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DAB: What Next?

Digital radio commentaries by Mike Starling, Skip Pizzi and Guy Wire.

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Radio World



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The Newspaper for Radio Managers and Engineers

May 22, 2002

INSIDE

ENGINEERING

▼ Flash lamp circuits are not for beginners.

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▼ Radio experts talk about the next great technology trends, and we review the JK Audio ComPack, CellTap and Daptor Two.

In This Issue

NEWS ANALYSIS

Mixed Reviews For Expanded-Band Moves

by Naina N. Chernoff

WASHINGTON Despite years of waiting to get their stations on air, broadcasters who have made the switch to the upper portion of the expanded AM band — 1605 to 1705 kHz — have mixed reviews on the economic benefits.

While they wait for the FCC to continue to develop rules governing the rare air of the expanded band and to see if digital AM radio will be economically viable, some of the 47 stations now on air are enjoying wider reach, stronger signals and slightly higher profits, while others have seen no financial benefit from their new frequencies.

WRNC(AM), a gospel station in Macon, Ga., has made little profit from its 1670 kHz frequency since it launched in 1998. According to James Gay, its engineer, the station has not prospered yet because it is still waiting for approval from the FCC to move its transmitter site from its location near several medical practices to a site a few miles away.

Soon after launching the station, Gay See EXPANDED AM, page 10 ►

NEWS ANALYSIS

Radio Stations to Make EAS Choices

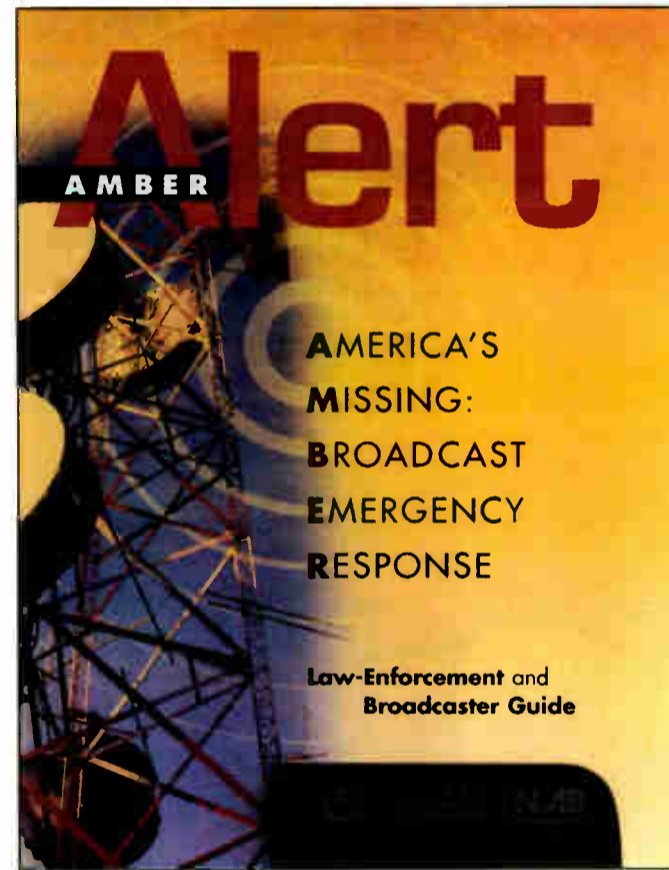
The Commission Approved New Codes, But Will Station Managers Upgrade Their Equipment?

by Randy J. Stine

WASHINGTON The addition of several Emergency Alert System event and location codes, including one used to activate Amber plans, is expected to improve the capabilities and execution of EAS during emergencies.

The FCC adopted a report and order in February updating Part 11 of the EAS Rules. The 21 new event codes include a 911 telephone outage emergency, a nuclear power plant warning, even a volcano warning.

Broadcasters now must decide whether to update their See EAS, page 6 ►



This brochure is part of the Amber education effort.

INTERNET RADIO



▼ The reality of 'per-song/per-listener' streaming fees sinks in.

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STUDIO SESSIONS

▼ Jim Wilson handles production duties for Rubber City Radio Group in Akron.

Page 51

THE SWEET SPOT

▼ Mackie and RW send a pair of HR624s to a small-town station in Pennsylvania.

Page 4



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◆ NEWSWATCH ◆

FCC Seeks Comments On AM IBOC

WASHINGTON Moving quickly, the FCC has invited public comment on the report by the National Radio Systems Committee about Ibiquity Digital Corp.'s AM IBOC system. The NRSC's report evaluates the lab and field testing of Ibiquity's system in the hybrid mode.

The comments are due by June 18 to MM Docket 99-325. This extended period is the same amount of time the commission designated for comments on the FM system. The agency wanted to give ample time for the many submissions it expects.

Additional testing is required to assess IBOC's performance during AM nighttime skywave propagation conditions and for Ibiquity to re-do some tests as it finishes integrating its Perceptual Audio Coder or PAC into its system. Earlier tests were conducted with its former codec, AAC.

The commission will seek further public comments when it receives the results of the additional tests.

Ibiquity Raises \$45M

COLUMBIA, Md. & WARREN, N.J. Ibiquity Digital Corp. has raised \$45 million and says its business now is

fully funded.

It also gained a new investor, Susquehanna Radio Corp., the nation's eleventh-largest broadcaster. Most of Ibiquity's investors contributed additional funds, with Grotech, JP Morgan Partners, New Venture Partners and Pequot Capital leading the latest round of financing, called "Series C."

This is the last planned round of private equity funding and it raised the most money for the company in its history. Ibiquity President/CEO Robert Struble said the money raised through the stock sale would be more than enough to get the company to profitability, which Ibiquity expects in late 2003.

The price investors paid for the stock was undisclosed.

The money from this round of financing is slated to pay for Ibiquity's operational expenses and for commercialization of its technology. Ibiquity hopes to transition about 100 stations to digital by the end of this year and introduce IBOC receivers at the Consumer Electronics Show in January.

Ibiquity already generates some undisclosed revenue by licensing its Perceptual Audio Coder to Sirius Satellite Radio and XM Satellite Radio. Although XM recently declared it is using a different audio compression technology rather than Ibiquity's PAC (see page 3), Struble said XM still has a licensing agreement with Ibiquity.

Ibiquity licenses its IBOC technology to several transmission equipment companies, as well as to several firms that manufacture receivers, chip sets and receiver components. Ibiquity plans to charge stations licensing fees as well.

The company's investors include 14 of the nation's top radio broadcasters, including ABC, Clear Channel and Viacom; financial institutions such as J.P. Morgan Partners, Pequot Capital and J&W Seligman; and strategic partners Ford Motor Co., Harris, Lucent Technologies, Texas Instruments and Visteon.

With the addition of Susquehanna, 14 of the largest U.S. broadcasters own a portion of Ibiquity.

See NEWSWATCH, page 14 ▶

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DIGITAL NEWS

Satcasters Battle Over Codecs

XM, Sirius Each Claim the Better Codec, While Ibiquity's PAC Gets Some New Competition

by Leslie Stimson

It was the battle of audio compression algorithms this spring, with each of the satellite radio companies claiming its coding is better.

XM Satellite Radio revealed that its audio codec of choice now is CT-aacPlus, rather than the Perceptual Audio Codec, the earlier choice for which it still has a license agreement with Ibiquity Digital Corp.

By contrast, both Ibiquity and XM's competitor Sirius Satellite Radio use PAC.

Some observers said XM may be worried about sound quality now that listener comparisons to Sirius Satellite Radio are possible.

"If it's perceived that the difference between them sound-quality-wise is significant, that's not good," said one source.

XM claims superior sound quality using CT-aacPlus, a combination of Advanced Audio Coding — the work of AT&T, Dolby, Fraunhofer and Sony — and Spectral Band Replication from Coding Technologies.

Digital Radio Mondiale also has adopted CT-aacPlus as its codec, according to XM. DRM is developing digital technology for shortwave, medium- and long-wave service overseas.

XM is using the CT-aacPlus codec.

XM's use of CT-aacPlus is the first commercial implementation of this codec.

Third-party testing of CT-aacPlus by the BBC, Deutsche Telekom and Robert Bosch GmbH found it to be more than 30 percent more efficient than AAC at providing superior sound quality at satellite bit rates, XM said.

XM is enhancing the effect of the codec with Neural Audio, preprocessing software that uses algorithms based on models of the brain's perception of sound. Neural Audio also is the name of the Seattle-based research lab where the product got its start.

