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Park's Projects

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Page 35



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June 16, 2004

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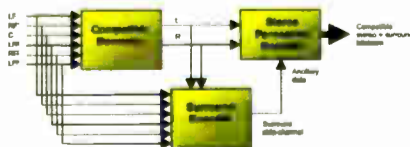
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Company Hunts Pirates

With Illegal Radio Rampant in Florida, The Private Sector Gets Involved

by Randy J. Stine

WEST PALM BEACH, Fla. With the number of radio "pirates" operating in South Florida ever increasing and the FCC trying to keep pace using enforcement efforts to shut them down, a pair of businessmen have formed what they say is a first of its kind: a company to step in and hunt down rogue signals.

The company says the data they gather could give broadcasters the option of quashing unlicensed radio operators in civil court.

Broadcast engineers in South Florida contacted for this article say the area has numerous illegal broadcasters — typically members of the area's minority ethnic communities who say they are underrepresented by commercial broadcasters — who use cheap transmitters to broadcast without FCC licenses. With used

See PIRATES, page 6 ►

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Pubcasters Study Sat Listening

by Leslie Stimson

Public radio programmers want to know who's listening to them on satellite radio, and why.

National Public Radio programs two channels and Public Radio International programs three on Sirius Satellite Radio. NPR's arrangement with Sirius is exclusive into 2007.

NPR's research department will conduct a study to understand behavior of early adopters. Executive Vice President Ken Stern said at the recent Public Radio Leadership Conference that public radio's strategy for satellite has focused on industry's rather

than listeners' needs.

Although Sirius has more than 400,000 listeners, and its deal with EchoStar's Dish Satellite TV network brings a potential 6 million more subscribers, NPR doesn't know how many are tuning into NPR channels.

"While the general response from listeners to the service is positive, nearly all of the negative feedback comes from listeners who bought the service expecting to be able to hear 'Morning Edition' and 'All Things Considered,'" said Stern. Those programs are not carried on NPR's satellite radio channels.

Edison Media Research President Larry Rosin said the most optimistic pre-

dictions peg satellite radio subscribers at 25 million in six years. Edison's research for clients shows what's fueling growth for both satellite radio companies is consumer distaste for music on commercial radio.

Early subscribers tend to be young, minority males who spend a lot of time in cars and consume lots of music. Yet such adopters still listen to AM/FM radio for news, sports and personalities, Rosin said.

Compared to those already subscribing, public radio listeners tend to be older, white, consume less music and are less likely to own gadgets such as MP3 players, according to an in-car study con-

ducted by Edison Media and Arbitron. Public radio listeners are even heavier drivers than the typical satellite subscribers, driving on average 330 miles a week.

He said public radio might consider offering locked channels, available only to those satellite radio subscribers who donate money to a station.

"That's better than a tote bag," he quipped.

Among questions NPR hopes to answer from its research over the next six to nine months: Who is the audience for satellite radio? What are they listening to, and why? Has there been any discernible impact on local public radio listening or support? What channels besides the public radio channels will potentially draw or are drawing in public radio listeners? Are public radio listeners being driven to other satellite channels by the absence of "Morning Edition" and "All Things Considered"?

The revenue question

NPR's business model for its service on Sirius is to sell underwriting; however it's not clear when its audience would be large enough to generate net revenue. On the recommendation of a station advisory group regarding its satellite radio channels, NPR said it would split such net revenue 50/50 with its member stations.

When it signed its deal with what was then called CD Radio back in 1999, the network, with the support of the Corporation for Public Broadcasting and the station advisory group, created a morning news program called "The Way In" specifically for the satellite radio channels. When the launch of what became Sirius was significantly delayed, NPR scrapped the program, laid off employees and reassigned others.

The question of whether its signature programs should be on Sirius remains a touchy issue with member stations.

In Santa Monica, Calif., KCRW(FM) Assistant General Manager Jennifer

See STUDY, page 8 ▶

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Ham, Antenna Groups Fight BPL

Is the March to Broadband Worth Possibly Stomping on Some Amateur Frequencies?

by Naina Narayana Chernoff

WASHINGTON Some ham radio operators fear that a new technology to allow data to be sent over power lines may interfere with radio spectrum.

Groups representing amateur radio operators as well as antenna and tower owners are leading an effort to prevent the authorization of "broadband over power line" technology. The American Radio Relay League and the National Antenna Consortium believe the proposed service represents a significant potential interference source for all radio services in the 1.7 to 80 MHz range.

In February, the FCC proposed amending its Part 15 rules to adopt new requirements and measurement guidelines for a BPL system. These use existing electrical power lines to provide high-speed communications. Because power lines are ubiquitous, proponents say, BPL systems have the potential to bring high-speed communications to rural and isolated areas.

FCC Chairman Michael Powell and the Bush administration are eager to have a third delivery method of high-speed communications into the home in addition to cable and DSL.

Amateur radio operators, shortwave broadcasters and mobile radio system users have been appealing to the FCC to apply more stringent restrictions to the broadband solution compared to normal Part 15 devices. Tests conducted and sponsored by ARRL, an advocacy group representing approximately 163,000 radio amateurs, show that overhead electrical power lines and residential wiring act as antennas that unintentionally radiate the broadband signals as radio signals throughout entire neighborhoods and along roadsides. Interference has been observed nearly one mile from the nearest BPL source, according to the group.

BPL is not expected to cause interference to conventional AM and FM broadcasters because of its placement — above the AM band and below the FM band — on the spectrum, said ARRL General Counsel Chris Imlay. One television group, the Association for Maximum Service Television, has called on the FCC to limit BPL operations to below the low-VHF TV band because of potential interference to digital and analog television operators in that band.

Other major broadcast groups, such as the National Association of Broadcasters and the Society of Broadcast Engineers, had not filed comments with the FCC on the proposed technology as of May. In filings in response to an FCC notice of inquiry on BPL last summer, NAB expressed broad concerns of interference from BPL to existing communications services.

Although it supports bringing broadband service to Americans at lower cost, ARRL leaders say BPL is an inappropriate technology with far greater disadvantages than advantages. Imlay said if BPL is approved, the commission should place restrictions on the new technology.

"I'm not certain there is a practical solution or compromise," he said. "It's a medium-range interference problem ...

there's no win-win solution."

In crafting the rules, Imlay said, the



Steve Martin, FCC senior engineer, demonstrates BPL products, seen at lower left. The FCC has established some theoretical models and is testing field-strength theories related to BPL.

FCC should consider whether a permanent radiation level is appropriate for the BPL system, which acts like an RF distributor. Additionally, he said, ARRL believes the FCC must determine the appropriate amount of radiated RF suitable for various configurations of radio, such as amateur, broadcast and mobile radio systems often used by police.

Models

The FCC has established some theoretical models and is testing field strength theories related to BPL.

Powell and Edmond Thomas, chief of the FCC's Office of Engineering and Technology pointed out to reporters last month that hams operate on several frequencies.

"We have the same concerns (regarding interference) but remain optimistic about the possibilities of BPL," Powell said.

"We want to make sure that if BPL does no harm, that it's on equal footing with DSL and cable," said Thomas. BPL device companies claim to achieve speeds of between 2 to 4 Megabits per second, he said.

BPL modulates using Orthogonal Frequency Division Multiplexing, and some companies are testing filters that would notch out or omit certain carriers, such as ham frequencies, FCC officials said.

Some companies have deployed BPL devices; others are testing such devices. The agency has alerted companies devices may need to be modified or potentially pulled off the market, depending on the outcome of the proceeding, Thomas said.

Powell, who has visited at least three companies that want to deploy BPL, said such devices also have the potential to help power companies monitor grid conditions.

The FCC hopes to issue a BPL Report and Order in the fourth quarter.

Like ARRL, the National Antenna

Consortium is lodging a campaign against BPL. The antenna group, along with the Amherst Alliance, an advocacy organization, is protesting the BPL technology because of potential interference to receivers. The NAC and Amherst

Alliance contend that BPL that uses HF or VHF spectrum will cause serious degradation of the communications capability to nearby receivers on those frequencies.

In comments to the FCC, the groups made a series of recommendations for the BPL rulemaking including requests to keep BPL power levels restricted to current Part 15 ceilings; restrict BPL use within 20 miles of airports, military bases and ground antennas for ground-to-air communications and within 2 miles of hospitals, police stations, fire stations and similar facilities; and limit BPL authorization to create the lowest-interference technology.

Amherst Alliance member Nick Leggett said the FCC should set realistic performance standards for interference mitigation measures. Leggett, a longtime proponent of low-power FM service, is recommending that methods used to mitigate BPL field strength should accommodate at least three different and simultaneous radio uses such as ham radio, shortwave listening and radio astronomy.

In addition, the NAC and Amherst say the FCC should specify the procedures for filing complaints and enforcing interference mitigation standards in greater detail. They believe the agency should revoke BPL authorization if the results of BPL studies show that efforts to stem interference wouldn't work.

ARRL's and NAC's arguments

See BPL, page 5 ▶

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Take Three for the Beach

It's summer. While other people are slathering themselves with SPF-15 and listening to yet another rendition of "Hot, Hot, Hot" from the boardwalk steel band, you're driving around the back roads of beach towns trying to find transmitter sites.

Hey, at least you can get a farmer's tan that way.

If your idea of vacation fun is to spend even *more* time talking and reading about radio, here are a few books that have crossed my desk worth checking out.

★ ★ ★

"What's this digital thing all about, anyway?"

If a radio manager asks you that question, hand 'em "The Road to Digital Radio in the United States" by Don Lockett. This paperback, published by NAB as part of its Executive Technology Briefing series, is a management-level overview of digital audio broadcasting. It would also benefit broadcasting students.

Lockett, familiar to many from his 16 years in engineering and technology roles at NPR, provides a plain-language explanation of digital radio, including IBOC and HD Radio, Eureka-147, Digital Radio Mondiale, satellite radio and other less-familiar forms.

He delves into the business potential of digital, reviews policy developments of the past 15 years and explores what is required to convert a station to HD Radio. He quotes receiver and chip manufacturers about their plans and identifies technology trends broadcasters should monitor.

This book is broad, not deep. It will be a boon to a radio manager who has wondered what all the fuss has been about, why people keep using words like

Ibiquity, CEA, NRSC, PAD, interleaving, data displays and so on. As its marketing suggests, it is more suitable for non-technical managers than engineers who have already boned up on digital.

Retail: \$54.95, paperback, 178 pages, illustrated. Info: www.nabstore.com or (800) 368-5644.

★ ★ ★

Who invented radio broadcasting?

If you answered "Charles Herrold," perhaps you were reading Radio World last November and saw Mike Adams' opinion piece on just that topic.

Adams and Gordon Greb are the authors of "Charles Herrold, Inventor of Radio Broadcasting," published by McFarland & Co.

history of mass communication and discuss his work running station KQW, selling radio time and working as a high-school AV technician and a janitor.

The authors think "Herrold, when he was alive, should have been recognized as a genius." Will you agree? If you enjoy history, biography and radio, read it.

Retail: \$45, paperback, 259 pages, photos and illustrations. Info: www.mcfarlandpub.com or (800) 253-2187.

★ ★ ★

I remember the first time I walked into a radio newsroom. I was 19 and a college student — bright, but with no particular understanding of how to write for the ear.

From the Editor



Paul J. McLane

nally under the title "Beginning Broadcast Newswriting") and published by Iowa State Press, it includes numerous exercises. We learn how to choose a lead, use the active voice, attribute a quote, type out a number, cope with long titles and help the half-attentive listener.

The book perpetuates some unfortunate habits I hear in radio news. For instance, no author writing *about* writing should rely on clichés such as "trim the fat," "short but sweet," "nickel and dime," "home sweet home," "pat on the back" or "just do it," all of which show up — not in the examples, but in the instructional text itself.

Nor does the book teach the fundamentals of journalism, although it waves at them as it goes by. For instance, the crucial concept of whether and when to attribute information is discussed too briefly.

I also couldn't help but notice that the first topic of the first chapter is "Rewriting." That choice says a lot — or not very much — about the priorities of radio and TV newspeople. I would have started *my* newswriting book with the word "Accuracy."

The workbook includes a list of radio/TV news terms and summary writing assignments to test a student's mastery of skills. It won't replace a journalism professor, but it could be a helpful secondary tool for someone just starting in the biz.

Retail: \$24.99, paperback, 116 pages, tests and samples. Info: (800) 862-6657 or www.iowastatepress.com.

Table 5.1 Estimated Conversion Costs (\$US)

Estimated range of conversion costs: \$30k - \$200k (Largest cost factor is transmitter expense)					
Conversion Method	Exciter	Transmitter	Related Equip/Costs	Digital Studio Equipment (if required)	Total Range
Low-power combining (FM)	\$30K	\$25K-\$207K	\$2K-\$20K	\$1K-\$30K	\$58K-\$287K
High-power combining (FM)	\$30K	\$25K-\$135K	\$17K-\$68K	\$1K-\$30K	\$73K-263K
Dual Antenna (FM)	\$30K	\$4K-\$16K	\$7K-\$62K	\$1K-\$30K	\$42K-138K
AM	\$30K	\$0K-\$130K	\$2K-\$20K	\$1K-\$30K	\$33K-\$210K

Source: Robert A. Mazer Vinson & Elkins L.L.P., December 2003

Lockett's book includes this chart on estimated IBOC conversion costs.

Herrold penned the following sentence in 1910: "We have given wireless phone concerts to amateur wireless men throughout the Santa Clara Valley." The authors argue for Herrold's place in the

The fourth edition of "Beginning Radio-TV Newswriting: A Self-Instructional Learning Experience" is a workbook for someone in that position. Written by K. Tim Wulfmeyer (origi-

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Berg Remembered for Kindness

by Naina Narayana Chernoff

Scaling towers of up to 1,000 feet was everyday work for Nick Berg. His real vocation, though, according to friends and colleagues, was using his skills to improve conditions for people in need.

The owner of a tower service company near Philadelphia, the 26-year-old went to Iraq to help rebuild communications towers in the war-torn country. Berg did not have the chance to finish his work; he was beheaded in May by captors seeking retribution for alleged abuses of Iraqi prisoners by American soldiers.

"Nick was very supportive of what was going on in Iraq and he really wanted to be part of the rebuilding process," said Dave Skalish, technical supervisor of WPHT(AM) in Philadelphia, who hired Berg for tower inspections. "He went there not to make money, but to help people."

As the circumstances behind Berg's death and days in Iraq were made public, Skalish said he hoped his friend would be remembered as a skilled professional with a unique combination of talent, nerve and drive. Skalish also disputed reports that Berg was reckless.

"He respected risk and respected danger."

Ambitious

While in Iraq last winter, Berg developed proposals to rebuild and repair several towers, including one damaged radio tower near the Abu Ghraib prison. When he returned in March, he hoped to turn those proposals into contracts, said Skalish, who kept in touch via e-mails Berg would send to family and friends.

At a time when most tower manufacturers might have been reluctant to take on work in a dangerous place, Berg relished the opportunity, said Ed Bukont, owner of Comm-Struction and Services in Baltimore, who hired Berg as a subcontractor several times and turned



Nick Berg is shown in 2003 working on a lighting circuit at the base of the tower for WMCA(AM), New York. He was replacing a conduit to the tower in the Meadowlands in New Jersey.

down Berg's invitation to join him in Iraq.

A significant number of towers had been destroyed but there were several bureaucratic roadblocks to repairing them, Bukont said, adding that Berg tried to speed the process along by helping train local professionals to do system integration.

This was not the first time Berg helped people help themselves. He had visited third-world countries in Africa to help citizens learn how to erect towers using natural materials. Although Berg enjoyed his work in the United States, Bukont said "he drew more satisfaction out of his work" in those countries.

Berg's warmth toward people was evident. "He was all about customer service and helping people," said Bukont. "If you needed something

done, he would find a way to do it."

Berg's interest in towers began early, in high school, and led to a job in the cellular industry, Bukont said. He later became interested in radio and television towers and recognized a need for

United States. The president called for nationwide broadband access by 2007 and urged the FCC to maintain its deregulatory agenda. ARRL sent the administration a fax appealing to Bush to withdraw his support for BPL, saying it will not offer a solution for rural areas. BPL signals carry only a few thousand feet down a power line and then must be repeated, said ARRL CEO David Sumner. "This requires a lot of hardware and will not be economical in areas with low population densities."

ARRL also is taking its concerns to Capitol Hill, where it is lobbying members of the House Telecom Subcommittee about BPL. Rep. Greg Walden, R-Ore., a ham operator, wrote to Powell last winter seeking a delay on the BPL proceeding until the release of the NTIA study and a subsequent public comment period. Powell did not comply with the request.

Imlay said ARRL will take the issue to the House later this spring, in hopes of getting more support. "It's not really much of a Hill issue yet," he explained. "We want them to know our concerns."

Leslie Stimson contributed to this article.

tower inspection and repair work.

Berg's company, Prometheus Methods Tower Service, did tower work for stations in several states including New York, Delaware, Maryland and the District of Columbia.

Though he did not earn a bachelor's degree, according to news reports, Berg attended Cornell University, Drexel University, the University of Pennsylvania and the University of Oklahoma.

According to Time magazine, during a semester studying at the University of Oklahoma in 1999, Berg let an acquaintance access his e-mail account. His user name and password subsequently was passed around and used by an associate of Al Qaeda member Zacharias Moussaoui, who is considered to be the "twentieth hijacker" of the Sept. 11, 2001 terrorist attacks. In 2001, Moussaoui enrolled in the nearby Norman, Okla., flight school.

In 2002, the FBI investigated Berg but ultimately agents determined that he had no connection to Moussaoui's associate.

Skalish said Berg's death at the hands of a group of guerillas tied to Al-Qaeda is "chilling. It's a story of grand proportions."

The Berg family has set up a scholarship fund in their son's memory. Donations for the Nicholas E. Berg Scholarship Fund can be sent to the First National Bank of Chester County at P.O. Box 514, West Chester, Pa. 19380.

BPL

► Continued from page 3

recently were bolstered by the results of one such interference study by the National Telecommunications and Information Administration. The report concluded that while BPL systems may present a valuable economic opportunity, technical rules governing their deployment must address potential harmful interference to critical systems.

The federal agency called for technical solutions that would protect critical federal systems yet enable BPL to become the "third broadband wire into the home."

In the second phase of its study, the NTIA is expected to evaluate the effectiveness of its Phase I recommendations and address potential interference from large-scale BPL networks.

The FCC's effort to advance BPL despite potential restrictions is supported by the White House. In an April 26 speech at the American Association of Community Colleges, President Bush advocated changing technical standards to encourage BPL deployment in the

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Pirates

► Continued from page 1

transmitters selling for as little as a \$1,000 on the Internet, pirates typically need nothing more than a rooftop antenna, a CD player, mixer and microphone to operate, these engineers say.

Signal Finder Inc. President Lu Vencl and Vice President Steven Grey say the proliferation of pirates has many South Florida broadcasters worried.

"This is the Mecca for pirates," said Grey. "They set up in basements, vans and apartments. They'll rent high-rise office space for \$500 a month setting up multiple rooftop antennas running transmission line up the elevator shaft. It really reached a point where we said, 'We need to form a company that can give an independent view of interference.'"

Area engineers say Signal Finder is at

the forefront of a possible dawning of a "cottage industry" unique to South Florida; it may be the first company solely devoted to finding the cause of interference.

Signal Finder, founded in February,

Grey said that at any time, as many as 60 broadcasters are on the air illegally in Miami-Dade and Broward counties in South Florida, some with power levels as high as 2,000 to 3,000 watts.

South Florida has become synonymous with pirate radio.

— Joe Cassara, WDNA(FM)

charges clients an hourly rate to hunt for pirates. Vencl said it has a small staff of engineers and clients across Florida.

Licensed broadcasters from Miami to West Palm Beach say they compete with pirates for listeners and advertising dollars and endure interference with their signals. South Florida is believed to have more illegitimate broadcasters than any other region of the country.

"These are experimenters, kids, hobbyists ... really people from all walks of life who can be very brazen in their operations," Grey said.

Some pirates have taken to giving out their addresses and tying into promotions with local TV stations, he said.

Clients of Signal Finder receive a detailed report with bandwidth of an offending signal and how it affects them.

"We can show (clients) maps of how much degradation a legitimate station can receive when a co-channel pirate is on the air," Vencl said.

Grey and Vencl — the name is pronounced "VEN-sill" — use various homing devices to hunt pirates, from Doppler systems, helping them narrow down the vicinity of a pirate quickly, to spectrum analyzers and even some "home-brew" equipment to pinpoint the location of the offending signal.

Signal Finder's van is outfitted with a Will-burt telescopic mast, Scala antennas, Inovonics model 530-modulation monitor, Onan 3 kW generator and Icom and Yaesu mobile radios, Vencl said.

"We have gear that can rate the power level of the signal causing interference and give the client calibrated power levels for certified readings of locations and frequencies," Grey said.

The client typically would take that information and use it to pursue damages from the pirate in civil court.

Grey comes from a broadcast background, having recently worked for Clear Channel Communications in several South Florida markets as a chief engineer. Vencl worked for more than 25 years in the telecommunications industry, including a long stint with Motorola, finding interference hazards.

It's not only broadcast interference Signal Finder is after.

"We are not just a pirate-busting company," Vencl said. "We pinpoint anything interfering with a radio signal, from cordless telephones to power-line interference. We work also with law enforcement, business communications companies and others to eliminate interference with their communications. It just so happens that a lot of our clients are broadcasters."

An FCC official, who asked not to be named, said the commission has 26 investigations in various stages of development against pirates in South Florida. It has meted out thousands of dollars in fines in the past year and confiscated some broadcast gear — but has yet to make a mark on the number of pirates in the area, the official said, because when one pirate is shut down, another usually takes its spot on the dial.

"We are doing as much as we can right now with our resources and current staffing levels. We are investigating these claims to determine whether we need to refer these people to the Department of Justice for criminal prosecution," she said.

The commission's Tampa district office has two field agents and is charged

See PIRATES, page 7 ►

A Pirate Did What?

Don't expect pirates to make a dent in the field of legitimate broadcast engineering. Signal Finder Vice President Steven Grey says the homemade broadcast setups he sees leave much to be desired.

"More than once I have found antennas mounted upside down. Sometimes you want to say, 'That's real nice. No wonder you guys were getting out so good into the ground.'"

Grey said a pirate's equipment can present dangers to themselves and those around them.

"The RF danger level is pretty high. I've seen a guy holding together transmission line with Scotch tape, after the coax was cut by closing the window in his home. Goofy stuff like that," Grey said.

Perhaps goofy, but also clever. He has found pirates broadcasting from converted school busses and vans with push-up antenna poles right through the roofs.

"They'll hide antennas in trees, too. (Pirates) try to blend into their environment to attract less attention."

One mobile pirate set up a live remote at a flea market, running an audio cable inside and powering up a generator. "This one was hard to find, as he would move every few hours or so," said a Signal Finder official. "There were two locations running on the same frequency, so at any moment, the signal would just disappear and then reappear seconds later, from another direction."

A few savvy pirate broadcasters are even incorporating Radio Data System technology into their signals, Grey said, which allows them to scroll text data on RDS-equipped car receivers. But they are scrolling much more than just song title and artist information.

"They sometimes will even scroll text words containing an obscenity to help attract a certain crowd," he said.

Grey advises against legitimate broadcasters trying to handle pirates on their own.

"My former boss at a radio station in Miami became so fed up with a pirate, he walked up to the guy's building and cut his transmission line. There was (a) huge spark and he picked up a RF burn. This is not necessarily low-power stuff."



This was a mobile FM that used a generator and a push-up pole through the roof of the truck. Image has been altered to cover the license plate.

— Randy J. Stine



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Pirates

▶ Continued from page 6



Photos courtesy Signal Finder, Inc.

This was a pirate rig found on top of a building in Miami, running an ERP of about 1.5 kW.

communication systems, VHF and UHF. It's just too much to handle right now."

The commission has been quiet about Signal Finder's efforts to this point, Grey said.

"One FCC enforcement officer told me that having us pinpoint a pirate could expedite the process. However, they still need to do their complete investigation. That leaves our clients the option of taking action against unlicensed broadcasters in civil court," he said.

The six-station Clear Channel Communications group in West Palm Beach is considering using Signal Finder, according to Chief Engineer Jim Leifer.

"We have had discussions with them about the interference problems. It's a major concern for us," Leifer said. "If it's something we think Signal Finder can help us with, we'll use them."

Randy Bennett, owner of WCEE, an LPFM station in Melbourne, Fla., said he used Signal Finder in late March to track a pirate on a first-adjacent channel.

"We are at 93.1 MHz and someone fired up a station at 92.9 MHz. We're just 40 kW, so we don't need interference like that," Bennett said.

Signal Finder tracked the pirate to Palm Bay, Fla., approximately five miles from Melbourne, where a man had started a pirate station from his apartment building, Bennett said.

"I think the documentation and photos we had from Signal Finder certainly helped to get the FCC in here quicker. The FCC confiscated the gear and shut him down," Bennett said.

Other means of relief for legitimate stations in the Sunshine State could be on the way. The Florida state legislature passed a

provision in April under which pirate broadcasters could face third-degree felony charges and stiff penalties if convicted under state law. A conviction is punishable by five years in prison and a \$5,000 fine for each count. The bill was awaiting the signature of Gov. Jeb Bush in early May.

