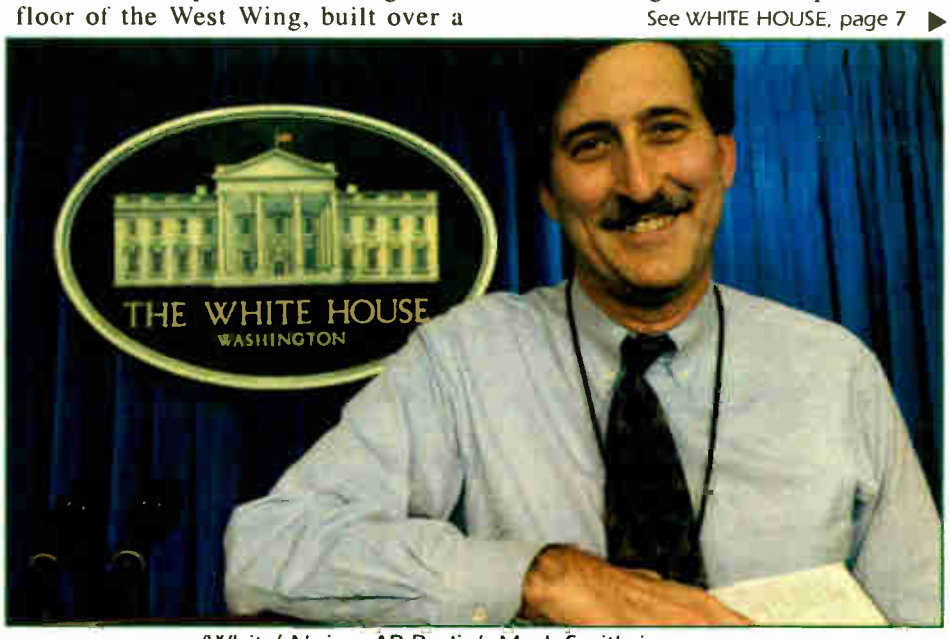
Becoming a member of the White House press corps is not easy. In addition to the deadline stress familiar to any news talent, a correspondent must be versed in economics, homeland security, policymaking, energy and international relations — and able to discuss the material on cue in a coherent manner.

"Some consider it the ultimate beat ... a chance to be a part of the exclusive press corps that travels the world with the president," said Peter Maer, CBS Radio News White House correspondent. "Others view it as a spoon-fed beat. The challenge is to get past what Scott McClellan tells you and find the real story outside of the White House briefing room." McClellan is the White House press secretary.

The White House press briefing room is a cramped area on the ground floor of the West Wing, built over a famous indoor swimming pool — the one Franklin D. Roosevelt used for polio therapy and John F. Kennedy for entertaining guests. The pool was closed and the briefing room built over it in 1970. It's adjacent to the press secretary's office.

A major planned renovation of the press briefing room, which might begin in August, temporarily will displace the press corps to the nearby Eisenhower Executive Building. Most sources for this article agree that the press room

See WHITE HOUSE, page 7 ▶



'White' Noise: AP Radio's Mark Smith is among the journalists who cover the White House on radio.

World Radio History

Messer Leaves IBB for DRM

by Leslie Stimson

WASHINGTON Dr. Donald Messer has retired from the International Broadcasting Bureau to work full-time with the Digital Radio Mondiale Consortium, an organization of broadcasters and manufacturers in several countries that promotes a technology to migrate shortwave, medium-wave/AM and now FM to digital.

The IBB intends to fill Messer's position and continue to participate in the DRM Consortium and the ITU.

The bureau provides engineering and administrative support for U.S. government-funded, non-military international broadcast services such as Voice of America and Radio Martí. Formed in 1994, it formerly was part of the U.S. Information Agency. IBB and its governing body, the Broadcasting Board of Governors, were established as independent federal government entities when USIA was disbanded in 1999.

Full-time digital

Messer's move expands what has been a part-time endeavor among his IBB duties to a full-time role with compensation. He remains chairman of the consortium's Technical Committee and a member of the steering board and strategic planning group.

Messer has also been the test coordinator for any country wants to evaluate DRM.

DRM has test agreements with Mexico and Brazil. Tests in Mexico were to be completed in July, he said, with the 26 MHz results to be submitted to the consortium by September, to be followed later in the year for the medium-wave/AM results.

"The Brazil work should start this fall, but the test plan schedule is not yet fixed," said Messer. "We have also received inquiries about testing of this sort from other countries. Along these lines, tests continue in Russia and China, as well as in many countries in Europe and in Kuwait."

Additional countries represented by DRM members include Italy, Germany, France, Sweden, Spain, Japan, Canada and the United Kingdom.

On this continent, Messer has scaled back his role with the National Radio Systems Committee. He has resigned as co-chairman of the DAB Subcommittee's standardization working group, to avoid the appearance of a conflict of interest in his DRM role.

Sony's Paul Feinberg remains co-chairman of this group; Dom Bordonaro, chief engineer for Cox Radio in Connecticut, is the new co-chair.

"This group still has a lot of work to do, Advanced Data Applications being the most important one," said Messer, who added he will continue to attend meetings as an observer.

Aerospace and government

Messer had been with IBB for 20 years. He left IBB in May as director of the Spectrum Management Division.

He held a variety of engineering positions earlier in his career. After graduating from New York University with a Bachelor of Science in engineering physics in 1952, Messer went on to get his Master of Science from Cornell in theoretical solid-state physics and a doctorate from Johns Hopkins in operations research.

He spent several years in the aerospace industry in advanced development and applied research. In 1971-81 he was president of Messer Associates, a technical and management consulting firm later acquired by Dynamac.

In his IBB role, he was the Broadcast Satellite Program manager at the USIA's Voice of America. There, he helped lead to fruition what is now called satellite digital radio, according to a 1996 FCC filing by Messer and others evaluating

See MESSER, page 6 ▶

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World Radio History

Navigauge Seeks New Backers

Passive Mobile Audience Measurement Firm Tries to Regroup After Suspending Operations

by Randy J. Stine

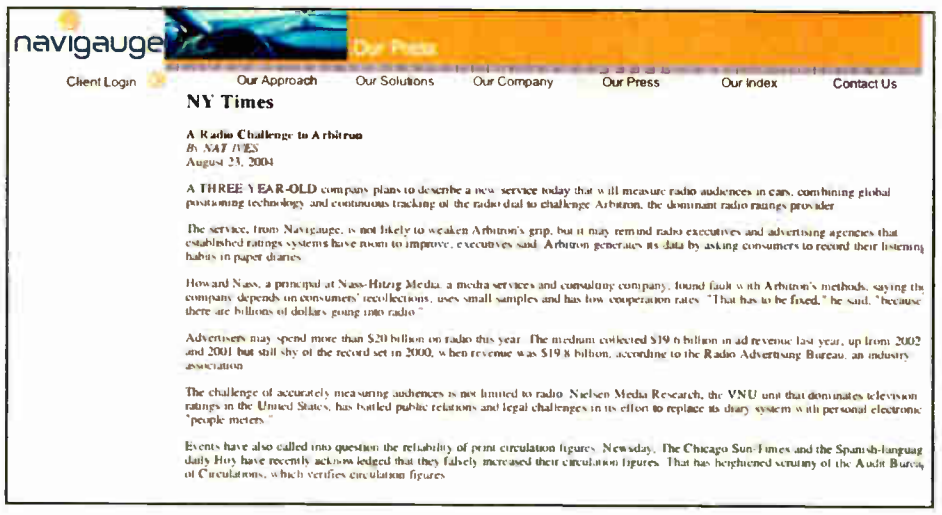
ATLANTA It appears Arbitron has one less competitor in the move to make data collection portable.

A former Navigauge executive says he believes the in-car monitoring data collection firm will be back in operation soon with new investors. But it closed its office here and suspended operations in June.

An agreement to sell the firm to an unnamed investor hit a last-minute snag in late May, officials said, which forced Navigauge to close and release 18 employees including CEO Tim Cobb and President Carl Ceresoli, who was a technical expert and co-founder of the company.

Ceresoli and Bruce Layman founded Navigauge in 2000.

Former Senior Vice President of Media Drew Simpson said he is working with Navigauge's major investors, Armada Ventures and SkyTerra Communications, to explore sale options. Navigauge hired Simpson, who previously did executive stints with Arbitron and Tapscan, last fall.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NY Times

A Radio Challenge to Arbitron
By NAT IVES
August 23, 2004

A THREE YEAR-OLD company plans to describe a new service today that will measure radio audiences in cars, combining global positioning technology and continuous tracking of the radio dial to challenge Arbitron, the dominant radio ratings provider.

The service, from Navigauge, is not likely to weaken Arbitron's grip, but it may remind radio executives and advertising agencies that established ratings systems have room to improve, executives said. Arbitron generates its data by asking consumers to record their listening habits in paper diaries.

Howard Nass, a principal at Nass-Hitzig Media, a media services and consulting company, found fault with Arbitron's methods, saying the company depends on consumers' recollections, uses small samples and has low cooperation rates. "That has to be fixed," he said, "because there are billions of dollars going into radio."

Advertisers may spend more than $20 billion on radio this year. The medium collected $19.6 billion in ad revenue last year, up from 2002 and 2001 but still shy of the record set in 2000, when revenue was $19.8 billion, according to the Radio Advertising Bureau, an industry association.

The challenge of accurately measuring audiences is not limited to radio. Nielsen Media Research, the VNU unit that dominates television ratings in the United States, has battled public relations and legal challenges in its effort to replace its diary system with personal electronic "people meters."

Events have also called into question the reliability of print circulation figures. Newsday, The Chicago Sun-Times and the Spanish-language daily Hoy have recently acknowledged that they falsely increased their circulation figures. That has heightened scrutiny of the Audit Bureau of Circulations, which verifies circulation figures.

The New York Times profiled the company in August 2004 in an article still on the Navigauge Web site. 'The service ... is not likely to weaken Arbitron's grip, but it may remind radio executives and advertising agencies that established ratings systems have room to improve,' the Times reported then.

"The current investors had already made plans to move on and were forced to suspend operations. We are currently accessing what the next move will be. Obviously, a sale to a new investment group to keep the company intact is the outcome we are seeking," Simpson said.

Atlanta data

Simpson said Navigauge spent $6.5 million of investors' money on proprietary technology installed in nearly 500 vehicles in the Atlanta area in summer 2004. The company's IQMonitor radio audience measurement service tracks media consumption by each driver. Data is still being collected and will be retained by the firm until operations resume, Simpson said

"The radio listening information we collect is discreet and precise and shows what station is being listened to in the vehicle, for how long, volume indicators and even whether the occupant is listening to a CD," Simpson said.

IQMonitor, which incorporates global positioning technology, collects and sends data to a Navigauge collection center in "data bursts" every thirty minutes through the city's SkyTel pager network, Simpson said.

"It's possible to measure how current local advertising is moving the needle and impacting purchasing habits. Since it is GPS-based, we can geo-code major retail locations and map a very precise purchasing pattern," Simpson said.

Arbitron's Portable People Meter system has participants carry monitoring devices with them. Navigauge panelists agree to have the device installed in their cars for three years.

Navigauge collects research consumer data that it says is helpful to advertisers and radio broadcasters, Simpson said. "We had done work for Coke and Pepsi and were preparing to spend the summer in budget discussions with advertisers and broadcasters to lock up annual contracts for 2006," Simpson said.

In February, Navigauge named Houston as the first of five top markets where it planned to roll out this summer. Houston is home of the second Arbitron PPM test. Simpson said expansion plans for Houston and the other cities now are on hold.

Simpson said the technology can be used to determine when a listener tunes out, and where on the dial he or she goes next, key information to determine a song's burn rate, for example.

Ceresoli told Radio World earlier in the year that the technology can determine when someone tunes away from a terrestrial station for satellite radio. Navigauge had planned to incorporate this information into the advice in future generations of product.

"It takes a while to earn your stripes in the data collection industry. I think in a short time we proved the worthiness and accuracy of our data," Simpson said. "We continue discussions to move forward and I'm optimistic we will find a buyer."

'Difficult' to compete

If Navigauge ultimately fails, Arbitron would face less competition, said Marc Greenspan, partner in Research Director Inc., a ratings analyst that consults radio stations.

"Navigauge would have been a nice adjunct to Arbitron's diary measurement and would have provided tracking information to show change much more quickly than Arbitron's quarterly ratings," Greenspan said. "However, Navigauge would only have provided a partial picture compared to data we might get from Arbitron's PPM panel."

Greenspan called in-car monitoring "just a part of the total picture" when gathering useful information for radio stations and its advertisers.

Officials with MobilTrak Inc., a competitor of Navigauge in the in-car data collection business, said they were not surprised by recent developments. The vast majority of MobileTrak's revenue is derived directly from retail advertisers and advertising agencies.

"In my opinion, it will be extremely difficult for anyone to compete directly with Arbitron in radio measurement. That is a difficult business model and requires a huge amount of money," said David Boice, MobilTrak's managing partner.

MobilTrak's Radio Monitoring Systems technology senses which radio stations drivers are tuned to by picking up faint electronic signals emitted from car antennas as they pass by selected locations. The company collects data from approximately 500,000 cars traveling past fixed locations in Washington. It also operates in Seattle, Los Angeles, Baltimore and Charlotte, N.C.

RMS requires no special electronic equipment mounted in automobiles to collect listener data, according to MobilTrak.

The current investors had already made plans to move on and were forced to suspend operations.

— Drew Simpson

Correction:

The story on Florida's "pirate law" in the July 6 issue jumbled the call letters of a station. "WEXL" is in fact WXEL. The Boynton Beach AM is owned by Barry University.

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World Radio History

You Can Always Turn the Page

From the Editor

Paul J. McLane

Some broadcasters are wasting no time getting themselves into multicasting mode.

As we report on page 15, 109 radio stations now have temporary permission from the FCC to use their digital signals to broadcast more than one program channel; in early July seven were doing so.

As Radio World has on all related topics since the inception of digital radio, we are leading the industry with our coverage of this movement and its implications. Let me know what your station is doing, planning or thinking in regard to multicasting or HD Radio. Write to *radioworld@imaspub.com.*

★ ★ ★

Long-time readers know that Steve Dana is founder of Radio World and CEO of IMAS Publishing. Colleagues will be interested to learn that he is moving from the Washington area. He and his wife will relocate to Las Vegas.

In a memo to employees, Dana emphasized he's not retiring. "I will still be active in running the business, but I want to disengage myself from the company's day-to-day activities, and spend more time pursuing my other interests, which include archeology and car racing." The couple now will also be closer to their daughter and son, who live in the West.

"Fortunately, I can make this move because the company has a strong management team, which handles most of the day-to-day details already," Dana wrote.

"I am pleased to announce that Carmel King is taking over as CEO of IMAS. Eric Trabb will become VP Sales/IMAS and Group Publisher of TV Technology. John Casey will step up to the role of Publisher of Radio World U.S. And Raffaella Calabrese was promoted last month to CEO of our Italian company, IMAS Publishing (Europe) Srl."

Dana said his move will have little impact on most operations and that he will remain in daily contact with the company's other top execs. Readers can also expect to continue to see him at trade conventions, where he's a familiar presence. Still, this marks a big change at IMAS, a company Dana founded in the 1970s. (We're already taking bets to see if Steve tries to save a few bucks by putting us all up in his Las Vegas basement at NAB time ...)

Steve welcomes your thoughts and good wishes via e-mail to *sdana@imaspub.com.* Kudos also to former publisher Carmel King on her new role. And shake hands at the next convention with John Casey. Readers (and I as editor in chief) are fortunate to have a publisher who has deep roots in radio and pro audio through his background at companies like RE America, Telos Systems and Denon, his love of music and his early involvement in RDS. Casey knows the technology of this industry; he has put a significant imprint on Radio World and its associated publications even before taking the publisher's helm.

★ ★ ★

I shared with you last month a letter condemning us for publishing a lengthy excerpt of a Clear Channel letter to shareholders. I also explained my reasons and asked for thoughts.

One reader took me up on my invitation:

"I bit my tongue and didn't write to you when you guys ran that full-page CCU press release/letter to shareholders," he wrote to me. "I figured someone else more fully connected to the industry than I am these days would; and from your editorial this week I see that they indeed did.

"You should accept your error without the attempted justification that you placed in your latest column, though. RW was completely off base when you ran that tripe, unless you're seriously trying to regain your old 'shopper' reputation.

"Clear Channel's PR department can afford to buy a full page in your magazine if they want to communicate with their shareholders. That you supposedly didn't accept payment for this verbatim reprint of what started out as a waste of paper when it was legitimately mailed to the same shareholders (and then only as part of CCU's nominal compliance with SEC rules) only sets precedent that will no doubt require you to run similar blather from every other public company that's remotely related to radio broadcasting.

"Certainly you guys are smarter than this. Why did you run it, then? As a favor to CCU, one of the big-pocket owners of Ibiquity, hoping to get a few extra HD Radio ad dollars? Come on ... there had to be some reason you (sold out) in public and gave tens of thousands of dollars to the largest and most profitable broadcast firm out there today. Could it be because one of their divisions has been slow to scratch your own back? Inquiring Minds Want To Know, Paul, and in the absence of reasonable explanations they Make Stuff Up. All the tabloids know this, so why would you fall for it?

"Next time IMAS and RW have a blank page to fill, why not run a PSA? Consolidated Radio never airs them anymore; you'd be doing a real service! Or maybe you could do a little investigative reporting about why the Bush administration's 'Fake News,' taxpayer-paid PR continues to be aired in violation of law, as defined in the story on the page following your Clear Channel piece? You don't have to embarrass yourself by reprinting corporate 'junk mail' on a slow news day."

I know this writer and consider him a friend to RW. Even he describes himself as a grouch, so I don't take his letter (too) personally.

In replying, I told him I disagree, and that his speculation about my motives are definitely 180 degrees out of phase. Still, I offered to publish his letter. He declined, so I am not sharing his name; but I wanted you to share in the discussion.

I repeat: My goal is to provide you with an exceptional publication. In striving to do so, I do not feel it is my job to protect readers from what I think they don't want to hear. It's my duty to collect as much relevant information from sources that influence our lives in radio day to day; share that with you; comment as I see fit, in a manner clearly identified as opinion; and let you decide what to read, what to think and what to ignore.

I happen to believe something you might find surprising: "Clear Channel bashing" is the common opinion that gets plenty of ink, and pro-Clear Channel "voices" are less common here. Few complain to RW about the many CC bashes that we receive and publish. But CC is so demonized, woe be to us if we dare to even think about giving the company's views a chance to be seen here.

Goes against your grain, maybe. But it's a journalist's job to recognize and avoid "group think" — and in our circles, "group thinking," for some time now, has been anti-Clear Channel.

I don't argue that the big broadcaster has, at times, deserved the criticism. It certainly has. But it remains a key player, perhaps the key player, in our industry.

In a vituperative climate, it's harder to defend publishing *anything* that might be perceived as positive about the company. But journalists do not have an easy job. If I change our policies about editorial coverage simply *because* a subject happens to be a big, sometimes-unpopular organization, I'm failing to do my duty as I see it.

(The discussion is ironic because, if anything, we could view Clear Channel as a competitor; among other things, it owns a competing radio publication.)

The only thing I'd change about my original decision is that I would not devote as much space to the article. However, that letter to shareholders contained the most concise summary I have seen of CC's views on the success of its initiatives this year. I would publish those excerpts again, and will do so in other cases if I come across material that I believe affects you and me in our daily professional lives.

If you don't like opinions you see here, write your own. Or to paraphrase a popular saying about radio indecency, just turn the page.

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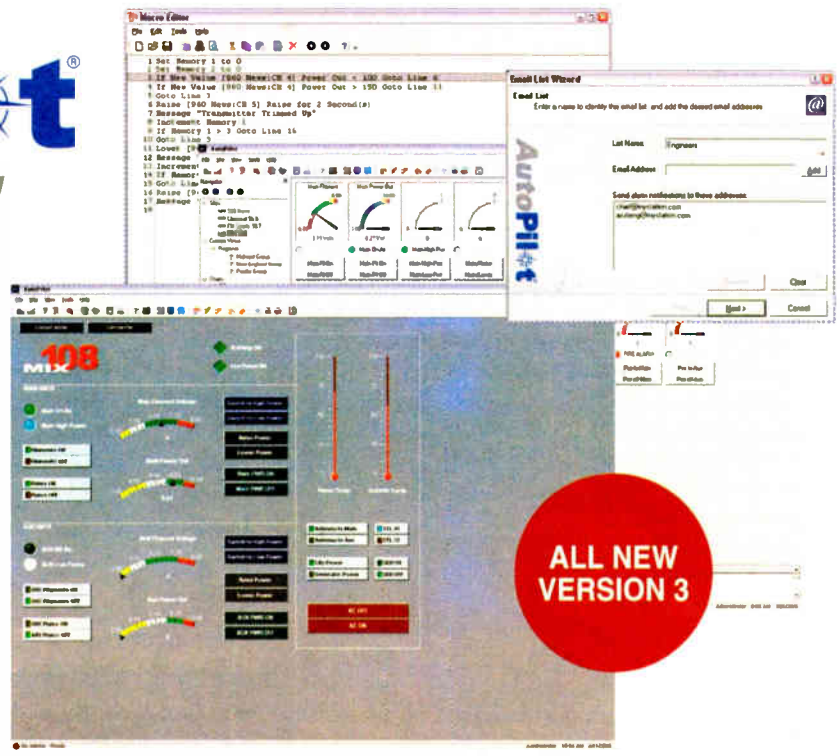

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World Radio History

GUEST COMMENTARY

Pay Radio Will Happen in Canada

Despite Calls for Reconsideration, Author Says, Country Will Tune to the Future

by David Bray

The author is senior vice president of Hennessy & Bray Communications, a consulting firm and advertising agency specializing in radio.

A new wave is sweeping over Canada in what will become a defining moment for radio broadcasting.

With the approval of three subscription licenses, the Canadian Radio-television and Telecommunications Commission issued an emphatic *yes* to new technologies that Chairman Charles Dalfen, in a crystal-clear (you might say digital) fashion, declared "will help to give Canadian talent exposure to listeners across Canada and indeed, North America — both through new Canadian channels and airplay on U.S. channels."

The first critical step took place last November with the CRTC hearings in Ottawa/Hull at which three satellite/subscription applications were presented. These included the XM/Canadian Satellite Radio and Sirius/CBC/Standard satellite proposals along with the CHUM Ltd./Astral terrestrial/Eureka-147 offering.

In the room was a Who's Who of radio in Canada. The lobbying for intervention support leading up to all of this was intense. So much handshaking and arm-twisting took place that few people in the radio or music industries were left with shoulder sockets intact.

After that came the hand-wringing, as everyone awaited a decision more than seven months in coming.

Uniquely Canadian

If I were a sports reporter I would call the outcome a home run for satellite. Still, as we forge toward the launch dates, a good deal of debate continues.

Canadian content, known here as CANCON, has been the pivotal issue being discussed during this entire process. In a uniquely Canadian fashion, the fostering of Canadian talent is always a major consideration for the commission when granting broadcast licenses. (*The Canadian content requirements for the applicants were described in Radio World, July 20, page 3.*)

Both satellite applicants said they will embrace niche formats, new music and emerging artists, giving them the opportunity to reach all of North America. CHUM, with a terrestrial-based system serving Canadian major markets only, focused on its pledge to adhere to the current CANCON regulations for traditional broadcasters.

The satellite radio applicants don't see themselves as being in competition with conventional radio, but rather as a compliment to it — one that offers cutting-edge niche programming that mass-appeal stations can't afford to deliver. The presumption here is that rather than cannibalize tuning to existing traditional stations, satellite will help to revitalize listeners and increase overall tuning to the medium, weaning attention away from video games, MP3 players, etc.

The artists, musicians and comedians with whom I have recently spoken are enthralled about the satellite broadcasters' commitment to new talent and niche formats as well as the opportunity to reach the U.S. market. Many Canadian artists, including Daniel Lanois — producer of U2, Bob Dylan, Peter Gabriel — Robbie Robertson, Ian Thomas, Colin Linden and Jeff Healey, have spoken in favor of satellite in Canada.

Behind the scenes, Canadian Satellite Radio confirms that production on high-profile features has begun with a number of these artists. As well, building of the technical infrastructure is underway.

Certain industry groups such as the Association of Canadian Radio and Television Artists have appealed the CRTC decision to the cabinet of the federal government, perhaps in hope of negotiating some further concessions. History indicates that the chances of such an appeal are slim.

The satellite applicants seem to be undeterred. John Bitove, president and chief executive officer of Canadian Satellite Radio, said he expected resistance to the CRTC ruling, and that won't stop CSR's plans to launch its service by Christmas.

"I think some of (the coalition's members) have vested interests with existing broadcasters and some of the status quo, in terms of the Canadian broadcasting industry,'" he said in an interview with Canadian press.

"The fact of the matter is that tens of thousands of independent artists are behind satellite radio because of the new-found exposure it will mean for them ... as well as the hundreds of millions of dollars in funding it will mean to Canadian artists and musicians."

Fears unfounded?

For his part, Kevin Shea, president and chief executive officer of Sirius Canada, said, "The commission has worked hard to give us a reasonable and creative framework within which we can move toward providing Canadians with an outstanding programming line-up." Wall Street's fears that Canadian content restrictions might deter satellite's launch appear to be unfounded.

One minor sticking point for Sirius was the decision that re-broadcasting of existing services in their entirety (such as the Sirius re-broadcast of CBC services) would not be permitted. At least 50 percent of the programming on each of the eight channels must be original Canadian programming, the CRTC said in its application approval in June.

The CHUM/Astral group, which had sought exclusive access to the subscription market, responded quickly to the decision. Paul Ski, executive vice-president of radio for CHUM Ltd., said "We are extremely disappointed with the commission's decision. ... It is unrealistic to expect that an all-Canadian service such as ours can compete with undertakings whose channels are 90 percent U.S.-originated."

CHUM representatives have repeatedly said that they would not launch if all three applications were approved. Many industry pundits agree that it would be economically impractical for CHUM to attempt to launch given the cost of producing 50+ channels and the formidable satellite competition.

Equally important is the fact that auto manufacturers have said that they won't support the CHUM Euereka-147 platform, leaving would-be pay radio provider to concentrate on the portable/home market alone.

Car radio expansion

Following the U.S. experience, auto manufacturers want satellite radio in Canada. Michael Grimaldi, president of GM Canada, issued a statement, saying, "Without doubt, satellite radio is the biggest advancement in mobile audio technology in the last 60 years and we plan to present it (Canadian Satellite Radio) in our upcoming models."