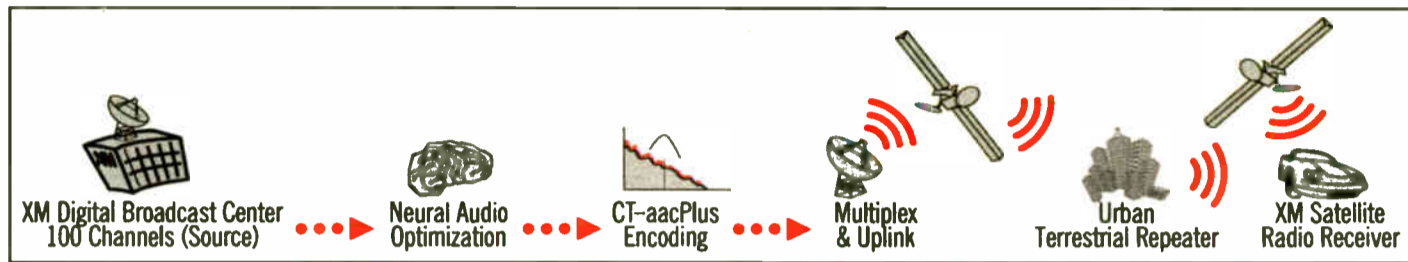
Tony Masiello, XM vice president of operations, said Neural Audio helps the encoder make a better decision about which audio is perceived by the human ear and which is not.

"That's how codecs work. They achieve their reduction by deciding which audio elements are not perceived, therefore they're not encoded."

Masiello said, "The neural preprocessor takes audio from the studio and processes it before it goes into the encoder on a channel-by-channel basis."

"We take the studio signal, feed it into the neural engine, then take the same

audio and go through the encoder and (satellite) uplink. Then we take the decoded output of a radio, put that into the neural engine as well and the neural engine learns the differences between the original and the audio that has gone through the coding process, and compensates for the differences."



The XM Signal Path

There's a neural engine for each of the 100 channels, he said. A white paper released by XM states that Neural's process analyzes and adjusts the audio signal every 22.7 microseconds.

One broadcast source whose company works with codecs characterized the neural concept as "marketing hype" and said the way XM and Sirius compress sound has little relevance for applications to a typical station. He declined to be named.

XM said its use of CT-aacPlus and the Neural Audio preprocessing algorithm means it doesn't need to use "traditional statistical multiplexing."

Sirius, however, is using statistical multiplexing.

No 'tit for tat'

A spokesman said Sirius didn't want to get into a "tit-for-tat discussion" of the merits of both Sirius and XM's technologies, but said Sirius is pleased with both PAC and statistical multiplexing.

"We have had positive customer feedback. There was a reason that changes were made on the other side."

Mark Kalman, vice president of Sirius' national broadcast studio, said statistical multiplexing uses a variable bitrate encoder, unlike AAC or MP3, for example, which employ fixed bitrates.

Statistical multiplexing, he said, is efficient and doesn't waste bits; it takes only those it needs to encode the audio at that instant. Statistical multiplexing puts the unused bits in a common bit pool for the other channels, giving Sirius the ability to change the bitrate for each channel constantly, and devote more to some and less to others.

Kalman said DirecTV and phone companies traditionally use statistical multiplexing to increase the number of channels they can put in a set amount of bandwidth; but Sirius is not using the technology that way.

"We have a basic quality (bit rate) target; statistical multiplexing improves the quality above that target, and most of the time, we're above that."

Ibiquity has said its IBOC technology will allow stations to use 96 kilobits per second on FM, and that the satellite companies are using less, around 64 kbps. Sirius said it doesn't comment on its bit rates.

"These algorithms are so advanced and so efficient that what people know in the marketplace, like Windows Media, Real Audio and MP3, are not in the same league as these coders," said Kalman.

PAC or no?

The selection of CT-aacPlus means that XM will not use Ibiquity's Perceptual Audio Codec. An XM spokesman said, "PAC is a fine technology. But we felt CT-aacPlus, enhanced by

an older version of PAC, Version 3, and that there was a big difference in how the versions performed. "Version 3 had some severe limitations," one source said.

Version 4 is what Ibiquity uses in its in-band, on-channel terrestrial digital radio system, Struble said.

Accounts differed about whether the codec revelation was a surprise to Ibiquity. Certainly it did not come as welcome news, as the company hopes to license PAC for different applications. No sources who spoke with Radio World saw XM's decision as a blow to IBOC, although some felt it was a blow to Ibiquity's business plan to market PAC for other applications.

the Neural Audio preprocessing technology, was the best for our platform."

Ibiquity Digital Corp. President/CEO Robert Struble said XM's decision was a disappointment, but would have small impact on Ibiquity's revenue. XM paid Ibiquity an undisclosed amount for licensing PAC.

Sirius is using Version 4 of Ibiquity's PAC and is happy with its performance.

Sources close to the issue said XM had

"You don't want to have folks saying, 'How come these people are saying one of the things you want to sell is no good?'" said one source.

But observers contacted for this story agreed that the bottom line for digital radio is not about who has the best codec. It's about the programming, they said, and whether consumers will feel it's a good deal to pay more in the future for analog radios.





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FROM THE EDITOR

A Summer of Radio Reading

by Paul J. McLane

Let's see what the mavens of broadcast book publishing have for our summertime reading.

Master storyteller William O'Shaughnessy loves to talk and loves to listen. He does both in his second book, "It All Comes Back to Me Now: Character Portraits From the Golden Apple," published by Fordham University Press.

It is a collection of essays, radio editorials (remember those?), speeches and interviews by one of the country's most prominent community broadcasters, president of Whitney Radio and editorial director of WVOX(AM) and WRTN(FM) in Westchester

County, N.Y.

O'Shaughnessy talks to politicians, journalists, activists, musicians, lawyers, restaurateurs, sportswriters and other shady characters. We get to listen. It's great radio. Readers from the New York metro area will find themselves particularly at home.

Proceeds benefit the wonderful Broadcasters' Foundation. The hardcover, 638-page book is \$25, available from bookstores or www.fordhampress.com.

★★★

If I were to walk into your station today and ask to see the public inspection files, would you be ready?



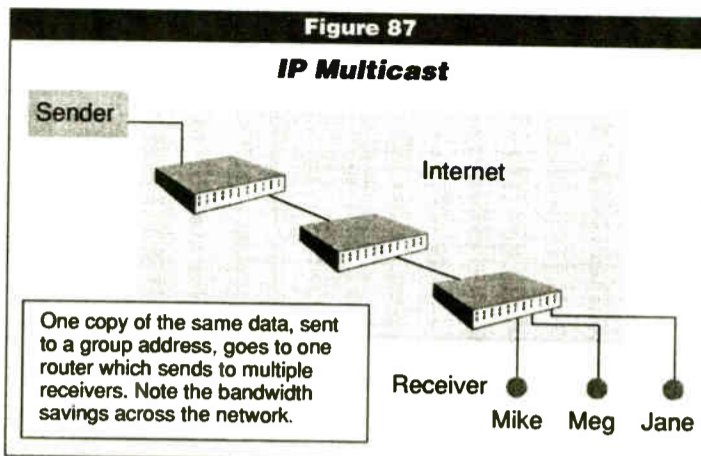
A pair of Mackie HR624s — retail value \$1,298 — will ship to the Rev. Bill Baker, who oversees the day-to-day operation of noncommercial Christian station WTMV(FM) in Youngsville, a town of less than 2,000 in northwestern Pennsylvania.



WTMV was licensed in 1998 and operates out of Bill and Patty Baker's former living room, with a 50-foot tower and single-bay antenna right outside. The call letters stand for "We're The Master's Voice." At 100 watts, it covers the Brokenstraw Valley with the word of Jesus.

The Mackie HR624 is a THX-approved, 6-inch, two-way active reference monitor that provides the accuracy of the HR824 in a compact, lighter package. It is suitable for recording, home and project studios looking for a monitor with a combination of features and value. Characteristics of this near-field speaker are smooth, detailed response; even dispersion for a wider sweet spot; and user-adjustable controls for acoustic spaces.

Rev. Baker won his speakers by signing up in our Readers' Choice Sweepstakes. To enter, just visit www.rwonline.com.



An Explanation of IP Multicast From Tech Terms'

In the course of a year, Jack Layton performs 100 or more Alternative Broadcast Inspection Program compliance visits. He says 75 percent of the files he reviews are deficient. Some have serious problems that could cost stations a lot of money if the FCC were to inspect.

Out of this experience comes "The Broadcaster's Guide to Creating and Maintaining the Public Inspection File." This is not a slick hardcover, just a simple booklet with a plastic binder full of practical advice from someone who knows of what he speaks.

It's a bargain at \$19.95 plus shipping. Contact Jack Layton via e-mail to layton@sgi.net.