C. Patrick Roberts, president of the Florida Association of Broadcasters, said in a statement, "We're happy the state recognized a problem that's become a major concern across the state."

Some Floridians have questioned why the state needs to step into the pirate fray, saying pirate broadcasters are serving their local areas with low-power signals featuring community-based programming and providing an outlet for ethnic music. Broadcasters have maintained that illegal broadcasts could interfere with emergency broadcasts during hurricanes and other disasters. ●

with oversight of the South Florida pirate problem. The FCC also maintains a resident agent office in Miami.

The operation of an unlicensed broadcast station is a violation of the Communications Act of 1934. Operators of illegal broadcast stations face monetary penalties up to \$11,000 per violation and the threat of criminal sanctions, including additional fines and imprisonment.

The FCC says its investigations result in the shutdown of hundreds of unlicensed broadcast operations each year nationwide. Since 1997, the FCC has shut down more than 400 pirates in Florida alone.

Florida pirates

"South Florida has become synonymous with pirate radio," said Joe Cassara, operations manager for non-commercial and Miami-based WDNA(FM), a potential Signal Finder client.

Non-commercial broadcasters may suffer the most harm from pirate interference because many are at the low end of the dial and many low-power transmitters operate on those frequencies.

Cassara said the services of Signal Finder would not be necessary except for failures of the FCC in spectrum compliance.

"While the FCC is busy sanitizing the content of broadcasts, they neglect the responsibility with which they were originally charged: to regulate the spectrum as a resource," Cassara said.

In the FCC's defense, Grey said, there appears to be more pirate traffic than it can handle in South Florida. "I think they are just overwhelmed, not only by pirate radio but also interference with two-way



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Study

► Continued from page 2

Ferro likened "Morning Edition" and "All Things Considered" to the "tent poles that sustain a station's local service. To take them away would radically alter" that station's local model, she said at the conference. "If we give people the opportunity to avoid a pledge drive, they'll take it."

Dave Edwards, general manager of WUWM(FM) in Milwaukee, said the issue goes beyond those two programs.

"Public radio needs to embrace new technologies. I want to bring Gen Xers to my station. We air Tavis Smiley one hour a day. Who are we kidding? That's not

going to bring black listeners to my station.

Would public radio consider 'locked' channels just for donors?

"We need to think beyond the core offerings," said Edwards.

Eric Nuzum, director of programming and operations for WKSU(FM), Kent, Ohio, said, "When we don't include ME/ATC in satellite radio's offerings, we're losing a big audience."

NPR has a talk channel on Sirius, "NPR Talk," and a news magazine channel, "NPR Now." PRI manages a stream of its programs, "PRI's Public Radio World," plus two BBC streams, "BBC World Service" and "BBC Mundo," which is Spanish-language programming.

PRI pursued partnerships with stations for its satellite radio programming by founding American Public Radio LLC, a not-for-profit partnership with Chicago Public Radio/WBEZ and WGBH Radio Boston. PRI plans to experiment with new programs and different scheduling of those plus current programs on its Sirius channels. PRI isn't labeling its arrangement exclusive, and a spokesman said the company has not approached Sirius rival XM Satellite Radio. 🌐

NEWS WATCH

\$22,000 WWYO Fine Cancelled

WASHINGTON The FCC cancelled a \$22,000 fine for MRJ Inc., licensee of WWYO(AM), Pineville, W. Va.

The agency admonished MRJ for not conducting weekly EAS tests nor registering its tower, and for failing to have a working fence around its tower and antenna.

MRJ did not dispute the findings and said it continues to try to correct the problems; it asked that the fine be cancelled or reduced due to financial hardship. MRJ backed up its claim with documentation, which the agency reviewed and found adequate.

The commission cancelled the fine and admonished the station instead.

FCC Fines KTKC \$12,000

WASHINGTON Metropolitan Radio Group Inc., the licensee of KTKC(FM), Springhill, La., was fined \$12,000 for public file violations and not having a meaningful staff presence at its main studio.

During an inspection in 2002, the operations manager told the agent the station had no staff presence at its main studio but visited the site twice a day to take transmitter meter readings. The field agent said much of the required public file material was missing.

Metropolitan said it was moving the station at the time of inspection and that its public file was nearly complete. It asked for the fine to be dropped or reduced.

The agency said the violations were serious and upheld the penalty.

NEWS WATCH

Clear Channel Traffic Debuts In Mexico

MEXICO CITY, Mexico Clear Channel has debuted a traffic service in Mexico City, the first rollout of its traffic product outside the United States. Radio Trafico Total is a joint effort of Mexican broadcast group Grupo Acir and Clear Channel Traffic.

Radio Trafico Total claims to reach more than 33 percent of Mexico City's 26 million residents.

Operating on Grupo Acir's core stations in Mexico City, the service plans to expand Radio Trafico Total to cities such as Guadalajara, Acapulco and Monterrey.

Clear Channel Traffic now operates in more than 100 markets in the United States. Clear Channel is part owner of Grupo Acir, which has 110 stations in Mexico.

Housing Open for Fall Radio Show

WASHINGTON Housing is open for this fall's NAB Radio Show in San Diego. For online registration go to www2.expobook.com/evl/evt_home.asp?eventid=52. The event is Oct. 6-8 at the Manchester Grand Hyatt. For information e-mail to nabhousing@expovision.com.

(((FCC NEWS)))
UPCOMING AUCTION

FM BROADCAST
AUCTION NO. 37
NOVEMBER 3, 2004



The FCC is preparing to auction 290 construction permits in the FM Broadcast service for stations throughout the United States, Guam, and American Samoa. These construction permits are for vacant FM allotments. For more information, please contact the Auctions & Spectrum Access Division at 202-418-0660 or choose from the options listed below.



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Audio Metering (XMIT/RCV)	Transmit only	One-at-a-time	Simultaneous
Audio Processing	None	Simple AGC	Digital multi-band AGC with look-ahead limiter by Omnia
Remote Control	No	RS-232 and dedicated computer	Ethernet via Web browser
Auto Dial Storage	19 Numbers	50 Numbers	100 Numbers
Frequently-Used Settings Storage	none	none	30
Standards-based POTS Codec	No - Proprietary	No - Proprietary	Yes - aacPlus (MPEG HEAAC)
Transmit-Receive Quality Display	No	Yes	Yes
Contact Closures	2	2	3
Display Resolution	120x32 LCD	120x32 LCD	128x64 LCD
Analog Cell Phone Interface	Optional	Standard	Standard
Mixer Inputs	1 mic, 1 mic / line	2 mic / line	1 mic, 1 line
Phantom Power	No	No	Yes - 12 volt
Automatic Voice-Grade Backup	No	No	Yes
Power Supply	External	External	Internal auto-switching
Local Mix Audio Outputs			
Headphone	Yes	Yes	Yes
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Direct Receive Audio Output	No	Yes	Yes
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Entercom Boston Embraces HD Radio

by Thomas R. McGinley

BOSTON Major-market group owner and Ibiqity investor Entercom has converted its first stations to digital.

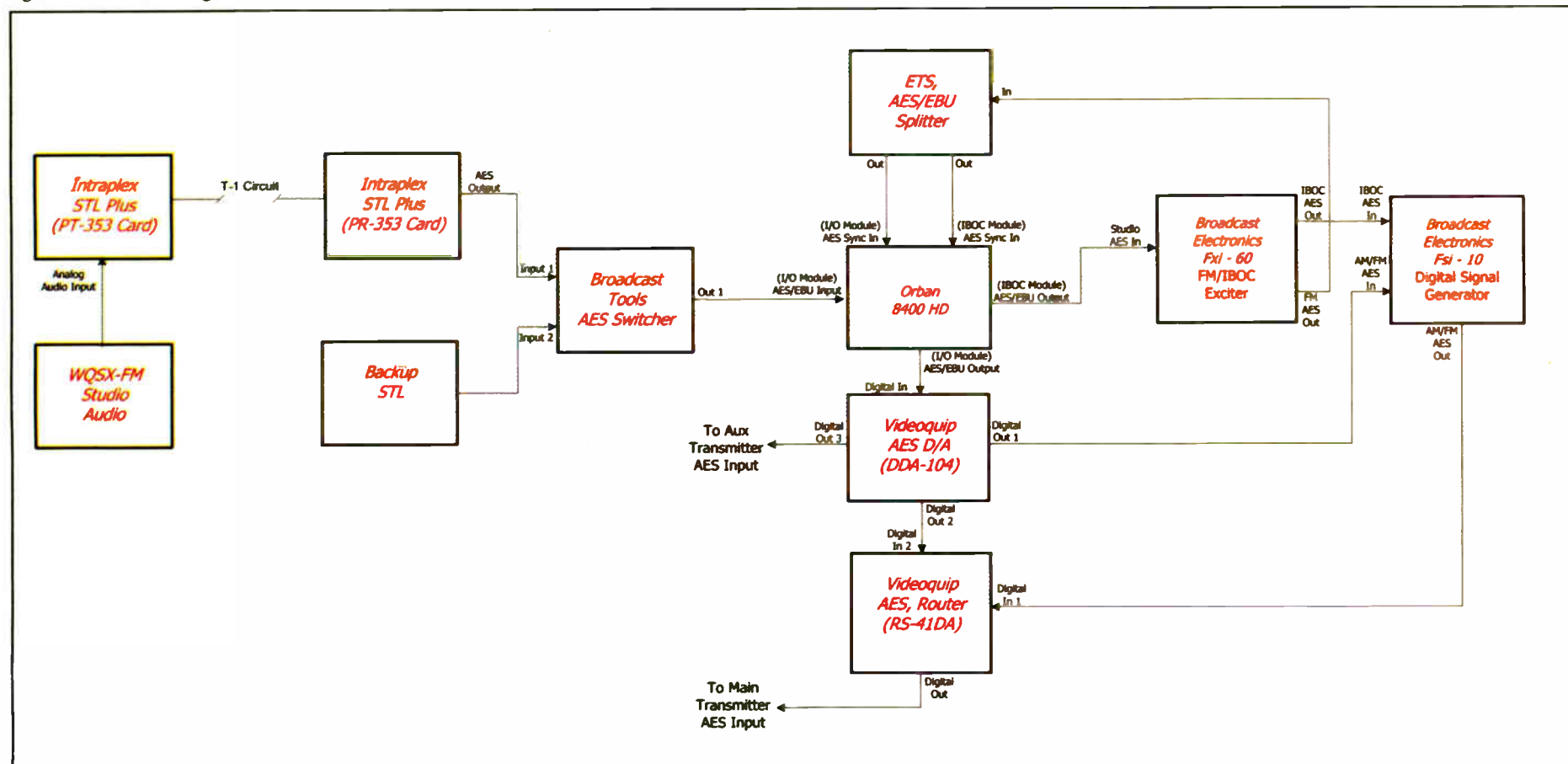
WQXX and WAAF in Boston, Class B FM stations, are the company's first digital stations, along with three of its

installation for the two stations in April. Both employ high-level combining using Broadcast Electronics FSi-10 HD excitors, BE Fmi-703 HD 7 kW linear transmitters and existing Harris analog transmitters. Shively 10/1 dB high-level combiners feed the existing Shively antennas.

The most challenging problem resulting from the addition of HD Radio was the need to resolve fourth-adjacent-channel blanketing interference. The transmitter site is near a major commuting highway intersection north of Boston. Blanketing interference to the local fourth-adjacent sta-

log FM subcarriers soon.

Kennedy gives high marks to BE for support throughout the HD Radio installation project. "We had some problems with power control and power supply fault indications that were resolved with software upgrades." He also said the Ward-Beck Bit Buddy AES signal analyzer was a "life-saver" for troubleshooting digital audio problems.



WQXX(FM) Air Chain

FMs in Seattle.

John Kennedy, director of engineering for Entercom's Boston cluster, supervised the project and finalized HD Radio

Gear List

Among the equipment used by Entercom in Boston for its HD Radio installations:

- Intraplex STL Plus
- Orban Optimod 8400/HD
- Broadcast Electronics Fmi-703 Transmitter, with FSi-10 IBOC signal generator
- Shively Labs IBOC Injector
- Shively Labs Filter
- Myat Transmission Line
- Bird Power Meter, Model BPM-3
- Ward-Beck ABB-1 "Bit Buddy" AES Analyzer
- Burk ARC-16 Remote Control
- Lucid AES Converter, Model ADA 1000
- Broadcast Tools AES Switcher, Model 8XIDAS

The HD Radio conversion project cost was about \$150,000 per station, according to Kennedy, who said, "It will be tough to determine if it's all worth it, but I believe long-range, it will be."

He also thinks the hybrid mode will be around the industry for a long time before radio gives way to all-digital.

The WQXX(FM) HD Radio installation began in February of 2003, with on-air testing commencing last fall.

"We reconfigured our STL path and audio processing chain to prepare for HD Radio, which also improved our analog performance," Kennedy said. He has more than 20 years experience as a radio engineer and chief working in the Boston market. Eric Fitch, engineering manager for Entercom Boston, assisted in the project.

The STL is an Intraplex STL Plus over a T-1 conveying uncompressed linear audio. The processor is an Orban Optimod 8400HD.

The existing remote control system was expanded and HVAC capacity increased to handle additional heat load to the transmitter room.

tions on both sides of WQXX within 1 to 2 miles of the site became a major issue generating complaints from those stations and their listeners.

Although initial measurements suggested WQXX transmissions complied with the FM mask limits, a Shively twin notch filter was installed to suppress the interference to about -84 dB below carrier, or an additional 20 dB. The first filter introduced excessive on-channel VSWR and was replaced with a second filter of a different design that resolved the problem. Kennedy retained Dave Maxson of Broadcast Signal Labs to do before-and-after measurements to confirm the effectiveness of the filter.

The only other interference complaints Kennedy has received have been from FM DXers who can no longer listen to distant signals on first-adjacent channels.

Neither station had started promoting HD Radio as of April, nor added data services, but both stations planned to add song title and artist text scrolling to their digital signals as well as to their RDS systems on ana-

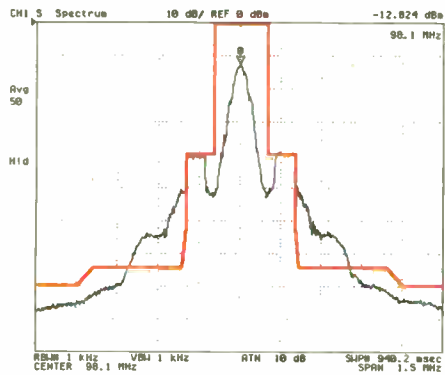
Kennedy has installed a Kenwood KTC-HR100 HD tuner with KDC-MP925 receiver in his car and is evaluating digital coverage of the metro Boston area. So far, he says, coverage matches that of the analog.

"The areas that we've tested within the 1mV/m contour have shown extremely solid results ... basically not losing the digital at all."

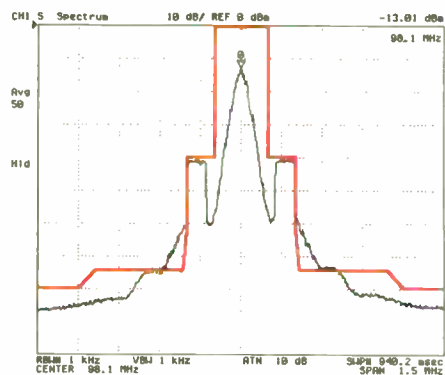
Coverage in shadowed areas that have been prone to bad multipath interference in analog has stood up well in HD Radio. Says Kennedy, "Some areas that I'm quite familiar with have shown that the digital stays on solid and doesn't revert back to analog ... I've been pleasantly surprised."

Regarding the long-anticipated HD Radio rollout, Kennedy said, "I think it will take the better part of five years for receivers to be common in the marketplace and for broadcasters to open their arms to the technology. But we must be patient."

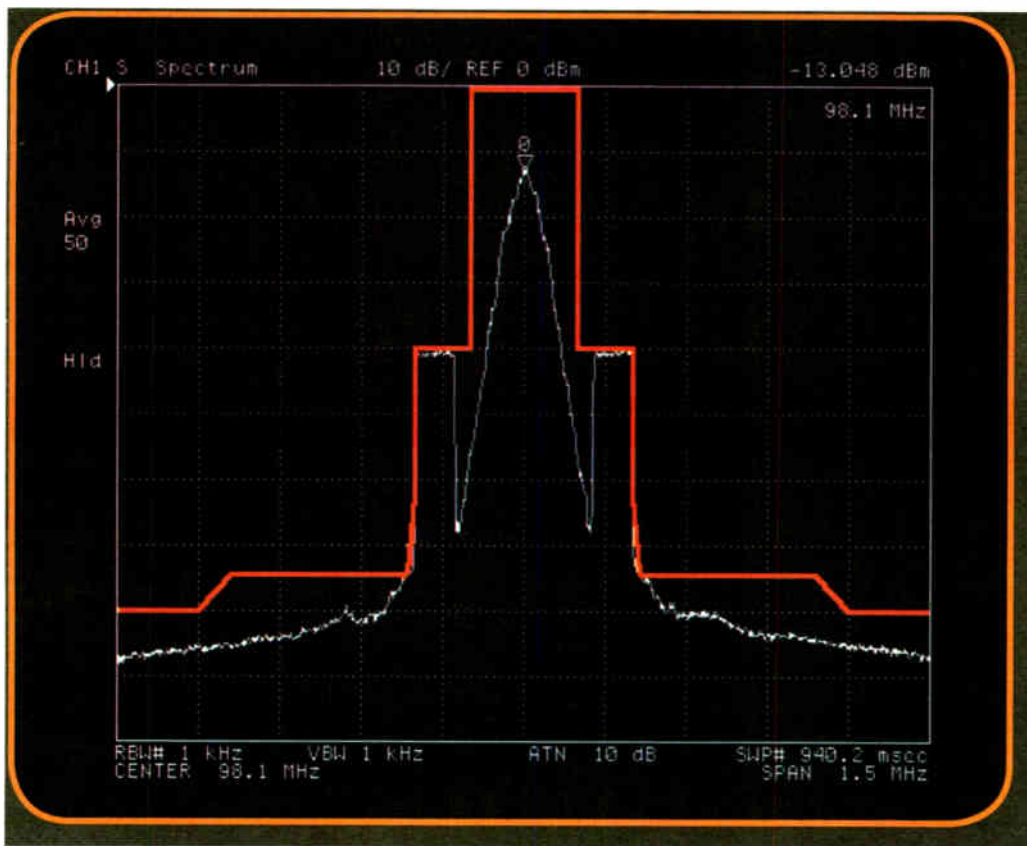
Tom McGinley is director of engineering for Infinity Seattle and a long-time Radio World technical adviser and contributor.



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SIMPLY THE BEST ENGINEERED TRANSMITTERS

More Companies Introduce IBOC Gear

by Leslie Stimson

LAS VEGAS More transmission companies are introducing HD Radio transmission gear, as a swing through the exhibits at the spring NAB 2004 revealed. Some exhibited their first HD Radio transmitters at that show.

DRS Technologies, formerly Continental Electronics, displayed a prototype of its first FM IBOC-dedicated transmitter, the 815D5. The solid-state transmitter will have a rated power output of 5 kW.

The company took suggestions from customers about the unit at the show. "It goes into production in 30 to 60 days...expect to see this ship early in the fourth quarter," said Bret Brewer, marketing manager.

Continental Lensa unveiled AM solid-state IBOC transmitters available in power levels from 1.5 kW to 50 kW. At the show, the company displayed its 5 kW and 10 kW models.

This was the company's first time exhibiting alone at NAB. Continental Lensa had been part of Continental Electronics. The new company is based in Chile. President/CEO Marcos Caballero said the company is developing a digital exciter as its next HD Radio product. This would be the fourth company to make a digital exciter, after Harris, Broadcast Electronics and Nautel.

Nautel introduced its digital ensemble, the Jazz 1,000 W AM transmitter,



Marcos Caballero, president/CEO of Continental Lensa S.A., with the company's new digital solid-state 5 kW AM transmitter, the DA-5.

Maestro FM exciter and Virtuoso 10 kW FM transmitter. The Virtuoso can run in analog-only, analog/HD Radio or digital-only.

The new exciter "probes the output signal, pre-corrects the non-linearities

and pre-corrects the signal that's being fed to the amplifiers to cause an overall system to be linear," said Mike Woods, FM project leader. "The exciter, on the fly, re-adjusts the pre-distortion curve, and keeps the spectrum" within the FCC mask.

The products also adapt for Digital Radio Mondiale use.

The Jazz 1,000 W AM transmitter replaces the ND series of 1 kW transmitters. Nautel had an industrial designer redesign the look and used cognitive science to make the control panel design intuitive, said President/CEO Scott Campbell.

When asked what spurred the company to introduce more HD Radio products



Nautel's J1000 1 kW AM transmitter can be configured for either HD Radio or DRM operation.

new Fsi10 and Asi10 signal generators.

BE now has a three-year price quote guarantee for its HD Radio transmission equipment. A price quote given now for any transmitter purchased in 2004 is good for up to three years should the buyer choose to add digital components later.

HD Radio is making itself felt in the product lines of other, non-transmitter companies.

For example, Belar Electronics Laboratory Inc. is the first to license the Ibiqity technology to develop monitoring products. Belar intends to integrate the digital technology into modulation monitors that will allow AM and FM engineers to monitor the performance of their digital broadcasts.

The company demoed options it plans to incorporate into the device. For example, Belar planned to include a spectrum analyzer in the HD Radio monitor. With the monitor, "If the digital's on the air they can also listen to it. They can check relative levels between the analog and the digital signals. It's important to make sure they're keeping within their parameters and make sure that when (the signal) blends to analog on the outskirts, it's as imperceptible as possible," said a spokesman.

Belar is the first company to license the technology for such a purpose.

At Moseley Associates, "We're seeing a lot of orders due to HD Radio implementation," said David Chancey, broadcast sales manager. "As more people put coding in the studio, we've added a land capacity to the Starlink so

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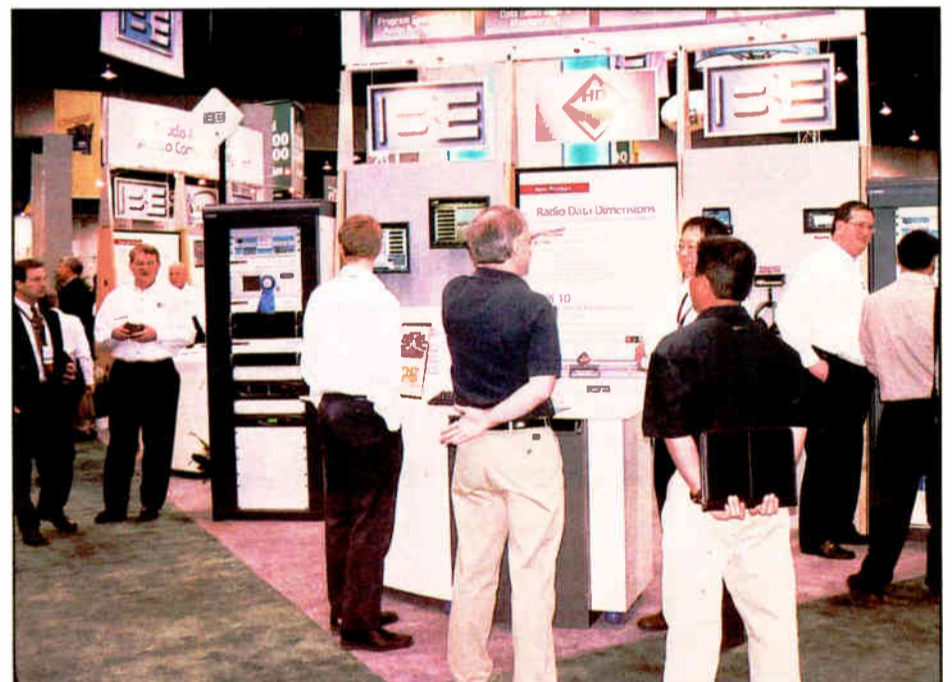
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Traffic in the Broadcast Electronics Booth

now, Campbell said, "In the last few months a lot more of our customer base came to us asking about HD (Radio)."

Broadening lines

Harris and BE are expanding their existing HD Radio product lines.

Harris has produced a lower-power FM HD Radio transmitter line. The Mini-HD products are available from 10 to 600 watts of digital-only power.

Harris also announced that MMIC, a proprietary Neural Audio technology that claims to duplicate any sound in seconds, is now standard on the Harris NeuStar HD Radio codec processors.

Broadcast Electronics unveiled the Xpi10 HD Radio signal generator, broadband link and data management software suite. Also included in its lineup were

you can run 44.1 kHz AES stream and in addition, convey about 300 kilobit to 400 kilobits land connection in one direction over your STL system." The land capacity can be retrofitted on any Starlinks sold, he said.