In addition to being factory installed in new vehicles, satellite radio will soon be available at audio retail in Canada. Receivers by Polk and Yamaha allow for integration into home stereos. Satellite radio is also available through other manufacturers such as Sony, Alpine, Pioneer, and Panasonic, for dashboard install to upgrade a car stereo.

Perhaps the most vibrant sectors of satellite radio equipment are the portable and plug-and-play categories. These devices can interface with a car stereo through wireless FM modulators that hook up to a home stereo unit through a hardwired cradle; some plug into a boombox for portability. Delphi, Audiovox, Pioneer, and Tao manufacture these devices, as RW has reported.

All eyes are on the number of satellite subscribers in the United States, currently more than 5-1/2 million and growing. Retailers are anticipating revitalizing the radio receiver industry at retail.

Listeners and artists have been demanding change and they are, in all likelihood, about to get it. The radio industry — and, it would appear, the CRTC — is listening to them. Canada is about to tune in to the future.

Contact the author at davidbray@sympatico.ca.

RW welcomes other points of view.

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World Radio History

NEWS WATCH

Harris to Cut Workforce,Outsource Certain Functions

MASON, Ohio Harris Broadcast is streamlining operations by outsourcing and eliminating some jobs.

In a July memo to employees, Broadcast Communications Division President Jeremy Wensinger stated that by the end of the year, the company will consolidate transmitter production in Huntingdon, England into its main plant in Quincy, Ill.

By the end of September, he wrote, it also intends to outsource PR&E console assembly as well as carpentry, systems wiring, warehousing and shipping functions now done at division headquarters in Mason, Ohio, outside of Cincinnati. The company will still design consoles, radio systems and furniture and handle engineering functions and quality control, a spokeswoman confirmed.

The company will eliminate what it positions in the automation and digital asset management lines that it considers duplicative as a result of last year's Encoda acquisition.

A Harris spokeswoman said the number of positions to be lost or outsourced was uncertain, but the company believes up to 10 percent, or roughly 170 jobs, of its 1,700 divisional workforce could be affected. Most employees affected are in Ohio and Europe.

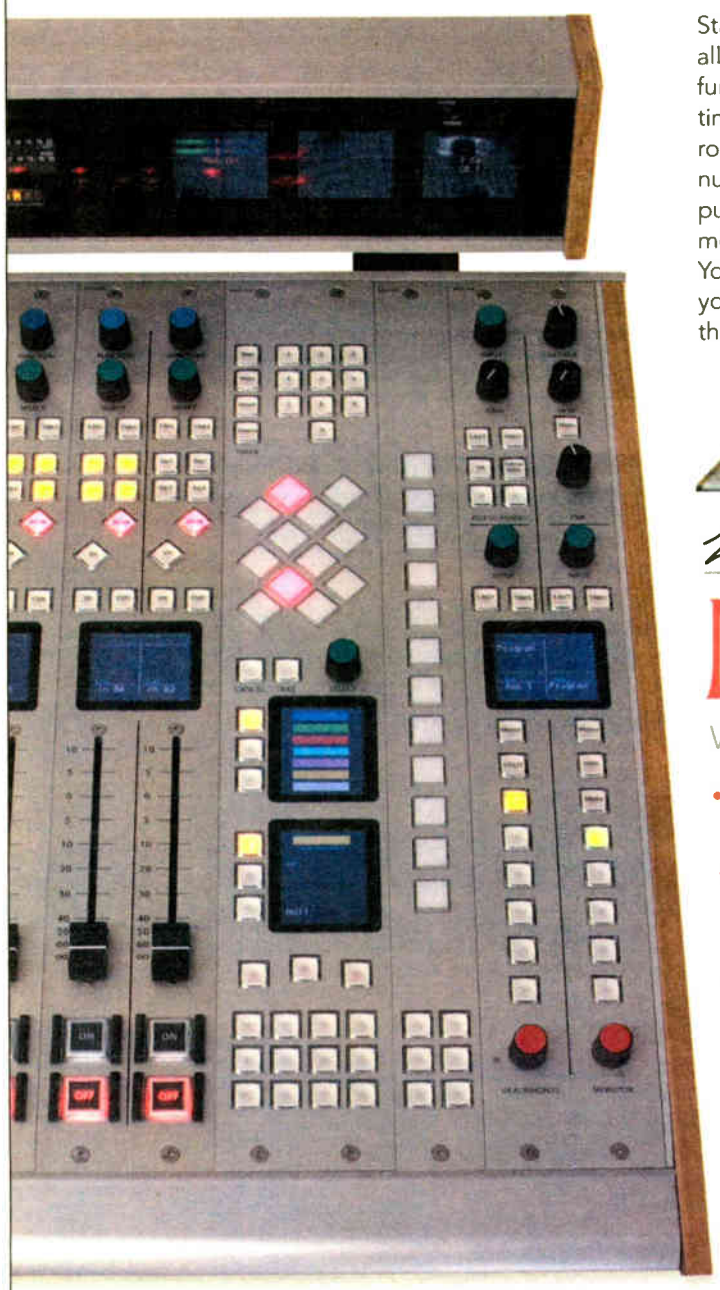
In the memo, Wensinger said the moves would reduce costs, make the company more flexible by simplifying operations and increase competitiveness.

Although transmitters destined for Europe will be manufactured in Quincy, the company will continue to assemble exciters in Rankweil, Austria, and provide European transmission equipment customer service there and in England.

The spokeswoman couldn't say how much money the moves would save or when layoffs would begin.

The news come as Harris reached the end of a fiscal year. Last year at the same time, the company laid off 5 percent of its U.S. workforce and went through a restructuring. Then, Chairman, President and CEO Howard Lance said the broadcast division needed to improve contributions to the overall bottom line.

How to build the perfect console.



Start with a flexible routing system that can accommodate all of your facility's audio distribution, along with intercom functions, EQ and dynamics processing, profanity delays, timers, and more. Next, select the right frame size for the router's control surface. Populate the frame with the number of faders you want, along with programmable pushbuttons, countup/countdown timer controls, and meter bridge with extra graphic displays. The result? Your console, exactly as you want it, with the functionality your talent craves and a sleek design that complements the studio perfectly.

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Console Router Systems

Ibiquity Early-Adopter Discount Rate Changes

COLUMBIA, Md. The price for an Ibiquity Digital license went up July 1. Earlier, Ibiquity had extended its $5,000 introductory special through June 30 for stations that agreed to convert this year. On July 1, the fee rose to $7,500 for stations that agreed to convert by Dec. 31, 2006.

The nominal licensing fee is $25,000; broadcasters planning to convert over the next four years will receive some level of discounts. The fee is a one-time payment that grants a station the right to use HD Radio patents, software and trademarks for its main-channel audio.

Messer

▶ Continued from page 2

pioneer preferences.

In the late 1960s, some U.S. and European broadcast groups began analytic work for would become communications satellites capable of transmitting audio programs to fixed, portable and mobile receivers. The European Broadcast Union, Voice of America and NASA conducted this early work, which increased in the 1970s and '80s with the development of more powerful satellite transponders.

In 1988, the U.S. government became interested in satellite radio for diplomacy purposes and directed the National Security Council to look into it. It did so, and the government directed delegates to the World Administrative Radio Conference to begin working towards frequency allocation for satellite digital radio.

In 1990-91, VOA, under Messer's guidance, and NASA funded and directed the Jet Propulsion Lab on a series of tests, including a demonstration in Washington with what was the forerunner of a transmit/receive system for use with either L-band or S-band spectrum.

Messer was a key U.S. delegate at the 1992 WARC that led to the S-band allocation for satellite digital radio in this country and L-band overseas for testing a satellite component with the Eureka-147 DAB system. In 1990, the FCC received its first application for satellite digital radio from Satellite CD Radio.

In 1996, he was one of the experts the FCC called to review spectrum applications for the original satellite applicants, to determine whether they qualified for a "pioneer's preference" for spectrum. The experts said no.

The applicants for the spectrum were Primosphere; DSBC; Satellite CD Radio, which became Sirius Satellite Radio; and American Mobile Radio Corp., which became XM Satellite Radio. Eventually two licenses went to the highest bidders at auction.

Around 1996, Messer recalled, the NRSC tested the VOA/JPL experimental satellite system, and he had the idea to apply the techniques to shortwave broadcasting.

"We did some work on this, and during that time I got involved with what has evolved into DRM." He became the chairman of the DRM Technical Committee in 2000.

World Radio History

White House

▶ Continued from page 1

needs a more contemporary design.

"It's a bit of a dingy area, actually. I was the first one in the briefing room one morning a few years back, and flipped on the lights to find a rat on the camera stand looking at me. The work area is very cramped and needs an update," Maer said.

The 'West Wing' (Not)

Maer enters the White House grounds at the northwest gate just off Pennsylvania Avenue every morning and clears security, going through multiple checkpoints, credential scans and metal detectors. Security concerns severely restrict the movement of the press corps, Maer said.

"It's not like 'West Wing' on TV," he said, "where I could wander to the national security director's office to ask questions. We have access to the press secretary's office, but that's about it."

Maer shares White House network reporting duties with CBS Radio News correspondent Mark Knoller.

National Public Radio's Don Gonyea joined the White House press contingent in 2000 at the beginning of the first term of President George W. Bush. Gonyea's first news report of the morning airs on NPR's "Morning Edition."

"I'm in Monday through Friday, and sometimes the weekend if something happens. The schedule takes its toll on your personal life ... especially the travel. And the bone-crunching deadlines," Gonyea said.

His daily schedule includes the White House "gaggle" around midmorning with McClellan.

"It's an informal Q&A session with no tape recorders or cameras. That is our first chance to hear reactions to what happened overnight. It also gives the White House an idea of what we'll be asking about during the day."

The daily afternoon press briefing is on the record and is a chance to pry information out of a generally tight-lipped administration, he said.

"This is considered a very leak-proof White House. When something is leaked, the antenna really go up. You always have to be mindful that you could be ... used. You have to work hard to cut through the spin."

Gonyea splits NPR White House mic time with correspondent David Greene. The pair alternates weeks at the White House. This frees both to do NPR's signature long-form enterprise reporting.

AP Radio News correspondent Mark Smith, a 27-year AP veteran, has covered Presidents Carter, Reagan, Clinton and both Bushes. He also is incoming president of the White House Correspondents' Association, which represents the White House press corps in negotiations with the Bush administration.

Lots of travel

"I've traveled with presidents to some pretty exotic places, including the Australia trip with President Clinton. But we are in and out so fast we don't get to see much. Those trips usually turn into 80-hour work weeks," Smith said.

Presidential travel does break up the daily routine a bit, Smith said, and serves to get the press corps out of its cramped White House workspace.

Each radio network has its own small work booth at the White House, where the correspondents can sit with their laptop and recording gear. Some of the nets are on the main level, while a few are relegated to the basement of the press briefing area.

C-SPAN Radio offers a style of White House coverage minus commentary. Instead, its "event-driven programming" depends on live, long-form airings of briefings and ceremonies.

"Our mission is to provide many of the same things our television counterpart offers, but for the radio audience," said Bob Spence, general manager of C-SPAN Radio.

C-SPAN Radio is broadcast on WCSP(FM) in Washington and can be

See WHITE HOUSE, page 8 ▶

Don Gonyea in NPR's work area at the Executive Mansion.

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Email photos and stories of the interesting ways you use YOUR Comrex. Send to: story@comrex.com
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IN THE MIDDLE OF THE ACTION... LIVE, FROM IRAQ.

Armed with little more than two microphones and a Matrix, Ted Leitner of XPRS, The Mighty 1090, broadcast his radio talk show LIVE during morning drive from the Al Asad-Marine Base in Iraq. Leitner is facilitating on-air live communication between troops and their families back home in San Diego, as well as bringing along special guests from the San Diego sports world, including several of the San Diego Charger Girls. "Keeping the spirits of our armed forces up is what its all about," said Ted, "Nothing beats bringing a little piece of home to our troops stationed abroad. Thanks, Comrex!"

Matrix Portable:
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World Radio History

White House

▶ Continued from page 7

heard on XM Satellite Radio and Sirius Satellite Radio.

Hot mics

Covering the White House requires a mix of new technology blended with some of the old, said Craig Swagler, managing producer of CBS Radio special events division.

"The White House has never been an extreme technological challenge because there is so much infrastructure there and it's been continually developed to be quite media-friendly," Swagler said.

CBS Radio News has multiple audio paths originating from the briefing area with "nailed up" positions with permanent dedicated open phone lines wired directly to our Washington Bureau, Swagler said.

"This gives us hot-mic conditions that are always ready. From Washington, then everything is on T1 back to New York. Each one of those has a dedicated independent return line for IFB," Swagler said.

Most radio correspondents carry laptops and MiniDisc recorders to edit sound bites and reports for audio feeds.

The White House mult box provides clean audio from various locations around the White House, including the Oval Office and the Rose Garden. Recorded audio generally is filed from laptops via the Internet to FTP sites or dumped right onto the local area network, engineers said.

Peter Maer of CBS Radio News

"Our setup is pretty straightforward," said Rich Rarey, NPR master control supervisor and a contributor to Radio World. "Our White House booth has a T1 line with a NPR/Benchmark Loudmouth feeding the left side of a Musicam USA Prima 110 codec back to NPR. The right side is being fed from the mult," Rarey said. "Any remaining bandwidth we get is used for phone and computer data that is sent to an Adtran 3200 router at our Washington headquarters."

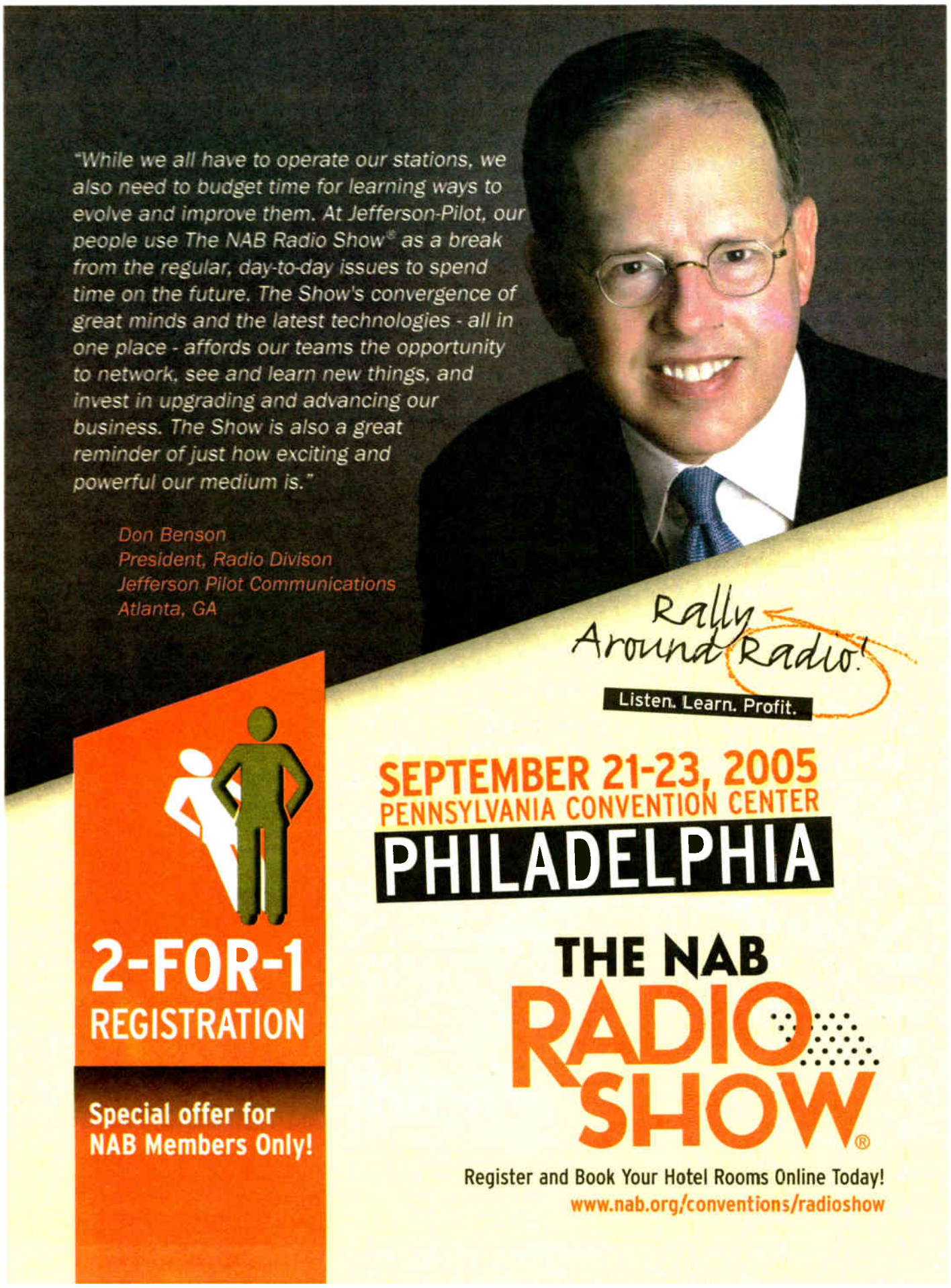
> **I was the first one in the briefing room one morning a few years back, and flipped on the lights to find a rat on the camera stand looking at me.**
>
> — Peter Maer

The Benchmark Loudmouth is a switching box with preamp that feeds sources down the analog program circuit from each of NPR's Washington booths including Capitol Hill, the White House and the Supreme Court, Rarey said.

Covering the traveling White House presents a unique challenge, correspondents say. The travel pool will generally fly on Air Force One, while the remaining reporters fly on a chartered jet paid for by the news organizations. Once onsite, correspondents file reports from an open filing center with Wi-Fi connectivity via their laptops.

"For example, when the president travels to the Texas Ranch, the White House press corps is set up in the gymnasium of the Crawford Junior High School. The broadcast conditions are a bit different every time," Gonyea said.

ABC News Radio, Fox News Radio, CNN Radio, Talk Radio News Service, American Urban Radio Networks and Voice of America are among the radio nets with full-time correspondents assigned to the White House beat.



World Radio History

We're all talk.

And all action, too.

All talk and no action? That certainly doesn't describe any radio station we've ever seen. With guest interviews, news and traffic feeds, live reports and listener calls to juggle, a talk studio is one of the most active places on the planet. Seconds count, and there's no room for mistakes.

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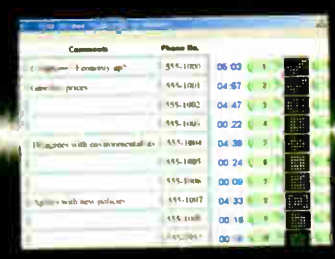
12 lines, two digital hybrids, and superior audio performance. Desktop Director controller features handset, speakerphone and headset jack. Drop-in controls available for popular consoles.

New Call Controller has Status Symbols, DTMF pad and recorder controls (like Desktop Director), but lets talent use their favorite wireless phone or any standard handset for call screening.

Status Symbols show exactly what's what. Intuitive icons show calls locked on-the-air, which hybrid they're on, who's next in queue and more. So much better than a panel of blinking LEDs.



Assistant Producer enables talk show production via LAN or WAN. Status Symbols, Caller ID support, instant messaging and caller database are just a few benefits. Supports touchscreens, too.

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World Radio History

Workbench

Radio World, August 3, 2005

Past columns are archived at *www.rwonline.com/reference-room*

Pinholes Take a Station Down

by John Bisset

Broadcast engineers are an ingenious bunch. It seems we're always pressed to do more with less or to cut corners just to get a station back on the air.

Fig. 1 is a case in point. Need "something" to insulate drooping feeder wires for a sagging folded unipole? A plastic coat hanger fits the bill.

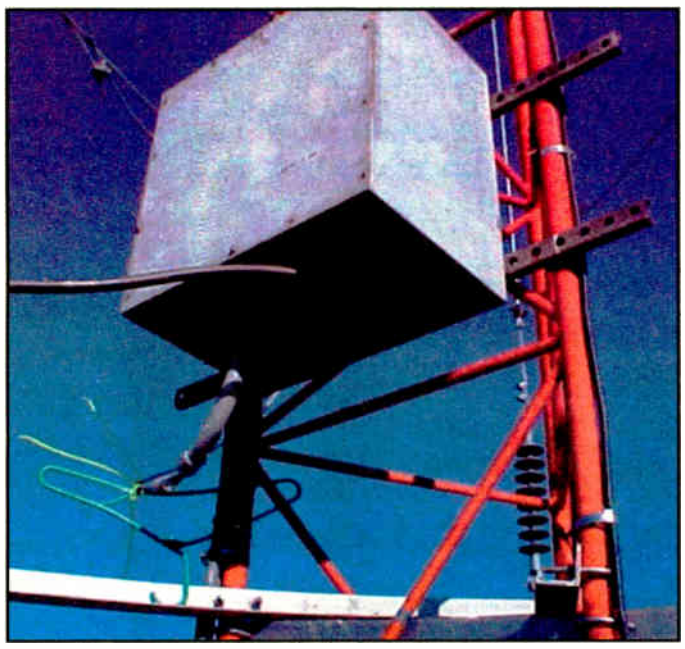

Fig. 1: A plastic coat hanger makes a good quick insulator. But remember, this fix is temporary.

The problem with a temporary fix like this one is that too often it becomes permanent. A proper solution might wait until the station is sold and due diligence is performed.

Temporary fixes that age into permanent ones may be a red flag for the inspecting engineer. His pictorial photo essay of the station equipment and its condition could paint you in the wrong light.

So go ahead and be ingenious to get yourself back on the air. But then also be firm with management about the need to "fix it right" sooner rather than later.

★ ★ ★

Gary Wachter, DOE for KKDA(AM-FM) and KRNB(FM) in Dallas, read the suggestion from one of our readers about relays by Elk Products.

Elk makes other innovative products of interest. Gary has been impressed with the M1-Gold "cross platform" control. It looks like a standard security controller but is much more.

The control is programmable and comes with 16 zones, expandable to 208. The zone inputs can be simple alarm contacts or analog inputs. The outputs are open collector and can drive relays or optical isolators directly.

You can write scripts to execute tasks based on inputs, time of day, temperature, etc. The control can communicate over the telephone with voice, tones, modem, even directly with RS-232 or Ethernet. It may not replace your dedicated remote control, but it sure can keep tabs of your facility and take corrective action.

Here's the best part: A complete package with cabinet, controller, power supply, speaker, battery and keypad retails for $839. Gary found his at AutomatedOutlet.com for less than $550.

Gary Wachter can be reached at *garyw@k104fm.com*.

Fig. 2: LED white light helps identify components.

★ ★ ★

Paul Sagi, who writes to us from Malaysia, obtained one of those white light LED key chains. He reports that the white light does a great job when reading component color codes. Sometimes other light sources are not white enough, or too dim, to correctly render the colors.

The keychain light also is helpful when unlocking dark transmitter buildings — you know, after the vandals have smashed the outside lights.

Reach Paul at *pksagi92@yahoo.com*.

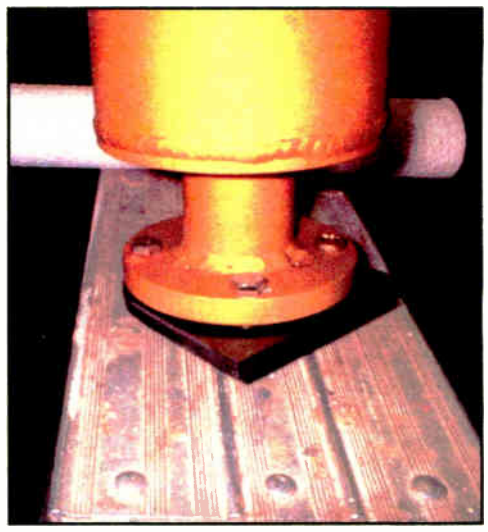

Fig. 3: 'Don't Cry for Me, Line Reducer.' Water weeps from pinhole leaks.

★ ★ ★

Unusual engineering stories always seem to find their way to this column; here's one from contract engineer Tim Walker. He was investigating high VSWR overloads at a new LPTV transmitter site in Martinsville, Va., recently.

See PINHOLES, page 12 ▶

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Our 702 "Mini Encoder" gives you a big RDS presence with minimum investment. Display your call or 'street name,' or even scroll your ID/promo message across the radio faceplate. Send all the important RDS housekeeping info, plus independent RadioText messaging for phone numbers or ads. The702 features a Windows® interface and easy USB connectivity.

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World Radio History

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World Radio History

News of recent sales of equipment and services. Stations and suppliers can send project news to radioworld@imaspub.com.

Wheatstone won a contract for a system for **Entravision's** new facility at 777 Grant Street in Denver. The contract includes four Generation 5 Control Surfaces, one Bridge Router and pre-wiring

Separately, **Delmarva Broadcasting Group** ordered a Bridge Router with one Satellite Cage plus pre-wring at WDEL/WSTW in Wilmington, Del. The Bridge's dimensions are 80x32 with one cage. Installation is by **Loupas and Associates** and Delmarva's engineering staff.

And **Emmis Communications** purchased a Wheatstone Generation/Bridge system for its Phoenix facility on North Central Ave. The system includes three Generation 6 Control Surfaces, three Satellite Cage Routers and one master Bridge Router. ...

Dielectric Communications provided a new antenna to **WFAE(FM)**, an NPR station serving Charlotte, N.C., on 90.7 MHz, to improve its signal pattern and facilitate a transition to IBOC broadcasts. The project was funded by a PTFP grant. Dielectric also supplied transmission lines for the analog and digital services, an auxiliary antenna and installation services.

The supplier said WFAE is the state's first public station to implement HD Radio. Tim Warner, P.E., was the consulting engineer; Jobie Sprinkle is WFAE director of engineering. The station had used a side-mounted directional antenna on a large-face tower with multiple rental clients. (See related story, page 14.) ...

Univision Radio purchased 10 **Audion Labs** VoxPro PC software and control panel systems for use in their Houston properties through **Giesler Broadcast Supply**. ...

AZCAR Technologies, a Canadian technology integration company, won a $2.6 million contract to provide a turnkey digital radio automation system with modular digital audio routing subsystem for the **American Forces Radio and Television Service** digital radio facility at the Defense Media Center at March Air Force Base; the project is to be completed late this year.

The system will be capable of managing programming for 18 on-air format channels and 24 off-line recording channels, with expansion capabilities to 24 and 30 channels respectively. Subcontracts are being awarded by AZCAR to **OMT Technologies, Burli Products** and **Sierra Automated Systems.** OMT said its piece is a multichannel iMediaTouch digital broadcast system. OMT values its contribution to the project at $629,000. ...