★★★

Words and phrases like Boolean search, coaxial cable, L-Band, ambient noise, directional antenna and round-robin DNS may be as clear as crystal to you. But if they aren't, take a peek at "Tech Terms: A Techno-Field Guide," published by the NAB.

This second-edition softcover provides 314 pages of explana-

tions for terms and buzzwords, from "A&B Signaling" to "Zulu Time," covering radio and TV as well as online technology and



Ed McLaughlin, Bill O'Shaughnessy and Gordon Hastings, from left, are shown in a photo from O'Shaughnessy's book.

other new media. It would be simplistic for an engineer reader but quite handy for the non-techie manager or anyone who works in our technical world and needs a guide to the language. I really enjoyed flipping through it. The \$89.95 price is, however, steep for a softcover.

This softcover reference retails for \$895. Not exactly a beach book, but you're paying for the expertise and data a-plenty. To order call (831) 624-1536 in California.

I have many more books sitting here on my review shelf to tell you about. More to come.

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Jeff Kuhne, Engineer, WRPI-FM

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GUEST COMMENTARY

DAB May Mean Radio on Demand

A Leading Public Radio Engineer Asks Whether Digital Radio Will Indeed Be More Satisfying

by Mike Starling

This article is based on one that appeared in the publication *Current in March* and is used with permission.

Digital radio is not about technical quality. Some of the worst audio you'll ever hear will be digital audio. Although compression technology continues to improve, some digital service providers inevitably want to devote fewer bits per program stream so that they can air more programs at once.

Digital is also not about cost-effectiveness. This year, National Public Radio is retiring scores of analog reel-to-reel recorders, some in service as long as 30 years. From now on, we'll be tempted to replace audio equipment at the same furious rate that computers become obsolete.

And digital is not about speed. Though digital technology can save time in audio postproduction, it also lets producers extend their quest for the best, absorbing any time saved. (You'd be surprised to know how cleverly some are painstakingly simulating spontaneity during post-production.)

Slice and dice

What is digital really about? Its over-mastering attribute is that it engages the computer, the first machine that manipulates content.

Whether it's doing voicemail, a digital automation system or a transmission protocol like the Ibiqity Digital Corp. proposal now pending at the FCC, digital technology's stellar achievement is all about slicing and dicing content. That's good news because making great radio is why we're all here.

Long before we had heard of the Internet, I suspected that national program hosts would someday be sitting at home and recording segments for national broadcast. But today, the innovative "JazzWorks" collaborative production model developed by Boise State Radio and WDUQ(FM) in Pittsburgh has become a model for widespread emulation.

NPR Correspondent Ivan Watson can now send a report from his laptop computer in Afghanistan through a briefcase-sized Inmarsat satellite uplink and directly into NPR's digital production system in Washington.

Recently, The Wall Street Journal showcased an article about a San Diego DJ recording an interview with a band passing through Sun Valley, Idaho, that was subsequently aired in Boise and sounded remarkably local and live.

Paul Schafer's innovative analog automation of decades ago is no match for the commonly deployed tools of 21st-century broadcasters.

What's truly exciting is what's coming for listeners. Listener behavior appears to be ruled by a maxim of human nature posited in the 1950s by communications theorist Wilbur Schramm: Individuals turn their attention to media that give them *high expectations of reward* for the amount of *effort required*.

Schramm's formula indicates how many readers will go inside a newspaper

to read the rest of a front-page story, or how many Web visitors will "drill down" for more information on station Web sites.



Mike Starling at the Public Radio Engineering Conference

Broadcasting's long-term success may depend on how well we leverage opportunities for high satisfaction and low effort in an all-digital environment.

On the receiving end of broadcasts, listeners and their digital helpers are taking a much more active role than in the past. Radio may be approaching a breakthrough that Alvin and Heidi Toffler termed Prosumption — the act of consumers producing their own high-quality goods with the help of technology and perhaps some thoughtful assistance from people on the sending end of broadcasts, like you and me.

TiVo is a pleasing example of an early media prosumption device. (Caution: evangelist at work.) Even at early-adopter pricing, TiVo has been the best media device I've purchased to date. My family never misses "Now," "West Wing," "Washington Week," "Providence," "Sopranos," "60 Minutes" or "South Park" (yes, the kids are still at home). We never have to rush to meet a start time.

We no longer care about commercial interruptions or particularly mind when friends call during a program. Our favorite moments can be played and replayed instantaneously, until we're content or saturated. If our aging ears miss a line, we can hit the "last eight seconds" button and hear it again.

With advanced search criteria, we easily find and command the capture of beloved classics fed in the middle of the night, otherwise lost in the clutter of 500 channels. While we watch no more TV than before, we enjoy it more.

The problem is, I've become an increasingly frustrated radio listener. TiVo users routinely lament the lack of a radio version. If only I could start the latest hour's "Morning Edition" when I get into the car. If only I could skip over pledge breaks (after calling in my contribution, of course).

If only I could hear "Car Talk," Imus, Tavis Smiley, Paul Harvey, Susan Stamberg, Letterman's Top 10, or Charles Osgood when I've got the min-

utes and yearning for them. If only.

Let's imagine a radio version of TiVo called PAR/ROT— Personal Audio Recorder/Radio On Tap. Parroting is exactly what it will do for us, repeat what we want, whenever we ask. It's coming, and it will forever change how listeners

With program choice directly under the control of the prosumer, not the program director or serendipity, expectation of reward will be high and the effort required will drop virtually to zero. Under Schramm's hypothesis, user satisfaction will skyrocket.

When listeners have PAR/ROT devices, we'll be able to air compelling niche programs in off hours that will compete on an open playing field with the blockbusters of primetime. Radio will have shifted from a serial, temporal delivery technique to access on demand.

Feed the PAR/ROT

Except for live programming, prime time will have nothing to do with when programs are transmitted. It will be the refreshing time I spend with my most cherished radio companions.

Listeners and their PAR/ROTs won't be entirely on their own. Astute PAR/ROT owners will seek out programmers and editors to suggest content they will enjoy and expand their horizons to new programming they're likely to appreciate.

TiVo already offers a crude "suggestions" protocol that recommends programs because they feature performers or writers you've chosen in the past. Sometimes it works well, sometimes not. Video stores also offer a "Mark's Suggestions" shelf of tapes, and Amazon.com bases its recommendations on the preferences of other buyers who share some past selections with you.

Imagine a cottage industry of content advisors who use demographic and focus See STARLING ON DAB, page 12 ▶

Photo by Leslie Stimson

use our programs. A critical link in this will be adding digital tags to content so that machines like PAR/ROT can manipulate it.

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- 2 MODELS TO CHOOSE FROM**
If budget is a primary concern, buy the classic DA-16 or DA-8 models. Thousands of these models are in use because they still offer great performance and dependability at a great low price (but lack front panel indicators and rear removable connectors).

EAS

▶ Continued from page 1

EAS encoders and decoders to accommodate the new codes, even though they will not be required by the commission to make these changes.

The FCC will require broadcasters who replace existing EAS equipment after Feb. 1, 2004, to install EAS equipment that is capable of receiving and transmitting the new codes.

Incentive?

Some industry experts have expressed concern that the commission, by making the changes optional for broadcasters, has opened the door for some broadcasters to take their time to make the improvements.

"The worst-case scenario will be having an EAS system that's functioning with only half the stations having the upgrades," said Gary Timm, broadcast chair of the Wisconsin EAS committee and a member of the EAS National Advisory Committee.

"There really is no incentive for broadcasters to make the changes. Everything is optional. I think having the FCC mandate the upgrade by a certain date would have been preferable," Timm said.

Richard Rudman, who expected to give up his title as chairman of the EAS National Advisory Committee earlier this month, said it is difficult for the FCC to do more than suggest the changes to

broadcasters.

"As a practical reality, it's hard to mandate anything that is strictly voluntary and not funded," he said.

Yet Rudman, who still chairs the Los Angeles County local emergency committee, is hopeful broadcasters will take the lead in loading new event codes in their EAS systems.

"It will also be important that local and state EAS committees rewrite their plans to incorporate the new codes to help keep confusion to a minimum," Rudman said.

Several EAS equipment manufacturers said if a station's encoder/decoder were unable to receive a new event code, the equipment would log that an "unknown event" had been received.

The NAB has not taken a position on whether stations should make the upgrades.

"However, we are very supportive of the Amber plan and the other new event codes," said Dennis Wharton, NAB senior vice president of corporate communications.

Industry experts said the cost to retrofit existing EAS equipment would be minimal for most radio broadcasters. In their comments to the FCC, EAS equipment manufacturers estimated the new software would cost \$100 to \$300 per encoder/decoder.

EAS equipment manufacturer TFT Inc. expected to release software/firmware updates for its EAS911 encoder/decoder by May 1.