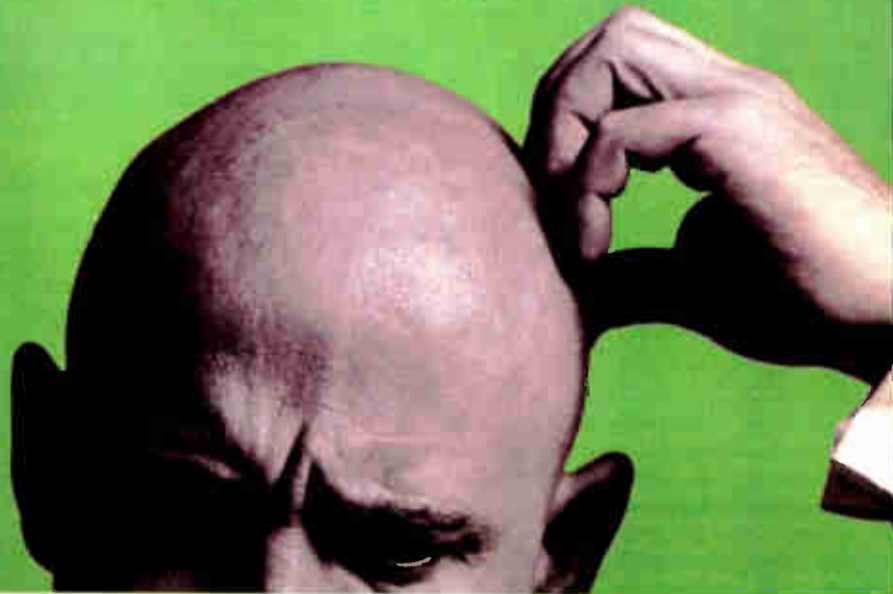
"On the analog portion of the signal, by going to a 44.1 and with a StarLink with some suggestions made by audio processing friends, we've improved the low-end response of the audio card, which allows the average station to gain average loudness on the broadcast.

"There is an improvement in analog broadcasting overall now because of the push by HD Radio. It made everybody more conscientious about their analog broadcast."

An upcoming article will review new data-rs10 products.

Wish you had more

up top?



Announcing Omnia-6EX.

There's a lot of buzz about the new HD Radio codec. We've heard it and agree with the many others who like it and say it's now time to get on with radio's transition to digital.

Because HD Radio can transmit audio frequencies up to 20kHz, listeners will finally be allowed to hear the full CD spectrum – if their radio stations choose the right on-air processor. On this point, you should know something important: Some "HD" processors simply hack off everything above 15kHz... robbing listeners of the full HD Radio experience and keeping our industry in a fidelity backwater.

The new Omnia-6EX won't short-change your listeners. We've built Omnias with sampling rates of 48kHz and higher from the start. All along, we've needed the sampling headroom to keep analog FM audio grunge-free. Now it's essential for HD Radio. Even if some listeners wouldn't notice the missing high frequencies, there's a fair chance they would hear a sharp 15kHz low-pass filter operating within HD Radio's codec range.

Omnia-6EX is also full of processing enhancements that result in yet more bass punch, yet more voice clarity, than the original Omnia-6. A sound so powerful and free of artificial constraints, you'll crave it for your station the first time you hear it.

More than 50% of the US' Top 100 FM stations have already upgraded to Omnia. Maybe you're next?



The new Omnia-6EX has enhanced processing for analog FM, and is ready for HD Radio with a second limiter section and digital output. Both FM and HD limiters and outputs are included as standard.

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Until the End of (Real) Time

Delay Makes Real-Time Broadcasting a Thing of the Past in the Not-So-Distant Future

As the transition to digital has unfolded, we gradually have accepted the fact that "delay happens." Digital signal processing takes some time to do its work, and buffers are required at numerous stages in a digital audio signal path. Perceptual coding is a particular culprit in this respect, with higher data compression ratios generally involving proportionally higher processing latencies.

The radio industry has adapted itself to these delays, just as it did when geostationary satellites were first used for signal backhaul and distribution. Satellite delay was uniform and predictable, at about 1/4-second per hop. This was not altogether different from confidence monitoring delay on three-head analog tape decks — a staple of the time, but now historical artifacts — so the amount and fixed nature of the delay involved were somewhat familiar. It required some creative methods in com linking (i.e., various uses of the "mix-minus" process) so that talent never had to hear its own live voice with this kind of delay, which could turn an otherwise intelligent person into a babbling idiot.

Digital delay was a less predictable thing. Switched 56, ISDN and even POTS lines equipped with perceptual codecs began to replace satellite backhaul; in addition to their convenience,

these systems reduced the audio delay encountered on sat links, so this was considered a step forward on multiple accounts. Yet because every path length was now different, one never knew just how long the delay would be, and it became a guessing game to see if talent could handle a live voice return or if mix-minus was still required.

Broadcast audio delays have stretched from milliseconds to minutes, due to an odd confluence of technical and programmatic causes.

Engineers began to notice that there were two variables, one physical and one human. The actual (as opposed to the billed) routing of the phone line plus the codec latency determined the physical delay, generally on the order of tens of milliseconds. But some talent seemed to tolerate more delay than others, so obviously a perceptual variable was also at work.

The latter issue was also noticed when perceptual codecs began to be used on

compressed digital STLs. Here the delay remained fixed throughout, but some talent could handle the delay better than others. A rule of thumb held that any delay over 10 ms (in some cases, up to 20 ms was used) should not be used for live talent monitoring, meaning that either a mix-minus (for backhaul communication) or a local program feed (for off-air monitoring) should be engaged instead.

Another temporary step forward came about with uncompressed digital STLs,

making many complex air-monitor switching systems no longer seem necessary. But this respite was short-lived.

The past is prologue

Today most broadcast air chains are populated by numerous sources of delay, from compressed backhaul links to digital storage systems to digital mixing consoles and routers to STLs to signal processors, all of which take small amounts of time to fill their buffers and run their DSPs. Even with the uncompressed STLs now in common use, such signal paths often tally up total latency that runs well over the 10 ms perceptual threshold. It has therefore become standard practice in many facilities to use local program signals for all live talent monitor feeds, rather than off-air monitoring. This generally is accomplished via switching added to all mic keys. Whenever a mic comes on, local program audio is fed to the monitoring bus, and when the mic goes off, the air monitor returns.

This is a good thing, because delays are likely going to increase dramatically for many stations soon. What may be added to those air-chain delays are two forms of IBOC delay, and in many cases, profanity delays, as well.

The first type of IBOC delay is generated by the HD Radio format's audio codec processing and its channel codec interleaving. The former turns the audio program into a high-quality, low-bit-rate signal, while the latter adds robustness for mobile reception. The exact amount of this delay varies, depending on the design and mode settings of the exciter, but it will generally run around three or four seconds. Because the HD Radio exciter outputs both the digital and analog signals, the analog signal is delayed in the exciter by whatever amount of processing delay is applied to the digital signal, so the two signals are time-aligned after the digital signal is generated.

Then the second form of IBOC delay is applied. This is the so-called *diversity delay*, which is fixed at three HD Radio frames (1.486 seconds each), or about 4.5 seconds total. This is an additional delay added to the analog signal by the exciter, which is introduced so that the analog and digital signals are purposely out-of-sync in the broadcast signal. IBOC receivers are programmed to delay the

The Big Picture



Photo: Gary Hayes, BBC

by Skip Pizzi

decoded *digital* signal by three frames to resync the two signals after reception.

The asynchronous relationship of the signals while they are in the air means that any disturbance to the RF signal will affect the two audio signals at different times. In other words, if at time T an obstruction causes a momentary fade at the receiver, the digital signal will be affected at time T , but the analog signal will be affected at time $(T - 4.5s)$ (i.e., earlier), implying that the analog signal likely will be back to an unimpaired condition when the digital signal impairment occurs, and a "blend" to analog can then occur without difficulty.

The 4.5-second gap was chosen after statistical analysis revealed it would be an optimal window to accommodate most mobile FM reception impairments, thereby providing the highest likelihood that analog and digital signals would not fail simultaneously. The three-frame buffer is relatively easy and cheap to implement in receivers, and because the signal would necessarily be delayed by codec processing and transmission interleaving anyway, there might as well be some benefit in increased system robustness added by a little more delay. (This is based on the rationale that says, "Once your system has four seconds of delay, is another four that big a deal?")

Note that HD Radio's codec/interleaver delay is intrinsic to the system, but the diversity delay is optional. Ibiqity strongly recommends it be used, but it can be switched off by the broadcaster. There is a flag in the bit stream to indicate such status, but it is up to the receiver manufacturer to decide whether or how its devices will react if diversity delay is not enabled. Some designs may disable analog blend functions in this case, while in others digital and analog audio signals will be out of sync (and the advantage of time diversity to combat signal fading will be lost). Of course, it also makes the analog signal ~4.5 seconds closer to real time, which is why a number of early adopting IBOC stations have elected to run with diversity delay switched off for the time being, until a reasonable number of HD Radio receivers are in use.

'Acquisition blend'

Finally, consider that this sync issue is not only encountered in the event that a digital signal loss causes the receiver to blend to analog (and back), but also occurs every time a station is tuned in (Ibiqity calls the latter "acquisition blend"). Recall that HD Radio tuners acquire signals using the analog audio, switching to digital signal only after the receiver's delay buffer is filled. If diversity delay is not enabled by a

See DELAY, page 16 ►

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Dick Irland, GM of Access 1 radio stations, was elected to the **New Jersey Broadcasters Association** board. He succeeds Gary Fisher, president of Equity Communications.

Elizabeth Christopherson, executive director of NJN Public Television & Radio and president of the NIN Foundation, was appointed secretary of the association.

Digidesign welcomed **Rich Nevens** as director of worldwide console sales. He contributes to marketing and development of the product line.

Les Hollander was named senior VP/regional manager of **Infinity Broadcasting's** Eastern region, for operations in Chicago, Minneapolis, St. Louis and Kansas City, West Palm Beach, Fla. and Hartford, Conn. ... **Brian Ongaro**, executive VP of the Western region, assumed operational oversight of Infinity's seven stations in Los Angeles ...

Jim O'Connell was named VP of Infinity Solutions and Beyond, its in-house marketing and sales group. He joins Infinity from the National Football League, where he was VP of its London office.



Wayne Pederson

Moody Broadcasting Network's WMBI(FM) hired **Wayne Pederson** as its station manager. He was as a special assistant to the president at Bethel College and Seminary in St. Paul, Minn.

The **National Association of Shortwave Broadcasters** elected **Doug Garlinger** president, succeeding Jeff White, whose term ended at NASB's annual meeting. Garlinger is the former director of engineering for LeSEA Broadcasting, which owns shortwave stations WHRA, WHRI and KWHR.

Jim Peck joined **SCMS Inc./Computerworks** in broadcast sales. He had been in sales at Wheatstone Corp. for nine years.

RCS Sound Software appointed **Joe McCallion** executive VP of its AirCheck broadcast monitoring division. He had been a special consultant to AirCheck. Also promoted to the division: **Frank T. Cammarata**, VP of new business development; **Brice Kirkendall**, VP of engineering and U.S. operations.

Pulitzer prize-winning journalist and former editor of the Baltimore Sun **William K. Marimow** was tapped by NPR to oversee its national coverage as managing editor for

NPR News. He joins Managing Editor Barbara Rehm, who oversees NPR's foreign coverage, and production of NPR's news-magazine and talk shows.

DK-Audio appointed **David Hubble** as area sales and support manager. He had supplied and installed non-linear and broadcast equipment as an independent contractor.

James Bradshaw was promoted within the audio division of the FCC's Media Bureau to deputy chief. Bradshaw joined the FCC in 1991 and has served as associate chief and supervisory engineer of the division.

ABC Inc. appointed **Louis F. Gutierrez** and **Andrew T. Martin** VPs who supervise "HR Business Partners," an initiative to deliver human resources and support to ABC Inc. businesses.

Clear Channel Radio hired **Kevin Cassidy** as VP of sales for stations in the

Dallas market. Cassidy had been senior VP and regional executive for Interep National Radio Sales.

Gary Krantz was promoted to executive VP of music operations for **Premiere Radio Networks**. He had been senior VP of operations.

Canada-based **OMT** welcomed **Rick Landry**, former engineer for CKLQ/STAR(FM) in Manitoba, to its support department, and promoted **Al Lotufo** to quality assurance lead.

Internet advertising strategist and founder of digital marketing organization **Avenue A**, **R. Michael Leo** joined ad operations company **Trafficmac** as CEO.

DK-Audio appointed former regional business development manager for Tektronix **Rob Moodey** to marketing manager. Moodey is a former member of the IABM's technical sub-committee and a reg-

ular speaker on the SCTE white paper circuit.

Robert Benjamin joined the AOL Radio@ Network as program manager for its alternative rock stations. He had been the program director for WFHS(FM) in Washington and Baltimore.

Paul Erlandson joined **Lynx Studio Technology** as director of product support. He had been director of sales at Carillon. Prior to that, he founded and ran **Sound Chaser**, a computer-based music systems provider.



Paul Erlandson
music systems

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GUEST COMMENTARY

Say No to a Radio Broadcast 'Flag'

Our Right to Record Wanes as the Music Industry Jumps on the Content Protection Bandwagon

by Gigi B. Sohn

Most people are familiar with the radio. Today's radios have buttons for selecting stations, switching bands and controlling sound features. And if the big media companies have their way, radio manufacturers will have to add another button to future radios — the "buy button."

For decades, consumers have been able to record music from their radios. We were recording entertainment content at home even before the advent of the VCR. But that time-honored tradition may be about to change. Just as Big Media is trying to crack down on our rights when digital TV becomes more widespread, they are also launching an assault on the rights of radio listeners. If you hear something you like, forget about your rights — recognized by the U.S. Supreme Court — to tape it off the air. If you want to record it, you will soon have to buy it.

Digital precursor

The push for regulated content protection of digital radio was prefigured by the content companies' push for protection of digital television. Hollywood and its proxies were successful last year in persuading the FCC to impose content protection, even though consumers have traditionally been free to record content from over-the-air television broadcasts. The new regulations allow TV broadcasters to "flag" their digital TV signals, so that HDTV receivers and cable set-top boxes allow only limited recording.

Hollywood argued that the "broadcast flag" scheme is necessary to protect their copyrighted material, and that without those protections, the media companies wouldn't put any good content over the air. It was a shakedown of the FCC in order to get mandatory copy protection, and the FCC gave in.

The agency is now engaged in a proceeding to work out the details of how the TV

"broadcast flag" will be implemented, with the issues ranging from what technologies can be used to implement the flag, to geographical limitations on how digital material that is available for download can be used.

Hollywood's success in obtaining copy-protection regulations for digital television encouraged the record companies to seek something even more extreme for digital radio.

Hollywood's success in obtaining copy-protection regulations for digital television encouraged the record companies to seek something even more extreme for digital radio.

Why did the FCC crater on the digital television issue? The main reason is that the commission didn't want to leave any real or imagined roadblocks that might hinder the digital television transition. What's important to remember is that the whole "broadcast flag" debate is taking place in the context of a larger public policy discussion. The FCC and Congress have ordered the broadcast industry to vacate the spectrum it now uses for analog transmissions (TV broadcasters also have spectrum they use for digital TV broadcasts). The resulting "recovered" spectrum will be auctioned off or reallocated for other uses.

As the FCC works out the details of its TV flag, the record companies have opened a new front for mandatory copy-protection technologies by suggesting an even stronger content-control regime for radio.

At first it seemed as if the record companies' pleas were falling on deaf ears.

Participants at an informal discussion at the FCC in January made a strong case that there was no need for content controls, and at the time, the FCC staff seemed to agree. It was clear, for example, that protecting digital radio content wouldn't result in "recovering" any analog spectrum, because radio broadcasters will use the same spectrum for digital radio that they're currently using for analog broadcasting.

What's more, it was unclear whether or not copying music from broadcasts would serve as a source of illicit music

copies traded on the Internet. At the end of the meeting, Ken Ferree, the head of the Commission's Media Bureau, said he didn't see any need for the FCC to act on a radio broadcast flag. Nevertheless, on April 8, the commission issued a Notice of Inquiry to determine whether content controls on digital radio service are needed.

The fact that the FCC merely started an inquiry means it isn't quite ready to propose rules to implement content

Delay

► Continued from page 14

broadcaster, upon signal acquisition some receivers may not automatically switch to digital (they may require the user to manually switch over), while in others the listener will hear a few seconds of analog audio followed by an instant replay of the approximately same few seconds in digital audio. (The opposite effect would occur during loss-of-signal blend, in which case the listener would miss a few seconds of audio when switching from digital to analog, or the receiver might simply mute.)

In any case, listeners could assume that this station was having audio problems, and would likely tune away after a few such occurrences, choosing to stay with stations where this did not occur (i.e., those with diversity delay enabled).

The biggest problem for listeners with such delays will likely occur when listening to the radio while watching live sports events at their originating venues or on TV, or when watching live news events covered by multiple broadcasters (such as presidential press conferences). In these cases, a seven- or eight-second delay between the event's live occurrence and its representation on radio could be quite disturbing. While TV programs are also likely to be delayed from real time or from one another by a satellite hop or so, radio will be shifted significantly further. Rather than being off by a word or two, radio will be a sentence or more behind the news event, and well in the wake of the action for sports. (Remember that this will affect



Gigi Sohn

controls — and it means there is an extra step to doing so. Still, the commission's issuance of anything at all is disappointing, as the arguments presented by the recording industry at the January meeting of the FCC had all been thoroughly discredited. As the workshop held by commission staff clearly showed, there are neither pressing technological issues nor spectrum-related issues that require the commission's immediate action to protect digital radio content.

Our view is there are no good reasons for the commission to move ahead with a "radio broadcast flag" or any form of copy protection for digital radio — the case simply hasn't been made for such protection. Additionally, no one has outlined what the proposed rules relating to content protection for digital audio radio would be. Unlike the TV proceeding, there is no specific technological proposal to consider.

If, as we say, there is no evidence linking digital radio broadcasting with the sort of threats to the music industry that record companies are claiming will occur if digital audio radio is authorized, why is the music industry in such a fever to impose

See FLAG, page 17 ►


both analog and digital listeners.)

Of course, these previously unencountered latencies may seem insignificant in the face of the current indecency binge, which is causing many stations to consider or even install multiple *minutes* of delay to their signal for protective purposes. While this, too, is not new, earlier profanity delays were limited to live call-in shows, and typically added only a few seconds of delay, providing just enough time for an operator to react to a profane utterance in the studio and dump the caller and the buffered audio before it hit the air.

Today's approach is routinely to add much longer delays to *all* live-assembled programs, whether call-ins are involved or not, such that a station's "appropriateness authority" can listen with, say, five minutes of lead time to decide whether the content should be broadcast. It's amazing what a little wardrobe malfunction can do to an (audio-only) industry.

Unlike the IBOC delays noted earlier, which station monitoring can deal with in much the same way earlier latencies were handled, a multi-minute program delay with dump option standing by requires more complex operational rethinking.

Like Moore's law, delay seems to be something that has increased exponentially over time. In just a few short years, broadcast audio delays have stretched from milliseconds to minutes, due to an odd confluence of technical and programmatic reasons. It seems hard to imagine, but the immediacy once so prized by radio broadcasters has itself been devalued by the passage of time.

Skip Pizzi is contributing editor of *Radio World*. 

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New 'Public Alert' Standard Is for Weather Radios

When a devastating tornado swept through the small town of Van Wert, Ohio in November 2002, its 200-mile-per-hour winds sent trees and cars flying. Among the buildings hit hardest was the town's movie theater.

When the dust cleared, the roof had been blown off the building and two cars sat stacked at an angle where the front rows of seating had been.

Yet everyone who had been in the theater that day survived, thanks to a quick-thinking theater manager whose office was equipped with a NOAA weather radio that gave him enough of a warning to move patrons out of the theater to a safer part of the building.

For the Consumer Electronics Association, the Van Wert disaster was a call to action. Within a few months, CEA members were plotting out a set of standards for a new generation of weather radios designed to put those early warnings in the hands — and ears — of millions of consumers.

Dave Wilson, the CEA's director of engineering, presented the CEA 2009 standard to broadcasters at NAB2004. Wilson says NOAA has made an aggressive effort to improve the coverage of its weather radio network, which now includes 121 forecast

offices feeding 881 transmitters covering 87 percent of the U.S. population.

In order to serve that public, the CEA 2009 standard will require radios to meet a tough set of technical criteria to bear the "Public Alert" logo. The standard



creates a uniform set of channel numbers for the seven 162 MHz weather radio channels, which have previously been numbered in different ways by various manufacturers. Radios must meet sensitivity and selectivity standards, as well as allow consumers to tune to a specific channel manually (in addition to auto-

matically selecting the strongest signal, which may not always be the most relevant to a listener's local area).

To be heard in crisis conditions, radios must output audio at least 77 dB (measured at one meter away), and they have to have battery backup if powered by AC.

One challenge in developing the standard was deciding which event codes users would be able to block from automatically turning the radio on.

"The idea was to go through and take off the ones that were going to become an annoyance factor, so the receiver didn't become a nuisance to the consumer," Wilson said. At the same time, certain codes were set as unblockable, including haz-mat alerts, nuclear power plant disasters and tornado warnings.

As more receivers get into consumers' hands, Wilson says, the NOAA weather

radio network will become an increasingly important link in the emergency communications chain, even for events that aren't necessarily weather-related.

"These networks are an excellent method for the government to alert the public about all types of hazards," Wilson said.

Radios bearing the new Public Alert logo have just begun to reach store shelves, Wilson said. The CEA hopes the adoption of these standards will help manufacturers reach a consumer base that, he says, is eager to put the new weather radios in their homes and offices. A CEA study found that while 51 percent of Americans are aware of NOAA weather radio, only 13 percent of U.S. households actually own one. The CEA estimates a potential market of 7.1 million radios each year.

— by Scott Fybush

Flag

► Continued from page 16

new content protections? It's worth noting that the issue hasn't even come up in the United Kingdom, where digital radio is already being offered.

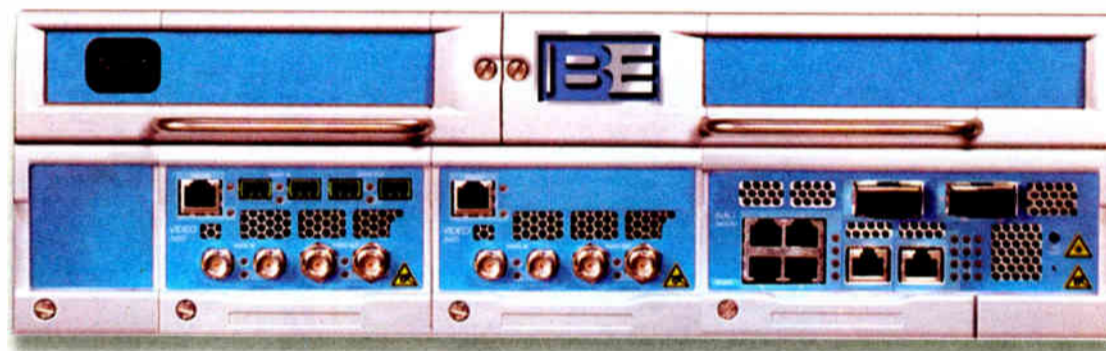
Quite simply, the answer is that the music industry sees in digital radio an opportunity to do just what Hollywood has succeeded in doing with digital television: using the nervousness about a digital transition as an opportunity to impose controls over content use that have never before existed. And the record companies are seeking even more control over their offerings than the movie and television companies have sought over television, with studios willing to allow a small degree of home recording. But if the music industry has its way, you won't even be able to record content at home without paying for the privilege.

In an important way the music and movie industries are seeking the same thing. We think the big music companies' overreaction falls in line with the general efforts by the content industry to use digital technologies as a way of controlling what you see and hear — and extracting more rents from you every time you turn on your TV or radio. Such extreme control has never been part of the broadcasting tradition in the past, and we cannot accept the argument that it must become so in the future.

The digital revolution was supposed to be about liberating consumers and citizens. We can't let it become an excuse for constraining consumers to spend every last cent.

Gigi Sohn is the president of Public Knowledge, a Washington-based organization that "advocates a fair and balanced approach to copyright and technology policy."

RW welcomes other points of view. 



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Radio World, June 16, 2004

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

Suppress the Urge to Surge

by John Bisset

There are many ways to protect your studio and transmission equipment from lightning. Some methods, such as proper grounding, are not expensive yet yield good results. If you don't have surge suppression at your studio and transmitter site, make it a priority.

you take steps to reduce or eliminate claims due to lightning by installing a surge suppressor, you shouldn't pay the same premium as an unprotected station.

If you plan surge protection for your

wouldn't want a series suppressor.

For as long as I can remember, parallel suppressors were the product of choice; if one of the modules blew, because the suppressor was in parallel with the AC feeder, the "protection device" wouldn't take you off the air. Also appealing: the parallel suppressors were cheaper.

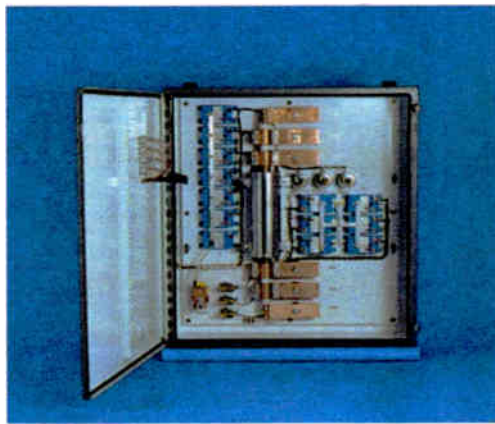
es; and though the modules are in parallel to the AC line, power flows through them all the time. There is no turn-on time, so the result is faster response. Although the suppressor box is in series with the AC feeder, the individual modules are in parallel. Should a module sacrifice itself, the feeder will not be taken down.