Clear Channel station **KIIS(FM)** in Los Angeles bought three **Marantz Professional** PMD660 Compact Digital Recorders for newsgathering and celebrity field reporting. They were sold by John Lynch at **Broadcast Supply Worldwide (BSW)**. Michael Callaghan is chief at KIIS. ...

Rush Limbaugh fans can get MP3 downloads thanks to a deal by software company **Maven Networks** and service provider **Akamai Technologies.** Premiere Radio Networks, syndication arm of Clear Channel, began delivering podcasts of "The Rush Limbaugh Show" in June. This means fans can time-shift the program and hear it on their device of choice when they want to.

The companies quoted the VP of interactive at Premiere, Brian Glicklich, saying, "We chose podcasting as one of our top priorities for 2005." ...

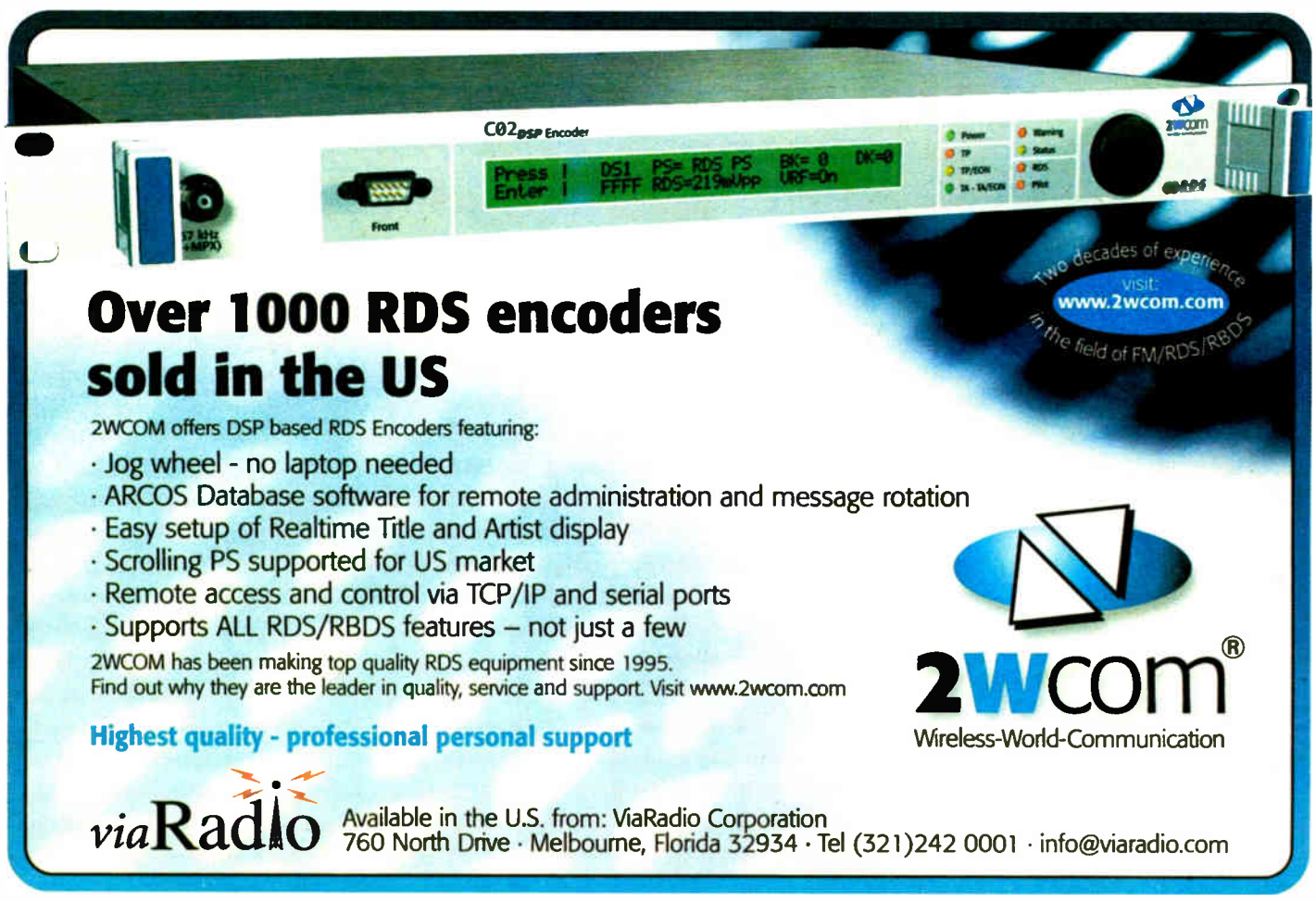
Prophet Systems Innovations says **Central Carolina Community College** chose its automation for WDCC(FM) in Sanford, N.C., a student-run noncom station. The school is using Prophet NexGen101. Bill Freeman is GM, lead instructor in broadcast production technology and department chair of media technologies. ...

Defontes Broadcasting Ltd. of Hamilton, Bermuda chose **Creative Studio Solutions** as the studio designers and integrators for new studios. CSS will design and integrate three studios and Master Control. Kenneth Defontes based the decision in part on a visit during the recent CSS project at WOR(AM) in New York, the supplier said. The system is being designed for a possible move to another location on the island later. The project includes **Arrakis** consoles, furniture and a Digilink system. Integration is to be complete by late fall. ...

New Dielectric Communications antenna at WFAE(FM) in Charlotte, N.C.

dMarc Broadcasting noted a milestone for its RevenueSuite service, a revenue-on-demand program offered to its Scott Studios and Maestro customers. The automation and media services supplier said 90 days since public launch, RevenueSuite had been syndicated into 250 stations, including **Nassau Broadcasting Partners** stations. ...

Entercom Communications named **Harris Broadcast Communications Division** as its HD Radio transmission supplier for its Sacramento and New Orleans FM stations. The nine stations are KSEG, KDND, KRXQ, KWOD and KSSJ in Sacramento; WEZB, WLMG, WTKL and WKBU in New Orleans. They will go on with Harris Z12HDS and Z16HDS solid-state transmitters by September. Marty Hadfield is VP of engineering for Entercom.



Pinholes

▶ Continued from page 10

It seems that within two months the transmitter began showing high reflected power overloads. Tests into a dummy load demonstrated that the transmitter was fully functional; and TDR measurements of the transmission line showed no indication of line problems to the base of the antenna.

However, when Greg Harrington, Sky Tower Service, disconnected the transmission line from the base of the antenna, he noticed about an ounce or two of water standing on the inside of the 1-5/8-inch flange transmission line connector. Because the system was unpressurized, the water was visible standing on top of the solid foam dielectric.

The flange and gasket appeared to be leak-proof. Everyone was puzzled as to how the water had invaded the line — until the 4-inch-to-1-5/8-inch reducer was removed from the base of the antenna.

Careful scrutiny found a tiny pinhole in a weld at the 1-5/8 end of the reducer.

Careful scrutiny found a tiny pinhole in a weld at the 1-5/8 end of the reducer. The team suspects that moisture entered at this point. They satisfied themselves that this was the culprit by sealing the 1-5/8-inch end of the reducer with a gasket and end cap, adding about two ounces of water from the 4-inch side and inserting the inner conductor of the reducer through its gasket seal and into the 1-5/8 section.

Pushing the inner conductor into place in this manner increased the pressure slightly inside the 1-5/8-inch reducer section and forced trace amounts of water out of the pinholes of the weld. Testing the reducer in this manner revealed two separate pinholes in the weld. Tim and his team surmised that on warm days, the air inside the assembly expanded and exited through the pinholes. As temperatures decreased, the inside air contracted, creating a slight negative pressure that sucked in any moisture droplets that had condensed near the pinholes or raindrops from precipitation.

Condensed water in this section of the line reducer fell to the bottom of the connector and collected on top of the solid foam dielectric until the quantity was sufficient to generate the VSWR symptoms.

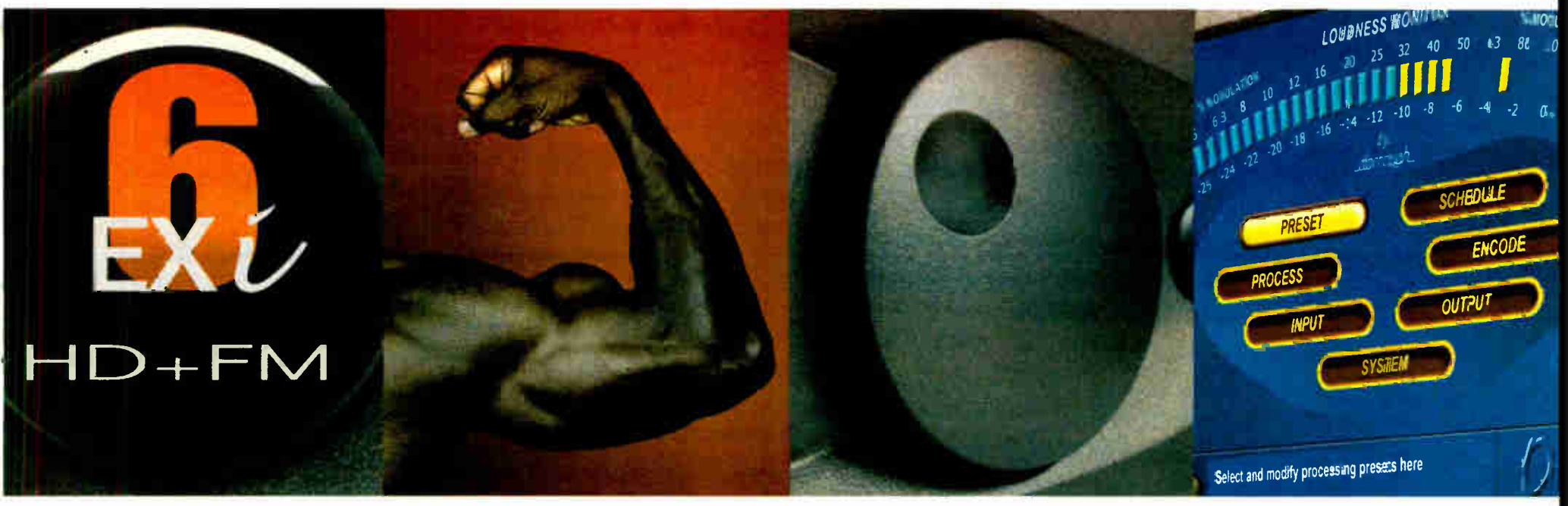
Fig. 3 shows the water droplets observed escaping the pinholes during the test. The pinholes were so small that water would not flow through them unless there was a pressure difference between the inside and outside of the reducer.

Tim Walker is at *timwalker@dilyns.com.*

John Bisset has worked as a chief engineer and contract engineer for more than 30 years. He is northeast regional sales manager for Broadcast Electronics. Reach him at (571) 217-9386, or jbisset@bdcast.com.

Submissions for this column are encouraged, and qualify for SBE recertification credit.

World Radio History



Omnia 6EX*i*

The Ultimate Upgrade.

Omnia-6 is the standard by which all other processors are measured. In the last few years, thousands of leading stations in the world's top markets have upgraded to Omnia. In fact, Omnia-6 has been so successful that some competitors have just given up; others are mere shadows of their former selves.

So why do broadcasters love Omnia-6? The *sound*. The clean, pure, crystal-clear sound (bone-shakingly loud, if you want) that's become the choice of #1-rated stations in New York, Los Angeles, Tokyo, Paris, London, Rome, Sydney and Beijing. The other guys tried to match its winning sound... and failed. So they've settled instead for trying to copy its innovative features.

Features that Omnia pioneered — like dual, simultaneous processing paths for HD Radio™ and conventional FM at no extra cost. The world's first non-aliasing digital clipping system, with composite clipping for the ultimate in competitive loudness. The high-precision Multi-Band Look-Ahead Limiter (invented by Omnia) for perfect HD Radio processing. The six-band limiter for conventional FM, with adjustable crossovers for surgically-precise control over your signature sound. An integrated Dorrough™ Loudness Meter. And of course, the groundbreaking 96 kHz, 24-bit platform that delivers full 20 kHz bandwidth for HD Radio broadcasts. Always innovating.

Which is why the **new Omnia-6-EX*i*** makes perfect sense. With **integral HD Radio Diversity Delay** that helps digital broadcasters eliminate analog connections to the HD exciter, ensuring independent analog and digital program streams. And the exclusive new **LoIMD Clipper** that actually **suppresses intermodulation distortion** to deliver audio that's cleaner, clearer and more detailed than ever — no matter how aggressive your processing. (If you already own an Omnia-6, don't worry – there's a low-cost upgrade to give your processor full-fledged Omnia-6EX*i* power.)

A lot of muscle? You bet. No wonder the competition is running scared.

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World Radio History

HD Radio News

Radio World · Covering Radio's Digital Transition · August 3, 2005

Cris Alexander on 'Real-World' HD

Page 18

FIRST PERSON

WFAE Splits FM Signal Three Ways

Public Station Tests Multicasting Using Broadcast Electronics IDi Unit

by Ted Lantz

The author is HD Radio Product Manager for Broadcast Electronics.

CHARLOTTE, N.C. This March, several people met at non-commercial WFAE(FM) in Charlotte, N.C., to set up an HD Radio multicast using a new importer by Broadcast Electronics. Two years after initiating the concept, NPR now calls the action of splitting IBOC signals into several streams "multicasting."

Initially, stations that tried multicasting split their digital signals into two streams, with 64 kilobits-per-second for the main and 32 kbps for the supplemental channel. Now, WFAE wanted to split its 96 kbps FM IBOC signal into three distinct streams with a bit rate of 64 kbps for the main channel and 16 kbps each for the supplemental channels — for what participants believe would be the first on-air demo of that many IBOC streams transmitted by a station and then received by an HD Radio receiver.

Present for the tests were WFAE's Director of Engineering/IT Jobie Sprinkle; General Manager Roger Sarow; Broadcast Electronics Manager of RF Customer Service Stuart Peters; and S.C.M.S. Inc. President Bob Cauthen.

The setup

The 100 kW station is licensed to 90.7 MHz in Charlotte. The FCC had granted it experimental authorization to multicast.

Having recently installed a tower facility in a new location, the station had a previous tower site available for auxiliary purposes should there become an urgent need to switch over to it at any time during the tests. Its new transmitter facility has a panel antenna dual-fed separately by a BE FM 35T tube transmitter for FM analog and a BE FMi 201 transmitter for HD Radio.

WFAE DOE Jobie Sprinkle

BE's FXi 250 digital FM exciter and FSi 10 HD Radio generator are part of the system.

WFAE's upgrade path to multicasting was straightforward; no additional exciters were needed.

Peters arrived at the station with BE's IDi 20 importer, which he installed at the studio. The IDi 20 importer encodes the supplemental channel audio and multiplexes it with program-associated data and other data to be carried on the HD Radio signal. The unit delivers the resulting bitstream via Ethernet to BE's HD Radio signal generator, where it is combined with the encoded HD Radio main channel service and its data for transport over the STL to the IBOC exciter and transmitter.

For test purposes, the IDi 20 was set up to devote 64 kbps of the 96 kbps digital bitstream for the main program channel and devote 16 kbps each to the supplemental channels.

Testing one, two, three

With the addition of the IDi 20, WFAE went from one to three program services in the same 24-hour day. A news and information public radio station, WFAE at once had the capacity to handle several program feeds from the Internet or off the Public Radio Satellite System — content that its listeners have heard in other markets but WFAE hadn't been able to fit onto one channel.

The engineers took spectrum plots of the main analog and digital channels, and measured the total digital output to make sure it was within the FCC's RF mask. It was.

The group ran a different program feed through each multicast channel, both music cuts as well as talk, to challenge the Ibiquity HDC codec. A prototype Kenwood receiver decoded the signals.

The receiver scanned the band, and first locked onto the main digital channel. With another push of the button, the receiver locked onto the first multicast channel. With a third push, the receiver acquired the second supplemental channel.

Initial listening tests conducted by NPR and Kenwood last summer indicated that most content transmitted and decoded at the lower bit rates met minimal quality requirements, Radio World previously reported.

When the management of WFAE began planning for HD Radio, Tomorrow Radio was still a one-channel proposition. Fortunately, our company offers a program, called "BE's Total Radio Guarantee," which gave the station a cost-effective upgrade path to multicasting, without having to obsolete WFAE's existing BE exciter or signal generator.

Graphic showing WFAE antenna performance on analog transmitter.

Adding program channels presents several new considerations to HD Radio implementation. Foremost is how to get all that program content from the studio to the transmitter site over an STL designed for one channel.

Placing the digital coding at the studio instead of at the transmitter, BE feels, is the most promising option to date. By coding all the content at the studio, the station is able to reduce the payload to fit the bandwidth of a typical STL system.

In the case of WFAE and other stations that purchased first-generation HD Radio architecture from Broadcast Electronics, moving the FSi 10 HD Radio signal generator to the studio requires a nominal investment:

• A plug-in card added to the FSi 10 now makes it possible to convert the studio source material to the HD Radio 44.1 kHz

See WFAE, page 16 ▶

Tomorrow Radio Today.

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Radio World's HD Radio™ Scoreboard

WHO'S MULTICASTING? WHO PLANS TO?

As of early July, 109 FMs have received experimental authority to multicast their digital signals, according to FCC statistics obtained by Radio World. The seven marked with asterisks were actually multicasting as of July 5, according to Ibiquity Digital.

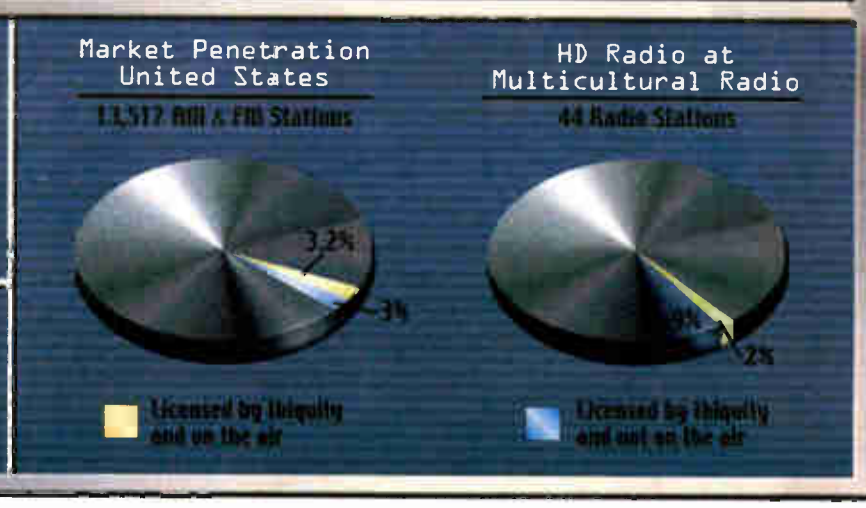
WDIY, Allentown, Pa.	Lehigh Val. Comm. B cst
KSKA, Anchorage, Alaska	Alaska Public Telecom
WKLS, Atlanta	Clear Channel Radio
WLTM, Atlanta	Clear Channel Radio
WNJN, Atlantic City, N.J.	N.J. Public Broadcasting
KUT, Austin, Texas	Univ. of Texas at Austin
KPRX, Bakersfield, Calif.	White Ash Broadcasting
WYPR, Baltimore	WYPR License Holding
WNJS, Berlin, N.J.	N.J. Public Broadcasting
WDJC, Birmingham, Ala.	Crawford Broadcasting
WJMN, Boston	Clear Channel Radio
WNJB, Bridgeton, N.J.	N.J. Public Broadcasting
WDCX, Buffalo, N.Y.	Crawford Broadcasting
WNJZ, Cape May Ct., N.J.	N.J. Public Broadcasting
*WFAE, Charlotte, N.C.	University Radio Counc.
WVTU, Charlottesville, Va.	Virginia Tech Foundation
WVTW, Charlottesville, Va.	Virginia Tech Foundation
WBEZ, Chicago	WBEZ Alliance
*WJMK, Chicago	Infinity Broadcasting
*WUSN, Chicago	Infinity Broadcasting
*WVMX, Cincinnati	Clear Channel Radio
WPTR, Clifton Park, N.Y.	Crawford Broadcasting
KBIA, Columbia, Mo.	University Of Missouri
WOSU, Columbus, Ohio	Ohio State University
WXJC, Cordova, Ala.	Crawford Broadcasting
WYCA, Crete, Ill.	Crawford Broadcasting
WYDE, Cullman, Ala.	Crawford Broadcasting
*WJLB, Detroit	Clear Channel Radio
WMUZ, Detroit	WMUZ Radio
WRIF, Detroit	Greater Boston Radio
WKAR, East Lansing, Mich.	Michigan State University
KUAF, Fayetteville, Ark.	University Of Arkansas
WBOI, Fort Wayne, Ind.	Northeast Ind. Public Radio
KVPR, Fresno, Calif.	White Ash Broadcasting
WUFT, Gainesville, Fla.	University Of Florida
WYRB, Genoa, Ill.	Crawford Broadcasting
KUNC, Greeley, Colo.	Community Radio for N. Colo.
KMHD, Gresham, Ore.	Mt. Hood Community College
KUHF, Houston	University of Houston System
WJSU, Jackson, Miss.	Jackson State University
WSSR, Joliet, Ill.	NM Licensing
KTOO, Juneau, Alaska	Capital Community B cst
WPWX, Hammond, Ind.	Crawford Broadcasting
KMBH, Harlingen, Texas	RGV Educational B cst.
WLRH, Huntsville, Ala.	Alabama Educational TV
WUOT, Knoxville, Tenn.	University of Tennessee
*WFBQ, Indianapolis	Clear Channel Radio
WFYI, Indianapolis, Ind.	Metropolitan Ind Public B cst
KRVS, Lafayette, La.	University of La. at Lafayette
KSJN, Minneapolis,	Minnesota Public Radio
WUWF, Pensacola, Fla.	University of West Florida
WDAS, Philadelphia	Clear Channel Radio
WIOQ, Philadelphia	Clear Channel Radio
WJJZ, Philadelphia	Clear Channel Radio
WRTI, Philadelphia	Temple University
WSNI, Philadelphia	Clear Channel Radio
WUSL, Philadelphia	Clear Channel Radio
WXPN, Philadelphia	University Of Pennsylvania
WDUQ, Pittsburgh	Duquesne University
WLTJ, Pittsburgh	WPNT, Inc.
WQED, Pittsburgh	WQED Multimedia
KJZZ, Phoenix	Maricopa Co. Comm. Coll.
KBAQ, Phoenix	Maricopa Co. Comm. Coll.
WKTU, Lake Success, N.Y.	Clear Channel Radio
WSRB, Lansing, Ill.	Crawford Broadcasting
KCNV, Las Vegas	Nevada Public Radio
KCCU, Lawton, Okla.	Cameron University
KQHM, Lubbock, Texas	Texas Tech University
WNJM, Manhawkin, N.J.	N.J. Public Broadcasting
KHID, McAllen, Texas	RGV Educational B cst
WXKS, Medford, Mass.	Clear Channel Radio
WLRN, Miami	Miami-Dade County Schools
WPLN, Nashville, Tenn.	Nashville Public Radio
WHTZ, Newark, N.J.	Clear Channel Radio
WWNO, New Orlears	Louisiana State U./A&M Coll.
WAXQ, New York	Clear Channel Radio
WCBS, New York	Infinity Broadcasting
WFUV, New York	Fordham University
WLTW, New York	Clear Channel Radio
WNYC, New York	WNYC Radio
WWPR, New York	Clear Channel Radio
WHRV, Norfolk, Va	Hampton Roads Ed. Telecom
WHRO, Norfolk, Va	Hampton Roads Ed. Telecom
KQEI, N. Highlands, Calif.	KQED, Inc.
WMFE, Orlando, Fla.	Community Communications
WMUB, Oxford, Ohio	Miami University
KOPB, Portland, Ore.	Oregon Public Broadcasting
WQUB, Quincy, Ill.	Quincy University Corp.
WRAL, Raleigh, N.C.	WRAL-FM
KUER, Salt Lake City	Salt Lake City, Utah
KQED, San Francisco	KQED, Inc.
KCSM, San Mateo Calif.	San Mateo Co. Comm. Coll
KUOW, Seattle	University of Washington
WNCW, Spindale, N.C.	Isothermal Community Coll.
WUIS, Springfield, Ill.	University of Illinois
WPSU, State College, Pa.	Pennsylvania State University
WNJP, Sussex, N.J.	N.J. Public Broadcasting
KPLU, Tacoma, Wash.	Pacific Lutheran University
WUSF, Tampa, Fla.	University of S. Florida
WNJT, Trenton, N.J.	N.J. Public Broadcasting
WWFM, Trenton, N.J.	Mercer County Comm. Coll.
WUAL, Tuscaloosa, Ala.	University Of Alabama
*WAMU, Washington	American University
WASH, Washington	Clear Channel Radio
WMZQ, Washington	Clear Channel Radio
WRCI, Webster, N.Y.	Crawford Broadcasting
WXEL, W. Palm Beach, Fla.	Barry Telecommunications
KMCU, Wich. Falls, Texas	Cameron University
WICN, Worcester, Mass.	WICN Public Radio

The HD Radio Bottom Line

Total Licensed	On the Air
831	429

Last Month

Total Licensed	On the Air
759	361



World Radio History

IBOC Studio Implications Detailed

A Group Engineer Works Out Studio Implementation For HD Radio in a Small to Medium-Sized Market

by Michael Ring

The author is chief engineer for Regent Broadcasting's Watertown, N.Y., cluster, consisting of WFRY(FM), WCIZ(FM), WTNY(AM) and WNER(AM). He also assists the Albany cluster.

I am an engineer for a radio group that is moving toward implementation of IBOC digital broadcasting and also doing studio build-outs. We wondered what the ramifications of both would be at the studio facility.

For example: How far should we implement digital? Should digital be implemented all the way to the microphone preamp? Should we use existing studio computer sound card audio or use the AES/EBU option?

Other questions: How does EAS work with a digital feed to the transmitter? What about sampling rates?

Analog-to-analog

I reached the conclusion that digital out of the console is adequate for most installations. Leaving other studio facilities analog, including the console, will likely have a negligible effect.

Here's why.

Existing analog equipment is mature and reliable; it has excellent specifications. Let us do a quick analog-to-digital comparison.

A look at a Digital Audio Labs CDX series computer sound card shows excellent specifications. It has a 110 dB input noise, with similar distortion ratings, a frequency response of +/- 0.25 dB 20 Hz–20 kHz with 15 dB headroom.

A modestly priced Radio Systems Millenium console boasts specifications of 88 dB signal-to-noise ratio, 0.008 percent distortion, frequency response of +/- 0.2 dB 20 Hz–20 kHz and 22 dB headroom. With the exception of the noise floor, there is little difference in specifications.