"The cost will be \$100 plus shipping

Big EAS Changes

The FCC acted on several requests from the Society of Broadcast Engineers for EAS rules changes.

The changes enacted in February are wide-ranging. For example, the FCC increased the time period a broadcast station is allowed to retransmit Required Monthly Tests from 15 minutes to one hour. Broadcasters who have at times found it burdensome because of schedule concerns to relay the mandatory tests within the 15-minute window are viewing the extension positively, EAS officials said.

The FCC also approved SBE's request to reduce the required modulation level of EAS codes from 80 percent to 50 percent of full-channel modulation limits.

The commission's revised Part 11 EAS rules will exempt XM Satellite Radio and Sirius Satellite Radio from installing EAS equipment, because the satellite broadcast services rebroadcast 100 percent of their programming from a main hub station.

—Randy J. Stine

and handling for a set of two EPROMs," or electrical programmable read-only memory integrated circuit chips, said Darryl Parker, TFT vice president for business development. "The new EPROMs can be easily retrofitted into existing units. We'll also be incorporating the software/firmware into all new TFT EAS boxes."

Skip White, vice president of software engineering for Multi-Technical Services, said the manufacturer expected to have the upgrade for its System 3000D EAS units available June 1.

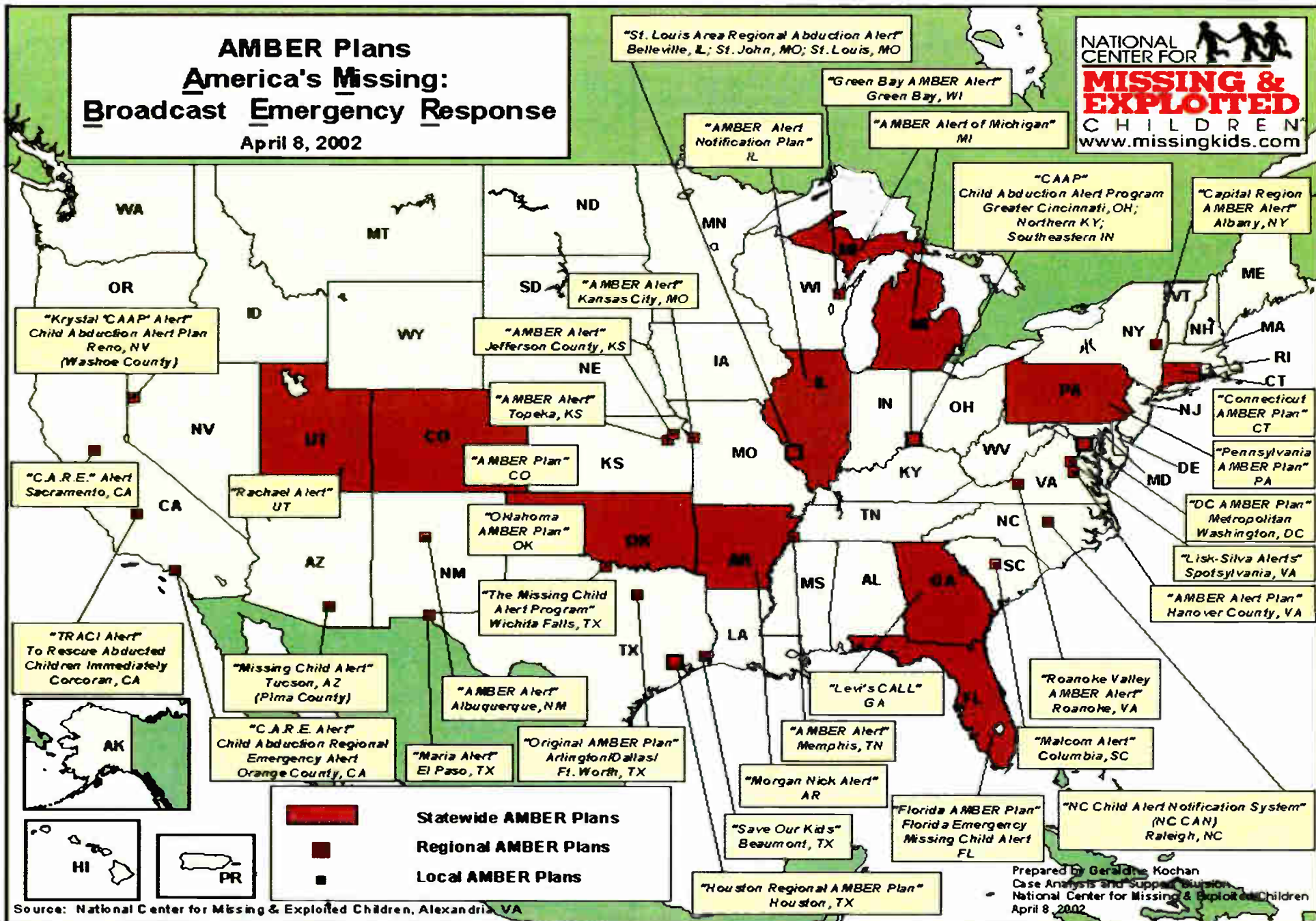
"It will be a software change only and can be done in the field. There will no charge for the software update," White said.

Jim Hauptstueck, resale products manager for Harris Broadcast Communications, said updates for the Sage Endec encoder/decoder, which is marketed by Harris, would be available by early summer.

PROM upgrade

"The PROM upgrade, for stations that originate alerts, will be at a very low price. It should really be a very minor cost. Stations that only relay or log events will eventually be able to upload the new codes to the Sage Endec through its serial port from the Web through the Harris site free of charge," he said.

Clear Channel Communications
See EAS, page 7 ▶



This map shows Amber plans as of April 18. Source: National Center for Missing and Exploited Children.

EAS

► Continued from page 6

planned to conduct a phased-in upgrade of its EAS equipment to incorporate the event and location codes at every station it owns.

"We hope to complete our EAS modifications by the end of this year. Our ability to achieve this goal will depend upon the cooperation and abilities of the manufacturers involved," said Al Kenyon, senior vice president of projects and technology. He expected to become chair of the EAS National Advisory Committee earlier this month.

At least two other broadcast groups, Entercom and Greater Media, said they would load the software/firmware upgrades for their stations EAS encoder/decoders when the product was available.

"All Entercom stations will install the new firmware when it's available. Our stations also have the option of manually adding the new event codes into their EAS units, affording us the opportunity to rapidly improve our participation in the Emergency Alert System," said Marty Hadfield, vice president of engineering and IT for Entercom.

Kate Healy, Emmis Communications spokeswoman, said its stations will decide independently when to make the improvements to their EAS units.

"Of course, all Emmis stations will comply when replacing existing EAS equipment," Healy said.

The most high-profile addition to the event code list is the Child Abduction

The National Center for Missing and Exploited Children lobbied the FCC for its inclusion to the event code list.

The child advocacy group has been working to establish Amber plans

9-year-old Arlington, Texas, girl who was abducted and killed in 1996, the Amber plan is a voluntary partnership between broadcasters and law enforcement to issue alerts via EAS to locate abducted children.

NCMEC President and CEO Ernie Allen said the new code will help to mobilize communities much faster when a child is kidnapped.

"We are thrilled to see the FCC recognize the Amber plan as an important use of the EAS. Just as hurricanes and tornados can be life-threatening to a community, so can child abductions," Allen said.

Allen said approximately 32 local, regional and statewide Amber plans are in place. Amber alerts are credited with the safe recovery of 16 children.

The most high-profile addition to the event code list is the Child Abduction Emergency code.

Emergency code. Until now, broadcasters have activated the Amber plan as a Civil Emergency Message, which led to some confusion among listeners about what the alert was for, EAS officials said.

across the United States. Amber alerts are only issued when police believe a child is in danger of serious bodily harm or death.

Named after Amber Hagerman, a

BUSINESS DIGEST

Prophet Systems Trims Workforce

OGALLALA, Neb. Digital broadcast systems provider Prophet Systems Innovations has joined the list of broadcast industry suppliers that have downsized operations in the last six months.

However, the company, which is owned by Clear Channel Communications, did not blame a poor economy for the move, but rather more "computer-savvy" broadcast customers.

PSI cut more than a dozen jobs when the company reorganized in early April, said Kevin Lockhart, chief executive officer at Prophet Systems. He said cuts were made in the training and installation departments to match the level at which the departments were used and the amount of revenue they generated.

"We're finding that our broadcast customers have grown savvier in the areas of system installation, engineering and computer technology," Lockhart said. "They just don't need the level of outside help that Prophet Systems has provided in the past."

Prophet Systems Director of Marketing Jackie Lockhart said interest in the company's new NexGen Digital NS product, which is designed for one or two station clusters, has been very good.