The new DS21S has two protection modules per phase, so if one is sacrificed, you're still protected. LEA International can provide suppressors with up to four modules per phase for



Fig. 1: 'Tis the season. Lightning hits Stonehenge Tower in Portland, Ore.

Modular Series Hybrid



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- Wagon Wheel™
- Most Effective

Fig. 2: The new LEA Dyna System DS21S provides improved protection against surges.

No budget? Check with your station's insurance agent; many insurance companies will pay for some or all of a surge suppressor because of the asset protection the device offers. Even if the insurer won't help, once a surge suppressor is installed, ask for an adjustment in premiums. An anti-theft device will lower your car insurance; similarly, if

station, a good place to start is LEA International. Carol Rassier demonstrated a new surge suppression system designed especially for AM and FM stations at the NAB show. Shown in Fig. 2, the Dyna-System DS21S is a series-connected suppressor, designed for critical loads. Don't jump to conclusions, like I did, that you

Carol points out that the parallel suppressors usually have fuses, which are current-limited. The parallel devices also have a turn-on or response time for the protection module to actually turn on and "clamp" the surge. Inevitably, some of the surge could get through.

In a series suppressor, there are no fus-

really critical applications.

Perhaps the best feature of the DS21S is its price. Series suppressors have been traditionally more expensive than their parallel counterparts. The DS21S lists for \$3,800 and is available through your favorite broadcast supplier.

See REBUILDS, page 20 ►

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Rebuilds

► Continued from page 18

Want more information? Head to www.leaintl.com or e-mail Carol Rassier at crassier@leaintl.com.

★ ★ ★

I met John T. M. Lyles more than 25 years ago when we worked at Delta Electronics. John went on to Broadcast Electronics, where he left his mark on several of its transmitter products. For more than a decade, John's been with the Los Alamos National Laboratory, working in the Neutron Science Center.

An avid Radio World reader, he saw our discussion of rebuilt vs. new tubes and weighed in. Fig. 3 is from John's lab Web page.

He and his staff received an internal award for savings of material and money for rebuilding tubes. Burle (RCA) had been rebuilding the big RF triode and tetrode tubes. The center's staff now rebuilds most of its own 4CW250,000B and 4CX3000A tetrodes through companies like Econco. The power tubes are used to support the linear accelerator projects at the center. The rebuilding saves not only taxpayer money, but time; some custom tubes require up to a year to build, seriously disrupting experiment schedules.

A side benefit is that, during rebuilding, one can often determine the cause of the failure. This data has been invaluable to the researchers at the Neutron Science Center.

About 500 pounds of hazardous waste per year is avoided by recycling the tubes, at a cost savings of about \$100,000 per year. A hundred grand is quite a tube budget!

John can be reached at jtml@lanl.gov.

★ ★ ★

I heard from another engineer who's a rebuild convert. He's been using nothing but rebuilds for the last 15 years,



Fig. 3: John Lyles is shown with four rebuilt Burle/RCA 4616 tetrodes at the Burle Industries factory in Lancaster, Pa.

with excellent results. Because of his responsibilities, he asked to remain anonymous. Suffice to say he's a one-man show, chiefing and contracting for nearly 30 stations.

With that many stations, he demands longevity. He selected Econco in Woodland, Calif., for rebuilt tubes. In many of the more popular transmitters — RCA, Collins, Continental, Gates and Harris — he's experienced longer tube life from rebuilds than new.

However, he writes that it is imperative that you tell the rebuilder the type of transmitter in which the tube will be used. Econco maintains information on various transmitter types and makes changes to the filament and grid structures as appropriate.

For instance, the RCA BTF20 he used to maintain would use anything at all, it was not critical. He would get about 1.5 years lifespan from a new tube and 1.5 years out of a rebuild. The Continental

816, on the other hand, took a certain tube structure, otherwise the tube would last less than a year, despite the fact it had filament regulation.

Once informing Econco of the type of transmitter, the rebuilds would last over two years.

We know what makes a tube "wear out." Simplified, the tube loses amplification effectiveness when the thoriated tungsten steel loses its thoria content. Well, if you "cook" the grid elements longer, and add more thoria to them, they will last longer, but they also become more brittle.

Making a deal with Econco in exchange for them "cooking" the tubes a little longer, he picked up his rebuilds in person, transporting them in padded containers on the front seat. The result was nearly 50 percent more life out of the tubes done this way. Some of the transmitting tubes that used to last 1.5 years are now approaching their third year of service.

For those of us not living near Econco, take advantage of the company's vast knowledge of tubes and transmitters, and specify the type of rig you're using.

★ ★ ★

There's always an opposing view.

Stu Tell writes that in all his years in broadcasting, he would always use rebuilt tubes. The biggest reason was to save the management money (so they could com-

plain about him over-spending somewhere else, Stu adds).

At one station, Stu was maintaining a Gates FM2.5H3. This little transmitter was a joy, except when he had to change the final. For Stu, it was a job of two to three hours, tuning and re-tuning — basically a long struggle to get it to give its licensed TPO with decent efficiency.

Once, when the final was dying, Stu called his rebuilder and asked them to send a tube. They said they couldn't because they had none in stock. There was a shortage of 5CX1500s at the time.

The station decided to order a new tube from Harris. It arrived; Stu installed it and pressed the plate "on" button. The first thing he noticed was the FWD power meter needle was all the way over to the right. This happened even with low screen current. He'd never seen this before with this transmitter.

It took only a little tuning and the rig was running with about the same readings that were on the factory test sheet. Stu had never adjusted the convenient front-panel FWD power calibration pot until now. He had to; the reading was pegged to the right at 120 percent. With no dummy load or Bird Wattmeter, the best he could do was to use the indirect method and adjust the meter accordingly.

The experience told Stu that the transmitter probably was not putting out all the RF it was supposed to with the various rebuilds used before. Somebody along the way just gave up and calibrated the power meter to show what power output they arrived at using the indirect method.

Since, Stu is sold on using new tubes. It got him thinking about all those times when he called various manufacturers' field service departments complaining about efficiency and power output problems. The field service rep would always ask if he had tried a new tube. Stu's reply was, "I have a installed a fresh rebuild." At that point they would usually pause, probably so they could roll their eyes.

In summary, if you use rebuilt tubes, specify the transmitter in which they will be used. And if you still have problems, try a new tube, even if borrowed from another station, just to prove that the problem isn't elsewhere in the transmitter.

Stu Tell can be reached at stutell@mch-si.com.

John Bisset has worked as a chief engineer and contract engineer for more than 30 years. He is the northeast regional sales manager for Dielectric Communications. Reach him at (571) 217-9386, or john.bisset@dielectric.spx.com.

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

MEASURING THE DIFFERENCE in Digital Audio Cable Performance...



The critical link in digital audio interfacing, Gepco 110Ω twisted-pair and 75Ω coax feature exacting impedance, bandwidth, and attenuation specifications to deliver low-jitter, minimal pulse rounding, and exceptional performance in high-resolution, digital audio systems.

- Precision 110Ω or 75Ω Impedance
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Burk Has Trade-In Offer on Remote Controls

Broadcasters using the Burk Technology TC-8 transmitter remote control system can upgrade to the ARC-16 and take advantage of a \$500 trade-in.

When customers purchase a new ARC-16 and trade in a TC-8, Burk will offer \$500 cash back. The deal is good through the end of August. This replaces an earlier promotion involving the VRC1000 and VRC2000.

The company said the ARC-16 has twice the control and monitoring capacity as well as multi-site capability with site-to-site control and other features not in the TC-8. For information visit www.burk.com/trade-in.



RoadStar™ & NetStar™

On the road or in the studio, deliver perfect stereo via IP or ISDN



Both RoadStar and NetStar come complete with IP and ISDN connections, AAC, AAC Low Delay, MPEG 2, MPEG 3, G.722 and G.711 encoding, and can even send and receive linear uncompressed audio. Both are effortless to operate, with automatic recognition of the calling codec and a built in Web Server for remote control from anywhere. Both give you 8 contact closures and ancillary data. Both can automatically switch from IP to ISDN, or vice-versa, if the primary link becomes unreliable.

NetStar is rack or tabletop mount. RoadStar is portable, with a built-in 4-channel mixer, 48 VDC phantom power, analog and AES/EBU inputs and outputs and a dual headphone monitoring system. Now, you can take your *stereo* show on the road and deliver spectacular audio your way.



RoadStar rear panel



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Summer Product Issue

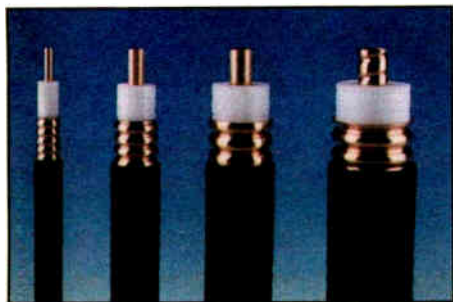
Get out the suntan lotion, it's summer time. In this section we provide an overview of the new gear that is on the market, introduced at the NAB2004 convention. Suppliers, if your company showed a product that we missed, send e-mail to radioworld@imaspub.com so we can tell readers in a future issue.

Contributors to this section include Paul McLane, Leslie Stimson, Kelly Brooks, Al Peterson, Susan Ashworth, Brett Moss, Scott Fybush, Marguerite Clark, Paul Kaminski, Mel Lambert and Tom Osenkowsky.

Dielectric Adds Foam Flexline

Among its range of RF products, Dielectric showed Flexline cable products, the DCR-X high-power FM antenna, and an emergency cable kit, which allows a station to feed the output from a transmitter exciter directly into the main station transmission line and antenna.

Flexline is now available in foam dielectric cable (shown) in low-loss (Type FLF) and superflexible (Type FLS) versions. The foam complements the Flexline air dielectric product line introduced in 2003.



On the HD Radio side, Dielectric displayed the In-line Analog-Digital Combiner Injector (for injection of a digital signal to an existing run of line): panel antenna systems HDFMVEE and HDCBR; and the interleaved analog/digital antenna HDR series, in which the analog signal has a left-hand circular polarization and the digital signal is right-hand circularly polarized, with both elements are interleaved in the same antenna assembly.

HD Plus Arrays were introduced, in which an HDR Series Array is configured so that no supplemental isolation or circulator is required in the transmitter room.

To complete the package, Dielectric presented the Symphony Monitor and Control System allowing for local or remote monitoring and control of multi station RF transmission facilities.

Call the company in Maine at (800) 341-9678 or visit www.dielectric.com.

Modulation Sciences Explores Surround

Modulation Sciences demonstrated its SpiderVision 5.1 monitoring system for surround sound audio.

This device takes an analog or digital signal and breaks it down into the components. The process gives a visual representation of a surround sound audio sig-

nal, which will help operators find and correct potential compatibility problems when the signal is matrix encoded to Lt, Rt for two-channel broadcast.



SpiderVision gives operators a visual representation of the entire sound field ("Spider Mesh" and "Spider Vectors"), traditional phase information in the familiar X-Y Lissajous pattern, and graphical monitoring of sound field components.

Call the company in New Jersey at (800) 826-2603 or visit www.modsci.com.

RDL Ships AM Noise Monitor, Mixer

RDL Radio Design Labs debuted the RU-MX4 four-channel mic/line mixer.

Each input can accept a balanced XLR microphone or unbalanced phono jack line-level input. Phantom power is switch-selectable for microphone inputs. An LED VU meter indicates level. Output is selectable XLR balanced mic or line level. A selectable soft-knee compressor ensures proper levels. Multiple RU-MX4s may be cascaded by the use of the line-level unbalanced phono output jack. An isolation output transformer is available in the RU-MX4T model.



Also available is the ACM-3 AM Noise Monitor, shown. Intended to aid the FM engineer in minimizing synchronous AM noise, the ACM-3 indicates levels by a row of LEDs. User may select wideband, 75 microsecond or high-pass filtering. Minimizing AM noise results in reduced subcarrier crosstalk, multipath artifacts, increased stereo separation and clarity and maximum loudness.

Call the company in California at (800) 281-2683 or visit www.rdlnet.com.

Audemat-Aztec Debuts New Navigator

The Audemat-Aztec Navigator 007, shown, is an FM field-strength meter with modulation, pilot and RBDS monitoring capabilities; it earned a Radio World "Cool Stuff" Award. It can be interfaced with an external GPS and laptop computer for mobile operation and data recording. While driving, GPS coordinates and single-station RF levels are recorded. This data can be viewed as a text file or exported to mapping software for visual display. The unit is intended for the U.S. small-market engineer.



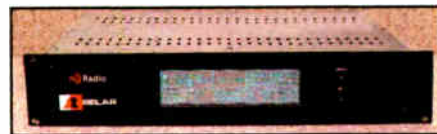
Also new are the additional features to the FMB80 RDS generator. The FMB80 is self-contained, requiring no computer or external software for programming or operation; it has the capability of Scrolling PS and Radio Text Messages. Users now can choose the mode of Public Safety messages. Song titles and artist information coming from the automation system can be wrapped around with text. Text can be justified, customized and configured through a new HTML Web page in the FMB80 via RS-232 or Internet link. An internal scheduler can display messages at user specified times of day.

Call the company in Florida at (305) 692-7555 or visit www.audemat-aztec.com.

Belar to Monitor HD Radio

Belar Electronics Laboratory Inc. introduced a prototype of its HD Radio FM IBOC modulation monitor.

With shipping anticipated for fall, the unit monitors both analog and digital modulation modes. It accepts an RF input, is frequency agile and can simultaneously monitor L+R/L-R or discrete L and R. The user can normalize to any lev-



el, with factory preset to zero dbfs. The Status Screen displays SIS data Port and Service IDs, FCC ID, Network ID, short/long names, Latitude/Longitude and Country Code.

Also monitored and displayed are MPS Data Stream and Bit Error Rates.

Call the company in Pennsylvania at (610) 687-5550 or visit www.belar.com.

IBOC Applications Are Targeted By Shively

Shively Labs introduced a 1-5/8-inch Power Splitter/Patch Panel at NAB, designed to feed IBOC and analog FM into a lower- and upper-half panel antenna. The unit has a low profile and may be housed in a standard 19-inch rack panel.



Also new is a corner mount power divider, shown. Designed to mount on a tower, the divider presents a low weight and windload on a tower. According to Sales Manager, David Allen, "Every IBOC installation is a unique project. There is no universal, one-size-fits-all solution. We have developed new techniques and redesigned components of our existing product line to facilitate cost-effective implementation of IBOC at both new and existing facilities."

Call the company in Maine at (888) 744-8359 or visit www.shively.com.

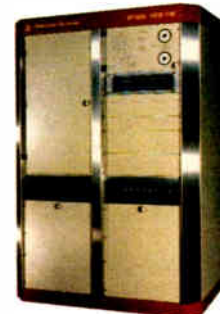
A New Continental FM Transmitter

DRS Broadcast Technology Inc., formerly Continental Electronics, debuted the Continental 815D5 solid-state 5 kW FM transmitter, shipping later this year.

Consisting of 16 hot-swappable driver/PA modules plus a spare, the 815D5's features include two analog front-panel 250 degree meters and quiet fan operation. Ceramic printed circuit boards for RF combining and splitting, VSWR protection and automatic fold-back, rollout PA/Combiner section, front-panel LED status indicators, broadband output, Automatic Power Control and AC Power Recycle are standard. Single-phase AC power is required.

Also, 10 kW and 20 kW transmitters using the 815D5 technology are in development. The equipment is being developed to accommodate IBOC/HD Radio broadcasting.

Call the company in Texas at (214) 381-7161 or visit www.drs-bt.com



Radio Systems Gets Digital

Radio Systems unveiled the Millennium Digital Console series.

Features include AES/EBU compatibility, analog or digital input and output capability, and sample rate conversion on every input, up to 10 mix-minus programmable outputs, 32-bit resolution, 10 extra auxiliary output busses and serial RS-232 interface for third-party equipment.



A CRT companion metering and time display is available. The Millennium Digital is slated for third quarter 2004 delivery; it can also be ordered as a field upgrade for existing Millennium consoles.

Call the company in New Jersey at (856) 467-8000 or visit www.radiosystems.com.

Moseley Has New Lanlink, Starlink Configurations

Moseley introduced an MPEG4-AAC Audio IP option card for the Lanlink 900. Operation mode may be full duplex dual mono or stereo. This allows for backhaul feeds, SCA or confidence monitoring and provides an inexpensive means for adding transmitter-to-studio linking on an existing 950 MHz STL.

Also new are Starlink SL9003Q configurations allowing up to six channels of 32 kHz or four channels of 44.1 kHz uncompressed audio on standard Part 74 950 MHz aural STL channel allocations.

Call the company in California at (805) 968-9621 or visit www.moseleysb.com.

BE Aims for Total Radio Program and Data Integration

Broadcast Electronics unveiled the Big Pipe, a 45 Mbps point-to-point bidirectional 5.8 GHz wireless link that can accommodate LAN, Ethernet, AES/EBU uncompressed digital and analog audio, video, serial data, HD and RDS data, and also



POTS with an optional module. It consists of a single chassis with eight AES independent channels (44.1 kHz/24 bit) or eight analog channels or any combination. Serial interface is included on each card. Network applications include delay-free bidirectional feeds for long-distance remotes, security video, LAN and POTS for a transmitter site. Big Pipe, shown, which earned a Radio World "Cool Stuff" Award, also can deliver 155 Mbps over OC3 fiber or 622 Mbps over OC12.

Also introduced are AudioVault features that allow talent to customize menus and screens, as well as a CD ripper, true IP networking and data services to enhance content management and automation. AudioVault has been upgraded for HD Radio secondary audio services.

Radio Data Dimensions software is a new data solution that can accommodate RDS now and HD Radio later. Features include eight character identifiers, 64 character title/artist text, promo messages, advertiser IDs, traffic bulletins and AMBER alerts. The software includes support for HD Radio's secondary program services such as Tomorrow Radio.

Also new is the XPi10 Studio HD Radio Generator, described as the first studio HD Radio signal generator, allowing reduced STL bandwidth requirements and helping protect equipment investments against obsolescence during HD Radio migration.

The company is promoting what it calls Total Radio Program and Data Integration for managing and transporting data, audio and Internet streaming.

Call the company in Illinois at (217) 224-9600 or visit www.bdcast.com.

Armstrong Demos New AM Transmitters

Armstrong promotes its new X-500 and X-100B compact AM transmitters for their reliability, redundancy and HD Radio capability. They are fabricated with 600-watt RF modules capable of 150 percent modulation. Features include better than 90 percent PA efficiency and 80 percent overall efficiency (powerline to RF output); optimized multi-phase modulator (flat group delay, low source impedance); 150 percent positive modulation; three preset power levels and remote control capability.

"Housed in a heavy duty aluminum chassis," said the company's Ernie Belanger, "they easily fit into a 19-inch rack," requiring just 7U.

The X Series offer three power level settings that can be field-set, to provide versatility for full power and pre sunrise/post sunset power adjustment, Belanger said.



Both units feature on-board lightning and power-surge protection.

Belanger said the units are suitable replacements for older-style solid-state and tube AM transmitters.

Call the company in New York at (315) 673-1269 or visit www.armstrongtx.com.

Logitek Brings Flexibility to Fast-Paced Operation



The Remora-4 is a tiny but powerful workhorse for production, news and backup operation.

Console Configurations Include

Numix - 6 to 24 faders (12-fader system shown)

Remora - 4 to 22 faders (4-fader system shown)

Powered by the Logitek Audio Engine, a full-featured audio router

As your needs change, Logitek can change with you.

Our Numix and Remora consoles are flexible enough to handle the pace of your facility, whether it's in a major market or a small town. On-air and production rooms, news and edit suites can all share sources from our versatile router, the Logitek Audio Engine. It's networkable to accommodate as many sources as you need to share. For your next rebuild or update, Logitek is the logical choice.

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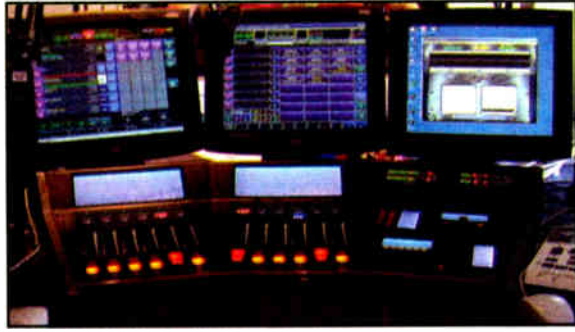
OMT Spotlights iMedia Series

OMT Technologies' iMediaTouch V2.1 has new features, including an On-Air Module with Dolby AC3 capabilities (in addition to standard apt-X, MP2, MP3, WAV, and PCM formats), plus a phone-bit editor, log swap button and other enhanced functions.

The Production Module offers Dolby AC3 compatibility plus expired/inactive cut text colors, database refreshing, multitasking CD ripping and transcoding, and automated trimming, cut labels and levels. Old and new TM Century data files can be imported into the production module, including track year and publisher.

Also, iMediaLogger is described as the smallest digital logger in radio and capable of recording up to 12 simultaneous stereo/mono audio sources, with apt-X, MP2, MP3, WMA, Real Audio and PCM formats. Each system can be configured remotely and managed via a conventional LAN or WAN; audio files are said to be compatible with major automation systems. It is suitable for logging, archiving and storage.

Call the company in Winnipeg, Canada, at (204) 786-3994 or visit www.omt-technologies.com.



JK Audio Offers Phone Interface

Recognizing that small can be useful, JK Audio introduced AutoHybrid, shown, a low-cost phone interface/hybrid. Attach a phone line plus XLR cables and the user is ready for broadcast with simultaneous full-duplex send/receive audio.

The system is suitable for remotes, remote monitoring, IFB feeds and simple studio, conferencing and PA telephone interface applications.



Also to be seen were demonstrations of the Innkeeper PBX Digital Hybrid connected to a Nortel Norstar system, showing that the unit converts any multi-line PBX telephone into a talk-show unit. Within a newsroom, the unit can be used with a PC-based recorder. Some 250 units have been sold to broadcast customers, including two dozen to Los Angeles-area news/radio stations.

Call company in Illinois at (815) 786-2929 or visit www.jkaudio.com.

Eventide BD500 Expands to 40 Seconds

Eventide unveiled a 40-second version of its flagship BD500 delay. "Recent events have compelled the broadcast community to ask if we are doing enough



to comply with the expectations of regulators," said Ray Maxwell, vice president of sales and marketing. "Eventide has effectively doubled the available delay previously available."

The unit has configurable delay and dump functions, which include adjusting dump increments from one second up to the full delay, in half-second increments. The Rebuild function rebuilds the buffer after a portion of audio has been removed.

Ramp-to-Zero gradually backs out of the delay buffer at the end of the program.

A precision delay mode allows adjustments as fine as 176.4 microseconds and is appropriate for HD Radio installations as well as other fixed-delay applications. The BD500 features AES/EBU-format I/O remote control functionality. The unit is programmable, with settings stored in nonvolatile memory; the configuration menu is password-protected.

Call the company in New Jersey at (201) 641-1200 or visit www.eventide.com.

PMD670 Is Solid-State

The combined Denon and Marantz — now D&M Professional — rolled out a WAV/MP3 Flash recorder, the portable Marantz PMD670.

The PMD670 has a look and feel comparable to familiar Marantz news-gathering cassette decks, but can record up to six hours of uncompressed .WAV audio on a 2 GB solid-state RAM card. There are no moving parts to jam or fail if the unit should be jostled or struck.



Battery life has been measured to better than 6 hours on standard AA cells. Audio can be downloaded to a computer editing system via USB cable or compact Flash card reader.

The PMD670 carries an \$899 suggested price tag.

Call the company in Illinois at (630) 741-0330 or visit www.d-mpro.com

Telos Forms Axia Division

Telos Systems announced the formation of a new division, Axia, to produce digital audio routing, mixing and distribution systems using established Ethernet topologies and a mix of proprietary digital components with conventional off-the-shelf switchers.

The basis of the product line is the

Livewire protocol, which moves uncompressed digital audio and control data over Ethernet lines with high reliability.



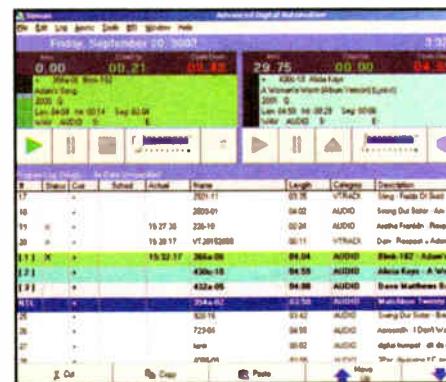
A Livewire radio studio setup would consist of an Axia SmartSurface studio console, shown, with a digital audio engine, and several nodes connected to studio source equipment and microphones. The first practical installations of Axia systems were done at WCSB(FM), a student-run station at Cleveland State University, and at WEGL(FM) at Alabama's Auburn University.

The Omnia division of Telos Systems debuted the 5EX HD+AM processor, a dual-purpose AM processing unit made to address both analog and HD radio. An FM version — the 5EX HD+FM — also was displayed.