The added headroom just may be important. We all know how announcers carefully watch levels when they are recording or on-air.

Let us look at the noise issue. Where will our listeners be hearing our broadcast? In a car, a noise floor at –88 would be many times more than adequate. In all environments, the signal needs to be converted back to analog to be heard, so we need an amplifier in every scenario.

Looking at some typical moderately priced home theater systems, distortion ranged from 0.2 percent to 0.7 percent with a distortion high for an upper-end Onkyo system of 5 percent at rated power. Frequency response was 27 Hz on one subwoofer's low end to a high frequency of 35 kHz on tweeters. (Let's drive the dog crazy, even if we can't hear it.)

The deviation from 1 kHz was not specified. Signal-to-noise was rated 73 dB for an upper-end FM and 100 dB for the DVD/CD section. Amplifier signal to noise was typically not listed separately.

Well-maintained analog studios likely will exceed all but a tiny minority of listeners' equipment.

It's not e-mail

Looking at the digital hookup, there are issues as far as cabling and sample rate.

The AES specification calls for 100 ohm, individually shielded twisted-pair cable. The bandwidth of the signal for audio is approximately 6 MHz. Category 5 network cable will work, in spite of the lack of shield. The AES digital signal calls for a maximum cable length of 100 to 200 meters (vague), a 48 kHz sample rate, 16 to 20 bits sampling with 24 bit sampling optional, and no packet re-send in case of error.

Typical audio cabling is useful to approximately 50 feet. Unlike typical computer files, AES streaming audio can contain glitches, because there are no corrupted packet re-sends. Sample rate transformations may possibly cause artifacts.

As with format transformations, you cannot retrieve information that isn't there. Transmitting the digital audio is not the same as e-mailing it.

Different processing needs

Other considerations for digital broadcasting include audio processing, transmission delays and EAS. Audio processing is integral to current broadcast operations. The digital side will need different, and very likely much less, processing. The consumer of the digital product will expect CD quality.

Depending on the format, achieving CD quality will require greater dynamic range than we currently supply. Provided the audio files are consistent (normalized) and console operators are reasonably careful, this should be achievable.

Such issues as excessively loud commercial production and audio transitions between the digital and analog signal contours will need to be examined. Also, transmission delays caused by insertion of digital equipment may cause problems for the announcer listening "off air." This opens up many discussions that are best resolved by all parties involved.

EAS has one solution at present. TFT manufactures Model 999 digital insertion unit that is placed in the AES feed in the processing chain. It can convert the analog EAS signal to digital at the correct bit rate and insert it in the transmitted digital signal.

Incorporating surround

For future consideration, converting the console output and transmission system to digital will provide a reasonable transition path to HD Radio. It is likely that radio will need to make a transition toward transmitting multichannel audio such as surround sound.

Implementing 5.1 surround sound or other possible audio schemes will require an entire rework of facilities. The present stereo studio equipment is not designed to accommodate the added channels.

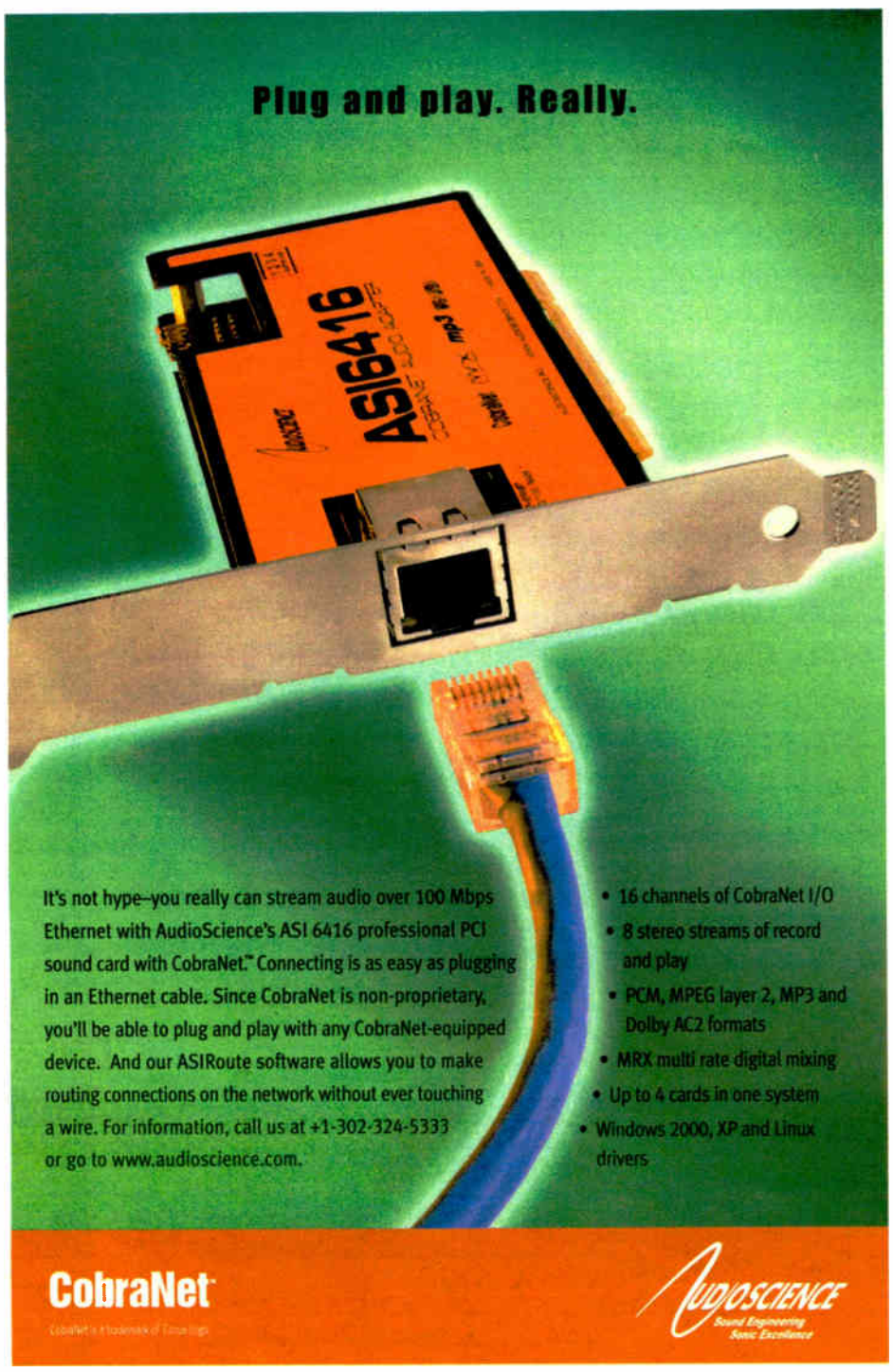
Dolby's Web site mentions 5.1 support for TV, but does not yet mention possible support for radio broadcasters. We should think ahead, as HDTV and DVDs are both available to the consumer and support 5.1 surround sound.

SRS Labs manufactures a 6.1 Circle Surround encoder that supports IBOC and has a stereo-compatible output too. Harris NeuStar has 5.1 encoders for both AM and FM that will work with existing consoles, feeding stereo with 5.1 encoding into existing inputs.

The first IBOC listeners will likely be the same ones who have home theater systems. A search for "DTS Sting" under "Popular Music" on amazon.com in April yield three results and reviewers of Sting's "Brand New Day" album were astonished by the sound difference. In June, there were 40+ titles and many reviews.

Read a few of them and see if you agree.

Radio World welcomes other viewpoints on this discussion at radioworld@imaspub.com.



WFAE

▶ Continued from page 14

sample rate before HD Radio coding is applied. BE's new XPi 10 second-generation unit now includes these functions.

• An Exgine card added to the BE FXi digital FM exciter fulfills the purpose of generating the HD (OFDM) carriers for all program and data channels, plus providing a decoded AES/EBU audio output.

The bottom line is that no additional exciter is needed. BE's guarantee ensures that stations don't have to spend another $20,000 or $30,000 on a replacement HD Radio exciter in order to be able to multicast several program channels.

BE's second-generation architecture also makes sense for stations wanting to add data to the HD Radio stream. With all signal generation and multiplexing done on the studio side of the STL, there is less of a need to add a bi-directional link onto an existing STL. BE's IDi importer and its new XPi 10 exporter/signal generator, are both at the studio, and therefore able to share data through a local Ethernet connection not separated by the STL.

What's next?

In the near future, as HD Radio moves into extended hybrid operation with greater bitstream capacity, WFAE will be able to add higher fidelity content, or perhaps another channel.

The IDi 20 will be capable of splitting WFAE's digital signal into multiple channels depending on station management desires. Moreover, the IDi 20 makes it possible to allocate bandwidth for channels on the fly similar to HDTV operation today.

WFAE, for example, would be able to split the bitstream of multiple channels for morning drive, and change to either fewer or more channels of a different bandwidth configuration for midday.

WFAE management also plans to pass program-associated data services through the IDi 20. As preparation for data nears, the public broadcaster will upgrade its existing BE AudioVault digital audio system for compatibility with ContentDepot, the PRSS' new content delivery system.

Reach the author at tlantz@bdcast.com. RW welcomes other points of view.

World Radio History

DIGITAL NEWS

XM, Audible Partner On Portable Device

WASHINGTON XM's latest effort to place its service on other devices is to partner with a content company and introduce a portable handheld device.

Audible Inc. and XM will launch "AudibleReady/XM" devices in 2006. It can play XM as well as Audible's spoken-word content, which can be downloaded from the Web into the memory of the device.

Audible sells audio programs from providers such as audiobook publishers, broadcasters, entertainers and magazine and newspaper publishers. Those programs are also provided for download and playback on computers, iPods and other MP3 players and PDAs.

Audible will offer XM talk shows on its Web site, beginning with "The Bob Edwards Show" and Opie & Anthony. It already sells access to other audio content on the site.

Sprint to Offer Sirius On Cell Phones

NEW YORK Later this year, Sprint users will be able to hear some Sirius Satellite Radio channels on their cell phones and possibly other devices. Some of the music channels being evaluated by Sprint and Sirius for the new service include new hits, classic rock, hip-hop, country, blues and soul to jazz and Broadway's best music. The companies plan to announce specifics of the service, including price, later this year.

The deal is for Sprint PCS Vision cell phone customers.

Sirius, Ford Extend Agreement

NEW YORK, DETROIT Sirius Satellite Radio and Ford Motor Company are extending their exclusive partnership through 2011. All Ford Motor Company brands in the U.S. — Ford, Lincoln Mercury, Land Rover, Jaguar, Volvo, Aston Martin and Mazda — are covered by the agreement.

Earlier this year, Ford and Lincoln Mercury said they would target up to 21 vehicle lines for factory installation of Sirius over the 2006 and 2007 model years, expecting to generate up to 1 million Sirius subscribers over the two- year period.

Space Systems/Loral To Build XM-5

WASHINGTON XM Satellite Radio is going with a different company for design and construction of its fifth satellite, Space Systems Loral, the company that built the three satellites for Sirius.

Construction of XM-5 will be completed in 2007. XM-5 is intended as a ground spare for XM's in-orbit fleet.

The news represents lost potential business for Boeing Satellite Systems, which has built XM's three in-orbit satellites and is completing construction of XM-4, which will be available for launch in 2006. Spacetoday.net pegs the value of the contract at around $200 million and says the new contract will help Space Systems/Loral plan its exit from Chapter 11 bankruptcy protection.

XM has had problems with the Boeing 702 satellites; the two in orbit will need replacement sooner than expected due to a power problem with the solar array.

Sirius Changes Modulation to Get More Out of Its Bandwidth

NEW YORK When Sirius Satellite Radio unveiled improvements to its planned video technology at CES in January, executives wouldn't reveal how the company could transport mobile video images without hurting its satellite radio channel integrity.

Now Sirius is prepared to answer that question, saying it has developed a proprietary technology that will increase its total network capacity — initially, by approximately 25 percent — within its existing digital transmission system.

Sirius says the so-called "hierarchical modulation" will allow the satcaster to offer more audio channels, as well as advanced services such as data and video, without affecting the quality of its satellite radio broadcasts.

It said the approach would allow it to increase the bits it transports through its satellite and repeater networks with "minimal" upgrades to its satellite uplink and terrestrial repeater infrastructure.

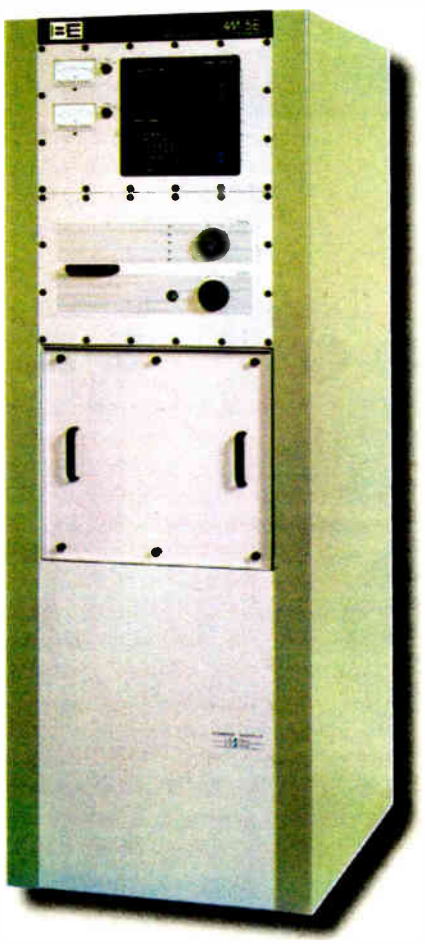
The company says the modulation technology will not change the customer experience on existing Sirius radios. Future Sirius radios will be outfitted with the technology, making it possible for them to receive the additional services planned.

Sirius is working with IC suppliers to integrate the modulation technology into its chipsets. The company expects to begin offering the services in the second half of 2006.

The company's New Jersey-based Advanced Development Team developed the concept. Sirius has conducted several tests of the technology to confirm the performance.

When RW contacted Sirius to get more information, a spokesman said the technology is proprietary.

— Leslie Stimson



Cool operator, night and day.

Nighttime operation is where the E Series solid-state AM transmitters truly shine. The AM 2.5E operates from 12.5 to 2750 watts and the AM 5E runs from 25 to 5500 watts, with maximum audio quality at all power levels. Thanks to a patented power module design, the E Series offers cooler operation for extended component life, unsurpassed power economy and the most efficient performance. Redundant power supply and RF power modules, RF output matching network, integrated voltage regulation and built-in modulation monitoring add up to many years of trouble-free operation for both analog AM and HD Radio.

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World Radio History

FIRST PERSON

HD Radio Observations in My Truck

A DOE Relates His Experiences Upon Listening To 'Real-World' HD Radio for the First Time.

by W.C. Alexander

A couple of weeks ago, I installed a Kenwood KTC-HR100MC HD Radio tuner in my truck. The installation was an easy one-hour project. In fact, the whole experience, from order to radio-on, was pleasant and frustration free.

I ordered the unit from Crutchfield. The sales rep was knowledgeable, up on HD Radio and the different units that were available. He also provided, free of charge, the wiring harness adaptor and mounting plate for my specific make and model of vehicle along with a good set of instructions that clearly showed how to get into the dash to remove the old radio, how to mount the new unit and how to wire it into the existing harness.

There was zero guesswork, and the finished installation was professional and complete. The new radio looks like it belongs there.

Since I installed the radio, I have had a lot of fun dialing around the AM and FM bands, listening to the HD Radio stations in the Denver market.

Denver is not all that well populated with HD Radio signals, but there are enough to get a feel for what this new digital terrestrial medium is all about. There are four FM stations and five AMs transmitting HD Radio signals that I can receive locally.

Listening to "real-world" HD Radio for the first time, I found that on FM, there was no "night-and-day" difference from analog FM. When the analog blends to digital a few seconds after tuning a station, there is a perceptible difference, notably a complete absence of noise and a much more "open" sound, presumably the result of lighter processing and the absence of clipping. All the local HD Radio FM stations have fairly well matched the audio levels of their digital and analog signals, and all but one are in perfect time alignment. The one station that wasn't perfectly time aligned was out by maybe 50 mS or so, enough to cause an "echo" effect during the blend-to-digital transition.

AM, on the other hand, really is night and day. As the blend-to-digital takes place, the high and low ends open up, the noise disappears, stereo separation becomes apparent (in some cases; some of the talk stations were transmitting in mono) and the audio sounds like noise-free FM.

No doubt about it, AM stands to gain the most in quality when converting to HD Radio, although some might argue that FM will be the real winner with multiple audio streams.

Artifacts

One negative thing I have noticed on some of the local AM stations, however, is the presence of digital artifacts. It's apparent on some of the stations all the time, and most of the stations some of the time.

On FM, there was no 'night-and-day' difference from analog. AM, on the other hand, really is night and day.

One station sounds truly great, a local independent Christian station on 910 kHz. There is no artifacting, and especially during music segments, the station sounds *outstanding*.

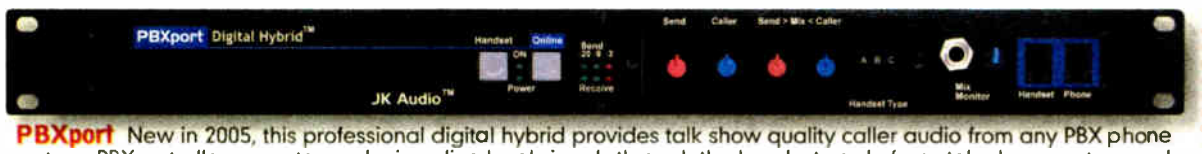
I hear digital artifacting just about all the time on Denver's big 50 kW talker, and I hear it during at least some segments on all the other AMs except the one on 910. This has me wondering what the cause is. A few things come to mind: source material (MP2 files on a digital automation system?), profanity delay, digital STL and processing. I suspect that the 910 station sounds good all the time because it plays CDs, uses no STL (studio and transmitter are collocated) and processes lightly.

Source material certainly has the most potential to cause trouble, sometimes having been through the MPEG grinder one too many times, or worse yet, through a non-MPEG compression cycle and *then* through the MPEG grinder.

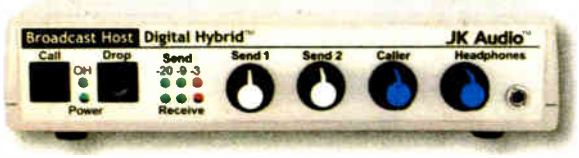
I have no idea what degradation is caused by a profanity delay when combined with multiple compression passes, but I suspect it's something we'll have to figure out. Digital STLs would seem to be an area of potential trouble, particularly the Moseley DSP6000 digital transmission system. That system uses ADPCM coding at a 32 kHz sample rate.

See LISTENING, page 19 ▶

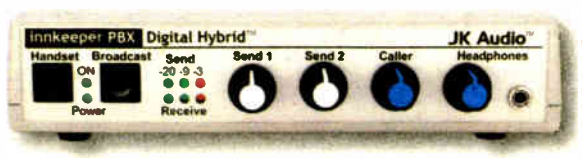
PBX Interfaces (Between handset & phone)



PBXport New in 2005, this professional digital hybrid provides talk show quality caller audio from any PBX phone system. PBXport allows you to send mic or line level signals through the handset cord of any telephone system and return only the caller's voice, ready for broadcast.



BroadcastHost The lowest priced digital hybrid anywhere. Designed for desktop applications where the phone line / audio interface must remain user-friendly.



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World Radio History

Listening

▶ Continued from page 18

You can avoid the ADPCM coding if you go in AES, but you're still limited to 32 kHz, which presents a significant bottleneck.

In my experience, sample rate downconversions are okay as long as you stay at the reduced rate. The trouble is, most HD Radio transmission equipment operates at 44.1 kHz, so an upconversion is necessary, one that necessarily involves interpolation of data. Presumably with the Starlink, one would downconvert to 44.1 kHz at the studio and stay at that rate all the way into the HD Radio generator.

Digital processing also presents an opportunity for degradation and artifact production, particularly if a sample rate up-conversion takes place in the processor. It is my hope that these stations' engineers will *listen* to their stations on a digital tuner and work to clean up the artifacts.

Although our stations do compete with these stations, we all lose if the general listener impression is that AM HD Radio sounds like a fair Internet stream. We all *win* if we all sound good.

You can be sure that our Ed Dulaney will be paying close attention to sound quality on KLZ, KLTT and KLDC when those AM stations begin HD Radio transmissions later this year. I suspect that significant changes in the audio chains are forthcoming.

Lessons

One thing is for sure: We're all going to have to find ways to avoid multiple MPEG passes and sample rate conversions in the future. This means standardizing on codec settings, choosing the most advantageous sample rate (no doubt 44.1) and sticking with it. It also means getting into the digital domain and staying there.

That may be easier said than done.

Consider the typical case where the satellite antenna is located at the transmitter site. Let's count the A/D conversion cycles.

Satellite feeds are demodulated and output as analog audio (that's one). The analog satellite audio is fed to the Intraplex PT- 255 and fed to the studio where it is decoded to analog audio (that's two). The analog audio is mixed in the analog domain and fed through an Eventide BD500 profanity delay (that's three).

The analog audio out of the delay is then fed to an AGC and then back into the Intraplex PT-255 and on to the transmitter, where it is decoded back to analog audio (that's four). That analog audio feed is then fed to the input of the Omnia processor. In analog-only stations, the analog output of the processor is fed to the transmitter audio input (that's five). In digital stations, digital outputs are fed to the HD Radio generator, and an analog output is fed to the audio input of the transmitter (again, that's five).

So in a typical case, we're looking at *five* A/D cycles, some of which may have been at different sample rates and at least three of which involved MPEG coding. Should we be surprised that there are digital artifacts in the on-air signal?

If our studios were all-digital, we could cut a number of cycles and all but one MPEG pass.

The satellite audio could be taken as an AES digital feed (hopefully at 44.1 kHz) and fed to the studio as AES via a linear AES card in the Intraplex. At the studio, the AES satellite feed is connected directly to the bridge router or digital console, mixed and output as 44.1 kHz AES. That signal is run through the profanity delay as AES and then fed back to a linear Intraplex AES module for delivery to the transmitter site.

At the transmitter site, the 44.1 kHz AES would be fed directly to the Omnia and processed. The AES outputs would be fed directly to the HD Radio generator, and an analog output of the HD Radio gen (there's one) would be fed to the audio input of the transmitter.

Photo by Amanda Alexander

The author tunes in on his new Kenwood HD Radio receiver.

All that boiled down to just one A/D cycle, and no trips through the MPEG grinder. So what's stopping us from making those changes now? Not much — just cost. Our entire infrastructure in most of our AM stations is set up for analog transmission. It's going to take time to swap out analog boards and modules.

But even if we can't immediately make the entire path digital, we must find ways to eliminate A/D cycles and MPEG passes. For every one we eliminate, we'll make a measurable improvement in the station sound. Be thinking about that as your date with HD Radio approaches.

The author is director of engineering for Crawford Broadcasting. RW welcomes accounts of your own HD Radio listening experiences.

World Radio History

Bridging the Surround-Stereo Gap

The Big Picture

Photo: Gary Hayes, BBC

by Skip Pizzi

The Developing MPEG Spatial Coding Specification Attempts to Add 5.1 Surround To a Digital Stereo Channel

by Skip Pizzi

Unlike the digital transition in television world, the audio industry's has been almost exclusively focused on stereo distribution. On the air, online and on the store shelf, practically all digital audio media available are either monaural or stereophonic forms. The lone exceptions have been an occasional surround broadcast on terrestrial or satellite radio, and the relatively limited catalog of releases on the DVD-A and SACD formats.

Yet surround sound is a hot property in the consumer electronics business today. Of course, its great success in the home theater sector has been driven almost entirely by *video* content, particularly movies (and more recently, video games), where a 5.1 soundtrack has become the norm.

Meanwhile, the other main locale where surround sound reproduction systems have begun to proliferate is in the car — which, for the most part, is intrinsically an audio-only environment. In the automotive environment, however, the surround content to date has been largely "virtual" or "derived," meaning that it is a single-ended, pseudo-surround system based on effects created in the receiver by manipulating the difference signal between left and right stereo channels.

In some cases this derived effect is reproduced through properly placed, distributed multichannel speaker systems, while in others the derived effect is "acoustically virtual" as well, i.e., reproduced with as few as two speakers. The latter approach is far more sensitive to the listener's position, while the former presents a relatively stable image anywhere in the listening area. Depending on the constraints of the environment, either approach can be effective, but the multi-speaker method is generally preferred.

Consider also that the packaged multichannel audio releases mentioned above generally carry both a 5.1 and a separate stereo version of the same material — a marked difference from the video/TV world, where a single compatible multichannel mix serves 5.1, stereo and mono receivers. This duality for audio content products hearkens back to the early days of stereo LPs, when separate mono and stereo discs were produced, each containing different mixes of the same material.

So within this diverse context comes the challenge of extending multichannel sound to become the norm (or at least more commonplace) in audio-only systems. A key enabler missing from this milieu is the existence of a digital audio format that provides plentiful, real multichannel-capable content in a mode satisfying all applications, from the high-end home theater to the clock radio. This format should also be quite spectrum-efficient, allowing it to be applied to mediums that previously considered only stereo delivery.

Parametric data has to earn its keep by more than making up for the bits it steals from the channel.

Thus there is a need for content that can be considered compatible to all such listening formats, and a delivery system that addresses these in a compatible and efficient manner. Such is the genesis of *MPEG Spatial Coding*, a format that is making its way toward standardization at present. It attempts to carry both surround and stereo content in a spectrally efficient, backward-compatible way. Too much to ask, you say? Read on.

Parametric data

To understand how Spatial Coding works, let's look back a few years to the development of Spectral Band Replication (SBR), which was a technique designed to improve the spectral efficiency of high-fidelity audio coding. This was the first commercial implementation of a technique now referred to generically as *parametric coding*, meaning that auxiliary data is added to coded (i.e., compressed) audio data to provide instruction to the decoder on how to enhance the quality of the decoded audio. This implies that the stored or transmitted signal includes both coded audio packets *and* dynamic instructions on what the decoder should do with the audio during/after decoding.

Of course, within a fixed-bandwidth channel, a small amount of the channel's bit rate is required for the instructional data, so fewer bits are available for audio coding. Therefore the parametric data has to "earn its keep" by more than making up for the bits it "steals" from the channel.