Based on business in the first quarter, Jackie Lockhart said the company expected a nice bump in the next. "We expect the second quarter to be a good one for us."

— by Randy J. Stine

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DIGITAL NEWS

XM's Loss Grows; Radio Prices Cut

WASHINGTON XM Satellite Radio Holdings Inc. reported a loss for the first quarter of this year, due to costs related to its service launch. The loss was less than anticipated by many analysts.

At the same time, retailers expected to lower prices for some XM radios in early May due to reduced manufacturing costs for receiver components and XM's chipset.

The satellite radio company reported a first-quarter loss before interest, taxes, depreciation and amortization of \$75.9 million, compared with a \$40 million loss last year.

For the three months of this year, XM had consolidated revenue of \$1.8 million, compared to none a year earlier. XM reported for Q1 a consolidated net loss available to common shareholders of \$117.7 million, or \$1.56 per share.

XM projections for this year are revenue of \$20 million, subscriber acquisition costs of \$130 per subscription, and an EBITDA loss of \$275 million.

XM added 48,509 subscribers in Q1, ending the quarter with approximately 76,000. Company execs say XM is on track to garner 350,000 subscribers by the end of this year.

The subscriber churn rate is less than 1 percent a month.

In markets where it is competing with Sirius Satellite Radio, XM has seen its sales rise, said XM President/CEO Hugh Panero.

XM had \$310 million in cash in April, which it expects will carry the company through Q1 of 2003.

XM Pioneer Receiver Prices Cut

On May 1, retailers planned to offer the Pioneer Universal Receiver that can adapt a car stereo to receive XM with a

Consumer Reports Reviews XM

For its May issue, Consumer Reports tested three types of XM Satellite Radios.

"Generally, the signal was clear and strong in all areas and weather conditions we encountered, including rain and snow. The sound was comparable to that of a high-quality FM broadcast and didn't suffer from reception problems such as static and signal-fading that are common with conventional radio broadcasts," stated CR testers.

The magazine said that in more than 100 hours of driving, its testers experienced "relatively few signal dropouts, lasting only a few seconds at most." CR did say reception loss was longer in tunnels in Manhattan because the signal was blocked.

CR tested a Pioneer DEHP 3370XM in-dash radio/CD player for \$400, installed in a 2000 Ford E-350 van. It paid \$80 for an antenna with a \$30 rebate, \$30 for antenna installation, \$60 for receiver installation, and \$55 for cables, harnesses and labor. The system cost was \$595 after rebate.

CR was able to use the existing head-units in two other vehicles by installing XM-compatible receivers made by Sony.

The Sony DRN-XM01C, available for \$300, was installed in a Ford E-350 van and a Toyota Sienna minivan. With this unit, testers could hear XM programming through an adapter in the tape player. Testers listened to these units in a trip from Florida to New York.

Testers tried out a similar Sony plug-and-play unit, the DRN-XM01R for \$400, in a Volkswagen Jetta. This model uses a modulator to send the signal to an FM frequency (106.5 to 107.9 MHz) that a conventional radio can pick up. The reviewers' unit "suffered from interference from regular FM stations."

Testers listened to this unit while driving through remote areas of New Hampshire's White Mountains and in Manhattan and Boston. They found the Sony plug-and-play display text hard to read and thought the magnetic antenna was obtrusive.

CR noted the cost of the hardware is likely to drop over time.

"Within another two to three years," the magazine also wrote, conventional local broadcast radio stations likely will convert to digital.

CR did not test Sirius Satellite Radio units. The tests were conducted in late February, when Sirius had just begun its rollout in four markets.

XM began carrying Consumer Report radio programs in March.

— Leslie Stimson



suggested price of \$199 — a \$50 reduction. In addition, purchasers of an XM-ready head unit would be able to add the Pioneer XM receiver unit with a suggested price of \$149, also a \$50 reduction. The separate XM antenna is \$49 to \$79.

Panero said XM's second-generation, lower-cost chipset is on target for production late this year and that the company has completed the subsystem design on a third-generation chipset to reduce costs further next year.

He said the company plans to be "out of

the hardware subsidy business within three years." XM has shared receiver development cost with its receiver manufacturing and component partners.

XM's current radio configuration includes a head unit, antenna and a receiver mounted in a car trunk.

XM has been testing technology enhancements with its manufacturing partners that it hopes will enable chip developers to miniaturize the chipset, allowing it to be integrated into the head unit. Once that happens, the separate, trunk-mounted receiver now needed to

capture the satellite signal can be eliminated. This would reduce manufacturer's outlay for harness wiring, power supply circuitry and other parts. Panero expects products with these changes to reach retailers late this year.

The company also is working with GM and Honda on advanced data applications for satellite radio. XM said it designed its signal protocol with future data applications in mind.

GM intends to offer XM radio as a factory-installed option in 25 car and truck models in 2003.

"We'll start to see OEM flex its muscle in the second half of 2003," Panero predicted. XM expects to sell the bulk of receivers in new and leased vehicles rather than the current aftermarket sales.

"The big question is whether people will buy satellite radio when they have the opportunity to have it installed at dealerships," Robinson Stephens analyst James Marsh recently told The Wall Street Journal. "We're hearing that 10 to 15 percent of new radios sold are satellite radios."

Although that's ahead of his firm's current aftermarket retail sale projections, he said it's still early in the life of the product category. Aftermarket success, he stated, doesn't demonstrate by itself that satellite radio will be a mass-market service.

"It basically demonstrates that early adopters are willing to go to Circuit City and go through the hassle of buying a satellite radio and having it installed in their cars."

XM expects to have radios in 6,000 outlets by July, including its newest retail partner, Wal-Mart.

The company is developing marketing plans for a retail presence at truck stops, and it is pursuing purchase agreements with truck fleets.

— Leslie Stimson

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Expanded AM

► Continued from page 1

discovered that the medical equipment at the offices did not work properly because of the neighboring RF signals. The interference forced the station to operate at 1 kW during the hours of 9 a.m. to 5 p.m., while the doctors' offices were open, and power up to 10 kW only at night, Gay said.

Simulcasting

Due to the delay in approval for the minor change, WRNC has put off developing a separate identity. For the past two-and-a-half years, the station has been simulcasting programming from its sister, WLCG(AM). Though Gay expects the FCC to approve the change application soon, station executives have not developed a plan for a separate programming stream.

Still, Gay believes in the promise of the expanded band. "The band was so crowded before," he said. "This is like a new neighborhood."

He believes that the expanded-band frequency will give the station an edge when digital AM radio is introduced. Depending upon the power requirements of digital AM, Gay believes WRNC's area of the band is much clearer.

Others, like Jim Coloff, general manager of KCNZ(AM), a news/talk and sports station in eastern Iowa, agree that expanded-band frequencies will offer an advantage.

"The overall strength of the signal allows us to have a better signal," he said.

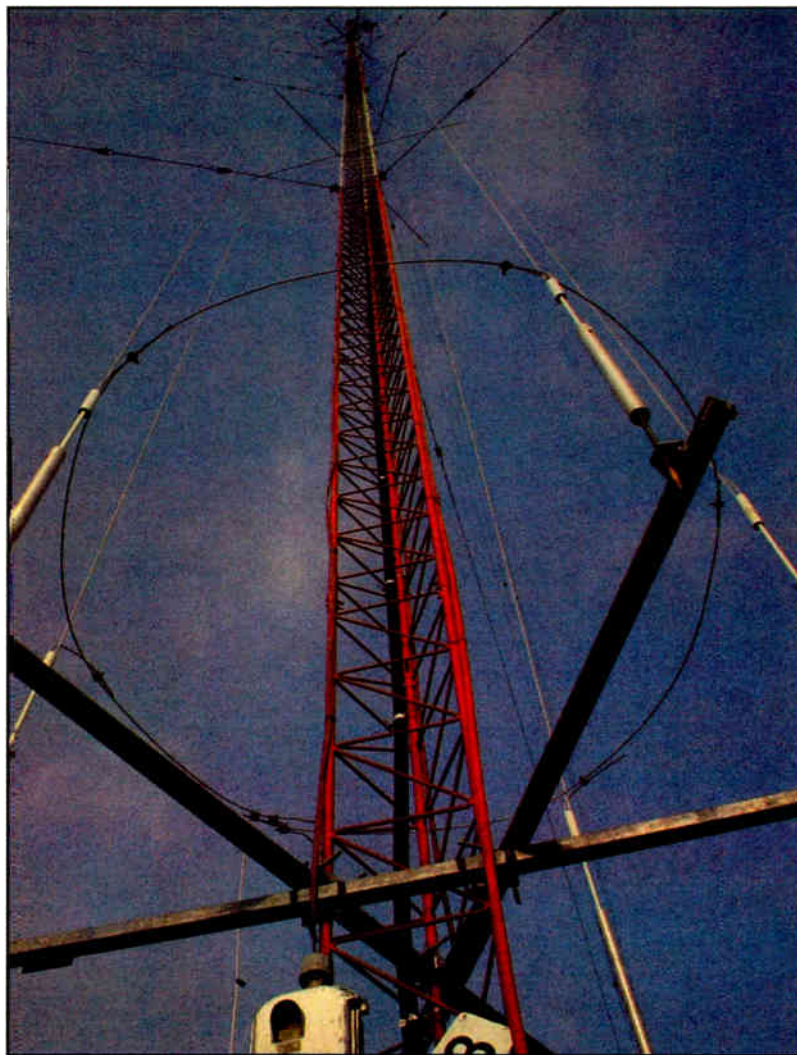
KCNZ is benefiting from the move. The station also has chosen to simulcast from its other AM station, the original KCNZ at 1250 on the band, except when broadcasting regional sporting events that take place simultaneously.