Contact the company in Ohio at (216) 241-7225 or visit www.telos-systems.com

BSI Upgrades Simian, Goes Multi-Lingual

Broadcast Software International introduced Version 1.5 of its Simian "radio station in a box" digital audio software, with added features such as Dynamic Time Compression, which allows audio to be compressed without pitch distortion. An expanded production mode is offered, as are multi-lingual versions, beginning with Spanish.



Simian runs in automation mode or as a live-assist system, during which the operator can make changes to the program log while Simian is playing. Operation is not interrupted when the user edits the log for a different time of day.

It is equipped with audio file labeling technology so the user may insert information into the audio file, and uses Microsoft standard audio files (compressed or non-compressed), MP2, MP3 (via codec) and TM Century files.

Simian accepts files from traffic and billing management or music scheduling systems, and uses a variable import filter when reading files from other systems. Highlights include "cart" capability, HotKeys, external device control and integration with audio editors. Three main playback decks, two record decks and a mixer with user-defined labels are featured.

Contact the company in Oregon at (888) 274-8721 or visit www.bsiusa.com.

Comrex STAC Has Multi-Functional Control Surface

Comrex's Studio Telephone Access Center for listener lines, talk shows and call-in segments incorporates two digital phone hybrids that handle up to four callers. It won a Radio World "Cool Stuff" Award.



The STAC12 mainframe and control surface are configured for 12 phone lines, while the STAC6 is configured for six. The panel includes three bicolor LEDs indicating level status of audio input and hybrid levels. Telephone line connections provide loopthrough to other systems or telephone sets sensing loopthrough provided for PBX interconnection.

The accompanying control surface supports producer and screener configurations, with IP-based call screening and control embedded for operation from any location. Features include auto-attendant and support of up to four control surfaces.

Control surface screener mode functions include off-air call answering, including placing calls on hold or releasing them. Callers selected from these controls communicate via the control surface handset. Bicolor green/yellow LEDs indicate whether the line was answered at this control surface or another.

Additionally, the control surface offers functions for studio and producer.

Contact Comrex in Massachusetts at (978) 784-1776 or visit www.comrex.com.

ENCO Guardian Deletes User-Defined Words

ENCO Systems won several awards including the Radio World "Cool Stuff" Award and the Award for Innovation in Media from the NAB for its 2 RU Guardian. The box takes audio, delays it briefly, monitors the words spoken within the audio to detect indecent words or phrases, then automatically mutes, beeps or reverses them in the outgoing audio.



It uses a speaker-independent, neural network-based speech recognition engine to inspect the audio. Then with a user-defined list of indecent words and phrases, the unit eliminates those words from an air chain, substituting with a bleep, silence or the reversed audio clip. Guardian logs the event, and retains a user-definable segment of audio containing the offending material for future reference.

Additionally, Guardian maintains a separate list of words and phrases that remain logged, without affecting the audio output. This audio segment also is saved to Guardian.

Guardian has a failsafe. If the unit should fail, the audio is routed through, so there is no interruption in on-air audio.

Call ENCO Systems in Michigan at (248) 827-4440 or visit www.enco.com.

Inovonics Features Third-Generation Processor

Inovonics expanded its line of FM processors with David III. It has three-band feed-forward pulse width modulation (PWM) processing, and polar independent peak processing for full carrier deviation by program audio regardless of signal asymmetry. The PIPP limiter may be defeated. Digital synthesis of the multiplex baseband signal yields stereo separation of 60-70dB.



David III offers better than 70dB below 100 percent modulation in decoded L/R audio. Individual digital noise components above 54 kHz are -70dB or better. The unit has distortion of less than 0.5 percent in baseband and subcarrier at 95 percent modulation with PIPP limited defeated, and less than 1.5 percent at any level of modulation with PIPP limiter engaged.

Active-balanced, bridging XLR inputs accept nominal program line levels between -15dBu and +10dBu. Nonlinear crosstalk exceeds -50dB, and linear crosstalk (through processing and filters) exceeds -40dB. Seven-pole, phase-corrected, active-elliptic low-pass filtering includes overshoot compensation. Clipping is performed prior to pilot injection, and baseband clipping may be adjusted between 0 and 3 dB.

Contact Inovonics in California at (831) 458-0552 or visit www.inovon.com.

Scott Studios Adds Phone Editor, Time Shifter to SS32

Scott Studios added features to its SS32 digital air studio, which plays songs and spots from a hard drive using a flat-panel touchscreen monitor. Already included are 30 sets of 30 Instant Play hot keys, each rotating up to 100 cuts. The buttons air through a separate console fader, show lengths before they play and count down while playing.



Six square start buttons play events on a program log through up to six console faders. Announcers can move events by touching a "cart" label, then touching another location for a swap. The Log button can be touched to edit parts of the log.

SS32 includes a basic NetCatcher for background recording and unattended time shifting of shows or spots. Auto-record is possible on contact closures, day and time or audio threshold. Sources and transponders can be auto-switched with most satellite receivers.

New features of the air studio are the Lazer Blade phone recorder, shown, Hooker song clip promo builder, Music Segue Editor and Spot Timing Stretch and Squeeze, with no pitch shift.

Lazer Blade records a call after a jock picks up the phone. Markers can be set while recording to save editing time, and visible waveforms are featured. Unlimited undo is allowed, and announcers and callers are on different tracks that can be locked or

separated for editing.

Highlights include quad-input Audio Time Shifter, SS32X hardware and user-selectable graphics.

ATS delays network programs and satellite feeds, and can record up to four simultaneous audio programs. Features include a grid matrix for setup and review, scheduling of single and multi-part recordings and a user-defined display and schedule sorts.

Contact Scott Studios in Texas at (888) 438-7268 or visit www.scottstudios.net.

TFT Exhibits 6-Channel STL For Part 74

TFT Inc. unveiled a six-channel uncompressed digital STL for use on

licensed Part 74 frequencies. The series of STLs will enable broadcasters to send three uncompressed stereo pairs (six channels) in a 500 kHz RF channel assignment.



The models 460 transmitter and 467 receiver feature a front-panel RS-232 port to connect to a PC that will characterize the unit for frequency, type of modulation, I/O configuration and display operating parameters. With a PC connected to each, the transmitter and receiver can be remotely controlled via the PC through an Internet or LAN connection. Sample rates of

32, 44.1 and 48 are supported, and modulation types include 256, 64 and 16 QAM.

Inputs and outputs can be analog or AES/EBU. The modulation type can be optimized for threshold of sensitivity, sample rate and number of channels.

The unit is not yet offered for sale in the United States, but will be shipped after the required FCC type-certification is obtained.

The company also introduced a 19-inch 45-watt STL transmitter for international use in the 400-470 MHz band. Model 4140HP enables users to optimize antennas and transmission lines for longer STL paths. This model also will be available in a 30-watt version at a lower cost.

Call TFT Inc. in California at (408) 943-9323 or visit www.tftinc.com.

THE WORLD'S 1st STEREO POTS AUDIO CODEC



Introducing the all new iMix G3

iMix G3 features a brand new super charged DSP platform that combines studio mixing power and new POTS/ISDN/GSM and data codec capabilities never before offered in a 16 x 9" sized remote mixer at such a low price.

The world's first 15kHz stereo POTS audio codec can deliver live stereo remotes or stereo studio links over dual POTS lines. A new Dual Mono feature also enables the use of one 15kHz POTS channel for main program and the second 15kHz POTS channel for a range of on-board IFB including production/engineering talkback and live on-air callers. You can even send your broadcast program to two locations.

A miniature expansion slot accepts a range of new hardware modules to suit individual remote applications such as GSM to landline for wireless remotes, Stereo/Mono ISDN, Stereo or Dual Mono POTS plus new IFB and front panel controlled live on-air caller facilities.

The on-board six input digital mixer can be easily configured for non-technical users or as a fully featured studio mixer including on-off channel buttons, cue, intercom, telephone caller control, LAN/RS232 interfaces and one button control of local and remote control relay inputs "and" outputs. You can even adjust your remote talent's audio input levels from the studio to ensure their levels are always perfect.

An optional Digital Router software kit will allow any of the six inputs to be routed to any audio output, giving you the tools to create a powerful and flexible studio environment in the field. iMix G3 will also connect to your existing Comrex* or Musicam* POTS codecs.

Call Tieline or your favorite dealer for a free demonstration.



Tieline TECHNOLOGY

*Compatible with Comrex Matrix, Blue, Vector, and Musicam Liberty POTS Codecs. Comrex, and Musicam are registered trademarks of each respective corporation.

Call: 800 750 7950
www.tieline.com

RoadStar Means Portability From Musicam USA

Musicam USA promoted its RoadStar compact portable broadcast audio codec, a portable version of the company's NetStar codec.



Like the NetStar, the RoadStar handles popular compression algorithms as well as MPEG2 and -4 AAC and can also send uncompressed audio via an IP connection. In addition, it incorporates a four-channel

stereo audio mixer that allows it to function as a full studio for remote broadcasts.

Front-panel switching allows talent to monitor send or return audio through the two headphone outputs; inputs are through Neutrik gold-plated combo 1/4-inch/XLR connectors; the unit can also input and output AES/EBU digital audio. The NetStar incorporates connections for ancillary data or control signals and a Web server that allows it to be controlled remotely.

Contact the company in New Jersey at (732) 739-5600 or www.musicamusa.com.

Sabre Offers Tower Variety

Sabre showed three lightweight communications tower designs. The 1200 TLWD guyed tower is a tubular leg tower with a 12-

inch face, available in heights up to 250 feet. It can also be configured in self-supported (up to 55 feet) or wall-bracketed (up to 50 feet above the top bracket) configurations.

The 1800 TLWD guyed tower is an 18-inch-face tubular leg tower that can be used up to 400 feet. The 1800 SRWD is a solid round-leg tower for use in coastal areas where internal rust and corrosion may be concerns.

Contact Sabre in Iowa at (800) 369-6690 or visit www.sabrecom.com.

Henry StudioDrive Is a Console For Your PC

Henry Engineering showed its StudioDrive "studio in a box" system,

which puts many functions of a full-size broadcast console in a box the size of a computer's drive bay.



The StudioDrive accepts six sources (a balanced mic input, three unbalanced line inputs, a phone line with a telecoupler and a dedicated input for a PC sound card) through four mixing channels. The main control unit can also be mounted on a desk: it connects to an outboard audio interface unit that contains the power supply and I/O connections.

Henry also introduced its PowerClamp transient voltage surge suppressor, designed to eliminate the AC spikes and surges that can cause equipment failures in broadcast facilities. Manufactured by Sine Control and sold by Henry, PowerClamp units are available in various sizes.

Call the company in California at (626) 355-3656 or visit www.henryeng.com.

Harris Introductions Include Mini-HD

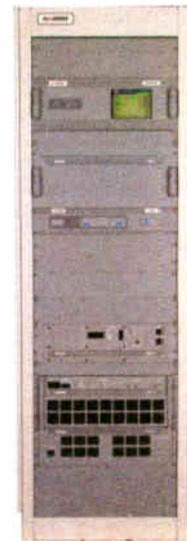
Harris Corp. introduced the Mini-HD FM digital transmitter line, shown, featuring models with 10 to 600 watts of digital-only power. They are intended for applications that require a low-power digital signal, including space-combining with interleaved or separate antennas, dual-port antennas, FM combiner port injection or high-level combining with a two-transmitter coupler.

Harris said MIM-IC, a Neural technology that can duplicate a sound signature in seconds, is now a feature of its NeuStar HD Radio Codec Processors. It uses spectral image mapping techniques; the company says MIMIC eliminates painstaking audio analysis and hours of manual tweaking.

Also in the Harris booth: ReCon Radio is a transmitter facilities management system with prices starting at \$5,000; also, the RMXdigital On-Air Digital Radio Console is new to the family of VistaMax-enabled, networkable consoles. Harris calls it a digital version of the PR&E Radiomixer Analog Console plus the features of BMXdigital and Legacy consoles. And the supplier introduced the VistaMax Small Digital Mixer, a compact audio mixer.

It also said it will refocus its systems integration business for TV facilities and studios toward efforts on facilitating large international projects and domestic radio system installations.

Call the company in Ohio at (513) 459-3400 or visit www.broadcast.harris.com.



WHAT'S YOUR DATA DILEMMA?

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- Changing remote control/telemetry?
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Lanlink is a bi-directional Ethernet and RS-232 serial data link operating in the license-free 900 MHz ISM band.

And it is so close to the 950 MHz STL band you can duplex into your existing antenna system.

Network your processing and even add Internet and email at the transmitter site too!

Let the digital STL experts at Moseley help you solve your data dilemma.

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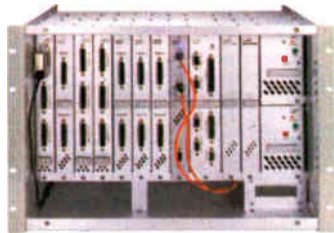
Dave Chancey 805-968-9621 ext. 213
Bill Gould 978-373-6303

Moseley

www.moseleysb.com

Logitek Enhances AE

The Logitek Audio Engine now functions as a full X-Y router, permitting selection of any input to any out. A separate X-Y router controller, the Route-XY, is available. Supervisor software provides the MatrixIP router controller, which offers X-Y routing, including individual channel metering capability. Routers provide mixed analog and digital I/O, channel mixing, gain control, EQ, compression and multiple mix-minus.



Intercom capability is now available in the Audio Engine. New as an add-on is an Optical STL; a bidirectional fiber audio link of 64 channels each way, up to 6 miles, is possible.

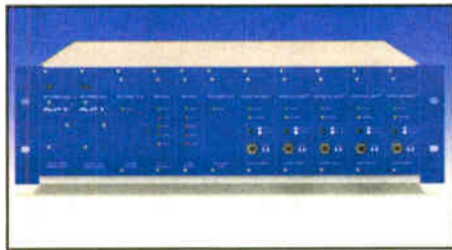
A ShareAttack multi-DSP card adds features to Numix and Remora consoles. Logitek now offers 30 stereo channels of EQ and dynamics processing; silence sense functions; a 10-second talk show delay per ShareAttack card with a "double dump" feature allowing users to dump half of the buffer at a time; and pre-fader input meters on the main LCD panels, along with a bar indicating compression.

Logitek increased the number of mix-minus busses available in Numix and Remora, from three to 24. It introduced drop-in panels for console systems that give guests control over mics and headphones. And a "Slave Fader" feature, part of the AE Config software, allows a fader to be slaved to another for use in split advertising applications on two stations running the same programming.

Call the company in Texas at (713) 664-4470 or visit www.logitekaudio.com.

APT Gets Global

APT debuted a series of multi-channel, multi-interface codecs in its WorldNet line, which the company says offer several ISDN and TCP/IP solutions for transferring digital audio.



WorldNet Oslo, shown, is a modular codec that comes as a 3U, 19-inch rack-mounted unit and delivers 24 channels of audio. It supports E1, T1, X.21, ISDN and TCP/IP data interfaces, and offers "packetized" audio by way of an Ethernet port. It can connect LANs/WANs over timeslots on a synchronous network. The core algorithm is Enhanced apt-X, which delivers audio and bandwidth for FM, DAB and HD services. Coding delay or latency through the algorithm is less than 3 milliseconds.

WorldNet Ohio is a 1U, V.35/X.21

audio codec with an ISDN terminal adapter for backup. The company says it is for "mission-critical" STLs and STSs. If the primary V.35/X.21 link should fail, the ISDN will back up and reroute the program feed. When the primary link is re-established, WorldNet Ohio drops the ISDN connection.

WorldNet Duo offers two channels of audio simultaneously delivered to separate locations using independent data circuits. It has two X.21 interfaces, and clocking at 64 kbps for 7.5 kHz audio bandwidth. The core compression algorithm is Standard apt-X, enabling a latency of less than 5 ms.

WorldNet Porto is a hand-held solid-state recorder for capturing and storing audio. It records content to a Flash card, which can be removed and inserted into

a notebook for transfer or editing.

Contact the company's office in California at (323) 463-2963 or visit www.aptx.com.

SAS: Rubicon In the Field

SAS showed three operative Rubicon Broadcast Console Control Surfaces networked with three 32KD Digital Router/Mixers.

New features include interconnectivity to several major digital delivery systems, host and guest turret assemblies that interconnect via RS-485 serial protocol (eliminating wiring of optos and relays), and programmable remote control.

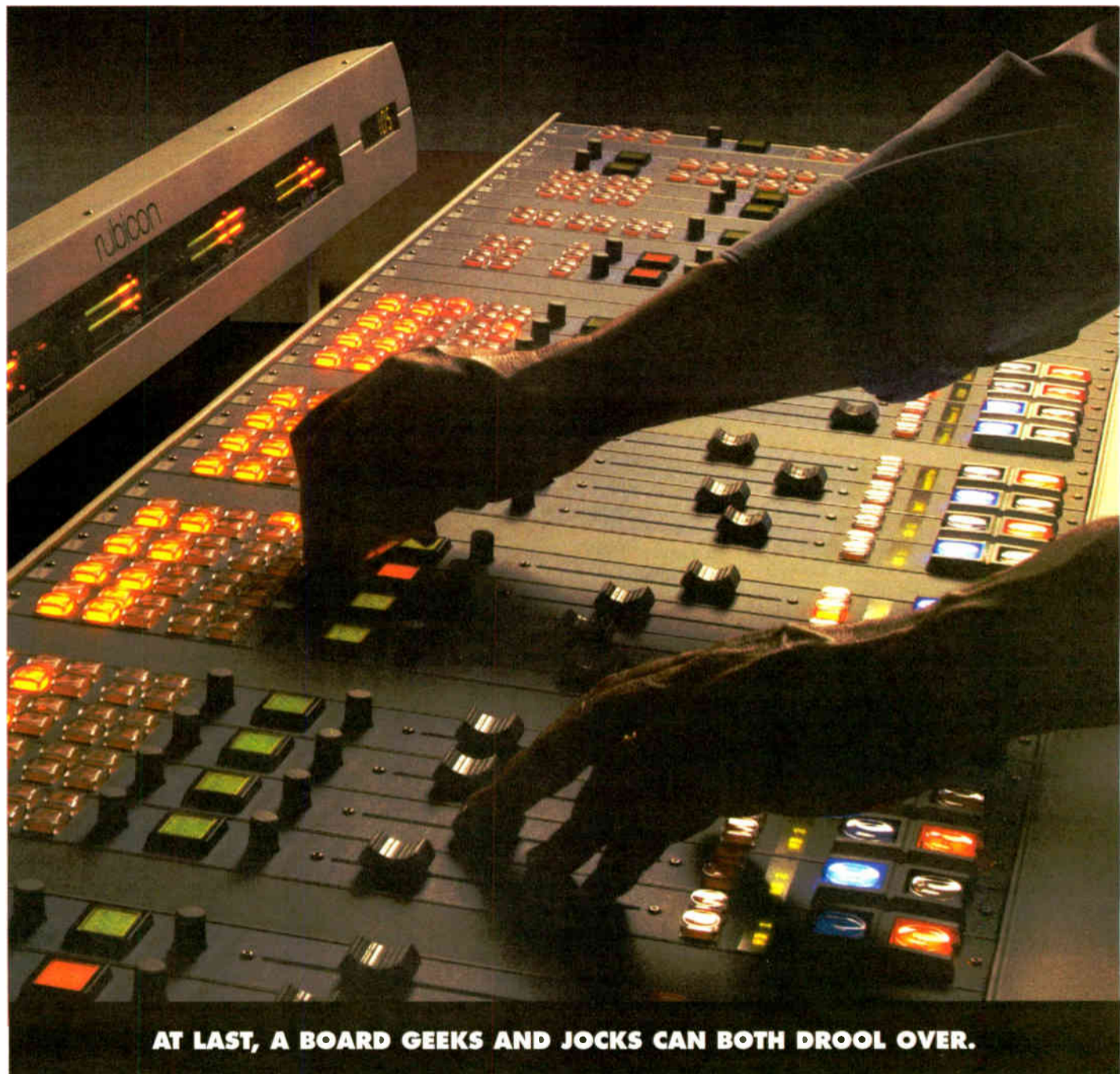
The company demonstrated the abil-



ity to remove a Rubicon module while it was on the air passing audio. The audio kept playing; when the module was re-inserted, it restored its status and regained control in less than a second with no audio glitch.

SAS said, it was in the process of a number of major-market installs of approximately 50 Rubicons.

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



AT LAST, A BOARD GEEKS AND JOCKS CAN BOTH DROOL OVER.

Fact is, SAS packs so much sophistication and capability into the depths of the new **Rubicon™** control surface that even the most intensive major market



SAS Connected Digital Network™
Rubicon Control Surface
32KD Digital Audio Router
RIOLink™ Remote I/O

programmer or board operator will swoon. Yet Rubicon is so intuitive, so comfortable, so easy to use, the weekend intern is sure to sound like a pro. Here's why:



Frequently used controls are always right at the operator's fingertips. And for the power-user, the multi-function "dynamic control matrix" provides quick access to deeper capabilities. In other words, Rubicon has a bucket load of features for the simplest or most complex of broadcast-related tasks.

And should you think form to precede function, you'll find Rubicon's clean, easy-to-understand interface wrapped up

within a custom-configured, drop-dead gorgeous frame.

Best of all, Rubicon is engineered by the brand synonymous with the finest in digital audio routing and network design. When it comes to quality and reliability, our name is all over it.

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Wheatstone Expands Across Generations

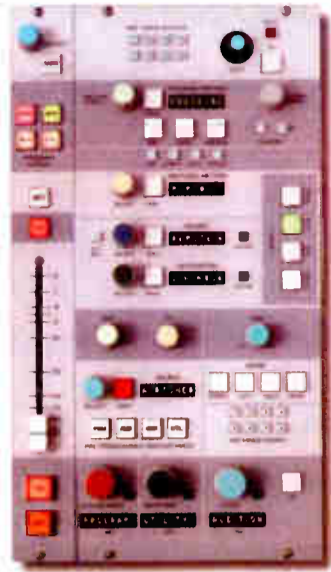
Wheatstone Corp. expanded its Generation Series of digital on-air control surfaces. The Generation 3, 4 and 5 are aimed at small to mid-size markets.

Features carried over from Gen 8 and Gen 9 include the ability to integrate with a Bridge digital audio network routing system. Virtual Dipswitch VDIP software facilitates configuration and system maintenance. The series is an integrated audio infrastructure that allows a station's resources to be shared without extensive wiring runs and complex mechanical patching. Ethernet-based X and X-Y controllers provide communication with the Bridge router; routing and distribution is handled digitally via CAT-5 or optical fiber.

Also new is the Satellite Router Cage, a studio-sized router scaled to meet the needs of individual studio locations. Installation is via single-wire CAT-5.

And the A-7000 is touted as a top-of-the-line analog on-air console; features include open architecture, call-in support and available individual-channel Bus-Minus IFB feeds.

Call the company in North Carolina at (252) 638-7000 or visit www.wheatstone.com.



Detail of the G-5

Gepco Varies Color, Relocates Plant

Gepco International reintroduced its 61801EZ single-pair audio cable, available in 20 colors, with a new riser-rated PVC jacket to enable more color-coding options. New jacket colors include lime green, tan, royal blue and chrome.



The 61801EZ has stranded, tinned-copper conductors that facilitate soldering or punch-down, and a polyethylene dielectric. Each pair is shielded with a bonded foil shield with drain wire. The company says the combination of these materials with its uniform pair twisting process and mechanical tolerances enables low loss and noise. The 61801EZ is UL-listed CMR for permanent installation.

Additionally, Gepco relocated its Burbank, Calif., facility to a 10,000-square foot location in the media district, and expanded its main headquarters in Chicago.

Contact Gepco International in Illinois at (847) 795-9555 or visit www.gepco.com.

Burk Adds Web Interfaces

Burk's ARC-16 Web Interface provides Web-based control and monitoring for its ARC-16 transmitter remote control system. Connected ARC-16 units can be linked to one Web Interface to allow site control from a Web browser on any networked PC. LAN/WAN capability provides users the means to control sites via their local net-

work or the company intranet or from anywhere using the Internet. Features include alarm notifications by e-mail or SMS to any e-mail-enabled device.



The GSC/VRC Web Interface, shown, adds IP capability to the GSC3000 and VRC2500 remote control systems, allowing site monitoring and control from a Web browser on the LAN/WAN. The remote site is accessible from any networked computer, without the need to install software at each control point. E-mail alarm notifications can be sent to a PC, or via SMS to cell phones and PDAs.

Also shown was Lynx 5 with new features for GSC3000 and VRC2500 control, monitoring and logging software; and ARC-16 firmware version 5.6, which the company says increases communication speed on digital links by a factor of eight and provides performance improvements and updated configuration menus.

Contact the company in Massachusetts at (978) 486-0086 or visit www.burk.com.

25-Seven Uses Content Shifting

25-Seven Systems, a new company, exhibited its Audio Time Manager at NAB. It lets radio stations shift live broadcast content in real time. It said users can add several minutes in an hour without removing important content, changing pitch, damaging inflection or creating artifacts.



Time compression algorithms and a Time/Rate Management Calculator are used to help on-air operations shift between scheduled and breaking events.

By allowing a station to delay the start of live programs and shorten their duration in real time, the company says, ATM enhances control of a schedule to accommodate unexpected events or create additional availabilities.

"Imagine not having to rush to back-

time to the network news, or slipping in a severe weather update at a floating network break, all without loss of content," the company's Geoff Steadman said.

Call the company in Massachusetts at (888) 257-2578 or visit www.25-seven.com.