SBR uses parametric data to extend high-frequency response by adding a small amount of data that describes the high-frequency spectrum characteristics of the encoded audio signal. The SBR decoder applies these instructions during its decoding of the compressed audio data, and thereby extends the audio bandwidth of the decoded signal. The parametric approach allows this to be done at a lower overall data rate than the same codec (without SBR) would have required to pass an audio signal with equivalent bandwidth.

Theoretically, parametric data could be retrofitted to any existing codec to provide backward-compatible performance extension. This means that ideally, the parametric data is added to the encoded audio signal in such a way that legacy decoders lacking the ability to interpret the dynamic instructions simply ignore them and decode the coded audio alone as they always would. Meanwhile, new decoders utilize the parametric data and improve the quality of that same coded audio.

In the case of SBR, commercial implementations have been made by Coding Technologies that retrospectively extend the high-frequency response of MP3 and AAC codecs. With the SBR additions, these codecs are called MP3-Pro and AAC+. The latter has subsequently been standardized under MPEG-4 as High-Efficiency AAC (HE-AAC).

Enter Spatial Coding

Now a similar parametric coding technique is being applied to surround sound. In this case, instead of backward-compatible bandwidth extension, the parametric data is used to add multichannel steering information to coded stereo audio, in the MPEG Spatial Coding format currently under development. Again, Coding Technologies is a key developer, this time working with Philips, but MPEG Spatial Coding also includes developments from Fraunhofer IIS and Agere Systems. (For those keeping score, the joint CT/Philips proposal and the joint Fraunhofer/Agere proposal were selected as the most promising candidates received in an ISO/MPEG call for contributions. The MPEG process has since converged the two systems into a format now referred to as MPEG Spatial Coding Reference Model 0 [RM0].)

Under rigorous listening tests, RM0 has proven to be as good or better than either of the two original proposals, across various codecs and at various bit rates. The bit rate applied to the parametric steering data has also been varied in these tests, and results have shown good performance using as little as 5 kbps of steering data (regardless of the audio codec used and its bit rate).

Next time we will conclude this examination with a look under the hood of the current Spatial Coding system's interesting design, and some boundaries on its operation.

Skip Pizzi is contributing editor of Radio World.

World Radio History

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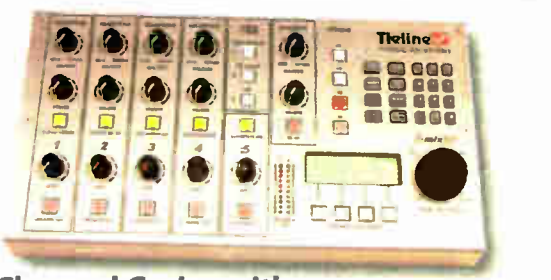

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World Radio History

How to Get Results From Other People

Today's Chiefs Think of Themselves as Managers As Well as Engineers; So Can You

by Tom Vernon

The role of chief engineer has changed dramatically over the past few years. The days when one could have a successful career by repairing and maintaining broadcast equipment largely are over. While hands-on skills remain important, today's chiefs think of themselves as managers as well as engineers. They are effective at managing others and at interacting with senior-level management.

To make the transition to management, a chief engineer needs to understand the factors for success and avoid common mistakes.

While good technical skills are a given, managing in a radio broadcast environment also requires skills at communication and business.

How you look at it

If you are moving to an engineering management position, a shift in perspective may be in order.

"Managers need to see the big picture and look beyond the workbench or transmitter site," said Gary Kline, corporate DOE for Cumulus Media. "This shift in focus includes understanding other department heads and how the chain of command works."

Anticipate types of questions management will ask and have answers ready, Kline advises. Expect queries about enhancing signal coverage and improving efficiency, for example.

Mark Kalman, vice president of national broadcast studios for Sirius Satellite Radio, said, "It's important not to let your ego get in the way of the job." He said managers also must learn to take satisfaction from getting results through other people.

Photo: Diana Mestrich

Mark Kalman

Another part of seeing the bigger picture is being well read. No one seems to have the time to read as much as they would like; but a dedicated effort pays off.

"It's important not only to read up on the trades that cover broadcast engineering," Kline said, "but also those that report on the rest of the radio industry. Beyond that, reading to understand how the radio business fits in the rest of the business world is useful."

Another common theme among experts is communication.

Milford Smith, vice president of radio engineering for Greater Media, said, "The ability to communicate effectively with co-workers, department heads and general managers is vital. Engineers must be able to communicate complex issues in a non-technical manner. They need to be able to do this both verbally and in writing."

Dr. Laurie Bonnici

Kline adds, "Too often managers come to me and say, 'I know Joe is a great engineer, but I just don't understand what he's saying.'"

An exceptional engineer also needs to be adept at negotiating.

"An engineering manager is constantly negotiating with vendors, the finance department and the GM," Kalman said. "If you're able to make a persuasive presentation, you'll usually get the money or close the deal."

For those lacking such skills, Kallman said, workshops are available; and there may be opportunities to seek a mentor in the sales department.

In interactions with coworkers and management, Kline said, you must know when to bend the rules and when to create win-win situations.

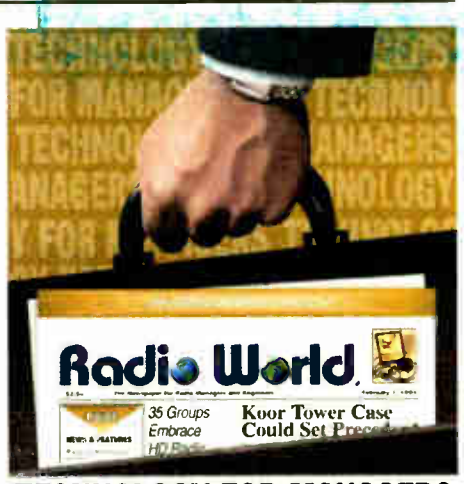
Culture shock

Also fundamental is a shift in the mindset one brings to work.

Dr. Laurie Bonnici, assistant professor at the College of Information Science and Technology at Drexel University, conducts research on management of change in organizations.

"Engineers tend to look at projects and problems from a purely analytical perspective," she said. "To make a smooth transition to management, they need to resist the urge to mechanize and organize things and develop a more people-oriented approach. In most situations, it is not the technology that creates problems, but the people."

For some engineers, this may mean consciously developing the "softer" right-brain skills to balance out the analytical left-brain abilities.



TECHNOLOGY FOR MANAGERS

Bonnici said engineers transitioning to management at a different company need to be especially observant.

"Even within one industry, such as broadcasting, the organizational cultures can vary considerably." Engineers contemplating a switch should look beyond the job description and assess how well they might fit into the new culture.

"These cultural differences explain why someone can be a superstar at one organization and a total failure in the next."

Get the look

Being on a management team in broadcasting means looking the part; but many engineers fall short.

"Engineers should come to work wearing 'business casual' at a minimum, and not wearing jeans and a tee shirt," Kline said. Perceptions matter; the engineer who appears well groomed and dressed will be deemed more competent than one who doesn't.

Maintaining a professional appearance can present problems when it comes to performing the hands-on parts of the job, which usually involve getting dirty. But Smith says engineers can make life easier for themselves by keeping a set of work clothes in the shop to allow a quick change as the need arises.

He also believes managers must be a good judge of character to make the right hiring decisions.

"If you don't get the right person, nothing else really matters," he said. One strategy he uses for making good hiring

See MANAGING, page 24 ▶

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Bedtime Reading for Engineering Managers

You may never feel caught up in your reading; but it's the habit that counts. RW asked several industry sources to tell us what is on their nightstand:

Gary Kline, Cumulus Media: "The NAB Engineering Handbook" — "There's just a wealth of good information in there."

Frank Foti, Omnia Audio: "Tony Soprano on Management" by Anthony Schneider — "It's a no-holds-barred business book that highlights efficiency and how it affects business." His colleague Steve Church reads Frederick Reichold's "The Loyalty Effect: The Hidden Force Behind Growth, Profits, and Lasting Value."

Dr. Laurie Bonnici, Drexel University School of Information Science & Technology: "Diffusion of Innovations" by Everett Rogers — "This is a must-read for anyone planning the introduction of change into an organization."

Joyce Lieberman, WHYY(FM), Philadelphia: "Principles of Digital Audio" by Ken C. Pohlmann — "A great review of the topic for anyone designing a digital plant."

What's on your recommended reading list? Tell us at radioworld@imaspub.com.

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World Radio History

The Second Great Spectrum Rush

Or, 'Four Rules for Auction Happiness From One Who Has Been There'

by James G. Withers

Well, here we go again.

Assuming the schedule holds, Nov. 1, 2005 marks the beginning of the second Great Spectrum Rush, as FM Auction No. 62 might be called.

As an unsuccessful — and still somewhat bewildered — participant in Auction 37, (see "Musings of an Auction Loser" in the Jan. 5 issue), I feel reasonably well informed on this subject and so offer some thoughts for prospective bidders.

Have brass

First of all, if this upcoming auction is even remotely similar to the last one, be prepared to throw bags o' cash at whichever permit catches your fancy. Remember those little steel balls Captain Queeg nervously rolled around in his hand in "The Caine Mutiny"? Not even close to what you'll need in an FCC auction, if you know what I mean. Think brass and think big.

Auction 37 generated around $175 million; so before you get in real deep, take some time now to evaluate exactly what it is that's on sale here.

And while you're at it, save yourself some money and do the initial fact finding yourself. You do not have to pay expensive consultants or buy high-priced software to check out the basics. In Auction 37, a lot of people paid premium rates to have someone else research and then bid on permits, only to find out that, in most cases, the bidding got so nuts that they had to drop out.

So before investing cash up front on experts, ask yourself: Does anybody actually live in the city-grade contour of that big full-throttle Class C in Outlook, Mont.? Draw a 50-mile circle around Outlook on a map (which is about as far as you can move a Class C and still cover the city of license) and see if there is anywhere you could put a 1,600-foot stick and cover anything of significance.

Check the coordinates of the permit — available in Attachment A of the Auction Public Notice at *www.fcc.gov/auctions* — to see where the original applicant planned to locate the station. Some of these permits were just tossed out there, with little thought given to running them; still others have been moved around to accommodate other rulemakings. You might be surprised when you plot the proposed tower site on a map.

The FCC Table of Allotments Section 73.202 — available online at *www.access.gpo.gov/nara/cfr/cfr-table-search.html#page1* — is also a resource to scope out the potential competition. There, you can find out what other allotments are in, or near, any of the 172 allotments being auctioned.

If you think you need to go to the next step of trying to figure out how to do a rulemaking to move three or four other guys in order to move Outlook to InClose, you can always hire that out. But remember, the money you spend on all that engineering and the filing fee (not to mention the time a rulemaking takes, usually measured in years, not months) should be factored into the amount you are willing to bid.

And, oh, by the way, if you win, you will, of course, still have to build that 100 kW blowtorch.

Get real

Second, forget about the various "bidding strategies" that you might be conjuring up in an effort to misdirect other bidders as to your actual intentions.

I tried a little of that in Auction 37, thinking — foolishly, it turned out — that I would fake out other bidders by "salting" my permit list with a few in which I had absolutely no interest. Then I could dance from round to round and from permit to permit, cleverly waiting for the moment to spring my completely unbeatable bid for Albany, Texas, on those unsophisticated dupes.

Right.

Turns out, I was so far down the food chain that even when I went all-in for one I really wanted ($100,000 for Albany!), the Deep Pockets just blasted past me. I could almost hear the yawns as my bid went from highest to lowest in a single mouse click.

So don't worry too much about someone figuring out that you really, really, love Montana. From my experience, if they want the darn thing, they're gonna get it, and damn the expense.

Take a deep breath

Third, don't get caught up in the moment. This is kind of a reverse *carpe diem* thing. If you are bold enough to seize the day, you will have to pay for it on another day, and not too far in the future.

Pick your permits and the amount you want (and can afford) to pay, carefully. When the gavel falls and you are the lucky winner of one of these permits, you can be assured that the FCC cares not one nit about your ability to pay.

If the permit you cherish ... just cannot live without ... just GOTTA HAVE!!... gets bid up past your top price, walk away.

See AUCTION, page 25 ▶

Managing

▶ Continued from page 22

decisions is to stay aware of "who is out there." His advice: Be proactive; get to know other engineers at conventions or local SBE meetings. When an opening does become available at your station, you'll be hiring someone you know a bit about, rather than making a snap decision based on a résumé and a job interview.

Also think about how to hold on to the right people once you have them. Kline said consider the needs, wants and personal lives of those working for you. With this perspective, you'll know when to push and when to back off.

He adds that successful management of people is a give and take matter. If you ask for a lot in terms of travel, overnights and extra hours, you must be willing to give a lot when it comes to salary, comp time and benefits.

Kline also makes a point of spending time with people in every market, and having lunch or dinner with them. He often invites spouses along to thank them for their support. "When the spouse is happy, everything is a lot better," he said.

One thing that seems to be a constant in today's world is change. Management of change is a topic that seems to be getting more press.

Smith urges engineers to see this challenge as an opportunity.

"All of the traditional ways this business has worked in the past are changing. On one hand, this can be scary and overwhelming, but the engineer who can effectively manage change can use it to his advantage," he said.

"Most of the changes are technological, and an engineer who can interpret emerging technologies for management can make a tremendous contribution to an operation."

Kalman sounded a similar note: "The potential with technology is incredible. The engineer needs to present a vision of what it can do to enhance the company's bottom line, and not become frustrated if others don't get it the first time around."

To bring technological change to an organization, Bonnici said, the manager or engineer needs to map its key individuals in terms of how receptive they are to change. At one end of the spectrum are innovators and early adopters, those who embrace change; at the other end are those who resist it. Forging alliances with the innovators in an organization can enable the engineering manager to get an agenda in place.

World Radio History

Auction

▶ Continued from page 24

The easiest way to do this is to set your price before you start bidding. Do your homework. Decide what this business is worth, and bid accordingly. Because if you bid $1 million for Outlook, or Blackduck or whatever, God help you, you might actually get it ... and then what? Well, you can withdraw your bid, but the FCC has made that a bit painful. There is a forfeiture formula, based on a couple of factors, but no matter the actual amount, who wants to pay for nothing? So, forget carpe diem and bid carefully.

Have hope

Fourth, take heart. Amidst the wads of cash being thrown around for truly questionable permits, a few folks did go home with bargains last time. Several permits with honest coverage went for under $100,000, and a few for less than $50,000.

In a time of million-dollar bungalows in the San Fernando Valley, that's not too shabby: a business — as opposed to an 80-year-old live-in shoebox 50 feet from the Ventura Freeway — for under a hundred grand. In spite of my occasional cynicism, owning a radio station *is* a lot of fun sandwiched, of course, in between the usual business crises from day to day and it beats the heck out of selling shoes.

So there you are: four rules for auction happiness. If you are inclined, get out the checkbook and the atlas, and join in the fun on Nov. 1.

The important dates are on the FCC home page; and don't forget the pre-auction seminar. If you plan to attend that, look me up; I'll be the guy with the two little steel balls, looking kind of lost in the middle of all that brass.

Reach the author at jim@koplar.com.

MARKET PLACE

Syfer Names Mouser as Sole U.S. Catalog Distributor

Mouser Electronics said U.K. capacitor manufacturer Syfer Technology Ltd. named it the company's sole catalog distributor in the United States.

Syfer makes ceramic multilayer capacitors and EMI suppression filters. Its line includes high-voltage ceramic chip capacitors up to 6 kV; application-specific products including UL-approved safety and surge protection; High Q/High frequency; and low inductance chips. Mouser will also sell the line of EMI filters.

Syfer's line includes FlexiCap, a polymer termination product developed as a solution to MLCC stress damage caused by variations in production processes. The company says it can withstand a much greater degree of board bending than conventional capacitors.

Mouser Electronics is a subsidiary of electronics distributor TTI.

Info: www.mouser.com.

SAS Adds Audio Network Interface

SAS is offering an audio interface module that connects multiple SAS 32KD Digital Audio Network frames.

ANI connects each frame with two duplex fiber-optic links that operate in a counter-rotating ring, the company stated. This topology results in full redundancy in the event that one of the fiber links is disconnected.

One ANI module in each frame links 750 to 1000 channels of audio between all frames in a 32KD system. A typical system of two frames operating at 44.1kHz links 850 channels.

Multiple ANI interfaces may be installed for the rare applications where more than 750 to 1,000 channels need to be shared among all frames, the company said.

ANI is on the air on five stations at Infinity Los Angeles, two at Infinity San Francisco, three at Bonneville San Francisco, two stations at Bonneville Chicago, and two stations at Infinity Philadelphia, SAS said.

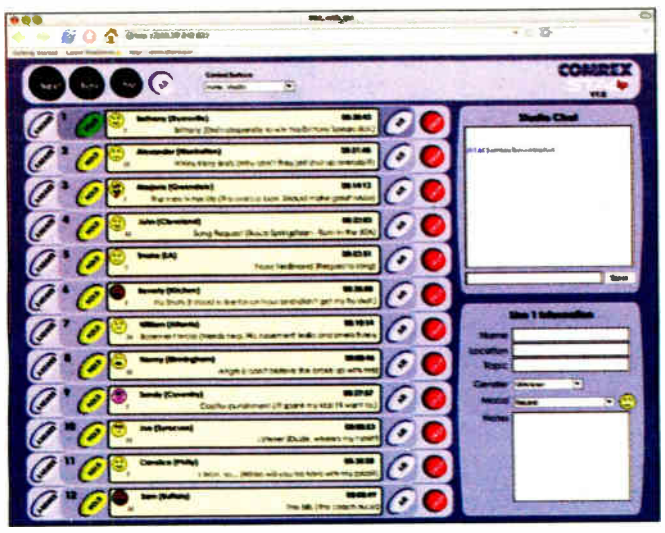
For information call the company in California at (818) 840-6749 or visit www.sasaudio.com.

RFS Introduces CPF500 And -2500

Radio Frequency Systems has premiered the CPF500 and CPF2500 Series of FM sidemount antennas for single-channel requirements.

Both series offer stainless steel construction, low windloading and circular polarization. The CPF500 series comes with a Type N connector and has a 500-watt-per-bay power rating. The CPF2500 has a 7/16 DIN feed connector and has a power rating of 2500 watts per bay. Each series is available in arrays of two, three, four, six or eight bays, using 7/8-inch transmission line for the lower-power units, up to 3 1/8-inch transmission line for the higher-power arrays.

Contact the company in Connecticut at (203) 630-3311 or visit www.rfsworld.com.



Use STAC any place there's a web browser!
If you have a computer, you've already got all the hardware and software you need. Just log onto the internet using a standard web browser — NO SPECIAL SOFTWARE TO INSTALL — go to your STAC IP address, and you are there! STAC 'EM from home, the studio or that great beach in Cancun!

Cool features include:
- **STAC IP** allows call control from multiple networked computers.
- **Busy-All** makes starting contests a breeze.
- **Auto-Attendant** answers, plays your message and STACs callers on hold. Great stress relief for screeners and producers!

GOT CALLERS?
STAC 'EM!

No matter what they're talking about, STAC is the best way to manage your calls.

STAC (Studio Telephone Access Center) puts you in control of your talk shows, request/contest lines, call-ins and phoners with great sound, ease of operation and scalable configuration. Incorporating a pair of Comrex high-performance digital hybrids, STAC provides the most natural sounding telephone audio — even when conferencing up to four callers.

The STAC system is available in six (STAC 6) and twelve (STAC 12) line versions. Connect up to four control surfaces using standard CAT5 cable — no custom cabling required. Best of all, STAC is incredibly easy to use — anyone can master it in seconds.

Got Calls? Put Comrex On The Line.

Toll Free: 800-237-1776 • www.comrex.com • e-mail: info@comrex.com
19 Pine Road, Devens, MA 01434 USA • Tel: 978-784-1776 • Fax: 978-784-1717

COMREX

World Radio History

The routing switcher gets a new twist.

(About five twists per inch, actually.)

Everybody needs to share audio. Sometimes just a few signals — sometimes a few hundred. Across the hall, between floors, now and then across campus. Routing switchers are a convenient way to manage and share your audio, but will your GM really let you buy a router that costs more than his dream car? Unlikely.

If you need a routing switcher but aren't made of money, consider Axia, the Ethernet-based audio network. Yes, Ethernet. Axia is a *true network*. Place our audio adapter nodes next to your sources and destinations, then connect using standard Ethernet switches and Cat-6. Imagine the simplicity and power of Ethernet connecting any studio device to any other, any room to any other, any building to any other... you get the idea.

Routers are OK... but a network is so much more modern. With Axia, your ins and outs are next to the audio, where they belong. No frame, no cards, no sweat.

Scalable, flexible, reliable... pick any three.

An expensive proprietary router isn't practical for smaller facilities. In fact, it doesn't scale all that well for larger ones. Here's where an expandable network really shines. Connect eight Axia 8x8 Audio Nodes using Cat-6 cable and an Ethernet switch, and you've got a 64x64 routing switcher. And you can easily add more I/O whenever and wherever you need it. Build a 128x128 system... or 1024x1024... use a Gigabit fiber backbone and the sky's the limit.

Are you still using PC sound cards?

Even the best sound cards are compromised by PC noise, inconvenient output connectors, poor headroom, and other gremlins. Instead, load the Axia IP-Audio Driver for Windows® on your workstations and connect *directly* to the Axia audio network using their Ethernet ports. Not only will your PC productions sound fantastic, you'll eliminate sound cards and the hardware they usually feed (like router or console input modules). Just think of all the cash you'll save.

Livewire

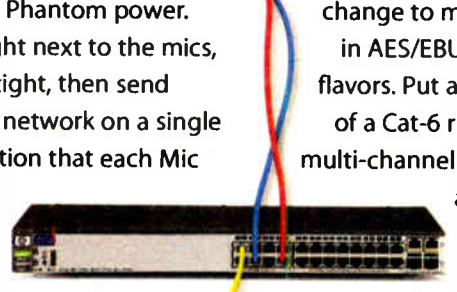
< · · · > 100/1000

There's a better way to get audio out of your PC. No more consumer grade ⅛" connectors – with Axia your digital audio stays clean and pristine.

Put an Axia Microphone Node next to your mics and send preamplified audio anywhere you need it, over Ethernet — with no line loss or signal degradation.

Put your preamps where your mics are.

Most mainframe routers have no mic inputs, so you need to buy preamps. With Axia you get ultra-low-noise preamps with Phantom power. Put a node in each studio, right next to the mics, to keep mic cables nice and tight, then send multiple mic channels to the network on a single Cat-6 cable. And did we mention that each Mic Node has eight stereo line outputs for headphones? Nice bonus.



Put your snake on a diet.

Nobody loves cable snakes. Besides soldering a jillion connectors, just try finding the pair you want when there's a change to make. Axia Audio Nodes come in AES/EBU and balanced stereo analog flavors. Put a batch of Nodes on each end of a Cat-6 run, and BAM! a bi-directional multi-channel snake. Use media converters and a fiber link for extra-long runs between studios — or between buildings.

An Axia digital audio snake can carry hundreds of channels of digital audio on one skinny CAT-6 cable. We know you're not going to miss soldering all that multi-pair...

With a little help from our friends.

A networked audio system doesn't just replace a traditional router — it *improves* upon it. Already, companies in our industry are realizing the advantages of tightly integrated systems, and are making new products that reap those benefits. Working with our partners, Axia Audio is bringing new thinking and ideas to audio distribution, machine control, Program Associated Data (PAD), and even wiring convenience.

ENCO SYSTEMS INC

PSI

radio

Scott Studios

BALSYS

Axia is already working with some great companies. Like Enco Systems, Prophet Systems, Scott Studios, Radio Systems, Balsys Technology Group, and of course Telos and Omnia. Check AxiaAudio.com/partners/ to find out who's next.

Would you like some control with that?

There are plenty of ways to control your Axia network. For instance, you'll find built-in webservers on all Axia equipment for easy configuration via browser. PathfinderPC® software for Windows gives you central control of every audio path in your plant. Router Selector nodes allow quick local source selection, and intelligent studio control surfaces let talent easily access and mix any source in your networked facility.

Control freaks of the world, rejoice: intelligent Axia mixing surfaces give talent complete control of their working environment. Reconfigure studios instantly and assign often-used sources just where they're most useful.

"This sounds expensive." Just the opposite, really. Axia saves money by eliminating distribution amps, line selectors, sound cards, patch bays, multi-pair cables, and tons of discrete wiring — not to mention the installation and maintenance time you'll recover. And those are just side benefits: our hardware is about half the cost of those big mainframe routers. That's right... *half*. Once you experience the benefits of networked audio, you will never want to go back. AxiaAudio.com for details.

AXIA

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Broadcasters General Store BSW

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World Radio History

PRODUCT EVALUATION

S-Logic Enables Audio Depth, Clarity

Ultrasone's Proline 750 Surround Sound Headphones Trick Ear Into Thinking It's Wired for 3-D Sound

by Doug McLeod

Just when you thought headphone development had camped on a predictable technical plateau, along comes German manufacturer Ultrasone with its S-Logic Natural Surround Sound headphones. While it isn't truly surround, it's as close as you'll get without having a hole in the back of your head.

The Ultrasone Proline 750 is part of the S-Logic line. Its uniqueness comes from its offbeat — and off-center — earphone driver alignment. Where headphones traditionally place the drivers directly opposite the ear opening, the S-Logic design moves them down and a bit to the side.

What's the point? According to company literature, the headphones use each individual's outer ear anatomy to fool the brain into thinking it's wired up to 3-D sound.

The Proline is shown with one pad removed. The company says wear the headphone directly across the top of the head to achieve the proper effect.

Sound perception

From the manual: "The sound first strikes the pinna and gets changed through the individual anatomy. This also works as a filter for different directions, which intensifies or weakens the frequency range. This frequency range will be processed by the human brain and then produces spatial listening."

In other words, the listener's hearing isn't changed, only the *perception* of sounds.

To see how it works, just remove an ear pad. They're designed for quick change, with just a small counter-clockwise turn needed to snap one off. The Proline 750 package includes a set of spares.

Once an ear pad is removed, the secret is revealed. Near the bottom of the cup, concentric circles of different sizes surmount the main driver. Five larger screened ports arc across the top of the cup. This alignment is critical, apparently, because the manual warns users to wear the headphone band directly across the top of the head to achieve the proper S-Logic effect.

Does it work? Yes — spectacularly — although it depends on your source audio. A potent test is provided by the included demonstration CD. It includes a broad spectrum of audio that gives the Proline 750 a workout.

In among the jazz and classical recordings I found a liturgical piece that was reproduced with such clarity I thought I heard vinyl pops. This is an issue with super-accurate monitors of any kind; any imperfection in the audio will be painfully obvious. A rumbling "Also Sprach Zarathustra" (also known as the theme to "2001: A Space Odyssey") brought out a strong, undistorted bass.