In addition to better signal quality, Coloff said the new frequency has a wider reach. Instead of its previous 30-40 mile radius, the station can be heard 120 miles away day and night, he said.

Though the station hasn't been offered a huge boon for the company, Coloff said KCNZ definitely has benefited from a stronger image and wider coverage area.

Ad sales at WQSN(AM) in Kalamazoo, Mich., has been helped by the expanded band signal, said Stephen Trivers, president and general manager of the station, one of four owned by Fairfield Broadcasting in the state.

Since it went on air in December of 1998, the all-sports radio station has maintained a separate identity from Fairfield's other properties. Because the four stations share a sales staff, Trivers said WQSN had a "running start" with revenue when it was launched and it soon gave the company an advantage because



The tower in Warner Robins, Ga., for WRNC(AM) and WRBV(FM) is a standard Rohn 55 type. The cables running up the side are an LBA Tunipole 611 folded unipole AM antenna.

Richard Hamilton

of WQSN's bigger coverage area and stronger signal.

The superior coverage achieved by stations like KCNZ and WQSN are exactly what the commission intended when it began the expanded-band proceeding in 1987. Since the FCC issued its original notice on the allotment plan, it has issued 65 construction permits.

Overall plan

While a majority of stations with CPs are on air, the rest have time to build out facilities. Depending upon when their applications were approved, the applicants have three years to build their new stations.

Issues also remain for the FCC to resolve before this area of the band is established, such as the possibility for more frequencies in the band and who may be eligible for them.

Recently, the FCC bought itself time to study these issues by instituting a freeze on applications for major changes within the expanded band. The FCC's Audio Services Division is in the preliminary stages of a study to analyze spectrum in the band and, if available, determine the appropriate protection standards

that should be in place, said Edward De La Hunt, associate chief of the office of broadcast licensing at the division.

He said the commission has not determined when the study will be complete and the freeze will be lifted. Other proceedings, such as the 350 vacancy allotments for FM radio, in which applications have been frozen longer, are higher on the division's priority list, he said.

Engineering consultant Charlie Hecht believes the freeze is proof of the FCC's beneficial long-range planning for expanded AM stations. The owner of Charles A. Hecht and Associates Inc. in Pittstown, N.J., he helped launch the first expanded-band station, WJDM(AM) in Elizabeth, N.J. It has since changed to WWRU(AM).

KCNZ(AM) in eastern Iowa has benefited from the stronger image it sells and a wider coverage area.

The time for further planning probably will yield more openings in the band, he said.

"After the freeze is over, the commission can maximize the number of stations while maintaining the technical integrity of the band."

If the study determines more spectrum is available, De La Hunt said the FCC will let the industry decide whether it should invest further in the band. Because of the improvements many stations have made and the changes the FCC has instituted in relaxing some of the rules for AM stations, he believes the

industry still considers AM radio to be a viable business.

"In the last AM window, we received 200 applications," De La Hunt said. "I don't believe that when you see that many applications filed, that AM is dead."

The likelihood of AM digital broadcasting may strengthen the position of expanded AM broadcasters further because of the superior coverage afforded by their location, said De La Hunt.

While the FCC is studying where to go with the expanded band, it also is studying the possibility of setting standards for digital AM service. Following the recommendation released by the National Radio Systems Committee in April endorsing Ibiqity Digital Corp.'s AM IBOC system for daytime use, the FCC is reviewing the recommendations to determine how the agency should move forward.

Under attack

But others believe IBOC will be the final nail in the coffin for AM radio.

"AM radio is under attack by the FCC," said Bryan Smeathers, president and general manager of WMTA(AM) in Central City, Ky. and one of the founding members of the AM Broadcasters Association, formerly ACAMBA.

Many AM stations will not be able to afford to convert to digital and pay the expected royalty fees to Ibiqity to broadcast digital AM radio, he said.

Overall, Smeathers calls the expanded AM band a "giant plunder," because of the few stations that were able to move. Though the FCC's study opens up the possibility of more spectrum in the expanded AM band, Smeathers said it may be a moot point.

"In today's climate, most small radio stations are not convinced that the return on investment is going to be worth the transition (to digital)."

One issue the FCC recently did resolve concerns the length of time that expanded-band stations have to broadcast on their former AM frequency and on their new assignment at the same time.

De La Hunt said the issue was settled in December of 2001 in a case involving Salem Media station KBJD(AM) in Denver.

The station questioned clauses in its license approval notice in which the FCC contradicted itself on the length of time Salem had to keep KBJD(AM) at 1650

kHz and KRKS at 990, said the station's attorney, James Riley, a partner at Fletcher, Heald and Hildreth, PLC.

In one part of the document, the commission stated the station had five years starting from the date of the construction permit. But in the AM expanded-band rule making, the FCC indicated that stations had five years from the date the expanded-band station was licensed, Riley said.

De La Hunt said the ruling over KBJD applies to all expanded AM stations but the commission does not plan to issue a further notice on the issue. ●

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Millenium Consoles - The NEXT big thing

by
Mark Stennett,
V. P. Engineer
NEXT Media Group

Sooner or later you may find yourself building out a new consolidated studio facility or upgrading an existing plant. When you do, Radio Systems has your console needs covered at prices you can afford with their Millenium series. Since they come in sizes ranging from 6 to 24 channels, Radio Systems has the right board for the job at hand. And all Millenium consoles come standard with 3 program output busses, complete remote control logic on A and B inputs for all channels and a comprehensive monitor selector that has 8 positions. Analog metering is also standard with a CT-6 clock/timer which can run stand alone or be synchronized with a master driver as a slave. Balanced input channels can accommodate mic through line level with simple jumper settings.

Installing a Millenium console is a snap whether you use Radio Systems StudioHub or wire it up yourself. With quick connect barrier strip headers throughout the console, crimping pins is a thing of the past. Designed to sit on top of your counter, small access holes drilled through it are all you need to be up and running. My own experience is that these consoles perform well in high RF environments too. Plug and play! Documentation is straightforward and easy to follow.

If keeping recurring maintenance costs down is important to you then you need a Millenium console. Millenium series consoles use extensive VCA technology and electronic switching. With no direct audio path through mechanical connections, your audio won't be affected by dirty connections over time. They also feature soft rubber button pads that feel great and last a long time. LED's illuminate the console surface,

eliminating the need to constantly replace burned out status bulbs. When maintenance is required, Radio Systems has made the job easy. Replacing faders is simply a matter of removing 2 screws per channel. We all know accidents happen. Cleaning soda or coffee out of any console is bad news for all concerned. With the soft rubber buttons in the Millenium however, removing the sticky mess is quick and easy thanks to their molded design. While the Millenium console doesn't have individual plug in fader cards, all of the logic is mounted underneath the control surface while keeping all of the audio circuits on the bottom of the board. Critical components are socketed making their replacement a fast process. If your facility is running a digital audio storage system, you probably already have those outputs summed together and can feed that to your STL while you repair your Millenium, thus minimizing your downtime.

Radio Systems has a great product in their Millenium console. During my career in broadcast engineering, I have seen over 50 of the RS-12 and Millenium consoles installed. Radio Systems is a pleasure to deal with. But they don't just do consoles. I've also had great success with their distribution amplifiers, GPS clock systems and even some custom electronics. Call Dan Braverman, President of Radio Systems and tell him about your needs. His "can do" attitude will likely result in the perfect solution.

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IBOC Q&A

Conversion Costs Demystified

This is one in a series in which Ibiqity Digital Corp. answers questions about how to implement in-band, on-channel digital audio broadcasting. Broadcast Technology Manager Jeff Detweiler answers here. Past answers are posted at www.rwonline.com under the tab "IBOC DAB."