Prophet Has ContentCheck

Prophet Systems Innovations directed attention to ContentCheck, which lets a station keep a "close ear" on its program. The content delay system allows 60+ minutes of configurable delay time, contrasting with delays that are measured in seconds.

The user can record, listen to and edit programs while they are happening, and log and archive delayed and non-delayed dayparts. The user can remove a joke, bit or segment. The system is configurable for uncompressed or compressed operation and works with most automation.



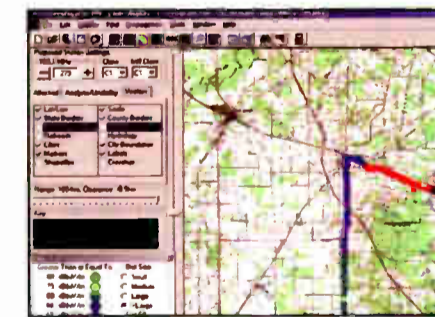
Also new is RemoteStudio software, which allows a user to assemble content such as weather, traffic or financial reports and push the reports via WANcasting or VPN to each of the stations set up to receive the report.

With the autoloading feature, the report can be sent, received and loaded automatically. The system can be isolated from the Internet for security. It retails for \$1,395.

Contact the company in Nebraska at (877) 774-1010 or visit www.prophetsys.com.

rfSoftware Plans V2.5 of rf-Investigator-FM

rfSoftware is promoting version 2.5 of its rfInvestigator-FM.



New features: the user can display Audemat-Aztec Navigator 100 and Navigator 007 field surveys; design boosters with automatic "DA Design Tool"; export propagation jobs for display in other mapping programs; make user-defined contours; display ESRI shape files on the job map; create your own map labels and display M3 Ground Conductivity Data.

Contact the company in Florida at (352) 336-7223 or visit www.rfsoftware.com.

Bext Adds to Solid-State Line

Bext Inc. expanded its line of solid-state transmitters with the FD 10000

mosfet technology 10 kW FM transmitter, housed in a 19-inch rack.

Also featured was the FX 1000 FM solid-state amplifier, with a menu-based digital display and low-power consumption for 1 kW of RF output — 1,375 watts from the line for 1,000 watts out. A 600 W TPO uses the same electricity as a 600 W amplifier, not the electricity of a 1000 W amplifier used at 600 W. Lightning arrester and surge suppressor are included.

The FFC5, a 5 kW FM bandpass dual cavity filter, was on display, part of a line of 70 new RF filters and RF combiners. And an updated version of the Bext Coverage Doctor FM broadcast signal analyzer is available.

Contact Bext in California at (619) 239-8462 or visit www.bext.com.

Heil Touts Style, Response

The professional division of Heil Sound promotes its Heritage cardioid dynamic microphone as reminiscent of 1950s "Elvis" mics such as the 55S Shure, with its copper- and chrome-plated "showchrome" finish for the molded steel body. A slide switch turns the audio on and off and can be deactivated.

The Classic Pro dynamic cardioid is a stainless steel-, chrome- and nickel-plated reproduction of a 1930s RCA Model 74B broadcast mic and RCA 91B cast steel base.

The Heil PR-20 is intended for commercial broadcast and other applications where a smooth response over wide frequency range is required. It is terminated into a three-pin male XLR connector — a 600-ohm balanced output.

The PL-2T "topless" balanced mic boom features springs that are internally mounted as a way of reducing noise from onboard springs when the boom is moved into position. The top panel of the arm is removable.

Contact the company in Illinois at (618) 257-3000 or visit www.heilsound.com.

Staco Fights Blackouts, Surges

Staco Energy Products says its FirstLine Conditioning Power System is suitable for broadcast applications, where blackouts are rare but costly. It promises true sine wave output and extends the life of capital equipment to enable it to continue running through unstable power situations and protect against damage from poor power quality.

The CPS is programmable for remote monitoring and protects where UPS cannot be used because of environmental or cost considerations.

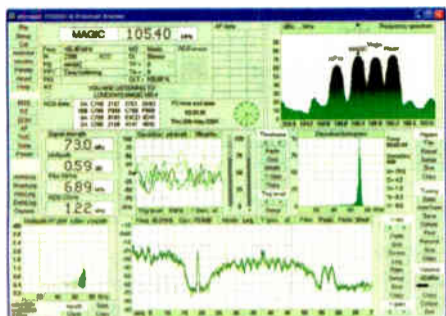
The company said the unit protects against 98 percent of power problems, such as voltage fluctuations, brownout conditions, harmonics and transient surges by isolating the connected load from the primary AC supply. The system can be configured for 208, 400 or 480 VAC and in 30, 40 or 65 KW ratings.

Features include a display panel, optional remote diagnostics and remote alarm.

Contact Staco Energy Products in Ohio at (937) 253-1191 or visit www.stacoenergy.com.

Process and Analysis From Broadcast Warehouse

Broadcast Warehouse introduced the DSP X digital audio processor, a 1RU multiband AGC, limiter and stereo generator with composite clipper, employing 18 24-bit DSP chips. Users may connect a computer to front or rear DB-9 connectors or use the front panel for control of parameters.



Also new is the microGen Electronics TS9000 FM Broadcast Analyser, shown, a combination FM receiver and modulation analyzer designed to interface to a PC computer. It earned a Radio World "Cool Stuff" Award. Features: on-screen FFT modulation display with 10 Hz to 100 kHz range and 10 Hz resolution, spectrum analysis, RDS data analysis, multipath information, deviation histogram, and 32-bit floating point calculation of modulation power. The USB port allows for mobile monitoring with sampling of multiplex signals at 240 kHz 12-bit precision and calculations performed by Windows software.

Also shown was the RDS2, an RDS encoder.

Call Broadcast Warehouse at (888) 866-1671 or visit www.broadcastwarehouse.com. The DSP X and TS9000 are available from Broadcasters General Store in Florida at (352) 622-7700 or www.bgs.cc.

Comet North America Increases Capacity

Countering any rumor that Switzerland is better known for cuckoo clocks than vacuum capacitors for AM and shortwave transmitters, Comet North America announced it has doubled production capacity to better than 1,000 capacitors per week to meet demand.



"After a rather sullen 2003," states Lothar Jahreiss, head of the vacuum capacitor business unit, "the last weeks of December brought a boost in bookings that no one in the business had projected. Thankfully, we planned for

this type of increase and had just settled in our new production plant, allowing us to react instantly."

Founded in 1948, Comet recently completed a move into a new plant. Comet's North American division is headquartered in Cincinnati.

Call the company in Ohio at (513) 831-5000 or visit www.cometna.com.

Comlab Revises Interface for Site Monitoring

New from Comlab was the Secure-IP multi-language Davicom MAC-2, which provides encrypted remote monitoring and control of transmitter sites. Features include a new, user-customiz-



able GUI, added control and language features; it is said to offer an enhanced level of security.

"Our newly added multi-language feature allows the RTU to send voice and text messages in your own language using 16-bit Unicode," said President

John Ahern. The Davicom MAC-2 features 128-bit encryption, "the highest level of protection available for Internet communications. With the Secure-IP Davicom MAC-2, stations can now access and control remote site equipment via a LAN or WAN, or the Internet."

Secure-IP communications allow remote monitoring and control at reduced costs, because system alarms are sent to a local server via Internet instead of using long-distance telephone calls.

Call the company in Quebec, Canada, at (418) 682-3380 or visit www.davicom.com.

Sabre Towers

Sabre offers a complete line of towers, monopoles and tower components. In the tower industry for more than 25 years, Sabre towers are engineered with experience. Offering everything in guyed towers from a 12" face tubular lightweight tower to an 84" face solid leg knock down tower, Sabre has a tower for nearly all broadcast applications. Committed to customer service, Sabre offers quality products at competitive prices with the shortest lead times.



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Orban/CRL Brings In the Bus

Orban/CRL drove its Mobile Broadcast Laboratory, Support Vehicle and Listening Booth onto the NAB show floor, producing an 80-foot long display.

New products included the affordable Optimod-FM 2300, which retains the two-band compressor with high-frequency limiter structure that began with the Optimod 8100, while adding new features. It is targeted to small-and medium-market broadcasters as well as non-commercial and educational operations.



"The Orban 2200 has been one of our best-selling processors of all time," said President and CEO Jay Brentlinger. "We knew that we had to retain and augment the audio quality that made the 2200 so popular while adding features that broadcasters expect in this network-centric age."

Those include stereo enhancement, Ethernet and RS-232 serial connectivity, remote control through any Windows PC and standard AES/EBU digital I/O.

The new Opticodec-PC is described as the world's first MP4 aacPlus codec for audio streaming, and is said to offer "the most important feature that the basic netcaster is looking for in an encoding product — entertainment-quality sound at economical bit-rates."

Call the company in California at (510) 351-3500 or visit www.orban.com.

Star Case Racks Knock Down

Star Case Manufacturing adapts military technology to solve civilian problems in knockdown rack design. The military uses these, too; unlike a welded rack, the kits can fit through an opening as small as the hatch of a submarine. The rack assemblies are shipped in three small cartons.



Features include a patent-pending design corner assembly, dog point screws (countersunk conehead, with the first few starter threads eliminated) and rack rails in any of 43 rack-unit lengths, with rack units marked every 1-3/4 inches). The company says up to 79,507 size variations can be fabricated in the field. Options include wheels, braces, handles, drawers and shelves.

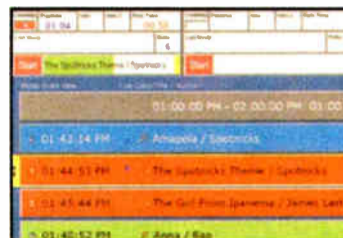
The system comes in an aluminum version (using aircraft-grade aluminum for the rails and corner assemblies) using stainless-steel dog point screws to connect the rack rails and corners.

Call the company in Indiana at (800) 822-STAR (7827) or visit www.starcasemfg.com/rack.

D.A.V.I.D. Offers Latitude

The Latitude Edition automation package is new from D.A.V.I.D. Systems. It combines a recording, editing and on-air playout system, scalable to the needs of particular stations or larger facilities.

Scheduling of playout events and audio captures can be done up to a year in advance, an integrated multitrack edi-



tor handles production tasks, and the user interface includes three channels of audio playout, 10 jingle slots and a Live Assist/Full Automation mode.

D.A.V.I.D. created Latitude for small to medium-sized broadcasters, offering features normally found in large-scale systems but at a lower cost.

Contact the company in Virginia at (703) 396 4900 or visit www.digasystem.com.

Omnirax Expands Furniture Line

A manufacturer of pro audio studio furniture for 15 years, Omnirax is expanding its line to include models for broadcast. The company can modify existing furniture models or create custom furniture.



The company developed and provided the broadcast furniture for Entravision's new Radio Broadcast Center in Los Angeles. That work includes 27 rooms for on-air, production and image studios. The concept incorporated a "fresh, smooth, rounded environment."

The company uses a CAD/CAM process to ensure precision fit, finish, repeatability and ease of modification.

Contact the company in California at (800) 332-3393 or visit www.omnirax.com.

Videoquip AM-4 Monitors Analog, AES3

The AM-4 from Videoquip Research is a DSP-based digital audio signal-monitoring unit, for monitoring two stereo analog, two AES3 stereo digital and two SDI-embedded stereo signal sources. The four (two stereo channel) level meters simultaneously display VU and PPM values with dBu and dBFS scales.

An "out-of-phase" LED illuminates with phase reversal on one of the stereo channels. A "silence" LED illuminates when signal level falls below a set threshold and stays



below for more than five to 10 seconds in any of the four channels.

Two stereo signals may be monitored at a time using the level meters. One of the two selected stereo sources can be monitored by way of the speakers or with headphones.

The AM-4 supports four monitoring modes: stereo, left-channel only, right-channel only and left and right summed mono. A volume control is for use with speakers or headphones.

The AES3 digital and SDI-embedded digital audio interfaces are optional plug-ins.

Contact Videoquip in Toronto at (888) 293-1071 or visit www.videoquip.com.

ESE Keeps Time Straight

ESE showcased a number of products for broadcast including new NTP Time Displays, a series of four- and six-digit network time protocol displays that provide a simple method of displaying accurate time information from a NTP time server.



The company also showcased its LX-5100 Series of analog time code readers. These clocks come standard with a black face and white second hash marks, but can be ordered with custom colors and logos as specified.

Also new from ESE is the PC-471PCI computer card, shown. This card reads several time codes (ESE, SMPTE or EBU) and keeps the computer clock accurate and reliable, the company said.

Contact the company in California at (310) 322-2136 or visit www.e-se-web.com.

A-T Adds Garwood, Mics Rock Hall Event

Audio-Technica said it will be distributing Garwood Communications products. Long orphaned in the American market, UK-based Garwood has a line of monitor controllers, intercom stations and headphone amps. Products being shown at NAB included the APM 200 and APM 400 Main Stations along with the APM 12 and APM 31 headphone amplifiers that make up receiving end of the APM system.



A-T said 80 of its mic were chosen for the VH1 broadcast of the Rock & Roll Hall of Fame induction ceremony.

It also showed several microphones aimed at other markets such as the AT898, a subminiature cardioid lavalier, and the AT897, a short shotgun for the camcorder industry.

Contact the company in Ohio at (330) 686-2600 or visit www.audio-technica.com.

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Ward-Beck Highlights Leveller

Ward-Beck Systems' ALFA, the Audio Leveller for Audiophiles, maintains target level at the ingest or playout point of the program chain. It is based on the DA305 digital audio processing amplifier of the Serialboxx cards, which offers a cost-effective method of controlling the level of multiple digital audio signals.

The system, which earned a Radio World "Cool Stuff" Award, offers up to eight AES channels of control in 1RU and 20 channels of control in 2RU. Parameters that can be set for ALFA include target level, peak limiter threshold, detector threshold and the range.

Contact the company in Ontario, Canada, at (800) 771-2556 or visit www.ward-beck.com.

Aphex Upgrades Compellor

Aphex showed an updated Compellor audio processor, which now incorporates digital inputs and outputs. The Model 320D dual mono/stereo auto level controller, shown, includes the features of the Compellor in a form that can be used by the increasing number of radio facilities that maintain an all-digital signal path.



Aphex also debuted its Model 228 unidirectional audio level interface, an eight-channel converter that transforms -10 dBV consumer-level audio sources to professional level +4 dBu signals. And it showed the Model 148 active digital audio splitter, a half-rack 8x32 channel splitter that allows digital outputs to be sent to multiple digital inputs.

Contact the company in California at (818) 767-2929 or www.aphex.com.

AEQ Offers Router-Based Digital Console

AEQ introduced the BC 2000 D router-based digital audio console, which incorporates a modular control surface with from five to 75 faders.

The console system interfaces with AEQ's EZ Control system, which includes codecs and other audio control and transmission equipment.

The BC 2000 D control surface uses motorized faders that respond to the system's automation, which includes time- and alarm-based macros. The control surface can be taken out of the studio to remote locations.



AEQ showed its Systel 6000 phone system, which allows users to rearrange phone lines among multiple radio stations or studios through AEQ's Impact digital audio network. Users can utilize the Impact router to sum and distribute up to 120 channels with mix-minus control.

Contact AEQ in Florida at (954) 581-7999 or www.aeqbroadcast.com.

Audion Expands VoxPro Line With e2

Audion Labs released VoxPro e2, an addition to its VoxPro PC voice editing software line. It is a one- or two-track editor for use at home or work, on desktops or laptops. Functions include the ability to record in any mode; display of the "just recorded file" as ready-to-edit; and the ability to import and export all file types, including MP3, which was added to VoxPro PC this fall. The software records and plays in stereo or mono, enables unlimited undos and redos for each recording, edits using the keyboard, number pad or mouse and auto-separates host/caller "talkover."

VoxPro e2 requires Windows 98, 2000

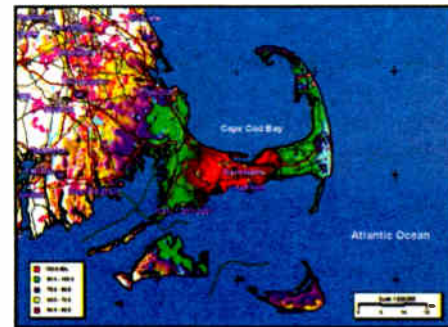
or XP; most sound cards are compatible. Trial copies are available at the Web site.

Contact the company in Washington at (206) 842-5202 or visit www.audion-labs.com.

V-Soft Adds to Probe Line

V-Soft Communications exhibited Probe 3 professional FM signal propagation software, the replacement for the Probe II software. Probe 3 contains the features of Probe II and enhancements, including the simultaneous addition of multiple FCC contours to multiple stations, an enhanced mapping engine, importation and exportation of Map Info Files (MIF), advanced FCC database culling and on-the-fly recalculation of

transmitter properties. Probe 3 is now available in a series of tiered layers to accommodate the needs of a variety of clients with different budgets.



Probe 3 and the companion AM Pro software now use Industry Canada's database for calculating Canadian station information.

Contact V-Soft in Iowa at (319) 266-8402 or www.v-soft.com.



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HHB Portadrive Ships

Sennheiser is now shipping the HHB Portadrive, a portable multi-channel recorder that records four hours of uncompressed eight-channel 24-bit/96 kHz or 20 hours of four-channel 24-bit/48 kHz audio onto a removable 40 GB hard disk.

Features include eight line ins, four line outs, eight channels of digital I/O and six XLR mic inputs, which feature individual phantom powering, gangable limiters, input pads, a high-pass filter, adjustable delay and phase reverse.

HHB also introduced software for its PDR2000 Portadrive eight-track location audio recorder at NAB. HHB products are distributed in the United States by Sennheiser Electronic Corp.

Contact the distributor in Connecticut at (860) 434-9190 or visit www.sennheiserusa.com.

Superior Electric Ensures Uptime

Super Electric offers a range of transient voltage surge suppressors in a parallel-connect topology. The firm's new PT1 Series has been designed to withstand surge currents in accordance with ANSI/IEEE recommendations.

The PT1 Series is capable of responding to repeated high-current transient voltage surges. A NEMA 4X fiberglass-reinforced polyester (FRP) housing features a non-removable cover. LEDs for all voltage phases indicate that protection is active.



Also to be seen: the SEG Series, described as a true, regenerative on-line design of uninterruptible power supplies said to provide the highest level of protection against a broader spectrum of power problems.

Call the company in Connecticut at (860) 585-4500 or visit www.superiorelectric.com.

ERI: Side-Mounted Dual-Input IBOC Antenna

Electronics Research showed its dual-input side-mounted FM antenna for FM IBOC applications, which earned a Radio World "Cool Stuff" Award. It is capable of transmitting both the analog and digital FM signals without requiring a high-loss hybrid combiner or a circulator to attain isolation between the digital and analog transmitters.

The antenna excites all radiating elements with both analog and digital signals in compliance with FCC IBOC Notification Procedures. It allows the use of a single antenna while eliminating combining loss as in the 10-dB hybrid combining method. The company said it achieves 1.05:1 VSWR for both analog and digital inputs, and is able to achieve in excess of 30 dB isolation



between analog and digital inputs without using an isolator/circulator, with no analog signal lost to circulator reject load and no additional insertion loss from circulator.

Because the same elements are used for both signals, both formats have the same horizontal and vertical patterns and therefore the same gain.

Call the company in Indiana at (812) 925-6000 or visit www.eriinc.com.

Richardson Shows Broadcast Solutions

Richardson Electronics showcased FM products including FM radio transmitters; 30-watt, 300-watt, 500-watt and 1 kW solid-state amplifiers; L-band (1450-1500 MHz) digital audio broadcasting solutions; as well as a selection of power tubes.

The company also handles custom FM, VHF and UHF amplifier requirements through its ISO9001-certified European design center.

Contact the company in Illinois at 800-737-6937 or visit www.rfwireless.rell.com.

Omnia Accommodates HD Radio

Omnia Audio debuted Omnia-5EX HD+AM, which it calls the first DAB/HD Radio + analog dual-purpose AM processor, designed to address immediate or eventual needs for digital transmission. The company showed Omnia-6EX HD+FM, with parallel processing paths individually optimized for conventional FM audio and digital transmission chains, especially bit-reduced codecs used with HD Radio/DAB service and satellite systems. It also is offering Omnia-5EX HD+FM.

It promoted a "turbo-charged" version of its Omnia-3fm, called the Omnia-3fmx; it provides three additional bands of AGC/compression to the three bands of



limiting in Omnia-3fm. And it highlighted a software-based audio processor designed for streaming audio, called Omnia A/X.

Call the company in Ohio at (216) 241-7225 or visit www.omniaaudio.com.

Altronic Shows Resistor Load

Altronic Research Inc. showed its new Model 6620 convection-cooled resistor load.

This convection-cooled terminator for 50-ohm coaxial transmission line systems extends the range of Altronic's product line to 20 kW. The Model 6620 handles frequencies from DC to 110 MHz with a VSWR of 1.10:1 or less across its entire frequency range. It stands 49 inches tall and is 71 inches long by 31 inches wide; it weighs 160 pounds and requires no AC power for operation.

Contact the company in Arkansas at (800) 482-LOAD or visit www.altronic.com.



Econco Has New As Well as Rebuilt

Econco showed its new tube line, in addition to the company's long-running lines of rebuilt tubes.



New tubes includes two types developed by the company, the 3CX10,000E7 and 3CX15,000E7. Also available new are 3CX2500A3, 3CX2500F3, 3CX3000A7, 3CX10,000A7, 3CX15,000A7, 4CX3500A, 4CX7500A, 4CX5000A, 4CX10,000D, 4CX15,000A and YU148.

Contact Econco in California at (800) 532-6626 or www.econco.com.

AudioScience Card Is a Radio Tuner

AudioScience showed the ASI8702 and ASI8703 eight-channel broadcast tuner adapters.

The ASI8702 is a universal PCI card that contains eight AM/FM tuners. Each tuner may be set to an independent AM or FM station. The audio from each tuner is presented to the computer host as a mono or stereo record stream, which may be accessed through a high-speed bus master interface.

The ASI8703 contains eight FM/TV audio tuners.

The AM portion of each tuner has a range of 520 to 1750 kHz. FM capabilities include a tuning range of 76 - 108 MHz with software-controlled stereo decoding. In TV mode, channels 2 through 69 are tunable.

The product earned a Radio World "Cool Stuff" Award.

Call the company in Delaware at (302) 324-5333 or visit www.audioscience.com.

Composite Switching From Broadcast Devices

Broadcast Devices Inc. introduced the CDS-300/302 Composite Audio Switcher/Distribution Systems. Both accept two balanced or unbalanced FM/TV stereo baseband, RDS, SCA and SAP signals that can be distributed to two exciters and a front-panel test point. Both feature a rear-panel switched RDS loopthrough to add an encoder to a composite signal.



Units have rear-panel remote control and status via DB9 connector and an auxiliary port input that accepts an optional CTD-1 composite-to-AES module. The CTD-1 decodes the selected composite feed from the switcher and generates two AES-compatible streams for application to digital input exciters or IBOC equipment. The composite outputs are still available to drive analog equipment.

The CDS-300 is a two-input switcher for manual switching. The CDS-302 adds a silence sensor for automatic switching to a backup feed.

Call the company in New York at (914) 737-5032 or visit www.broadcast-devices.com.

RVR Now Has U.S. Office

RVR was at NAB promoting its new Miami office, 24-hour tech support and a turnaround time on most orders of 24 hours.

It showed the TEX-1000LCD exciter/amplifier, which includes stereo encoder and the ability to be controlled remotely by PC, GSM telephone, modem or radio. The unit also works as a transmitter with an adjustable power output up to 1 kW.



The company, headquartered in Italy, also has a new line of digital STLs, the PTRL LCD and the receiver RXRL LCD. The system is capable of transmitting RDS, SCA and MPX or Mono signals. And the company offers a line of 5 kW and 10 kW plug-in, solid-state FM amplifiers.

Call the company in Florida at (305) 471-9091 or visit www.rvrusa.com.

Superior Broadcast Adds Antenna Options

At NAB2004 Superior Broadcast Products showcased a number of products for radio, including its Model FMA broadband circular polarized FM antenna.

This antenna is suitable for multi-station operation or the addition of digital FM, the company said. The antenna fits directly to the tower leg and standard brackets are included. According to the company, inter-bay cables are included on multi bay antennas.

The company also has the Model FMT low-power circular polarized antenna. The antenna also fits directly to the tower leg. Superior also offers low-, medium and high-power tuned antennas as well as FM panels.

Contact the company in Texas at (800) 695-7919 or visit www.superiorbroadcast.com.

Radio Experience Explores RDS

The Radio Experience demonstrated RDS products at the Telos/Omnia booth.

"Now Playing" studio software interfaces single or multiple automation systems to capture on-air activity and prepare it for RDS, HD Radio and Web displays.

RDS bound-data is multiplexed by the software and multiplexed into a serial channel sent to the transmitter site via one STL aux data channel. TRE RDS equipment features a rotary "channel" selector to select which multiplex data channel to read data from.

The Omnia TRE-5700 RDS encoder has multiple serial interfaces and TCP/IP connectivity. The TRE-5701 RDS stand-alone RDS Accelerator adds features of the TRE-5700 to certain encoders from other manufacturers.