Included was a piece played on bells and perhaps water glasses in which the sound seems to float and the highs are astonishingly true. You even hear the performer breathing.

In my test, the cut that really sold the S-Logic concept was one that simply involved flowing water. Yes, it's one of the oldest stereo effects going but the Proline 750 reproduced it so well that it seemed as though water was sloshing in all directions, like a tidal pool.

Clean and clear

For RW readers, of course, the question is: how does the S-Logic surround technology work day-to-day in a busy studio?

I do voice work for clients all over the country and used the Proline 750 every day for a week on every job. That included growling station sweepers, bombastic car dealer spots and punchy voiceovers for a TV sports network. The Proline 750 handled everything with great clarity and cleanness, which should be true of any headphone but isn't. I really enjoyed working over music and effects because everything sounded so clean.

As a bonus, I found I was running the headphone amp at a lower level than with some other "cans," so there was less fatigue during long sessions. The company credits its 40 mm titanium-plated drivers and says the S-Logic Surround Sound technology "allows listeners to perceive the same volume at significantly lower sound pressure (3-4 dB). up to 40 percent

See ULTRASONE, page 28 ▶

Product Capsule: Ultrasone Proline 750 Headphones

Thumbs Up

- ✓ Unique design creates realistic "surround" effect
- ✓ Requires less volume, so creates less fatigue
- ✓ Easy to change ear pads (spare set included)
- ✓ Coiled and straight cables included

Thumbs Down

- ✓ 1/4-inch to 1/8-inch plug-on adaptor
- ✓ Pricey for daily broadcast needs

Price: $399

CONTACT: Ultrasone of America in Tennessee at (615) 599-4719 or www.ultrasoneusa.com.

World Radio History

PRODUCT EVALUATION

STL-IP Also Suitable for Remotes

MDOUK's Codec Transmits Audio Over IP; RS-232 Connects Call Screener to Field

by Edward C. Dulaney

I recently had the opportunity to experiment with MDOUK's latest offering for the broadcast market, the AudioTX STL-IP, an audio codec that enables the digital transmission of audio over any IP connection. The device has analog and digital I/O and operates just as any other STL, in that it takes an audio input and sends it to another device on the other end of the chain, where it is returned to analog again.

I decided to use the devices in a number of scenarios to see just how they would perform. Because they are meant for both a typical STL usage and remote broadcasting, I decided to try and "break" them by putting them into some nearly impossible situations.

MDOUK is based in England. Readers may be familiar with its AudioTX line; it includes the AudioTX Communicator, an ISDN and IP codec. The company has been considering a U.S. dealer but at present sells to U.S. customers directly.

Getting started

Configuration, once the system is installed, is performed via a Web interface. The biggest problem with the interface is that it doesn't work with Mozilla Firefox, my typical browser, although the company says it works in the latest firmware. I had to resort to using Internet Explorer — something I try to avoid — to access the interface. Because IE is the browser that most users will likely have at their disposal this discrepancy may be acceptable.

I began by hooking them up to our present 5.8 GHz spread-spectrum link that connects the studio to one of our transmitter sites. We use the Motorola Canopy system, a device intended for ISPs for wireless Internet connections.

The Canopy gives us 5 megabits of bandwidth for IP data over a distance of roughly 10 miles (17 km). The Canopy is connected to the KLZ(AM) Denver transmitter site from the studio, and uses the Harris Intraplex STL system for transporting audio to and from the site.

Rear-Panel View of STL-IP

I configured the STL-IP for MPEG-I/Layer-2 coding, and set it for a 384 kbps stream. There are many other formats available, including linear audio, but for our purposes I kept it set for the MPEG format.

I also configured it for a UDP connection, although TCP is another available option. Using that method I was able to send audio through the Canopy with a total latency of less than 100 ms. However most of the latency was due to a 50 ms "jitter buffer" that I had configured to insure the audio was dropout-free.

Tough enough

After a short time of testing I decided it was robust enough to use over the weekend in place of the Intraplex. This could have been a risky step, but I trusted the STL-IP to operate without a hitch — and it did. The audio quality surpassed the Intraplex, mostly because we have the Intraplex set to encode at 256 kbps, whereas the STL-IP was set for 384 kbps.

The next test was to make a TCP connection with no buffering and no error correction. We tested the system in that configuration and found no problems. Latency was reduced to somewhere under 50 ms in this configuration.

Then I decided to give it an impossible test. I connected it to a cable-modem through a Linksys router. The manual explains the proper way to configure the router for this scenario, and I would highly recommend the user read it thoroughly before attempting a setup like this.

However the test wasn't successful. We were unable to determine if the problem was with my router's throughput (the Linksys doesn't have a way of setting QoS parameters, so there was not any possibility of optimizing the connection) or with my cable-modem speed (downloads are at 4 Mbps, but the upload speed is choked at 256 kbps). I had the STL-IP set for a TCP connection, 128 kbps MPEG-1/Layer-2. Yet the audio was choppy.

Because the unit can be used for remote broadcasts, it is possible that the user might run into this type of situation in the field. I didn't have time to try all possibilities, but the representative I talked with at MDO-UK explained there were methods to optimize the connection and have a reliable link under these circumstances.

The final test was connecting the units back-to-back on the bench and running linear audio through them. In this configuration there was no perceptible delay to the signal, though the specifications state that the latency is about 5 ms. For those who have dedicated IP connections between their studio and transmitter site, this method would provide a simple solution to the old-fashioned analog audio path.

In addition to the standard audio connections, there are ports for RS-232 connections and external logic. For a typical STL, the RS-232 connection may seem like overkill. If you are doing remote broadcasts with the system, however, the RS-232 could be used to connect your call screener system to the man in the field.

The logic connections can provide remote tally, or even a basic remote control system for a transmitter site. There are four digital I/O channels available.

There are a few things I did not like. The first thing I noticed after removing them from the box was the power switch on the back. It reminded me of the little 19-cent pushbutton switches found in the electronics bargain stores. MDO-UK assured me they were reliable.

But the switch also is located rather close to the AC line connection. An errant cord swinging around could impact the switch, turning the power off at a most inopportune time. The representative at MDO-UK informed me they would take this matter up at the next meeting of the minds.

Another issue I had was the manual that came with the unit. It is well written, but there are some areas that would leave the neophyte network administrator scratching his or her head. Suffice it to say that this equipment is meant for people who are experienced with setting up TCP/IP networking.

Finally, there is no easy method to configure the unit initially. In order to install the STL-IP you must reconfigure a computer to operate on the default subnet for the system (in this case that subnet is 10.0.0.0/8). A better method would be to use SNMP to access the unit via a hardware (MAC) address. Then it would be a simple matter to send the configuration to the unit, regardless of where it is located on your network. Many devices use this scheme already, and it would save a lot of time and headaches in the initial setup stage.

Overall I am more than satisfied with the STL-IP. At a price of roughly $3,000 per unit it is an inexpensive alternative to other systems available. And if you use a wireless IP link, such as the Motorola Canopy system, an entire end-to-end digital STL system could be installed for less than $10,000.

Ed Dulaney is chief engineer for Crawford Broadcasting Colorado.

Product Capsule: MDOUK STL-IP Audio Codec

Thumbs Up

- ✓ Robust system
- ✓ Highly cost effective
- ✓ Easy to maintain
- ✓ Versatile design

Thumbs Down

- ✓ Poor power switch
- ✓ Terse documentation not for newbies
- ✓ No easy way to set up the system initially
- ✓ No U.S. distributors

Price: $2,800

CONTACT: MDOUK at sales@mdouk.com.

Control Solutions

Model RFC-1/B Remote Facilites Controller
- control transmiter from any telephone
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- programmable control by date and time
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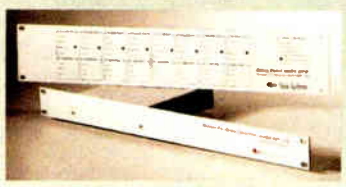


innovative solutions

Model RAK-1 Intelligent Rack Adapter
- parallel printer interface
- internal modem for data transfer
- front panel status indicators
- battery backed power supply
- rack mountable chassis
- accessory package for RFC-1/B

Sine Systems, INC

615.228.3500
more information: www.sinesystems.com

Ultrasone

▶ Continued from page 27

less compared to (some other) headphones."

In addition to spare ear pads, Ultrasone provides two sets of cables — one coiled, one straight — that plug into the left earphone cup by means of a 1/8-inch male plug. This is not the Achilles' heel it would seem to be because that plug is threaded, so you plug it in then screw it tight. Cable strain is always an issue but it will be hard to yank out or short a cord on these headphones.

Oddly, with that much care taken at one end of the cable, there's a concern at the other. A standard 1/4-inch to 1/8-inch plug-on adaptor is provided. While all connectors are gold plated, that is never a secure way to adapt plug sizes. Why not include a screw-threaded adaptor, like the plug *at the other end of the cable*? This has been a standard accessory for other headphones, notably Sony, for many years.

Ultrasone's S-Logic Surround Sound provides a sensation of sound depth and separation unmatched in my experience with headphones. Whether you want or need this depth of sound quality — or can tolerate hearing things you never imagined were buried in your audio — is your choice. Keep in mind, too, that this is a high-end audio device and is priced accordingly at $399 list.

Doug McLeod is a television and radio voice talent, most notably serving as the TV play-by-play voice of the NHL Colorado Avalanche.

World Radio History

USER REPORT

Facility Undergoes Digital Overhaul

Emerson College Refits WERS Studios, Adds Yamaha PM5D Digital Mixer

by Bruno Caruso
Assistant Chief Engineer
WERS(FM)

This article was intended to appear in the July 6 Buyer's Guide on consoles and routers.

BOSTON WERS(FM) presents a diverse mix of programming and music, and also serves as the training ground for our broadcasting students in Emerson College's School of the Arts and Communications. WERS has been a Boston radio institution since 1949, when it transmitted at 10 watts for a few hours a day. Thanks to the foresight of our founder and Emerson professor Charles Dudley, the station moved to its current location at 88.9 MHz so it could increase power.

WERS has lived at 180 Tremont Street since 1998, and now broadcasts 24 hours at 4000 watts to an audience from New Hampshire to Rhode Island.

Emerson recently did an extensive overhaul of the broadcast media gear and the WERS facility, including our post-production room and, most recently, our performance studio, a 13-by-19-foot space with a 9-foot ceiling. The five-week upgrade included physical alterations within the studio, new mixing and recording gear, new patch bays, snakes, cabling, terminations and final testing.

Parsons Audio of Wellesley, Mass., was our audio vendor; Sound Construction and Supply of Nashville provided a table for a new 54-channel **Yamaha** PM5D digital mixing console, and a side rack to house interfaces and patch bays for a Digidesign ProTools HD-192 system.

'Live' format

The performance studio is a multi-purpose facility where we track bands for broadcasts, and also hold our "Live Music Week" several times a year, with band interviews, live performances and so on.

The room has large windows so the DJs, engineers and performers can see outside, and the pedestrians walking by can watch the performers and hear the live broadcast through outdoor speakers. During those times, there are three scenarios happening at once: the bands are playing live in the studio, so we're treating that like a live show; they're going live over the air; and we're tracking their performances.

Our new gear choices were based on products that could handle the station's live-to-air and ProTools mixes, as well as give the students access to "real working world" items.

Yamaha Commercial Audio's Martin Dombey showed us a PM5D, and it fit the requirements of having the power of a digital board, world-class onboard effects, recall, scene memory, rerouting, a compact footprint and a "live" format.

For the in-studio live mix, we have an Aviom Personal Mixing System fed through a Y1/Yamaha A-Net output card in one expansion slot on the PM5D. That allows the engineer to assign and send 16 channels of digital audio directly from the console surface to external modules and daisy-chained Cat-5 connectors, so everyone can control their own mix. We have a supply of EAW SM109Z wedges for those who prefer traditional monitors.

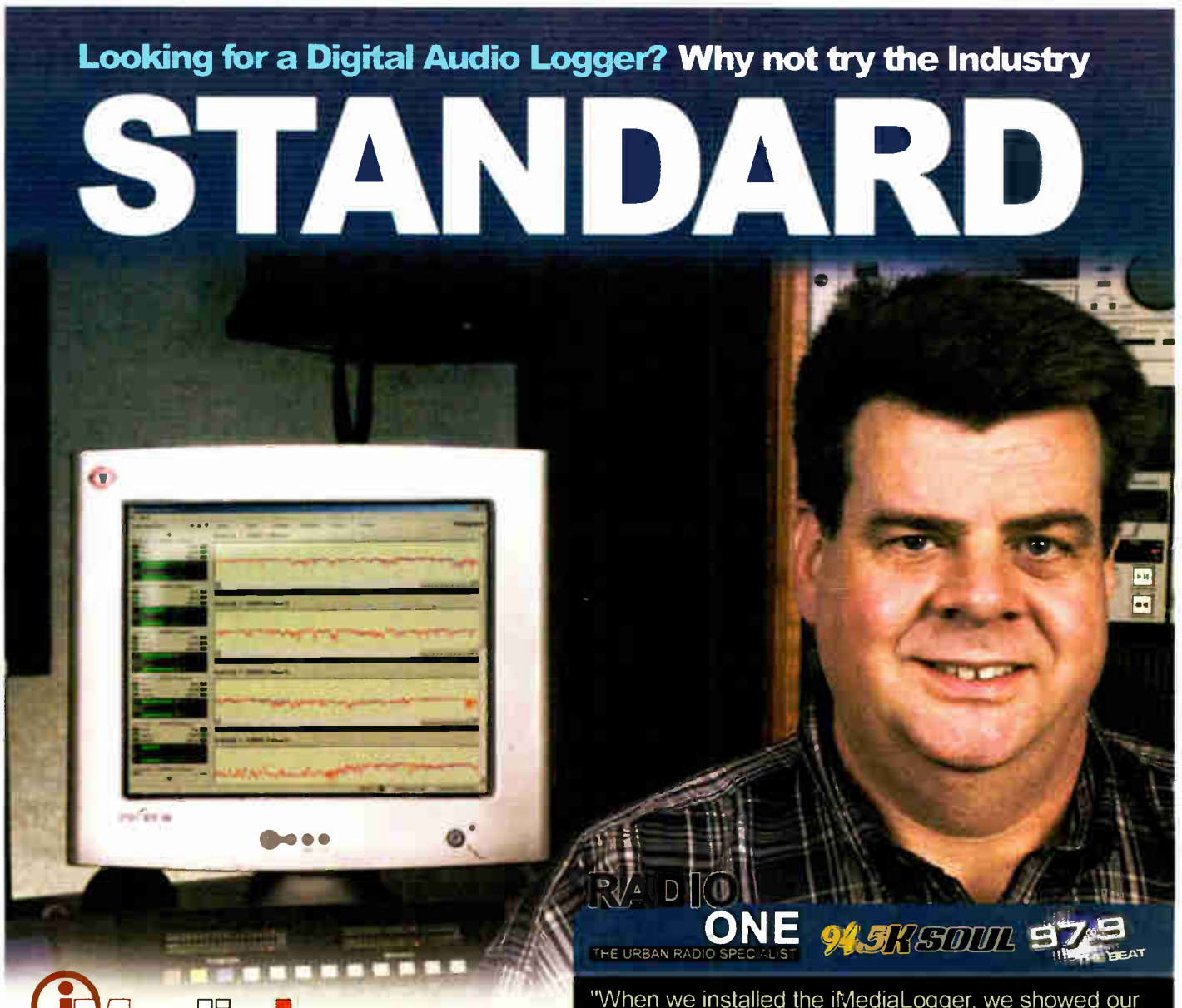
For tracking, the mix busses of the PM5D send everything discretely to ProTools. We've got two ProTools 192 units cascaded via Yamaha MY16AE AES/EBU expansion cards in the back of the PM5D. After we track, the mix gets some posting to clean it up, and the band or the client has a quality final product to take with them.

We're mainly using the PM5D's onboard effects — gates, EQs, compressors, some reverb here and there — but generally, there's not much processing going on. The other gear in the room includes several pairs of Yamaha, Genelec and Meyer studio monitors, a variety of playback equipment, and mics from Rode, Blue, EV, Audio Technica, Shure, Neumann and AKG.

The PM5D retails for $49,800. This pricing includes one power supply and cable.

Visit WERS at *www.wers.org*. *For more information, contact Yamaha Corp. of America, Commercial Audio Systems Division, in California at (714) 522-9011 or visit* www.yamaha.com/proaudio.

Caruso says the station uses a combination of a Yamaha PM5D digital mixing console and ProTools HD-192 system.



World Radio History

PRODUCT EVALUATION

Heil Sound Debuts Dynamic Mics

The Company's PR-30 and PR-40 Cardioid Mics Offer Frequency Response, Off-Axis Noise Rejection

by Charles Dubé

Bob Heil is a man whose life has revolved around sound from many different approaches.

His professional career has evolved from that of a pipe organist and a pioneer in sound systems for touring performers, to developing microphones and headsets for amateur radio.

Heil's microphones and headsets for that market have been in production for over 20 years and have received accolades in ham publications such as QST. He seems to take the time to approach his designs from a "consumer" standpoint, and that has helped greatly to establish his reputation.

His experience on the road touring with prominent and professional acts allowed Heil to recognize what he felt was missing from the available "tried and true" arsenal of microphones. He says he set out to utilize the lessons learned in his communication mic designs and live stage experience to create a line of dynamic microphones that would be economically and sonically superior to the conventional offerings in a comparable price range.

Dynamic range

The Heil PR-30 mic is a dynamic cardioid microphone employing a neodymium "supermagnet" material structure in a steel encasement. The literature claims a frequency response of 40 Hz to 18 kHz. A key feature to this mic is a 1.5-inch diameter dynamic element that exhibits a warm and rich response.

As a professional studio dynamic microphone, the PR-30 is among sparse company in the "street price" range of less than $300. One thing that surprised me in taking this mic out of the box was its weight. At 15 ounces it feels lighter than it looks.

It would be unlikely that this mic would suffer from "droop" while seated in its supplied SM-3 mount, although I would suggest using the optional SM-2 shock mount for optimum isolation from mechanical vibration.

The finish is an attractive anodized champagne matte. Due to its dynamic range, I can see this mic being employed in numerous applications, from the miking of guitars, kick drums, brass, amplifiers and acoustic instrumentation to, of course, the human voice.

The PR-40 is shown with the optional SM-2 shock mount, which comes with a blank call flag for station customization. (CBS eye not included!)

When set out at a distance of a few inches from the source (on axis), the PR-30 fulfills most of the manufacturer's claims — low distortion, high dynamic range and, most of all, a natural and clear response.

It is for a transparent capturing of the human voice that the PR-30 was designed, and this is where the Heil design team's experience with communication mic construction and experimentation with newer materials becomes apparent. I did several test recordings with this mic both in a small home recording studio and in a more demanding production studio environment, and found the PR-30 suited to both.

On axis, the PR-30's response was smooth and certainly competitive with other dynamic microphones costing far more. I did start to notice a small amount of coloration of the sound as I moved to the 45 degree and 90 degree points, more so than with a more expensive mic. Without using an external pop filter, I noticed this mic's proclivity to popping a bit more than I expected, as Heil utilizes an internal double windscreen.

I'm not sure I would abandon the external pop filter altogether.

The proximity effect of the PR-30 also seemed to be slightly more pronounced than that of a costlier reference, but it was also a smoother proximity curve as I moved in on it; not rising up abruptly at a given point.

Like with any dynamic mic, I had to maintain a certain distance from the mic to avoid this, but also could "work" the mic to utilize the proximity effect if I so desired. I think this could be an advantage to announcers who are used to this augmentation of their voice's response. Note that there is no roll-off switch to compensate for this.

I mentioned earlier the optional SM-2 mount because the PR-30 tends to transmit some mechanical vibrations from the case and cable to its element. This is not a microphone designed to be hand-held.

With that said, one feature about the PR-30 was a surprisingly good front-to-back discrimination. I think this contributed greatly to this microphone's ability to reject off-axis noise, such as one finds in a studio with computer fans whirring under the counter.

Of course, if the noise source is on-axis with the mic, there's little to be done. But off-axis ambient noise was notably quieter with the PR-30 than another professional dynamic mic with which I experimented. Seeing the way computers have propagated their way into studios, this is a real plus.

Additionally, in a room with several video monitors running as I was trying out this mic, I didn't see any indication of the monitors' EMF affecting it.

Sibling rivalry

The Heil PR-40 is the big brother to the PR-30 and exhibits some noticeable improvements.

According to Heil, the frequency response of this mic is an impressive 28 Hz to 18 kHz, thanks in no small part to its low mass aluminum diaphragm. For a few dollars more, it shares the physical niceties of the PR-30 and is well machined, but at 1.2 pounds is heavier and feels a little more robust.

See HEIL, page 31 ▶

Product Capsule:
Heil Sound PR-30 and PR-40 Dynamic Cardioid Microphones

Thumbs Up

- ✓ Great value
- ✓ Superb ambient noise rejection
- ✓ Well constructed
- ✓ Transparent response

Thumbs Down

- ✓ Internal popscreen helpful but a bit insufficient
- ✓ No roll-off switch

Price: Heil PR-30 List Price $199, Heil PR-40 Introductory Price $209

CONTACT: Heil Sound in Illinois at (618) 257-3000 or visit www.heilsound.com.

World Radio History

Heil

▶ Continued from page 30

The front to back rejection of the PR-40 is improved over the PR-30's. Although I did not run any sort of frequency sweep on this mic, like the PR-30, this mic has a smooth and natural-sounding frequency response to my ears, and I wouldn't hesitate to consider it suitable for a variety of applications. The extended bass response adds a touch of fullness, something I noticed even with my lackluster vocal abilities.

The proximity effect of the PR-40 is similar to the PR-30's and again no roll-off switch is supplied. Although this low frequency enhancement is less abrupt than in other mics of a similar design, one might have to be careful to not "eat" the mic. They don't digest well anyhow.

The PR-30 on the company's MS 36 boom.

The frequency response as one moves off-axis was noticeably less colored at the 45 and 90 degree points than the PR-30, with the chief effect being a basic attenuation of amplitude. I measured on the console VU meters an approximate 13 to 14 dB attenuation when annunciating into the back of the mic, and the off-axis noise rejection was superb. This is a mic you want to have in a studio when PCs are in the room or you have a less than quiescent air handling system.

The PR-40 seemed to be a little less sensitive to case vibration than the PR-30, and I'm told that an optional shock mount designed for this mic will become available soon. Until that time, the SM-3 mount is included. The PR-40 comes in a rather exquisite wooden box for safe-keeping. An optional desk base and mic boom are available for both the PR-30 and the PR-40.

For the record, the bulk of my listening to the PR-30 and the PR-40 was accomplished employing a Wheatstone A-500 console (with its MM-500 pre-amps, no outboard processing) recorded by Cool Edit (stock Soundblaster card). Playback was through a Hafler P3000 Trans Nova amplifier powering a pair of B&W Nautilus 805 speakers.

In terms of "bang for the buck," I was impressed with the PR-30 and -40. With their optional mounts employed, these well-constructed mics provide high-quality response and are adaptable. They give the old standards a significant run for the money and it wouldn't surprise me to see the Heil name soon cropping up in more broadcast, production and project studios.

Charles Dubé is the chief engineer at WFCR(FM) in Amherst, Mass.

PRODUCT GUIDE

Mojave Audio Has Condenser MA-200

Mojave Audio, founded by David Royer, debuted with the MA-200, a tube condenser microphone. The company says it is known primarily for Royer's custom mic modifications and do-it-yourself tube mic kits, and is moving away from kits in an effort to focus on assembled products. The MA-200 represents its first large-scale production effort.

The MA-200 features a cardioid polar pattern, and uses a one-inch gold-sputtered capsule in conjunction with three-micron capsules, Jensen audio transformers and JAN 5840 vacuum tubes, which the company says are military-grade. Additionally, it uses a balanced transformer output.

The mic ships with a carrying case, power supply, shock mount and cables. It retails for $995.

For more information, contact Mojave Audio in California at (818) 847-0222 or visit www.mojaveaudio.com.

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World Radio History

USER REPORT

WorldNet Broadcasts Live8 Shows

APT's Audio Codecs Were Used by Capital Radio To Deliver Stereo Feeds to Cities Worldwide

by Mark Woodhouse
Chief Engineer
Capital Radio

LONDON On July 2, the Live8 series of concerts in London, Philadelphia, Paris, Berlin and Rome was broadcast to a worldwide audience of millions. In the U.K., Capital Radio took responsibility for the distribution of the worldwide and London Hyde Park feeds to the majority of commercial radio groups such as Chrysalis, Emap radio and GCap Media.

One aspect of the project was to have several stereo feeds from the BT Tower to Capital Radio's facility in Leicester Square about two miles away. Capital currently has an E1 link utilizing BT Musicline 2000 codecs (branded RE/Barco units). These codecs use J.41 and can send 5 x 15 kHz channels, normally 2 x stereo and 1 x mono, over the 2 Mbps circuit.

However, for the Live8 project they needed to transport seven stereo pairs. Given the nature of the event the option of installing an additional three E1 circuits and a further six Musicline 2000 codecs was neither financially attractive nor operationally expedient. An alternative solution needed to be found.

Having worked with Mark Thom of Broadcom Ltd, **APT**'s U.K. distributor, in the past on several projects, and when looking after operational support of U.K. commercial radio stations such as Classic FM and LBC, I value his opinion on such conundrums and therefore contacted him. We determined that the WorldNet Oslo from APT fit the bill and BT kindly agreed to install the system.

The WorldNet Oslo is a 3 RU 19-inch rackmounted unit that supports an E1 interface and is modular in design. As such, it holds several audio cards and can transport the required seven stereo feeds over a 2 Mbps circuit.

Equipped with a 240 V AC PSU and a Micro Controller Unit in the crate as standard, the WorldNet Oslo can be populated according to the needs of the broadcaster. You can add extra redundancy in the form of another PSU and transport card. The audio cards are four-channel, and for this application each card was used in stereo duplex mode with an analog audio input and output, although the cards do support AES/EBU input/outputs.

Fundamental to the WorldNet Oslo is the Enhanced apt-X compression algorithm, and for this application we chose 256 kbps per card, which allowed 15 kHz audio bandwidth with 16-bit word resolution.

For the Live8 concerts, there were three main parameters the WorldNet Oslo was required to fulfill. Seven stereo feeds had to be sent over one E1 circuit; the audio quality had to be similar or exceed the existing J.41 solution; and the coding delay between the two facilities needed to be less than 5 milliseconds.