Q: What factors determine where my station falls into the \$30,000 to \$200,000 IBOC conversion range that has been publicized?

A: IBOC conversion costs depend on a station's transmitter power output and the current state of the transmitter and other equipment.

In the case of FM, the method of conversion is also a factor. A station on the low end of the cost range would be an AM station with a newer, solid-state transmitter. This station could convert for little more than the cost of an IBOC exciter.

A station on the high end of the cost range would be a high-power FM station without any overhead in the existing transmitter. This station would need to purchase a new transmitter and related equipment. Ibiqity Digital predicts the

average station cost to be about \$75,000.

Overall, a station that has kept pace with technology will find its transition cost on the lower end of the range compared to a station of similar power that is operating with dated equipment.

Almost all stations converting to IBOC will be able to use existing studio equipment. A few will need to reduce or eliminate audio compression in the studios to avoid incompatibility with PAC-encoded audio. Some will need to upgrade STL systems to deliver digital quality audio. Most stations will need to purchase digital audio processors with AES audio input and output for the IBOC audio chain.



AM facilities that have transitioned to a recent generation of solid-state transmitters will probably only have to make minor modifications for IBOC compatibility. Tube AM transmitters will likely be replacement candidates. For many AM facilities, the purchase of a stereo STL, an IBOC compatible audio processor and an IBOC exciter will comprise the majority of the upgrade costs.

The FM equation is a little more complex. If the station's FM transmitter operates with an output of less than 8 kW it will generally be more cost effective to look at the low-level or common amplification conversion method. Common amplification uses one linearized transmitter to amplify both the analog and IBOC signals. This implementation is most efficient in regard to energy consumption and space utilization. The bulk of the cost of such conversion will be the new transmitter.

For FM stations operating with transmitter power levels above 8 kW, low-level implementation will typically cost more than high-level or separate amplification. In separate amplification, the existing analog transmitter is combined with the digital transmitter using a 7 dB or 10 dB combiner.

The decision between high-level and low-level combining usually rests in the

amount of headroom in the existing transmitter. If the transmitter has at least the 10-percent headroom required to overcome the insertion loss of the injector/combiner then high-level combining may be less expensive.

If however, your transmitter does not have the required headroom it may be more costly to replace the existing analog transmitter and buy the necessary high-level components than it would be to buy a single low-level common IBOC/FM amplifier.

The estimated cost range is quite broad, but can be narrowed greatly once the existing equipment is evaluated. The good news is that those broadcasters who have invested in updating their equipment will benefit by a reduced cost in converting to IBOC.

Send your IBOC questions to radioworld@imaspub.com.

Radio World welcomes other points of view. 

Starling on DAB

► Continued from page 5

group research and layers of three-dimensional modeling of audience proclivities to make recommendations and save content on your storage device in case you'll like it. Some TiVo or PAR/ROT owners will want to be thoughtfully nudged toward content that will be even more satisfying.

It's the receivers, stupid

Where the proposed digital radio plan could stumble is if regulators fail to anticipate and preserve opportunities for innovative services when they craft the FM IBOC rules.

Warts and all, FM IBOC works pretty well. It's much improved over the 1995 version, reasonably interference-free on analog radios, with a sound quality statistically indistinguishable from a CD recording.

It also offers the potential of secondary program channels, an important means of serving niche listeners, though this will happen only if the receivers are designed to handle multiple channels. This may require mandating multimode receiver standards, an affirmative step of the kind the FCC has traditionally avoided.

During the first part of the transitional period for IBOC, when stations air both analog and digital streams on the same channels, a frequency will be able to carry both a digital music-grade channel (equal in quality to XM or Sirius satellite radio, with a bit rate of 64 kilobits per second) and an AM-grade digital voice channel, as well as the analog FM broadcast and various digital data services.

Later, in the "extended hybrid" part of the transitional period, the channel could carry two satellite-grade music channels and a voice channel.

And then, some years from now, when few people still use analog radios and broadcasters go entirely digital, the channel could deliver the equivalent of three or more channels equal in quality to compact discs. Or the broadcaster could devote the whole channel to a surround-sound channel. Hundreds of surround DVDs are already on the market. This would be the equivalent of the DTV option of high-definition broadcasts.

The lack of a federal effort for multimode digital radio standards could make IBOC a short-lived dead end and delay the advent of successful digital radio. UHF television nearly died until the All Channel Receiver Act required manufacturers to include UHF tuners in sets. The spread of closed captioning and stereo TV audio were hampered by the lack of universal mandates.

As radio broadcasters have learned time and time again—with aeronautical interference, with TV-6 interference, with SCA performance, with narrow lfs and with third-order intermodulation interference, it is receiver design that defines and often limits the services delivered to our audiences. The design of future digital radio receivers will either bear the fruit of innovation or will squander a promising opportunity.


We currently lack tests on listeners' subjective reaction to different multimode transmission formats, which will provide valuable information to help broadcasters make informed decisions on specific services to offer. No one knows how low bit rates will go while retaining good sound. This work can be pursued immediately.


Public radio recently lost a shepherd, statesman and friend, Rick Madden of CPB, who spent his final energies urging us individually, and as an industry, to think unabashedly big.

As he told us when receiving the Edward R. Murrow award, "We're not a smaller-is-better enterprise anymore, and none of us can think with that mindset." This admonition applies to all who have made careers of the original wireless medium. We need not be lost in television's stray, or doomed to obsolescence by the Internet, 802.11b, satellite radio or the Auto-PC initiative.

Is it too implausible that radio could consciously leverage digital opportunities to maximize listener satisfaction? And if we took those steps, is it possible to achieve greater success with established shows, as well as new successes with niche market programs? Could the "radio programs I want, when I want them" emerge as the killer application of digital radio?

Mike Starling's day job is vice president for engineering and operations at NPR. Reach him via e-mail to mstarling@npr.org.

Radio World welcomes other points of view to radioworld@imaspub.com. 



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World Radio History

◆ NEWS WATCH ◆

► Continued from page 2

"Through Susquehanna's involvement with the National Radio Systems Committee, we've seen and heard firsthand the benefits of Ibiqity's IBOC technology for broadcasters and consumers," said David Kennedy, president and COO of Susquehanna Radio Corp.

Tower Light Fine Upheld

The FCC has affirmed an \$8,000 fine against Eure Family Limited Partnership for failure to exhibit red-

obstruction lighting on its Mathews County, Va. antenna structure. The original fine was \$10,000, but the agency reduced it to \$8,000 based on Eure's past good compliance record.

The agency did not dismiss the fine entirely because it holds licensees responsible for the actions of their employees and contractors.

Eure operated the tower as an antenna site for WXEZ(FM), Yorktown, Va. and monitored the tower lights using a dial-up device programmed to notify the station engineer of any outages until the station was sold in October 2000. Eure leased space on the tower to Bullseye Broadcasting LLC,

licensee of WSRV(FM), Deltaville, Va. In that agreement, stated Eure, Bullseye was obligated to monitor the tower lights and notify Eure of any failures. Bullseye said it didn't know it was supposed to monitor the tower lights.

Bullseye's principal said the dial-up device used to monitor the tower lighting was never reprogrammed to notify its engineer of any lighting outages after Eure sold WXEZ.

Eure said the beacon had been repaired and the dial-up device had been reprogrammed to notify Bullseye's engineer of any lighting outages.

Brooklyn Pirate Arrested

WASHINGTON The FCC's Enforcement Bureau says it has shut down more than 20 pirate stations this year.

In April, an FCC investigation led to the arrest of Paul Dorleans for operating an unlicensed FM station on 87.9 MHz in Brooklyn, N.Y. The FCC and the U.S. Marshal's Service seized his equipment. The commission said it issued more than one notice to Dorleans directing him to stop operations before the arrest.

If convicted, Dorleans could be fined up to \$100,000 and spend up to one year in prison.

KTRY Fined \$22,000

WASHINGTON The FCC fined Jamie Patrick Broadcasting, Ltd., licensee of KTRY(FM) in Bastrop, LA., \$22,000 for failure to respond to FCC correspondence, install and operate EAS equipment or maintain a public inspection file.

The commission stated that the station did not respond to the fine, first issued in November 2001, so it reaffirmed the penalty in April. The station had 30 days to pay.

Arbitron: PPM Still Shows More Audience

PHILADELPHIA Initial ratings from the second phase of the Portable People Meter U.S. market trial in Philadelphia are on the books.

According to Arbitron, compared to existing methods of measuring media audiences, the PPM continues to report higher average quarter-hour audiences on a 24-hour day, total-week basis for the combined electronic media stations and networks that encoded full time.