The DDP-2860 Dynamic Data Processor is an RDS integration tool for collocated transmitter facilities that want to conserve precious data resources. It receives multiplexed RDS data from the studios and directly connects to multiple RDS encoders at the transmitter site.

Call The Radio Experience in Washington state at (425) 641-9043.

Tieline Goes Stereo

Tieline Technology showed what it called the first 15 kHz FM stereo POTS codec, which it said provides the ability to sent stereo music over a n a l o g phone lines.



"For the first time, broadcasters will be able to phase-lock left and right audio channels over two ordinary telephone lines to deliver stable and reliable 15 kHz FM-quality stereo programming for the cost of a couple of regular telephone calls," it promised.

Also new is provision for dual 15kHz mono transmission from a single Tieline POTS codec, which enables the use of a 15 kHz mono channel for program audio and the other 15 kHz channel for talkback, phone coupler for callers and simultaneous 7 kHz voice and 9600 bps control data.

These features have been implemented into the Tieline iMix G3 six-input digital remote codec/mixer, shown. It has an expansion slot for modules such as GSM to landline wireless, stereo/mono ISDN, stereo or dual mono POTS plus new IFB and telephone talkback caller facilities.

Call the company in Indiana at (317) 845-8000 or visit www.tieline.com.

CircuitWerkes Makes Contact

CircuitWerkes introduced four products including pREX, a tool for accepting simple contact closure inputs and managing or multiplying them throughout a facility.



Each relay can be programmed, letting the user configure the pREX in almost any way, including momentary, latching, interlocked, pulse stretching up to 45 hours, and leading- or trailing-edge triggered. Free software lets you program or manage the pREX from a PC with a serial port. Outputs appear on a telco RJ-21 for connectivity to a telco punch block.

Call the company in Florida at (352) 335-6555 or visit www.circuitwerkes.com.

JK Audio Adds AutoHybrid

JK Audio's AutoHybrid telephone interface enables simultaneous sending and receiving of audio through analog lines. The company says it is not a half-duplex coupler but a full-duplex auto hybrid suitable for remote monitoring, IFB feeds and studio phone interface uses. The desktop unit converts to rack-mount using an optional adapter, which holds four in 1 RU.



The dual-transformer hybrid circuit enables a nominal 20 dB trans-hybrid loss. Transmit audio appears mixed with caller audio, but at a level 20 dB lower than transmit level. A detachable screw terminal block is included for connection to remote control features, in addition to balanced

XLR jacks for connection to professional audio equipment.

The company also demonstrated its Innkeeper PBX digital hybrid, connected to a Nortel Norstar PBX system. Innkeeper PBX converts a multi-line PBX telephone into a professional talk show system.

Contact JK Audio in Illinois at (815) 786-2929 or visit www.jkaudio.com.

Nautel Shows Digital 'Ensemble'

Nautel introduced products for HD Radio and integration with the NE IBOC digital generator. The Jazz, J1000 (photo, page 12) is a 1 kW AM transmitter in a rack-mount package available for overnight shipment. The redundant modular design has two 500-watt wideband power modules

with RF amplifier, modulator, switch-mode power supply and ventilation fan.

The Maestro, M50 is a Direct-to-Digital Exciter for FM and HD Radio. It accepts data from the NE IBOC generator to produce a hybrid or all-digital HD Radio signal. The Virtuoso, V10 is a 10 kW FM-HD Radio transmitter capable of 3.2 kW digital, 7.7 kW hybrid or 11 kW analog operation.

Contact the company in Maine at (207) 947-8200 or visit www.nautel.com.

RCS Selector Celebrates Silver

RCS marked 25 years of the Selector music scheduler by adding features, including MusicPoint access, in which a button links users from the Selector song card to Musicpoint International's online music ser-

vice for song auditioning and digital transfer to automation. SmartRipper integration is included, adding title/artist, length and beats per minute to Selector's song card when a CD is ripped.


RCS AirCheck broadcast monitoring service was showcased; it has added sites in several markets to collect audio data as part of its goal to monitor spots and songs nationally. AirCheck also has acquired monitoring firm Media Monitors.

RCS Mobile made available the SMS short code 22022 and other memorable short codes to programmers. The company's president said RCS obtained sole rights to 22022 and the others "so stations can offer a simple way to get instant input from the thousands of mobile phone users in every city in America."

Contact RCS in New York at (914) 428-4600 or visit www.rcsworks.com.

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- Modular surface control with motorized faders; positions stored on pages.



BC2000 D Router

The same router used by the BC 2000D console works as a stand-alone router, with 2048 inputs and outputs, summing and processing, with a scalable and modular architecture.

For more information on the BC 2000D Digital Console visit our Web Page

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The new Omnia-5EX HD+AM is the only processor that accommodates **both your analog and digital channels** in a single unit that easily integrates with your HD encoder and transmitter.

Processing for the HD Radio side is smooth and clean, capably handling AM's programming variety - and really showing off the digital channel to listeners first sampling the new medium.

And you get a **potent upgrade for your analog AM**. Consider: Omnia AM processing is already on many legendary 50kw stations. Understandably, most of these want to keep their advantage a secret. But if you imagine the major AM signals - the real flamethrowers that sound great - you may very well be hearing an Omnia. CEs at these stations tell us, "Phone calls are clearer than before. And the bottom end is phenomenal, so the promos really punch." "Amazingly clear - even when we're in the 5 kHz analog mode for HD Radio compatibility."

You should expect more from your AM processing. More clarity, more presence, more power, more flexibility. Omnia-5EX HD+AM delivers.



The new Omnia-5EX HD+AM has enhanced processing for standard AM, and a second limiter section and digital output for HD Radio. Both limiters and outputs are included as standard.



For those who don't need HD Radio capability, there's Omnia-3AM, with a four band limiter, wideband AGC and our famous high-performance, non-aliasing final limiter for sweet, clear, natural audio that keeps listeners hooked.

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omniaaudio.com

Equipment of the '70s Comes Alive

He Works in the Digital Age, But His Passion for Vintage Gear Lives On

by Ken R.

Take a Gates Diplomat 10-channel monophonic board, and add an Electro-Voice Sentry 1 wall speaker (with the attractive slant design). Now select a Neumann U-47 microphone, a couple of Gates CB-500 turntables, four ITC SP cart machines and an Ampex 440-B-2 quarter-inch reel-to-reel.

Voila! A state-of-the-art radio studio. For 1975.

Much equipment, little time

C. Park Seward is a Los Angeles consulting engineer with an extensive list of clients like Disney, ESPN, CBS and many others. His industry awards and honors are too numerous to go into here. But what does he like to do in his spare time? Restore vintage 1970s-era radio equipment.

"I have a second garage that's now my workshop," he said. "I have no desire to sell any of this equipment or go into the remanufacturing business. I'm just building a collection."

One can hear the fondness for

equipment, he has been able to track down a lot of manuals and documentation from a company called *manual-man.com*; but sometimes the original manufacturers made things difficult.

"I have some old CBS limiters," Seward said. "In order to keep their technology secret back then, they put part of their circuit in a square metal case and welded it shut. You destroy it if you take it apart and the manual usually doesn't have a schematic for those circuits."

This obfuscation technique is called the "epoxy patent," because some com-

But Seward is not stuck in the past and in fact really enjoys working in the digital domain.

"Digital audio is remarkable," he said. "The freedom from wow, flutter and



C. Park Seward works on the Gates Diplomat radio board.

provides more "colors" of sound.

"Equipment today tends to sound perfect, but without character," he said. "Some record through tube equipment to get a warm sound and then edit and mix digitally for the inherent efficiencies and multi-generation dubbing possibilities."

He is particularly fond of his Neumann U-47 mic, made in 1955.

"It uses a tube that was made in the late '40s and it still sounds fantastic," he said. "The Beatles used that mic on all their recording sessions."

"They say the U-47 doesn't make music, it makes magic."

Even though Seward also owns the modern equivalent, the Neumann 147, he still likes the old sound.

You've heard the adage, "They don't make 'em like they used to?" Well it is still true, says Seward. "Broadcast manufacturers didn't make junk in the 1970s," said Seward. "All the stuff was built like a tank and was expected to last for many years. Today with technology expanding so fast, equipment is made cheaper. It's like classic cars; vintage stuff has character and style."

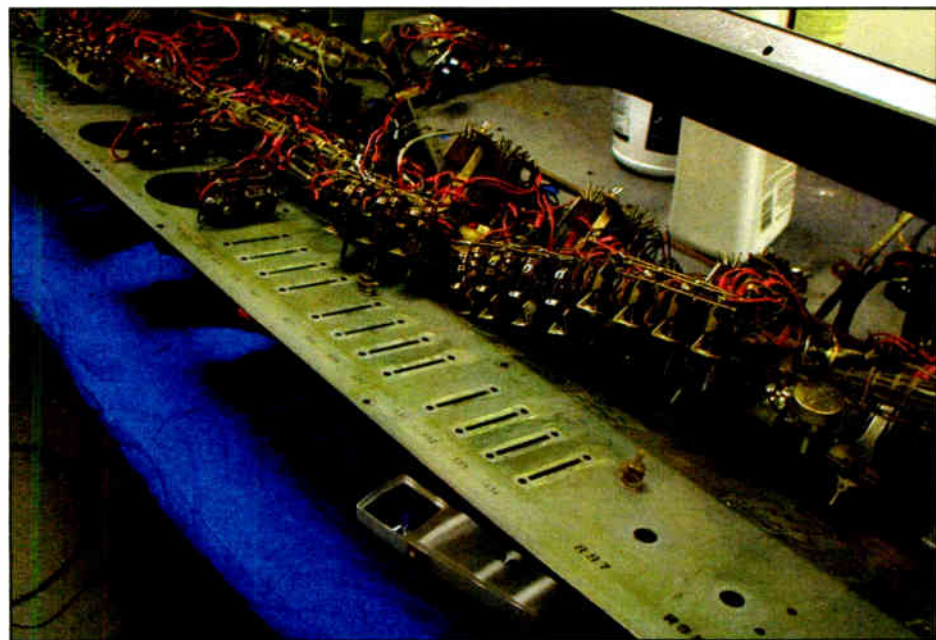
To see some of the restored equipment in the collection of C. Park Seward, visit www.videopark.com/oldbroadcast.htm.

Other helpful Web sites include that of Universal Audio, which makes exact copies of vintage equipment at www.uaudio.com/products/analog/index.html, and <http://stores.ebay.com/stores/category/14998/>, which sells vintage audio gear.

Ken R. is a former DJ from the potted palm days who used a steam-powered board and hand-cranked cart machines.

speed fluctuations is great. Although analog frequency response can approach that of digital, noise and distortion are better with today's equipment."

Seward said that many studios like to incorporate some analog gear because it



Because the board has been modified over the years, Seward had to trace each wire to make sure it went where it was supposed to go. Each wire has a wire number, so Seward could refer to the diagram in the service manual.

these artifacts in his voice as he lovingly describes the trouble he takes to bring them up to perfect working condition.

"When I got my Gates board it had rust and condensation. I had to clean the cables and remove the gunk," he said. "Someone made a lot of modifications to it, which I had to undo to make it 'factory.'"

The Gates board cost Seward only \$250, but shipping it cost another \$250. Regarding the effort and time involved with finding parts and restoring the

panies encased portions of their components' inner workings in that resin to keep prying eyes out.

Now and then

"There are three reasons people don't use vintage equipment much today," said Seward. "First, the maintenance is higher, and second is the cost. You can now buy a little Mackie board, which is very inexpensive. The third reason is flexibility. Those old boards had switches and knobs but no auxiliary circuits, no solo buttons."

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Back to the @#%&!! Future, Part 1

by Alan R. Peterson

Any resemblance between this article and a certain well-known movie and its sequels, right down to its implausible use of technology, is purely coincidental. That's my story and I'm sticking to it.

The bright white flash in the street, the clatter of struck garbage cans and the whine of an internal combustion engine's sudden deceleration in the driveway all shocked Marty out of a sound sleep.

The unexpected but now familiar clamor meant only one thing to Marty: Doctor Brown was back from his latest time-travel encounter, completely in a panic over the way events had shaped themselves.

"Marty!" shrieked Doc Brown, "You've got to come back with me!"

"Yeah, right, Doc," Marty yawned towards the doctor. "What is it this time? We have to restore the Bronze Age to its former glory after I introduced them to the aluminum soda can?"

"No no no, Marty!" Doc Brown continued. "We have to go back to last year's award show and stop it from happening!"

"Stop what, Doc?" Marty sneered. "Do we have to keep that band you hate from winning the Album of the Year?"

"Just get in the DeLorean," Doc Brown barked. "I'll explain on the way."

Not the same old gear

There was a lot about the inside of Doctor Brown's time-traveling automobile that was suddenly unfamiliar to Marty.

As the car sped up for its transition through the time barrier, Marty noted that the flux capacitor was the same as always, but the time circuits had been heavily modified, augmented by several rack-mount audio modules, all with big red Dump buttons on them.

"Doc, do you mean to tell me you built a broadcast obscenity delay line ... out of a DeLorean?"

"Not just one delay line, Marty," the Doc answered in a rapid-fire delivery. "The flux capacitor is routed through an Eventide unit, cross-circuited through an OMT delay set

for 90 minutes, then patched across an AirTools box which continually feeds through an ENCO voice recognition circuit, then back through the capacitor. The feedback loop through the flux capacitor allows infinite variable adjustment, so we can set our destination and delay amount to any time we want to."

"So what's with the Webcam?" Marty asked, pointing to another addition to the DeLorean: a tiny television camera on the dashboard.

"I put that in there to record the entire event," the doctor boasted. "I want a video file of this to remember later for my memoirs."

Do you mean to tell me you built a broadcast delay line out of a DeLorean?

"Well, I brought my PDA with me this time," said Marty. "I want to keep a running tally on whatever it is we're doing tonight too."

"By the way, Doc," inquired Marty, "just what are we doing tonight?"

A mission

"Read the papers, Marty," Doc Brown replied, tossing Marty a folded newspaper with several articles circled. "Morals are decaying all across the country. Shock jocks get on the air and say whatever they want to. The nation's economy is in horrific condition, and fines for broadcasters who allow nasty language are about to be kicked up to a half million dollars."

"Yeah, so what, Doc?" Marty asked. "The station appeals, the jock gets fired, everybody forgets what he said that got him fired, he gets a new gig on satellite radio and everybody's happy."

"Look closely, Marty," said Dr. Brown, directing his passenger's gaze to one article. "It seems that, 10 years from now, a DJ calling himself 'Alan Peterson Jr.' says something on the air so foul, so absolutely shock-

ing to his audience, that his company is immediately fined well over \$70 billion."

Marty whistled in amazement. This newspaper was from 2014.

Doc Brown continued, "The economy never really gets to experience the recovery it hoped for. The broadcast company immediately goes bankrupt, the cascade effect has a devastating ripple on other broadcast companies as well as the U.S. economy, and plunges the country into a depression so steep that Prince William of the United Kingdom makes a deal to buy the country back. And, amazingly enough, President Schwarzenegger goes along with it."

"Thanks to one dumb DJ's idiotic com-

ment, the U.S. will be penniless and once again under British rule," sighed Dr. Brown.

"So why do we want to go back to some award show?" Marty asked. "Why don't we just go forward and keep this guy from saying what he was going to say?"

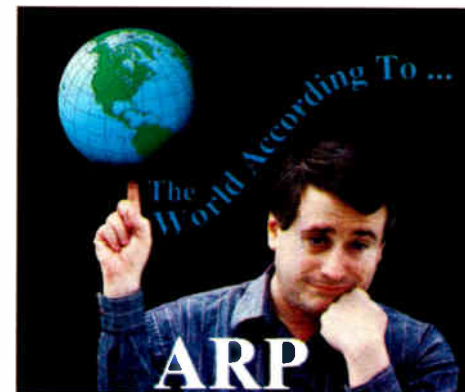
"Marty, we have to go back to the source — we have to go back to the moment when it suddenly seemed okay to say or do anything you wanted to on radio and television. Only then will we get the future under control again."

Reaching towards the dashboard, Dr. Brown keyed a number into the Eventide.

"I'm setting the delay line for Jan. 19, 2003. The place is the Beverly Hilton Hotel and the event is the Golden Globe Awards, when Bono dropped the F-bomb, triggering a nationwide wave of breast-barrings, shock jock firings, unrealistic fines and general lunacy permeating the land."

Dr. Brown hit the Dump button and the DeLorean vanished in a white flash, leaving twin trails of fire behind on the pavement.

Faster than you could say Bubba the Love Sponge, the DeLorean materialized in front of the hotel in 2003, where broadcast history



and infamy were about to be made in mere minutes.

"Keep a low profile, Marty," warned the doctor. "We don't want anyone to know that we're here and what we intend to do."

"So how do we pull this off, Doc?" Marty asked. "What's the plan?"

"Well," Doc Brown began, "Before we left, I checked with the local SBE frequency coordinator to find out what frequencies the satellite trucks were using back in 2003."

"If I could use the auxiliary time circuits to set up a harmonic of the one specific frequency the network truck is using, we might be able to cut in on the broadcast at just the right moment, then use the delay lines built into the DeLorean to shift time itself ahead one-half second, thereby removing the offending word from the broadcast."

"You're the doc, Doc," said Marty, as his friend went behind the car to set up the harmonic field. They were cutting it close, as the nominees for Best Original Song were being announced over television.

Marty fired up his PDA to begin recording the event.

Oopsy

Then it happened. Whether it was a power surge from the Doc's harmonic adjustment, a cold solder joint or Marty's PDA, the time circuits went down, taking the delay lines with them.

"Doc, what do we do now?" Marty yelled in a panic. "We can't run the delay lines, which means we can't knock out the F-bomb!"

"Marty, take the Webcam and plug it into your PDA!" yelled Dr. Brown. "With my own recorder down too, I don't want to miss a moment of this."

See ARP, page 39 ▶

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FIRST PERSON

WVOF Constructs New Studios

*Fairfield University Station Moves Up
From Dormitory to Student Center*

by Tom Osenkowsky

A few summers ago, discussions took place regarding major renovations and a wing addition to the Barone Campus Center at Fairfield University in Fairfield, Conn. The university's radio station, WVOF(FM), planned to relocate its studios from a dormitory basement to the Campus Center. Because WVOF would reside in a newly constructed wing of the building, we had the opportunity to build it from scratch and do it right.

College stations pose unique challenges, as persons using the studios can range from students to elders and non-technical community volunteers. I am WVOF's engineering consultant and acted as project coordinator for the renovation. Engineer Mark A. Weiss contributed significantly to the construction phase of the project. We planned to build three studios: a control room with one clear window wall facing a community area; a production room; and a training studio.

The philosophy and techniques behind the design and construction of the WVOF studios can be extended to any commercial or non-commercial station.

Keep it simple

When designing a studio, the first steps for me as an engineer are to define the needs of the station, and then choose the equipment and layout that most effi-

ciently and economically meets those needs. Versatility, redundancy and flexibility are key elements in any facility design.



A WVOF DJ prepares for a broadcast.

Many commercial stations employ experienced announcers and have a dedicated format with narrow technical demands. WVOF, like many university stations, features block programming with a variety of presenters, such as tech-

the irony, as they sped up and hit the Dump button once again to head back to 2004.

Doc Brown and Marty arrived back at 6 a.m., and were just in time to tune in a 2004 morning radio show. The doctor was hoping for something to have changed as he dialed around, then let out an anguished shriek.

There, on the radio, just as they always had been, were Frick and Frack, interviewing the Swedish Women's Volleyball Team in the nude.

"I don't understand!" hollered Dr. Brown. "Everything was supposed to have been fixed! The timeline was supposed to have been restored. Radio and television were supposed to be fun and entertaining again! But jocks are still talking like ignoramuses and still getting fined!"

The doctor staggered towards a chair in front of his TV. "What have we done wrong, Marty? What did we miss?" As he collapsed into the chair, his arm struck the remote control, turning on a classic movie channel.

"Look, Doc," Marty noted. "'Inherit the Wind' is playing. Isn't that the guy from 'Bewitched'?"

"Sure is," said the Doc, sitting up to notice. "Dick York, playing the part of the persecuted schoolteacher. And there's Spencer Tracy in one of his greatest..."

Dr. Brown's words trailed off and his expression fell as he watched the movie. Marty watched as his friend's expression changed to one of determination as he stood slowly up.

"Marty," said the Doc, speaking low and carefully, "Warm up the DeLorean and ramp all the delays to maximum. Looks like we've got a job to finish!"

To Be Continued ...

nically savvy students, or community volunteers hosting ethnic shows with a mixture of music, live interviews and telephone interaction with listeners. Sports programming also is featured.

Planning was essential in the WVOF project, which was completed in 2002.

There were meetings with the associate dean, station advisor, architect, electrician, contractors and telecommunications and information services departments. My philosophy was to keep it simple.

For instance, in the old control room, a patch bay was used with an eight-channel Harris Medalist board; a second business telephone sans handset was used to route telephone calls to the analog hybrid for sports and interview calls; and rebroadcasting NOAA Weather Radio was accomplished by placing a microphone next to the receiver's speaker.

The three studios were designed to be as identical as possible, so I chose three 18-channel Audioarts R-60 consoles with optional mic preamp expansion boards and telephone modules. The Audition bus of the control room feeds the other studios, and in turn the Audition bus of the other studios feed each other. The bottom MiniDisc and cassette deck inputs are fed from Audition in the control and training studios. The top MiniDisc decks are fed by the Monitor selection, enabling off-air (processed) recording.

This arrangement allows one to record from another source without interrupting normal programming. The training studio is used to train new station members, and feeds its own Web stream. When not in use, the training studio simulcasts the Audition bus of the control room.

A three-position four-pole rotary switch allows any studio to feed a Symetrix

See WVOF, page 40 ▶

ARP

▶ Continued from page 37

"Doc, we're never going to fix the future unless we get power now!" Marty shouted back. "Where are the power circuits?"

Doctor Brown assumed a blank expression for a moment, then blurted out as he remembered, "Behind these seats in the DeLorean!" He clawed at the driver's seat.

"Doc, wait. You'll need help back there," Marty said.

The two scrambled head-first behind the seats, where the power regulation circuits were kept. In their panic, they lost their balance and went feet-up, getting stuck face-first behind the seats. Inadvertently, someone's foot hit a switch on the dashboard, firing up the Webcam.

With the camera feeding Marty's PDA and the PDA interacting with the Doc's harmonic generation, the network satellite feed became momentarily scrambled just as the award was being handed off.

All of America was treated to a picture of two male rear ends dancing in the air to the strains of 2003's Best Original Song.

It wasn't their intent, but the time travelers got their wish. The local news-talk station the next morning spoke of "pirate" broadcasters somehow interrupting the satellite network feed just as Bono was accepting the award.

A representative of the FCC was quoted as saying the agency would not rest until the pirates were found and prosecuted. And the WB television network wanted to offer a series to the "dancing buttocks."

Both Marty and Doc Brown smiled at

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WVOF

► Continued from page 39
 profanity delay, which in turn feeds the transmitter. Each source has a dedicated input eliminating the need for a patch bay. I chose the Gentner TS-612 six-line system with networking option for telephone interfacing. The business line does not appear on the studio telephones.

A Comrex BlueBox system is used for sports broadcasts.

Inter-studio wiring is run through a trough in the cement floor. Twenty-four-pair shielded cables were run from each studio to the equipment rack. Only 13-pair are used, allowing for future expansion without the need for additional wiring runs. Speaker, on-air and other wiring runs inside the wall down into the trough. No surface wiring is employed.

An equipment rack in the control room



WVOF(FM) went on the air from its new studios in the Barone Campus Center.

houses the modulation monitors, EAS gear, profanity delay, Web stream processors and studio selector switch. In the control and production rooms, there are two turrets, which accommodate the Tascam CD players, Sony MiniDisc recorder/players and Technics cassette decks. A single turret is used in the training studio.

Each studio has three guest microphones plus an announcer microphone. Because turntables are used by a number of formats — notably reggae, rap and ethnic shows — the studios feature two turntables with remote start/stop functions, and protected by a hinged cover.

Studio Technology custom-fabricated the studio furniture.

Production uses ProTools as its editing software. Pre-recorded shows, PSAs, promos and station IDs are stored on networked Mac computers. Access to the Internet, Instant Messages and audio storage/playback are possible on the Macs.

Interconnectability

Redundancy is accomplished by providing nearly identical equipment in each studio, and enabling instant studio selection by rotating a switch. The profanity delay can be bypassed by interconnecting the rear-panel XLR connectors, and modules

among the R-60 consoles can be swapped if necessary. A utility box in each studio allows external mixers or musical instruments to feed an input on the console. An XLR female connector is wired in parallel with a 1/4-inch TRS jack and an unbalanced RCA jack, allowing interfacing.

Equipment in the turrets is bolted using security screws, which require a special tool to remove. This prevents unauthorized removal of equipment. Production and the hallway, music library and control room are monitored by security cameras and recorded on a computer in the office, with entry to the station controlled by a swipe card. Station members are not issued keys. CDs and vinyl must be requested prior to use, thus controlling music inventory. Headphone cables are secured to the countertops by small plastic clips. The announcer headphones can be unplugged if one wishes to use his/her own headphones, but the station headphones remain secured.

By incorporating flexibility into a studio, the accommodation of future needs with minimal or no technical changes is possible.

Tom Osenkowsky is a radio engineering consultant and a frequent contributor to *Radio World*.