As previously outlined, with the seven stereo cards each functioning at 256 kbps we were comfortably inside the 2 Mbps parameter. In fact there were about 192 kbps left over for ancillary applications, i.e. metadata using the X.21 port available on the E1 transport card.

Regarding the audio quality, the J.41 data reduction scheme used in the Musicline 2000 is a companding technique, which takes a 14-bit word and reduces it to 11 bits. As such, the dynamic range of J.41 is limited to 84 dB. Using +18 dBu as headroom, this ensures the ground floor level is around -66 dBu; however Enhanced apt-X using 16-bit has a dynamic range of 96 dB and can drop the ground floor level by an extra 12 dB to -78 dBu.

The acoustics, linearity and the spectral imaging of the WorldNet Oslo were of exceptional quality.

The final point was delay; J.41 is blessed with low delay. The WorldNet Oslo was able to match this delay and have an end-to-end processing time of around 4.5 milliseconds.

Several other features of the WorldNet Oslo are noteworthy. The audio response in the cards can range from 3.5 kHz mono, 16-bit up to 22.5 kHz stereo 24-bit. These options would be useful for intercom talkback; mastering quality contribution; plus the distribution of AM, FM and DAB services.

Another interesting feature was the ability to phase-lock six channels for 5.1 content, which will certainly be the next big thing.

The WorldNet Oslo is an intuitive unit, and easy to configure through a GUI. It fulfilled the requirements of Capital Radio and delivered seven stereo feeds of excellent quality from the BT Tower to Leicester Square.

For more information, including pricing, contact APT's California office at (323) 463-2963 or visit www.aptx.com. Apt-X is a trademark of APT.

Announcer's Consoles for Live Events

Whether used in radio, television, or stadium announce applications, the Model 200-series of announcer's consoles provide uniformly excellent performance. With four models to choose from and a host of options, everything on your "wish list" can easily be handled. And while each unit provides a unique mix of features, all share a common core: great audio quality, a simple user interface, and reliable operation.

To see which Model 200-series product is right for your application, visit the Studio Technologies website or give us a call.

STUDIO TECHNOLOGIES INC.
Skokie, IL USA | Ph 847-676-9177 | www.studio-tech.com

TECH UPDATE

Lectrosonics DMTH4 Works With DM Processors

Lectrosonics debuted the DMTH4 telephone interface as a companion to its DM Series DSP matrix processors.

The device integrates the phone line signals into the mixing and routing matrix. Highlights include acoustic and line echo cancellers, both of which are available on the pots and on the codec, and an echo-canceling tail time extending up to 250 ms. Also included is a DTMF dialer and two-wire/four-wire conversion.

The DMTH4 interconnects with the DM Series processors through the digital bus, so phone line signals can be routed to output channels in the sound system. The DTMF dialer also is provided as a virtual signal source so it can be routed to various outputs when dialing confirmation is needed, or delivered to only the phone line.

Six DSP filters and a compressor are provided for the line input and phone line signals, and six filters plus compressor and limiter are provided on the output.

The DMTH4 retails for $1,650.

For more information, contact Lectrosonics in New Mexico at (800) 821-1121 or visit www.lectrosonics.com.

World Radio History

TECH UPDATES

Broadcast Tools TT-1 Uses Dual-Hybrid Transformers

Broadcast Tools' TT-1, part of the "tiny TOOLS" line, is a rack-mountable compact telephone line-powered auto-answer and auto-disconnect hybrid/coupler. The company says it uses dual-hybrid transformers in providing full-duplex audio, and offers a rear-panel multi-turn hybrid Null trimmer to allow the user to achieve 20+ dB separation figures.

Features include front-panel line seize button; call Drop button; audio mute switch; and Off-Hook and Ring indicators. The rear panel is equipped with a RJ-11 jack for the telephone line and second loop-through RJ-11 that may be configured to disconnect attached devices when the TT-1 goes off-hook. Screw terminals are provided for balanced send and caller audio.

For more information, including pricing, contact Broadcast Tools in Washington state at (360) 854-9559 or visit www.broadcasttools.com.

Sonifex HY-03 Offers Mixed Output

HY-03 analog hybrids from **Sonifex** are available in three models, all with a ringing detector. The company says they can be used for any application where a clean telephone signal is required and the line is not subject to delay, including most general telephony applications, and radio station call-ins.

The HY-03 is a single automatic analog hybrid; the HY-03S is a single 19-inch rack-mountable automatic analog unit; and the HY-03T is a twin 19-inch rack-mountable analog unit.

Features of the HY-03 line include adapting to varying line conditions with automatic signal limiting; local and remote line hold switching; integrated auto-answer after a pre-determined number of rings; a balanced mic/line input; low-impedance balanced output with output gain adjustment; line limiter; bandpass filter; and output noise gate with preset threshold for low-distortion audio.

The hybrids are fitted with K-break disconnect detection as standard, with an option for dial tone disconnect (HY-03DTD option).

The company says a feature of the HY-03s is the ability of the output to be a mix of the caller and mic/line input signals, which is useful for recording both sides of a telephone conversation.

For more information, including pricing, contact Independent Audio in Maine at (207) 773-2424 or visit www.independentaudio.com.

Yellowtec b-line Mixes Call Screener, POTS, ISDN

Yellowtec says its b-line telephone hybrid and screener system is compact and combines a POTS and ISDN telephone hybrid with a call screener.

Interfaces for both ISDN and POTS are included, and the audio connections to the mixing console or audio workstation are equipped with balanced studio level and AES/EBU interfaces. The company says integrated digital signal processing, which features echo cancellation, AGC and expander, enables audio quality of the call connection. Plugging in a telephone handset or headset allows off-air screening.

When the system is set up as a compact talk show system, two callers can be managed simultaneously and switched to air independently in ISDN mode. Users can choose to use the touchscreen-based Talkmaster software or the optional b-line Keypad with display and buttons. Users have access to features including PreTalk, Hold, On Air, Drop, speed-dial and phone book.

Additional highlights include GPI/O with programmable relays and TTL inputs and outputs, a DTMF option to initiate calls, sending DTMF tones over existing connections or decoding incoming DTMF tones (such as in competitions) as well as an RS-232 interface for external control by a PC running Talkmaster software, or for connection of the b-line keypad.

The switching system enables analog and digital audio interfaces, as well as inputs and outputs for the digital word-clock, to share the same XLR connectors.

The b-line system retails for $2,420.

For more information, contact Harris' Broadcast Communications Division at (513) 459-3400 or visit www.broadcast.harris.com.

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World Radio History

USER REPORT

Innkeeper 4 Houses Four Hybrids

WSIP Selects JK Audio's Telco Interface for Controlling Calls and Making Calls to Remotes

by Fred Francis
Contract Engineer
Francis Technical Services

PAINTSVILLE, KY. Francis Technical Services provides contract engineering services to stations in West Virginia, Ohio and Kentucky. WSIP(FM) is a 100,000-watt station serving Eastern Kentucky, West Virginia and Virginia, and is owned and operated by Key Broadcasting Inc. WSIP has an old-school approach to radio and offers a great amount of local appeal programming such as "Swap Shop," local and regional sports, religious programming and paid remotes.

Each of the aforementioned programs requires something different out of an on-air phone system. The station has for years used a system that was custom-built by a previous engineer and somewhat served the needs of the station. Trying to find a phone system that would provide a solution to the various needs of the station, and most of all provide ease of use, was not an easy task. Several factors had to be examined, not the least of which was cost.

WSIP has had for some time a **JK Audio** Innkeeper digital hybrid, which is used in production to record a coach's interview for later broadcast. This unit has enjoyed trouble-free service. When we discovered the Innkeeper 4, with four digital hybrids in a one-rack unit package at a good price, we ordered it.

We assumed it would still need some modification to serve the needs of this facility. But we could not pass on the unit, knowing how well the original Innkeeper works.

Pictures don't do this unit justice. It is well laid out and has a good feel. Like all the JK products I have used, tt is straightforward and to the point. Everything you need is easily accessed, and the way the unit is laid out allows for numerous configurations to compensate for facility needs. The operator easily can control incoming calls and quickly make calls to remote locations with the use of the speed dial/memory phone list.

I was wrong when I assumed that modifications would be required. The remote interface allows connections to necessary external equipment for this facility.

The primary reason for replacing the existing unit, other than age and bad send/receive isolation, is that a new phone system for the building had been installed. The new system would not give an indication that the line was in use if it had been pick up by the hybrid. So you could be on the air with a paid remote and someone else in the building decides to call out. They pick up a phone, hit a line and then start dialing on the air.

This is not only annoying; it is dangerous should someone start cussing because they can't figure out why the phone doesn't work. Customers also have been lost due to this problem.

The Innkeeper 4 remote interface allows the unit to control external relays (not supplied) that can disconnect the lines from the phone system when they are active on the hybrid. Problem solved.

Another problem with the original unit was there was no easy way to screen calls. The calls were answered in the regular phone, placed on hold and then the screener would signal the operator.

The problem arises when the call is over but neither the screener nor the operator has hung up the phone. Now the phone line is tied up and nobody can call in. With the Innkeeper 4, the calls can be screened by use of a phone plugged into each line on the back of the unit. This removes the house phone system from the equation.

Send and receive audio are conveniently available in the form of XLR jacks on the back of the unit. If you are fortunate enough to have an on-air console with four mix minus busses, you're in luck, as the Innkeeper 4 has separate sends for all four hybrids. If you are not so fortunate, you're still in luck. The Innkeeper 4 has a master send that sends the audio to all four hybrids. Levels for send and receive are adjustable, which is convenient if you are using an older console.

If you have an on-air console with four mix minus busses, you're in luck; the Innkeeper 4 has separate sends for all four hybrids. If not, it has a master send that sends the audio to the four hybrids.

If you're in need of a flexible, digital, on-air phone system that's easy to use I recommend giving this unit a try.

For more information, including pricing, contact JK Audio in Illinois at (815) 786-2929 or visit www.jkaudio.com.

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TECH UPDATE

Scoop E-Z Adds Tri-Band GSM Module

The Scoop E-Z portable audio codec from **ATA Audio** is intended for live outside broadcasts. The company says it is capable of using analog, digital, wireless and satellite, and that broadcasters benefit from the maximum bandwidth available. Features include mic power selection, input gain adjustment, mic/line input, status LEDs and potentiometers for inputs 1 and 2.

Additionally, it is now available with a Tri-Band GSM module, which includes the 900-1800-1900 MHz bands. ATA Audio says reporters can file a report or do an interview from anywhere without worrying what GSM module is needed. Users insert their GSM Sim card into the module and dial back to the studio. The Tri-Band module auto-detects the band and service that are available.

Services and miscellaneous functions of the GSM module include pin code entry, indication of current network and radio reception level, selection of wireless network, Caller ID display and the ability to send DTMF codes from the keyboard during transmission.

The Scoop E-Z with GSM module retails for $5,199.

For more information, contact ATA Audio in New Jersey at (973) 659-0555 or visit www.ataaudio.com.

World Radio History

TECH UPDATES

Model 230 Has Mic Preamp Circuit, Talkback

The Model 230 announcer's console from **Studio Technologies** is a tabletop unit that employs standard connectors to interface microphone, headphone, on-air or talkback signals. It is described by the company as the audio control "hub" for announcers, commentators and production personnel.

A mic preamp circuit provides low-noise/low-distortion amplification over a 20 to 60 dB gain. The gain is adjustable in 10 dB steps. The input is compatible with balanced dynamic and condenser microphones. The mic power source is 48 volts nominal and meets the P48 phantom standard.

An LED indicator serves as an aid for optimizing the preamp's gain setting. The output of the mic preamp is used by the main output, and is routed to the compressor circuit that supports the talkback functions.

The talkback functions are intended to provide personnel associated with production trucks, control rooms and live performances with talent-originated cue signals. The Model 230 contains two pushbutton switches that control the talkback functions.

Each button can be configured to allow talkback audio to be routed to one of three locations: intercom channel 1, intercom channel 2 or a line-level talkback output. The line-level talkback output is transformer-coupled with a +4 dBu nominal signal level. It contains resistors in series with the output connector, allowing line-level talkback outputs from multiple units to be directly "summed."

The company says a studio-quality compressor circuit is provided to control the dynamic range of the signal coming from the mic preamp. The circuit uses a laser-trimmed voltage-controlled-amplifier integrated circuit for low-distortion level control. The signal from the compressor is used by the talkback functions.

Model 230 retails for $1,095.

For more information, contact Studio Technologies in Illinois at (847) 676-9177 or visit www.studio-tech.com.

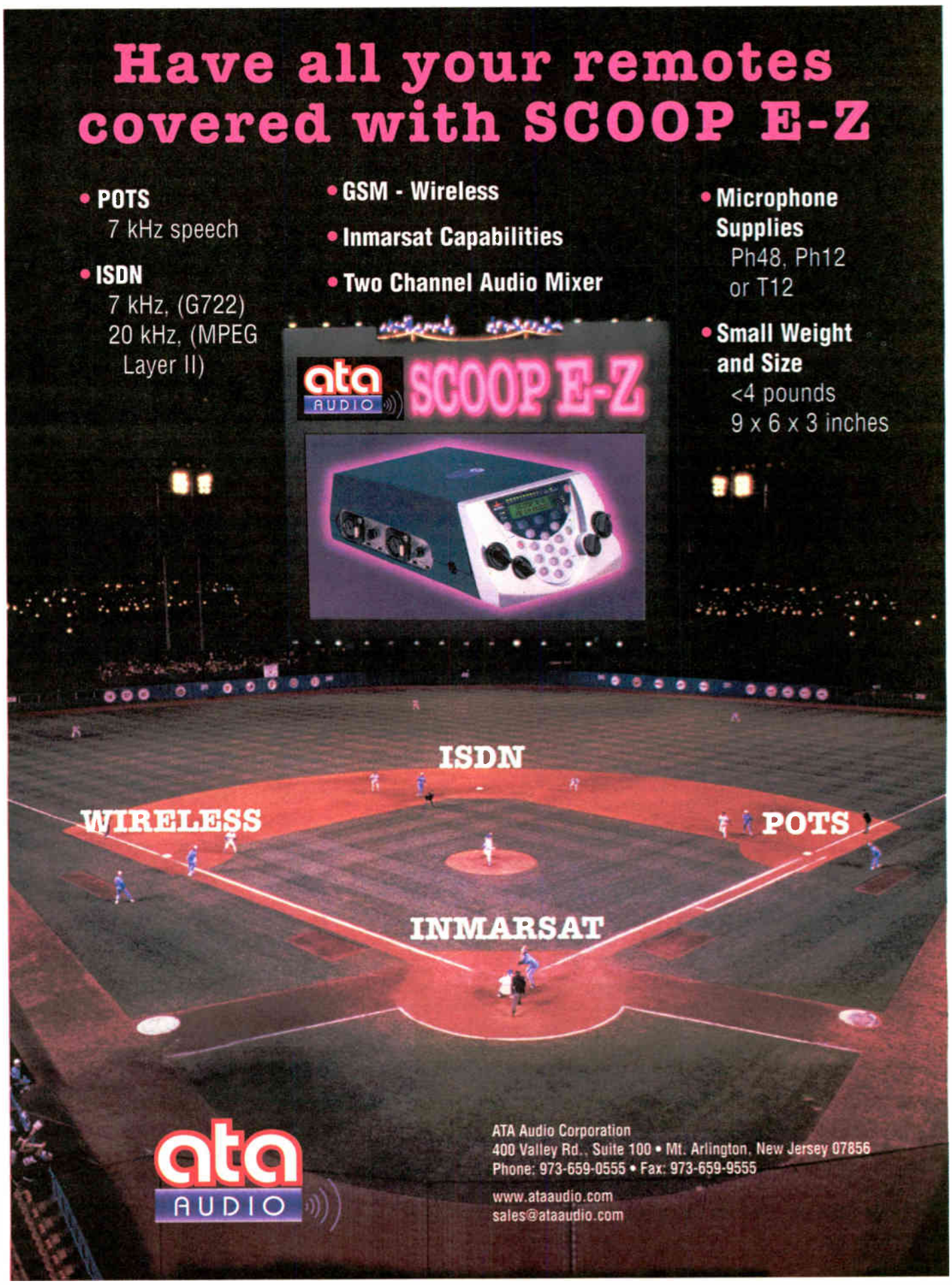
AEQ's Eagle Serves As Codec, STL And Hybrid

The Eagle ISDN audio codec from **AEQ** connects to an ISDN line, and provides an X21/V35 interface for a point-to-point connection. The company says many radio stations use this feature as a cost-effective STL.

The Eagle has digital and analog inputs and outputs. The two channels can be multiplexed to allow the callers on both lines to interact on the air. The talkback intercom uses the microphone/headphones and the Aux-TelSet connection in the front panel. The Eagle can be remotely controlled via AEQ's E@sy software.

The Eagle works with the following encoding formats: G.711, G.722, MPEG L II, MPEG LIII and AEQ LD-2. It is capable of operating in a split mode, sending audio in MPEG III and receiving in low-delay G.722. Additionally, the Eagle operates as a hybrid. It retails for $2,895.

For more information, contact AEQ in Florida at (866) 817-9745 or visit www.aeqbroadcast.com.



World Radio History

USER REPORT

Comrex Helps Festival Reach Masses

Matrix Enabled Earthdance to Be Heard Globally; Delivers Audio Stream for Internet Broadcast

by Dave Myers
Operations Manager
KMUD(FM)

GARBERVILLE, Calif. The motto of Redwood Community Radio KMUD (FM) is "people-powered radio." In 2004, we took this motto to a new level, using codecs to bring several events directly to listeners who otherwise couldn't experience them firsthand.

Using portable and rack models of the Comrex Matrix, we helped broadcast the Earthdance peace festival to a worldwide audience, interconnected a small network of stations in our rural region prior to the November election, and helped listeners at home partake in the 14th annual Humboldt Hempfest.

ISDN 'heartbeat'

The Earthdance peace festival is a three-day global festival around a shared collective moment focusing on world peace, which organizers call the "Prayer for Peace."

In its ninth year, Earthdance now takes place simultaneously in 130 cities and 50 countries. Our station, located about four hours north of San Francisco, has the fortunate distinction of being the closest station to the "mothership" Earthdance site at Black Oak Ranch in Laytonville, Calif.

KMUD hooked up a Matrix at its studio, behind the main Earthdance stage and at KZYX.

For the 2004 festival, in addition to the "Prayer for Peace," former Grateful Dead drummer Mickey Hart and his ensemble Planet Drum coordinated a "Drum Circle for Peace." For this, they sought to break the Guinness world record for Largest Drum Circle. The Remo drum company gave away 3,500 hand drums to ensure there were enough people to break the record.

KMUD proposed to the Earthdance organization that both its "Prayer for Peace" and "Drums for Peace" be broadcast live, using the KMUD studios as the conduit for further audio transmissions. The organization agreed, and KMUD made arrangements with the listener-supported Pacifica radio network to upload this programming to a satellite system known as the KU Band. From there, about 200 Pacifica affiliate stations had the option of putting this historic moment on the air.

In order to accomplish this, we needed to get a good signal out of the festival area, which was serviced only by POTS. We then needed to convert the signal to ISDN in order to get it to Pacifica station KPFA(FM), where they could upload it to the KU satellite. Here is where the Matrix units played a crucial role.

We hooked up one portable Matrix unit in a trailer just behind the main stage at Earthdance, one at the KMUD studios and one at Mendocino County public station KZYX(FM).

On Saturday, Sept. 18, at around 4:30 pm, Mickey Hart, Zakir Hussain and Airto Moriera began a "heartbeat" drum rhythm. KMUD was given a balanced analog signal from the main soundboard, which we then fed into one of the portable Matrix units. The Matrix encoded the analog signal and sent it via POTS to KZYX, where their engineer converted to signal to ISDN and sent it to KPFA in Berkeley.

Pacifica uploaded the programming to their KU satellite, covering North America. Radio stations throughout the continental United States with KU equipment were then able to pick it up and broadcast the Prayer for Peace and Drum Circle for Peace.

Another function performed by the Matrix was delivering the audio stream for worldwide Internet broadcast. Since the phone system at the festival could not provide enough bandwidth to allow streaming directly from the site, a local streaming company took the analog signal from the receiving Matrix at the KMUD studios, sent it to their computer (which they had relocated to the KMUD studios and plugged in to our Ethernet), and originated the worldwide Internet stream from there.

Thus, the Matrix was instrumental in helping this global peace festival to reach its worldwide audience through two routes.

KMUD received many e-mails and phone calls after the event thanking us for providing this historical linkup. Listeners played their drums along with the broadcast, listened to the many inspiring speeches and interviews we brought to them in high-quality audio and generally shared in the experience.

Election coverage

The dust hadn't yet cleared from Earthdance when the broadcasting community turned its sights on the November election.

Motivated by the efforts and grant resources garnered by Native American-owned Hoopa radio station KIDE(FM), KMUD had been meeting with KIDE and area community stations KHSU(FM) (California State University at Humboldt) and KZYX(FM) (Mendocino County) to form a regional radio network covering topics of interest to the region.

This network, calling itself the Seven Rivers Radio Network, sought a technical solution that would allow us to air programming simultaneously on all four stations that originated from one of the members. Again, lack of resources created the biggest challenge, as two of the four stations operated in towns with no ISDN capability, and only one of the four had reliable high-speed internet access.

Matrix provided the solution. KMUD News Director Estelle Fennell describes the process:

"On Oct. 14, 2004 the Seven Rivers Radio Network aired a special presentation on California's Nov. 2 election propositions. KMUD and KZYX were able to link via the Matrix so that programming could originate simultaneously out of both stations," she said. "This allowed us to design the program so that hosts at the two stations could switch off with different segments. It also allowed us to talk to each other and to each other's guests and produced a dynamic show.

"The fact that we were able to broadcast to a much greater audience and much larger segment of the North Coast's voting public made it much more attractive to the various campaigns, and we were able to have guests on who might not have been heard in our area otherwise," she said.

Humboldt Hempfest

Feeling that we were on a roll, we hardly hesitated when the Hempfest came to town. This daylong event celebrates all things hemp-related, from industrial hemp for clothing, food and fuel to medical marijuana and its other more celebrated cannabis cousins.

Featured were Jack Herer, author of "The Emperor Wears No Clothes: Hemp and the Marijuana Conspiracy," nationally-known physician and hemp activist Dr. Tod Mikuria, author and activist Chris Conrad, David Bronner (owner of the Dr. Bronner's Soap company), and live music performances by eco-troubadour Darryl Cherney, and many other local and regional favorites.

Because we were in the middle of our biannual on-air fund drive and the

See MATRIX, page 39 ▶

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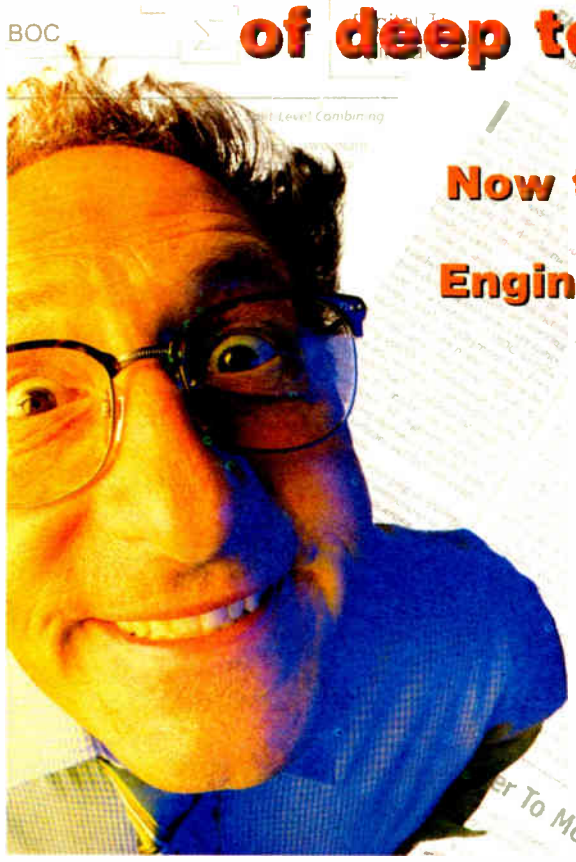

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World Radio History

TECH UPDATES

Audio OnLine's 'Modems' Connect to POTS

The Audio OnLine interactive telephone information system from **Henry Engineering** provides audio information via regular telephone lines.

It is intended for broadcast station listener information and voting lines, as well as public safety organizations, news/weather bureaus and broadcast actuality services. Sixteen incoming phone lines can be answered simultaneously, with messages accessible to callers.

Audio OnLine consists of up to four "modems" that connect to POTS lines with modular phone jacks, and software that operates in a standard DOS computer. Messages are digitally recorded on the host computer's hard drive.

(We asked Hank Landsberg why the company puts the word modems in quotes. He replied, "The board used is technically a Call Processing Board. We refer to it as a "modem" because any board that goes into a PC and connects to a phone line is commonly called a modem, even though our board is actually much more than that.")

For each 10 MB of drive space, about 20 minutes of audio can be recorded. Messages are recorded using 8-bit MULAW encoding to ensure high-quality reproduction the Henry says is suitable for radio station rebroadcast. Messages

can be recorded on site or "called in" over a phone line.

Audio OnLine's Edit functions permit messages to be updated, deleted or saved for later. Other features include Call Counter, which registers calls for each message; Screen Saver, which prevents burn-in of the monitor screen; and Record Password, which prevents unauthorized use.

A call counter tracks the number of times each message has played, useful for voting lines. Up to 999 messages can be stored. Call Count Reset resets counters to "000." The Line Routing feature permits incoming phone lines to operate independently or in groups, allowing Audio OnLine simultaneously to answer each phone line with the same or different message or menu.

Audio OnLine is available as a two-, four-, eight-, 12- or 16-line system. Retail pricing starts at $1,150 for a two-line system, and goes up to $5,600 for the 16-line system.

For more information, contact Henry Engineering at (818) 355-3656 or visit www.henryeng.com.

Musicam USA Has Upgrades for NetStar, RoadStar

Musicam USA says it has software upgrades for its NetStar, RoadStar, SuperLink and TEAM codec products.

NetStar codecs are available in 2 RU models, the 300 and 500. Both are capable of bi-directional stereo audio over IP via Ethernet, and ISDN operation, and support MPEG 4 AAC, MPEG 4 AAC-low delay, MPEG 1 and 2 Layers 2 and 3, G.722, G.711 and PCM uncompressed audio. The company says NetStar now supports Multicast and contains various custom setup options that were previously unavailable.