PRODUCT GUIDE

Digigram LCM220v2 Sound Card Makes Berlin Debut

Digigram has upgraded its LCM220 sound card, showing its LCM220v2 with 2/2 balanced analog I/Os at the AES Europe show in Berlin. The board is targeted at broadcast automation, permanent playback, logging and other professional applications.

The company says LCM220v2 has more functions as well as real-time simultaneous MPEG Layer I/II compression and decompression during record and playback. Highlights include 24-bit converters, analog and digital level control on the outputs and a short-length PCI format (6.875 inches). A universal PCI bus (5V, 5V + 3.3V or 3.3V) and PCI-X bus compatibility are featured. The LCM220v2 is compliant with Digigram's PC codec mp3.

Used with applications based on the Digigram np SDK, real-time mixing of multiple sound files, level adjustment, panning and format and frequency conversions are executed by the card's DSP technology.

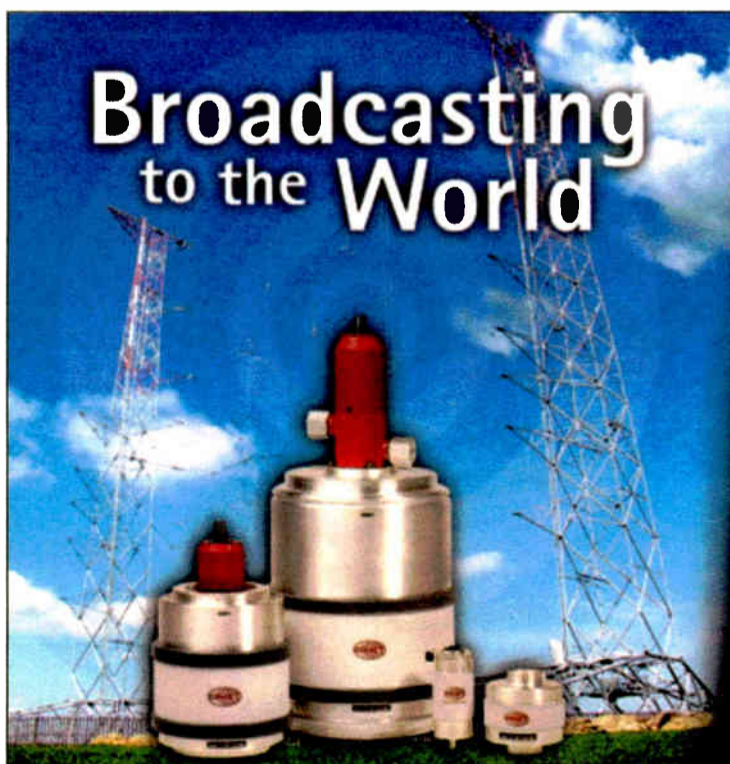
The company also released the v2.00g driver set, featuring an ASIO driver, for its miXart 8 range of multichannel sound cards. An open-source Linux driver project for the cards is available at www.alsa-project.org.

Included in the series are the miXart 8 AES/EBU and miXart 8 CN. All offer 8/8 analog mono I/Os, including four microphone preamps with phantom power supply. miXart 8 AES/EBU includes 4/4 additional stereo AES/EBU I/O, and miXart 8CN features a Cobranet interface.

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GUEST COMMENTARY

Surround: HD Radio's Wow Factor

5.1 Surround Sound for Radio Is An Imminent and Welcome Change

by Steve Church

Your car probably has four speakers, or more. But you are using them to listen to two-channel FM broadcasts — a technology that was invented in the 1950s.

Now imagine that your radio is pumping out immersive digital surround music and cinematic production effects, the sort of thing that you hear in a well-equipped movie theater or on a state-of-the-art home surround set-up. Wouldn't you think this to be a much better way of introducing the benefits of digital radio broadcasting to the public than the "improved stereo" message HD Radio offers now?

Look around and you will see plenty of action in the surround audio sphere. DVD Video audio tracks are universally in the 5.1 format. You will see surround speaker setups in any store that sells audio or video equipment. Even computer shops are full of 5.1 sound cards and speaker systems. The new DVD Audio and SACD disks are almost always produced in surround.

Surround sense

While the focus for multi-channel audio has been elsewhere, surround actually makes a lot of sense for radio.

A lot of listening occurs in cars, and the environment there is good for enjoying multi-channel music, as there is no problem to find space for the four or five speakers and sub-woofer. In contrast to an office or home, you are in a stable position relative to the speakers. High-end audio systems that play DVD Audio surround disks in cars are coming soon to the market. The Acura TL and some new Cadillacs will include this as factory standard.

But there hasn't been much talk yet about surround for radio. That is because the technology needed to accomplish it effectively has just recently been invented, and is only now being introduced.

Just a few years ago, it seemed we didn't have enough bandwidth for quality stereo in IBOC, let alone surround. But multi-channel audio coding technology has advanced quite amazingly, and with surround a real possibility for radio broadcasting, you can expect to hear a lot about it in the coming months.

Fraunhofer Institute (FhG), inventors of MP3 and most of MPEG AAC, has been pushing the frontiers of audio perceptual research. The latest result, achieved in partnership with Agere Systems, is a powerful spatial audio coding system that takes advantage of state-of-the-art knowledge in aural perception.

From psychoacoustics studies, we know that only three factors are required for the perception of a spatial image: level difference, time difference and coherence between channels. The key to FhG's new multi-channel system is that these difference values are represented with compact coding, rather than transmitting the individual audio channels. The encoder estimates the

values as a function of frequency (that is, within each of a number of sub-bands) and transmits them to the decoder in an ancillary stream that accompanies the main coded audio stream.

Killer app?

That's all well and good, I hear you asking, but will this work with HD Radio? The astonishing answer is: yes. The FhG spatial encoding system is

hundred DVD Audio and SACD surround discs to get us started. These are perfect source material for surround HD Radio, and are off-the-shelf today. A bit less perfect, but still useful, are the Dolby Digital and DTS 5.1 audio tracks that accompany DVD video clips and concerts.

With surround broadcasting up and running, record companies will have a powerful incentive to release new material in multi-channel. If the music industry offers music in a surround format, and radio promotes it, they will be selling their libraries all over again as happened with the transition from

need to have a downmix function to create the compatible stereo channels from the multi-channel source. The most obvious way to do this is with simple linear combiner, as follows:

$$L = L_{\text{front}} + a * L_{\text{rear}} + b * \text{Center}$$

$$R = R_{\text{front}} + a * R_{\text{rear}} + b * \text{Center}$$

where a and b are constant scale factors, with the values usually ranging from .5 to .7.

But this simple procedure is far from the best. We must present a stereo mix to listeners without multi-channel receivers that sounds as good as a stereo-only broadcast. Simply collapsing the front and back signals into a two-channel representation may cause confusion in the normal binaural cues and degrade stereo listening. And it almost certainly will sound different from the version that listeners are used to hearing.

The FhG system allows a producer to make a manual downmix, thus preserving artistic freedom and allowing flexibility to adapt to different kinds of audio material. Because almost all music released in surround format also has a stereo version on the same disk that could be used as input to the encoder, this stereo version is what would be heard by listeners with non-surround radios — with no modification or compromise of any kind.

Maybe you remember the quadraphonic systems from the 1970s that had a brief and unsuccessful run on vinyl and at a few radio stations? Don't confuse this modern multi-channel perceptual approach with those, or any of the many descendants that are vying for radio's attention. While these latter systems have new names, they simply act as lipstick applied to the withered old lips of the failed '70s vinyl quad schemes. They have the critical drawback that only fixed-scale downmixes are possible, so stereo compatibility suffers.

This is one reason the '70s-era matrix systems didn't catch on, as they had a weird, soft and indistinct quality in stereo. Clearly, this is an important issue for broadcasters. With most people listening in stereo, we can't afford to compromise our fundamental service.

Another problem with matrix schemes is poor surround separation. Matrix systems must mangle everything into a two-channel signal, a crippling constraint on performance. They can have only a few dB of separation between some of the channel pairs. Which channels get the separation and which don't are design compromises, and each system deals with this differently.

Because FhG's spatial encoding uses an independent digital side-channel and a modern perceptual approach to spatial cue encoding, it offers high separation that does not depend on the nature of the audio or that needs to be compromised for stereo compatibility.

By the way, beware of matrix demonstrations using material in one or two channels at a time. These are deceptive because a steering circuit — a gain processor in something like a noise-gate configuration combined with an operation that dynamically varies the matrix coefficients — detects this directional condition and steers the strongest signal into the target channel, while reducing gain or providing some kind of cancellation in the other channels. This approach is also a leftover from the '70s, having

See SURROUND, facing page ►

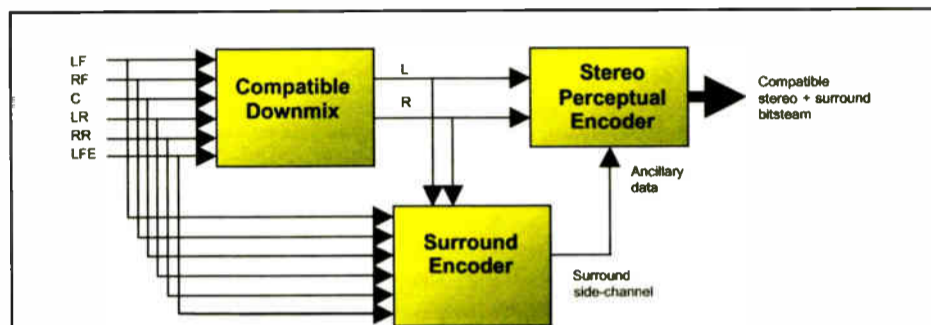


Figure 1: Encoding (transmitter) side

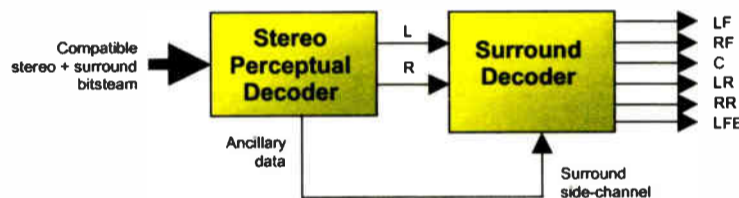


Figure 2: Decoding (receiver) side

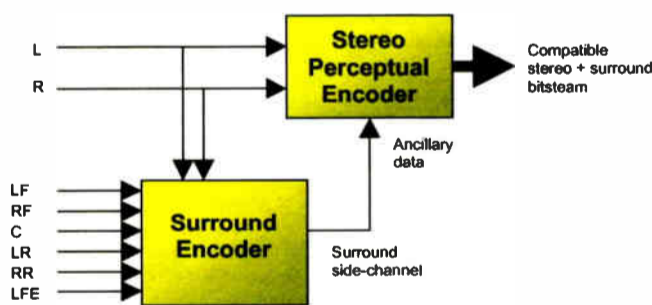


Figure 3: Encoder with external downmix process

compatible with HD Radio's current codec for the stereo channels. And the side-channel for spatial information is less than 20 kbps, a rate that is possible in HD Radio's ancillary data channel. The total bit rate can be set to 96 kbps, the capacity of HD Radio transmissions.

We demonstrated this system to a number of engineers at NAB2004 in private meetings and in a hotel room with a high-quality surround set-up. The near universal reaction was, "Wow! That works!" Many listeners went on to comment that surround, powered by this technology, would be the "killer app" for HD Radio.

Where will we get the music to play? In fact, there is a lot of material already available in multi-channel, such as a few

vinyl to CDs. They should love radio moving to surround broadcasting and be supportive with audio material.

Multi-channel approach

The block diagrams illustrate how an encoder/decoder pair would work within a broadcast channel. The stereo signal is coded using any perceptual codec. Because there are no changes to the basic codec, this stereo signal can be received by stereo radios. The spatial encoder extracts the various spatial cue parameters from the multi-channel input, which are transmitted in an ancillary data channel. The decoder, if present in the receiver, recreates the original multi-channel audio.

In the diagrams, you can see that we

Surround

▶ Continued from page 44
 first been used in the Vario-Matrix "logic" schemes.

With normal programming, which has material present in all channels simultaneously, the separation is dependent upon the underlying matrix scheme and is much poorer than the demonstrations suggest. At NAB, we let people listen to the difference between Dolby ProLogic 2, a state-of-the-art matrix system, and the FhG system. It was unanimous that the FhG system was far superior.

Crossroads

We think radio deserves better than a simulated or matrixed system. Broadcast, cable and satellite television will have true 5.1 surround sound, as do DVDs. Back in the days of the transition from mono to stereo, some records were released in a "re-channeled for stereo" version and were not

on Spatial Audio Coding. FhG will submit their spatial approach to MPEG for consideration and testing, and chances are good that it or some variation will eventually be approved as an international standard. Thus there will be the usual advantages of MPEG: an independent confirmation of performance, and assurance of fair and equal access to licensing.

One lesson from DAB in Europe is that "improved digital sound" is not enough to cause listeners to buy new and more expensive radios. We need a significant and clear message to motivate change.

Have a look at any shop that sells car audio gear. See all the multi-speaker setups? The subwoofers? The early adopters who are looking for the maximum aural experience? What about all the people with surround home theater systems? Wouldn't immersive audio on your air appeal to them — and be a good thing for your station? Wouldn't you like to listen to your station in surround?

Wouldn't you like to listen to your station in surround? Isn't this a win for all?

taken seriously by anyone who cared at all about sound. Radio is a crossroads. We can either let the other digital media overtake us, or we can ride the tech wave and remain relevant.

A well-produced DVD surround disc offers a remarkable listening experience, and more and more people are going to have that experience. Not taking advantage of the best technology is going to put radio in a bad position compared to alternatives. Imagine what would have happened if radio was stuck at AM fidelity when compact disks came along. Something similar is going to happen if we make the wrong choices now.

The ISO/MPEG audio group has noted these recent advances and their market potential, and has begun working

And isn't this a win for all? Listeners get something compelling, new and interesting. They already know about 5.1 from their exposure to home theater and could readily imagine the benefits of having that experience in their cars. FM radio stations again take the lead in offering a superior audio technology. HD Radio gets a clear and understandable value proposition. Record companies get to sell their libraries all over again — and in a format less amenable to MP3 copying.

Programmers and production directors get to create cinematic high-wow-factor promo pieces to breathe new life into programming. So, when do we start?

Steve Church is founder and president of Telos Systems.

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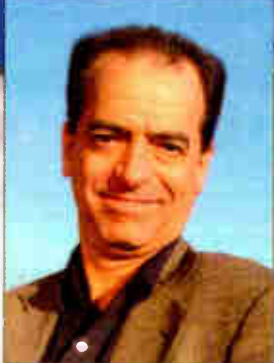
Column: The Big Picture

Experience: 31 years in broadcasting, audio, music, computer and publishing industries

Certifications and industry honors: Member SMPTE, SBE, AES; former chair of AES D.C. chapter; winner of AES Board of Governors Award; winner Public Radio Regional Organizations' PRRO Award

Mentors/heroes: Don Davis; Ed Greene; Neil Muncy; William Zinsser; Nick Negroponte; Bill Gates

Quote to live by: "Our generation will always speak digital with an accent."




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Jim Hoge
 President and GM
 WPOZ/WEAZ
 Orlando, Fla.



Leave a Light On

Regarding "Lighting Up the Dial," March 10, in which Dave Shannon turned a classic ITC cart machine into a lamp (shown above):

I thought you might be interested in knowing I found that I can hook my wiring to the switch that is activated when a tape is inserted. So now, when a tape is inserted, the light comes on. And then to turn the light off, you eject the tape.

I was also able to purchase a switch that I could install where the center round "red button" switch was located. It has a white button, but is now another working switch for the lamp.

David Shannon
Owner
Shannon's Lamp Service,
Lexington, Ky.

Bring Back The Music

I really enjoyed the article on Tim Brown and the Denver stations ("Tim Brown: Denver's Little Big Man," Jan. 14).

Correction

Daniel Slentz's guest commentary on LPFMs in the May 19 Reader's Forum referred to an article in the March 10, 2003 issue. That article in fact appeared in the March 1 issue.

I don't know his whole story, but what he is doing is extremely commendable in my book. From the time I got an on-air job at age 16 back in Iowa, to doing post work now for the "Riverwalk" show, I've found that radio needs to come back to it's roots — imaginative entertainment and real music.

Reading this article was a great inspiration in my day.

Benji Nichols
"Riverwalk Jazz"
Petaluma, Calif.

Split Decision

What a bunch of crap NPR proposed, asking the FCC to allow FM stations to split their digital signals into two channels — without requiring new station licensing. All this after they were so vocally critical about the sound quality, it caused the Digital Subcommittee to react.

With the spirit of the digital technology (also implied by its name) to provide "High Definition," the broadcasters that could care less about providing the public higher technical quality service should not be allowed to go digital. It's being done now with HDTV, and it stinks. I didn't spend \$2,700 on my 57-inch HDTV to see multiple channels of WGN — that's why I buy DirecTV. I am not going to pay \$500 for an HD radio system only to get more stations. I can pay \$99 and get XM or Sirius, which have more channels and no commercials — and are free to play and say what they want, un-edited.

This move is no different than creating new service. With the AM broadcasters again getting the big-stiff from the new technology not having a clear-cut nighttime fix, the FCC should not allow this to take place. In light of that, it is amazing that the FCC would consider LPFM. If we are going to trade technical quality of the DAB signal for space, then we need to consider our priorities.

I have not finished doing the math yet, but it appears that with the minimal need for guard-band between digital carriers, it would be likely that many digital-only carriers could be added to the FM band (yes, even in the major markets) to allow AM stations to migrate to full-time digital service. Then we won't have to concern ourselves with re-inventing physics to get the nighttime digital to work with nighttime conditions.

I also can see the number of daytime stations now — being able to be on the air at night, with enough power to cover their markets. No more 10W neighborhood covering signals! If we are consid-

Scrolling Text on the Dynamic Dashboard

Realizing that roughly 75 percent of new cars sold are equipped with RDS-capable radios, groups like Entercom, Clear Channel, Greater Media and others have been installing encoders to add song title and artist text scrolling. Many are using the PS display, originally intended for static call letter and logo identification.

The primary impetus to revive RDS can be attributed in large part to the use of text messaging on the competing satellite services. And with song title and artist information easily harnessed from a station's digital storage or automation system, it's there for the taking.

More FM stations should add this service. There's no need to let the sat boys reap the advantage or to wait for HD Radio.

Even though the song title and artist text display has proven successful here, some car radio manufacturers look to the European RDS model and, privately, take a dim view of placing it on the PS display. Too much liability, they say. Drivers would be distracted by watching scrolling or changing text. Perhaps accidents — and lawsuits — are waiting. This school of thought argues that the feature belongs in the RT or radio text display, the second-level, user-selectable function on most RDS radios.

However, the function is not available on radios that offer *only* a PS display. Further, radio text often is too confusing to engage; and most car owners are unaware of it. Broadcasters pressed the PS display into action when they realized the RT function that scrolls program-associated text would largely go unnoticed.

The original U.S. RDS standard assumed the PS data would remain static when the standard was developed 11 years ago. Different receivers react in different ways. Now, a subcommittee of the NRSC is trying to dedicate a code in the RDS standard to PS scrolling data; it would be similar to a template that receiver makers could use.

According to broadcast engineering sources, at least one automaker is so concerned about distractions on the dashboard, it is considering turning off the RDS PS display — or dropping RDS altogether if stations attempt to send any form of changing text messaging through it. A few other car radio companies appear to have some sympathy with this position.

Yet as far as we know, these companies are not proposing discontinuing the feature in satellite radios.

Let's be reasonable about how "busy" the car dashboard has become. Many indicators apart from the radio — text-based and otherwise — feature information updated constantly, such as GPS navigation screens and status indicators of on-board systems and accessories. Drivers have acclimated by employing "quick-glancing" techniques to pick up ever-changing messages on the dashboard, while concentrating primarily on driving their vehicle safely and responsibly. Seeing radio text is no different.

By using the RDS PS display creatively but responsibly, existing analog radio can achieve at least some parity with satellite services, and soon HD Radio, in the arena of text messaging. Car radio manufacturers should either apply the safety argument to *all* cabin distractions, or resist penalizing RDS PS text scrolling in the face of so many other moving messages on the dashboard.

— RW

ering splitting the upper and lower digital carriers content, then the availability of channels for every current allocation is doubled, making it even more plausible to do this.

I see that Ibiquity is not quoted in the RW Online news item ("NPR to FCC: Let Stations Split Their Digital Signals") sent to me, but it will be very enlightening to see their response to this. When I was with the founding IBOC group (then known as ACORN and then USA Digital Radio) we purposely avoided this propos-

al, knowing it was not about "bettering" the technology from a quality standpoint. It just seemed to live up to our branding and purpose, "By the broadcaster, for the broadcaster."

I don't think Howard Stern has to work too hard to "wreck this industry," as it appears to be doing that quite nicely on its own.

Scott Clifton
Director of Engineering
SportingNews Radio Network
Chicago

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D-8000

Digital Radio Console

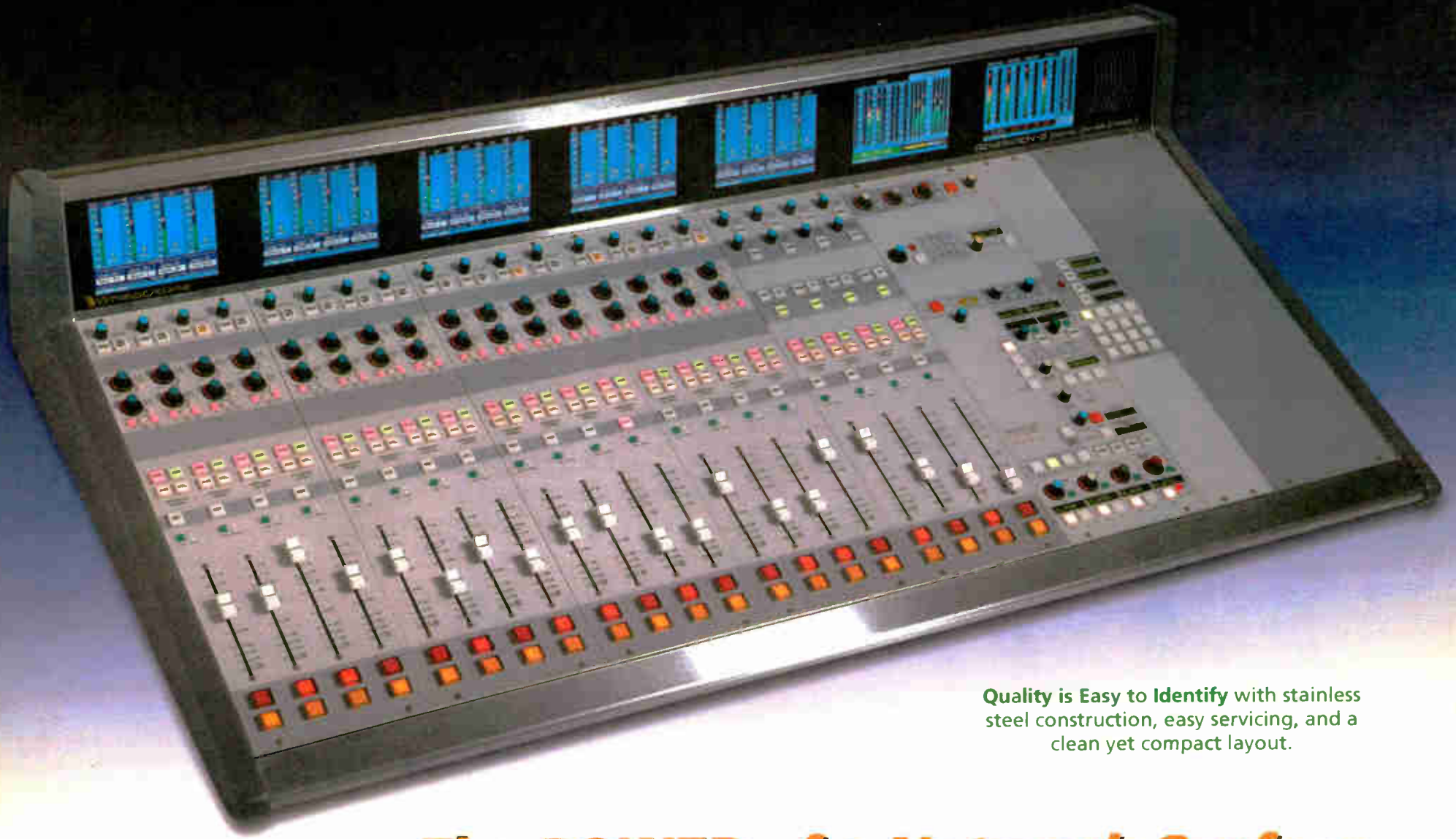
ADVANCED TECHNOLOGY! WHEATSTONE'S fourth generation digital console has what you need: dual-domain input modules that accept both analog and digital sources; built-in router integration with 8-character displays; a choice of features like auxiliary sends, equalization, dynamics control and event memory/recall—all without the aid of an external computer. The D-8000 is an all-modular design with no active components mounted inside. And best of all, it uses Wheatstone's exclusive VDIP® setup software, letting you easily configure individual console modules, logic modes and automatic functions. **Contact Wheatstone—the digital audio people!**



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