Musicam USA's RoadStar, top, and NetStar

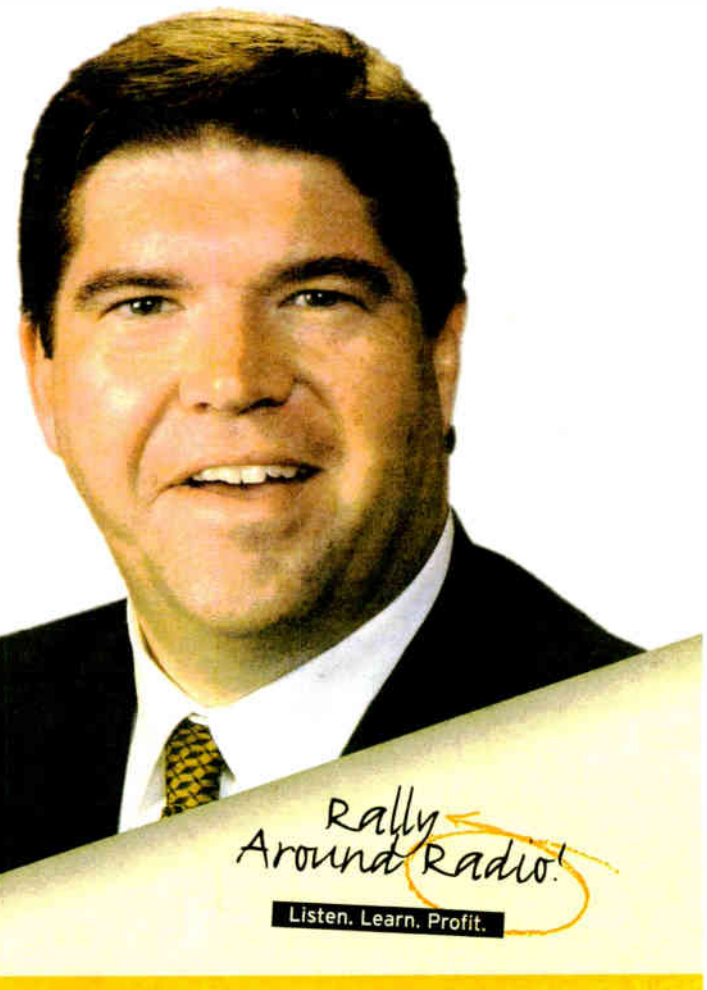
RoadStar is a portable four-channel mixer supporting the same algorithms and added features as the NetStar. RoadStar operates over IP and ISDN.

SuperLink is a rackmount STL and audio/data gateway that connects to T1, E1, ISDN, X.21 and V.35 transmission networks. Additionally, it streams audio over LAN, WAN, DSL or ATM. Audio may be received over T1 or E1 and streamed via SuperLink.

TEAM is a T1 and E1 multiplex transmission system consisting of seven hot-swappable modules capable of sending/receiving six stereo or 12 mono program feeds. The company says SuperLink and TEAM now support the J.42 algorithm and multiple sample rates and data rates for PCM (uncompressed) linear audio, as well as MPEG 2, MPEG 3, G.722, J.41 and J.57.

A Windows remote control program is available for SuperLink and TEAM. A demo download is available for free from the company's Web site.

For more information, including pricing, contact Musicam USA in New Jersey at (732) 739-5600 or visit www.musicamusa.com.



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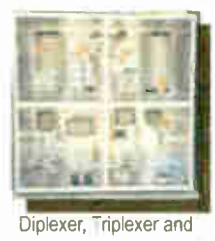

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World Radio History

TECH UPDATE

Tieline iMix G3 Is Remote Studio in a Box

Tieline says its i-Mix G3 is a codec, commentary, communications, talkback and control interface, combining six remote products into a 16 x 90-inch box weighing four pounds.

The company says G3 integrates communications, control and programming functions. It also touts the unit for its reduced setup time, personnel, wiring and signal distribution costs. It offers a choice of POTS, ISDN and GSM codecs (audio over IP is pending), offering 15 kHz mono/stereo over ISDN and POTS, plus 7-15 kHz over GSM.

A software module to be released this year will offer 15 kHz mono and stereo audio over Wi-Fi, ADSL and wired IP networks for remote broadcasts, as well as up to 20 kHz linear audio over high-bandwidth IP networks for studio/transmitter links.

A configurable 16 x 11 Cross Point Digital Matrix Audio Router is optional; it allows any audio input to be routed to any output, headphone or codec channel. The iMix has a configurable off-air communications facility for local and back-to-studio live communications.

The G3 has been designed as a six-input and three-output configurable digital mixer including five switchable mic/line inputs, one auxiliary and an analog line input. A telephone talkback interface is included for taking live callers in the field.

Control options include a relay and RS-232 control system for local and remote control of equipment at either end of the codec link, plus control of the remote talent's audio input levels from the studio.

There are five software profiles over POTS, ISDN, GSM and IP links including mono, stereo, mono plus communications, dual mono and bonded mono.

i-Mix G3 comes with a POTS codec and an analog telephone coupler. The user can add additional POTS, ISDN and GSM codec modules into the expansion slot on the right hand side of the i-Mix G3 or load up the IP streaming software module to increase programming, mixing and communications options.

The optional plug-in GSM module delivers 7.5 kHz audio over standard GSM networks and up to 15 kHz over High-Speed Circuit Switched (HSCSD) GSM networks. The user dials between the GSM-enabled codec to a landline-enabled Tieline POTS codec, and uses the battery module or vehicle power supply for a wireless solution.

Check with supplier on status of planned IP functions.

For more information, including pricing, contact Tieline Technology in Indianapolis at (317) 845-8000 or visit www.tieline.com.

Matrix

▶ Continued from page 36

Hempfest program was subject to change, KMUD Program Manager Michael Jacinto decided to set up the Matrix and leave it ready to go all day so he could put the Hempfest on the air when onstage doings were interesting enough to warrant it.

Leaving one Matrix unit connected to the soundboard at the Hempfest, with a microphone plugged into input 2, he essentially operated the live feed single-handedly from the station, listening to the event in "cue" mode and bringing it up on a slider when it got exciting. KMUD programmers attending the event used the on-site microphone to introduce and provide context to onstage performances and speeches when needed.

Listeners praised the quality of the audio, especially for the live music segments. Vocal clarity, rich bass tones and electric guitar snarl kept their dynamic qualities through the entire path of the broadcast signal.

Rather than simply publicizing this event or interviewing participants before and after the fact, we could cut back and forth from regular programming to (truly) live music performances and speeches of topical interest.

For more information, including pricing, contact Comrex in Massachusetts at (978) 784-1776 or visit www.comrex.com.

World Radio History

USER REPORT

Telos Xstream Expands on Classic

Xstream and Xport Audio Codecs Add Features, Functionality to Classic Zephyr Model

by Mike Schweizer
Project Manager
Improbable Missions Force

SAN FRANCISCO Sitting down to write this user report was tough. The problem is that the Zephyr Xstream audio codec from **Telos Systems** is one of my favorite pieces of equipment, and I didn't know where to start, as the box can be used in many ways.

Let's start with the obvious application, the basic remote broadcast. Instead of lugging a mixer, a headphone amp, mic processing, a telephone and a codec I simply bring my mixer version Xstream. I send high-quality audio to the studios on one ISDN channel (the Xstream offers more coding modes than the Classic Zephyr and other ISDN codecs) and use the second channel to communicate with the studios.

With four inputs that accommodate mic- or line-level signals, I just plug in mics or wireless receivers and go.

The four built-in headphone amps deliver plenty of volume, even pleasing talent who blew their hearing years ago. Two monitor mixers allow me to construct the "mix-plus" for the talent and PA right in the Xstream.

The ability to do so much in one box is handy when I have limited space in which to set up, or have to hand carry the gear a long way. It also eases getting through security when covering events such as the recent address by Secretary of State Condoleeza Rice in San Francisco.

Telos also makes a rack-mount non-mixer version of the Xstream with one set of line-level analog inputs and outputs. AES/EBU is standard on this configuration. This unit is ideal for installation at the studio end at a significantly lower cost than the mixer version.

New tricks

Another improvement over the Classic Zephyr is the ability to run high-bit-rate transmission in some coding modes via an optional V.35 or X.21 interface. I was recently involved in setting up telecom for a broadcaster in San Francisco who had begun a new LMA on short notice.

We had a T1 installed for the STL, and Intraplex multiplexers were on order, but it would be a few weeks before they arrived. Using Adtran TSU-100 T1 CSUs we connected a pair of Zephyr Xstreams to the T1 and ran them in Layer 2 Stereo at 384 kbps on a single V.35 interface. It sounded great, the coding delay was minimal and we saved a long dual-channel toll call. ISDN was available as backup utilizing the same hardware.

Four built-in headphone amps deliver plenty of volume, even pleasing talent who blew their hearing years ago.

When you install a Zephyr Xstream, you also get half of a great POTS codec system. Telos Systems makes a unit called the Zephyr Xport, which uses a high-speed analog modem to connect to an Xstream. Because the Xstream uses an ISDN line, calls are digital from the originating CO all the way to the studios in most cases. This is similar to the situation with 56k dialup modems; they can talk to the ISP's digital trunking at high bit rates, but if you try to use one to call another on analog phone lines, the best you can do is 33.6.

I carry an Xport when doing remotes for stations that are using Xstreams. Last year we were busy and didn't check an ISDN line in advance of a broadcast. The site was a long drive away, and we had been having great success in getting ISDN from SBC that worked every time. Big mistake. I arrived at the pizza joint two hours before airtime and couldn't find the line. Seems it was installed at another address by mistake.

The restaurant was so small it only had two phone lines, one for reservations and the other for credit card verification. But it turned out they also had a privately owned pay phone in the lobby. The radio station in question has "800" numbers pointing at several of the Xstreams to avoid having to register remote lines with long-distance carriers. We hijacked the pay phone line, connected the Xport and got the show on the air via the "800" number while we waited for the phone company to re-

See TELOS, page 41 ▶

World Radio History

TECH UPDATE

MicTel Interface Expands Upon Gentner Microtel

CircuitWerkes says its MicTel amplified mic/line-to-telephone interface replaces a telephone handset to provide audio for feeding and receiving information. It combines a single-channel mic amp with a headphone amp and telephone interface in a package suitable for locker-room reports and other extended remote broadcasts.

The company says MicTel improves on the original Gentner Microtel, first built in the early 1980s. That model had unbalanced inputs, where MicTel is active, balanced for inputs and outputs. MicTel's battery life is 20-30 hours compared to about 12 hours for the Microtel.

Additionally, the Microtel's maximum output level was about –1 dBm, whereas the supplier specs the MicTel at about +10 dBm. It offers defeatable safety limiters to prevent line overload. MicTel's headphone output is driven from its own volume control, whereas Microtel's headphone volume was only controlled by the aux gain control.

Features of CircuitWerkes' MicTel include outputs for telephone handset, cellular phone or balanced line level at up to +10 dBm; audio inputs from phone handset, cell phone or balanced line; and individual gain controls for send, receive and headphones levels. The program bus is fed by a balanced mic preamp and an auxiliary balanced line input.

Audio limiters in the send and receive channels are user-switchable and begin working at about +3 dBm of output. The limiter works by automatically reducing the gain of the device during high-output peak audio, thereby preventing clipping, output distortion or overdriving the telephone line.

MicTel has 1/4-inch and 3.5 mm stereo headphone/cue jacks. The headphone amp has a variable-level balanced input and adjustable sidetone so users can monitor an IFB, or cue return source and/or program audio.

MicTel has a side-tone adjustment for increasing the amount of send audio the user can hear in his headset. The side tone can be applied to the headset only or to the entire aux audio chain, which the company says makes the studio mic sound more natural during interviews. The side tone audio can be defeated when MicTel is being use for translation services.

MicTel retails for $319.

For more information, contact CircuitWerkes in Florida at (352) 335-6555 or visit www.circuitwerkes.com.

Telos

▶ Continued from page 40

route the ISDN to our location.

Another advantage of the Xport/Xstream combination, not so obvious, is that the board operator didn't have to reconfigure anything to receive our POTS codec call. We just showed up on the regular console input with audio quality almost, but not quite, as good as with ISDN. Incidentally, the Xport also can be optioned for mono use with ISDN lines, making it suitable for users on a tight equipment budget.

I was covering a city council meeting on a controversial issue. It was a last-minute thing, so I used the Xport on an awful phone line furnished by the city. Just as the mayor arrived to be interviewed, the modems gave up on the horrible line. The system failed back to the Xport's hybrid mode and the interview was on the air, although you could hear the ticks and pops that had given the modems fits. Had I been using another product, that interview would have been lost.

Both the Xstream and the Xport can be remotely configured and controlled via a Web browser, which opens up numerous possibilities for unattended operation and remote tech support. The Xstream also can be used to transmit and receive audio via IP streaming.

For more information, including pricing, contact Telos in Cleveland at (216) 241-7225 or visit www.telos-systems.com.

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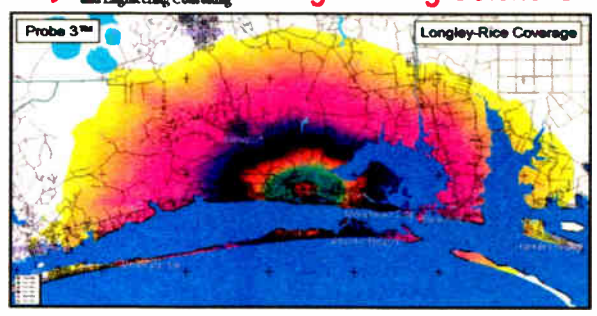

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JVC XL-V182 CD player. working condition but no manual. Will sell "as is" for $50.00 plus s/h. Call Michael Raley @ (704) 523-5555 or for a picture e-mail MRaley@bbnradio.org

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World Radio History

◆READER'S FORUM◆

Hit the Road, JACK

By now, nearly everyone in the radio business has heard of the demise of the oldies format on New York City's WCBS(FM).

While I'm the general manager of the New Jersey Radio Museum, I live in Pennsylvania, and here lies the most important point of my message:

It doesn't matter where you live; the phenomenon of radio programming confusion continues to grow.

At this time, traditional over-the-air radio as we know it needs to cater to the types of listeners who would tend to listen to an oldies station — and stations need to capture and retain these audiences for as long as they can, and do so right now.

Give them something they can't hear elsewhere. If you are rebroadcasting a certain network that can be heard within your contour, give that up.

Right now, the hottest formats for radio will be the ones not heard anywhere else, or rarely heard, such as classic country; beautiful music (background music); true light CHR; modern jazz; oldies pop (55-65); and yes, big bands and standards.

They sound like old formats, and they are. But they work, and they are virtually unavailable in most markets.

Really, do most people who like these formats subscribe to Sirius or XM? No, they don't. But they won't turn on your station if you run the same talk programs as the station 20 kHz down the band from you. I also don't think they will rush out and buy computers to catch the music coming from Radio Moscow. But why are we, as an industry, forcing our listeners to do all this?

The future of radio — AM or FM, HD or sat, stereo or mono — is simply this: On-air radio must super-serve its audience. They must first earn the audience, and then super-serve them.

The chances for traditional radio to reach listeners who may not be interested in Internet radio, iPods or satellite radio are best in the 40+ age group, as these are the few people left who may not yet own a car CD player, buy CDs or may not understand the Internet or satellite. But the industry is trying hard to disinterest them in what we offer as a radio community.

What's more — and most misunderstood among programmers and advertisers alike — the people we as an industry are turning away are the very people with spendable cash in their pockets, the bread and butter for on-air stations and potential clients.

I think back to my teenage years and I remember not having a ton of cash for cars, boats, houses or anything besides a cheap pack of cigarettes. Now at 43, I may consider buying a new car or a house. Hmmmm.

The future of radio — AM or FM, HD or sat, stereo or mono — is simply this: On-air radio must super-serve its audience. They must first earn the audience, and then super-serve them.

This will never occur if a station is a jukebox, an unattended operation, or now, a podcast (aka JACK).

How, as an industry, can we do this? It's easy. Actually it is an old idea. We need to give listeners something they simply cannot get on their CD players or iPods.

Let's remember Full-Service Radio, a specified selection of music, lots of news, a *ton* of community information and *local* personalities who know the area — the schools, the stores, the community. Give 'em the time and the temp constantly. Tell 'em about the neighbors, the bingo palaces and when you can go to church on Sundays.

Take all that away, and you just have a jukebox.

If you want to attract the Pepsi-guzzling, bubblegum high schoolers of your area, feel free to go JACK (or Mac or whatever you want to call it).

If you want to attract listeners who you have a chance of keeping, select a format that will give these listeners something to really listen to. They may be over 40 years old; but they also may eat at the diners at which your station advertises. They may even invest in the stock market.

We already killed AM stereo; we are looking to kill FM surround sound; LPFM became a non-answer; Part 15 AM isn't powerful enough to provide community radio overall; and with IBOC we may kill the general sound of broadcast radio.

But before we do that, lets try to get our audience back.

Carl M. Van Orden
General Manager
New Jersey Radio Museum
Dover, N.J.

Wave Band Fallacy

An article stated that a Collins 300-G was retuned to the 160-meter short wave band ("Restored Collins 'Beauty' Now Resides in Maryland," Feb. 16). There is no 160-meter short wave band; 160 meters is in the medium wave band, same as the AM broadcast band.

160 meters runs from 1.8 MHz through 2.0 MHz. Shortwave begins at 3 MHz and ends at 30 MHz.

Robert Stout, WB9ECK
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33	APT	www.aptx.com
41	Arrakis Systems Inc.	www.arrakis-systems.com
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14	ATI	www.atiaudio.com
3	Audemat-Aztec Inc	www.audemat-aztec.com
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21	BSW	www.bswusa.com
4	Burk Technology	www.burk.com
38	Circuit Werkes	www.circuitwerkes.com
7	Comrex Corporation	www.comrex.com
24-25	Comrex Corporation	www.comrex.com
1	Continental Electronics Corp.	www.contelec.com
38	Cortana	www.cortanacorporation.com
34	ESE	www.ese-web.com
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20	Kintronic Labs Inc	www.kintronic.com
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6	Logitek	www.logitekaudio.com
38	Mager Systems	www.magersystems.com
23	Musicam - USA	www.musicamusa.com
19	Nautel Ltd.	www.nautel.com
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32	Studio Technologies	www.studio-tech.com
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World Radio History

Not So 'Cool Stuff'

I must take exception to the Radio World "Cool Stuff" Award to Continental Electronics for its single-tube HD Radio transmitter.

My reasons are simple: This transmitter is not a technological innovation nor is it a new technological approach to HD implementation.

Much to the embarrassment of Radio World, your judge's published comments — "They finally got a tube amplifier to work with HD Radio" — shows your publication's judge lacked historical knowledge of HD Radio Development. Or at the very least, it shows that the Radio World staff failed to inform the panel of judges that this was not a new technology development, nor an innovative approach to HD Radio implementation, and as such should not have been considered for an award.

Several years ago, Armstrong Transmitter, in conjunction with Lucent Technology, and later endorsed by Ibiquity, proved the viability of single-tube HD Radio RF amplification. In fact the first digital radio station on the air in the United States used an Armstrong single-tube digital amplifier passing the Lucent PAC codec technology. Our tube amplifiers also were used for IBOC testing at two other locations.

These transmitters far surpassed the current specifications accepted in the final HD standard. We all were pushing the envelope to see what could be accomplished with this new technology. Also, at that time we could easily achieve better transmitter efficiencies and lower noise floors with a single tube than it was possible to achieve with solid-state technology.

But we are a small company without the deep advertising, promotional budgets, huge staffs or political clout of the big transmitter manufacturers. So we just did our thing and were technologically kicking their butts.

By the way, that first transmitter, I am told by insiders at Ibiquity, was sold to a station in Florida and has been on the air for over a year broadcasting a HD signal at a commercial radio station.

Once Lucent and USADR became Ibiquity, Glynn Walden sent an engineering team to our factory to run our single-tube digital amplifiers through rigorous testing. As the result of their findings Glynn and Ibiquity endorsed using a single-tube approach to pass the Ibiquity HD signal at the San Francisco Radio Show.

In his presentations at the show and thereafter he was clear in his comments: Armstrong Transmitter had a single-tube HD transmitter and had proven it to work with HD's system.

For two years after the San Francisco Radio Show we showed a single-tube HD Radio amplifier in our booth at both NAB and the Radio Show. Since that time we have display signage in our booth and our ads all have referenced this ability.

What strikes me as odd is this: Now that Continental has opted to align itself with Armstrong's single-tube approach to HD implementation, they are getting all of the recognition and the award.

It is as if it is now "en vogue" to recognize this approach. It is as if Continental had done the R&D, had proven the approach viable and suddenly "arrived" on the scene with new technology.

Yet at the time Armstrong pioneered the development of this approach, put the first digital radio stations in the U.S. on the air and with a single-tube transmitter, and then had our single-tube approach endorsed by Ibiquity, there was nary a whimper from Radio World — no award, no fanfare, only a few lines of reference in one of Leslie Stimson's stories.

The recognition of Continental's product with a "Cool Stuff" Award and the lame, uninformed published remarks by your judge make a large chink in the award's credibility. In fact they go a long way in destroying its credibility all together.

Sadly, this for me has tainted the award Armstrong received last year for our X1000B. I always thought the "Cool Stuff" Awards meant something special. Now after this unwarranted award to Continental, who ironically made an obvious increase in advertising in your publication, I see that the "Cool Stuff" Award isn't cool at all.

Ernie Belanger
Sales and Marketing Manager
Armstrong Transmitter Corp.
Marcellus, N.Y.

RW U.S. Editor in Chief Paul McLane replies:

Ernie Belanger's letter challenges the integrity of the process with which "Cool Stuff" Awards are judged, so I will take this space to respond.

The awards are given without regard to ad budgets. The broadcast engineers who serve on our panel are not privy to information about advertising income. Indeed many past award winners have never advertised in Radio World, or have won the award in years when they were not advertising. Conversely, in many instances, companies that do advertise new products have failed to win awards.

Those same standards were true when the judges saluted Armstrong with an award last year. Belanger's implication that the award is tied to advertising considerations is groundless.

For discussion of his other points, I asked several of the judges to comment. Here are excerpts of their replies:

"Ernie has a point that they provided linearized amplifiers for development way back when Lucent was one of the companies still developing digital radio.

"My problem with Ernie's comments: First, while it's a member of the Ibiquity 'alliance,' Armstrong is not, as of this writing, a licensed HD Radio exciter manufacturer. They could modify it and use someone else's exciter but they don't sell digital transmitters.

"Second, the ability to modify a device for linear operation is not the same as a product that is produced to be a digital transmitter. Harris, BE, Nautel and Continental have done significant work to get their product lines together, including compensation for non-linearities with either adaptive EQ or pre-correction tables. Armstrong has done none of this work that we know of.

"Also, Continental was showing an actual digital transmitter with tubes.

"Finally, the 'Cool Stuff' is an award for actual products, not products that could be modified to do something if you choose to do it and bolt on a few items from some other manufacturers."

Another judge wrote: "While Armstrong may have shown feasibility for doing linear tube transmitter operation that could support HD FM, other transmitter manufacturers did that as well, including CCA. We knew you could rebias a Class C tube amp, beef up the power supply and heavily swamp its input stage to achieve acceptable linear performance. The big giveaway to achieve that was, of course, efficiency.

"What Dan Dickey and Continental did was more clever to be able to achieve very substantial gains in efficiency to pull this off, applying a modification kit to a popular mass-produced transmitter still used everywhere. ...

"Ernie Belanger misinterpreted the judge's comment. His objection overlooks the facts."

A third judge noted, "Having the efficiency to make the transmitter work correctly while not making the power company's meter spin out of its socket, plus coming up with a modification kit to keep present assets operating is a very big plus to many stations and should not only be awarded but applauded."

A fourth: "Seeing the Continental box on the floor, running at substantial power, making the mask — nothing short of cool."

In short, the Continental product shown at NAB this year was found to be different and new compared to other HD Radio transmission methods offered for sale at the show. Continental deserved credit, the judges felt, for designing a high-power HD Radio transmitter that meets the NRSC tech specifications and simultaneously competes commercially with established HD Radio solutions.

The True 'Killer App' Stands Up

With multicasting, the terrestrial U.S. radio industry may be about to change — and big time.

Digital already has brought welcome change. But better quality alone does not compel consumers to buy new radios. Scrolling text information and other datacasting services are eye-catching but not unique to HD Radio; surround sound was the hot topic at NAB2005, but its critics say 5.1 music is not catching on and could turn out to be little more than a ho-hum gimmick for radio, one that confuses or annoys consumers.

Unless HD Radio brings consumers something of broad appeal and added value, something they'll spend on for new hardware, it's going to be a tough sell.

Enter Tomorrow Radio and supplemental channels. NPR, along with Harris and Kenwood, led its development while commercial broadcasters watched. Multicasting is now bearing fruit and stands to change the face of analog as well as HD Radio. It could even slow the growth of satellite radio if stations promote HD Radio and if consumers aren't confused when they go to buy those receivers.

Just in the past few months, multicasting has blossomed into a potentially powerful weapon in traditional radio's arsenal to defend its turf. NPR has said 24 member stations will begin multicasting this year. WFAE(FM) in Charlotte, N.C. is multicasting; WOSU(FM) in Columbus, Ohio and WUSF(FM), Tampa are among those with plans.

Commercially, two Infinity FM stations in Chicago are showcasing second channels. WUSN HD-2 is devoted to up-and-coming country artists. WJMK will feature its oldies format on WJMK HD-2 after switching its main channel to Jack-FM. Crawford Broadcasting is getting behind multicasting. Other stations may have announced by the time you read this.

In order to meet burgeoning demand, programming suppliers like Jones Radio and Westwood One are creating products and services. Some will be Web-based and are in beta development. NPR again led the way on the program side, with the announcement last winter that it would provide several program channels to feed multicasters.

Receiver companies have been scrambling to incorporate multi-channel tuning capabilities into second-generation HD Radio receivers, some of which will hit store shelves soon. Fortunately the feature adds little to the cost of making the receivers.

The advent of supplemental channels for FM HD Radio opens new options to owners and programmers. Eventually it also could have significant impact on existing stations that narrowcast and serve small, targeted audiences, especially AMs with marginal or reduced coverage. Some of these formats probably will migrate to FM supplementals.

Some observers think this development could devalue those facilities further and even spell their demise — making HD FM multicasting literally a killer app.

Many such questions of strategy are raised by these new channels within the FM band. But merely adding more of the "same old-same old" will not earn multicasting the title of killer app.

Content always will be king. FM succeeded because it offered content not available on AM. Broadcasters who take advantage of multicasting should execute their added formats wisely. Those who develop something unique and attractive stand to reap large rewards.

— RW

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