February results showed "somewhat higher" average quarter-hour audiences for radio. The PPM reported a higher average daily cumulative audience: 84.8 percent for the PPM vs. 73.7 percent for the Arbitron radio diary. It also showed less time spent listening for radio: 3 hours and 20 minutes per day for the PPM vs. 3 hours and 35 minutes per day for the diary.

Findings continue to suggest that the PPM is tracking media exposure that is not included in today's diaries.

Steely Joins Ibiqity Rollout Board

COLUMBIA, Md. Clay Steely, recently appointed vice president of engineering for ABC Radio, has joined Ibiqity Digital Corp.'s Broadcaster Rollout Advisory Board. Bert Goldman, his predecessor at ABC and now executive vice president of First Broadcasting, will remain on the board.

The advisory board is made up of a cross-section of the radio community to provide guidance and intra-industry support for the implementation of IBOC digital broadcasting.

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World Radio History

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Workbench

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

Radio World, May 22, 2002

Wasps, Pine Trees and Meter Bulbs

by John Bisset

A recent inquiry comes from an engineer in charge of three AM stations, with the studios in one building. Unfortunately, the building also housed one of the AM transmitters.

The engineer had tried a couple of car radios to get a clean signal, but was bothered most by the swamping effect of the co-located station.

Stuart Engelke with AM stations WMCA and WWDJ in New York wrote to radio-tech@broadcast.net that feeding the local station's modulation monitor using a Delta Electronics TCT Sampling Toroid will solve two problems.

First, the mod monitor will get a feed, regardless of whether the main or auxiliary transmitter is feeding the system. Second, the feed is coming from the toroid, not an external antenna that can pick up extraneous signals during low-power operation.

Stuart also suggested www.ccrane.com/am_antennas.asp for locating a loop antenna that can be oriented to null out the local signal, in the case of feeding the car radios. The site is a useful reference for listeners who have difficulty receiving your station.

★★★

It would be interesting to count the rings in the pine seen growing inside the tower fence of Fig. 1, just to discover how long that tree has been around.

The tree has deformed the fence. The photo is a good example of why engineers should be included in a due diligence for any station your company plans to acquire.

Show this picture to your station manager or owner, and make sure you are in the loop. If problems like this can be identified before settlement, escrow money to correct the violation(s) can be set aside.



Fig. 1: The pine tree inside this tower fence has pushed right through the wood.

Best of all, your upper management won't look foolish buying a "pig in a poke."

★★★

It's wasp season. Fig. 2 shows a visitor in flight, attempting to enter a transmitter building. Take five minutes and give your building eaves, ATU and air hoods a good spritz of Raid or other brand of insect treatment.



Fig. 2: The arrow shows a wasp trying to enter a transmitter building.

The time you take in completing this one maintenance task will save you hours riding your site of bees' nests and troubleshooting failed satellite signals as summer commences.

★★★

Wheatstone Audioarts R-60 consoles use a meter lamp that looks like a fuse. They aren't readily available except through the manufacturer.

Michael Glaser of LIRadiogroup found the bulbs at FELCO sales. The company is at (714) 712-6200.

The fuse-like bulbs are part number 19-29-39/6V and cost \$2 each. The only snag is you must buy at least 50.

★★★

Hal Kneller is the director of radio engineering for WGCU Public Broadcasting at Florida Gulf Coast University.

Recently his Inovonics 530 FM Modulation Analyzer acted like it was going into oscillation. If he left the monitor on for

any period of time, it would show blinking on the LED displays at a rapid rate.

Investigation showed one of the two 6800mfd 35VDC capacitors in the main power supply to be bad. Hal replaced both, because the cost was minimal; and the problem was solved.

This particular unit was only three years old and not housed in a hot environment. Hal surmises that the off-brand capacitors were just not up to quality.

See WORKBENCH, page 18 ▶

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Concerns About IBOC Grow

Numerous Issues Could Block the Progress or Threaten the Success of Ibiqity's Proposals

by Skip Pizzi

While wandering the halls at NAB2002, it became apparent to me that some of the recent columns in this space have struck a nerve — or several.

It seemed that everyone who had an issue or complaint about the proposed Ibiqity technology for AM or FM IBOC digital radio sought me out to bare his or her soul. Although much of the discussion centered on items covered here and elsewhere, several issues were raised.

For fear of the perceived Ibiqity juggernaut and possible negative effects on their businesses, most of the commenters requested their identities withheld for publication — a fact I lament, but understand.

Test questions

Primary among their comments were concerns about the reliability of tests performed on the Ibiqity systems to date. It is important to note that the recent NRSC pronouncements on Ibiqity's formats are based exclusively on tests performed by Ibiqity itself, or by laboratories that were hired by Ibiqity.

The NRSC did not perform or obtain any independent testing, and there are some familiar with the technical standards process who felt that even the NRSC's review of those tests was rather cursory and unscrupulous, particularly for the FM format.

Further, most of the testing that Ibiqity outsourced was performed by the Advanced Television Test Center, which some technical experts consider to be a second-tier facility at best. One engineer who observed the ATTC's work called some of its results on Ibiqity's FM IBOC system "unreproducible," and characterized the lab's methods as surprisingly unscientific.

Consider that this is the same lab that gave high marks to the 8-VSB modulation scheme ultimately adopted by the ATSC digital television standard, which has subsequently been the source of much controversy due to poor reception performance.

In general, these observers summarized that the test data analyzed by the NRSC was not closely indicative of what the real-world results will be if IBOC is ever widely deployed throughout a fully occupied major market's FM spectrum. Specifically they voiced concern that far more interference than has been predicted might occur, to the extent that broadcasters might be motivated to shut down their IBOC services fairly soon after initiating it.

Under wraps

It is also becoming obvious that Ibiqity has maintained very tight control over all the testing performed on its systems. For example, the International Association of Audio Information Services — the trade association representing radio reading services for the visually impaired, most of which use FM subcarriers to distribute their programming — apparently tried to obtain an FM IBOC exciter from Ibiqity to do some of its own testing and was unable to do so.

Another report from an informed source recounted that Ibiqity had earlier approached a branch of the National Institute of Standards and Technology to test the IBOC systems, but NIST declined when Ibiqity insisted on specifying which

tests would be administered. So Ibiqity moved to seek a lab for hire, where its desired level of control over testing could be exercised, eventually settling on ATTC.

In addition, potential implementers wishing to examine or learn about the format are thwarted by the fact that, to date, no published specification for any Ibiqity's technology exists. This calls into question the announcements of support for the formats already made by a few manufacturers.

Most of the attention to date over Ibiqity's occupied spectrum for FM IBOC

has been directed to Part 73 of the FCC Rules, where the well-known Spurious Emission Mask is defined.

Ibiqity has clearly and apparently accurately stated that its FM system remains within the constraints of this mask. But those intimately familiar with the nuances of regulatory matters have pointed out that the format nevertheless violates the requisite emission designator 240F3, which states that a bandwidth of 240 kHz around the channel's center frequency will contain 99.0 percent of the channel's transmitted power.

Because an FM IBOC channel would no longer follow this rule, it implies that the format officially involves occupation of adjacent-channel spectrum. Such param-

The Big Picture

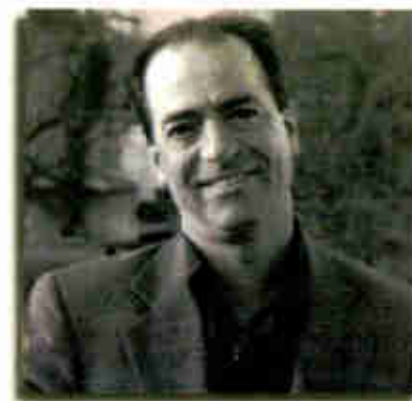


Photo: Gury Hayes, BBC

by Skip Pizzi

ters are defined in Part 2 of the FCC Rules, which is an area that involves treaty

See PIZZI, page 18 ▶

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Pizzi

► Continued from page 17

negotiations, and therefore requires congressional (not just FCC) approval to amend. To the best of our knowledge, no such action has been initiated.

Moreover, these matters will require international coordination, at least with Mexico and Canada — also activities that apparently have not yet begun.

These important elements would have to be in place before IBOC FM service launched. Naturally, such negotiations and approvals can take considerable time, which puts in doubt any claim that widespread IBOC FM service could begin imminently.

Much ado

Finally, there is a growing buzz around the sense that receiver quality improvements could provide as much audible benefit as could the proposed IBOC systems, but without the trouble and expense facing broadcasters under the Ibiquity proposals.

These need not be exotic and expensive devices, as evidenced by a few recent DSP-based receivers. One often-cited example is the Blaupunkt Alaska line of car audio systems. The FM tuners in these units convert the received signal to digital at the 10.7 MHz IF stage, and process it with DSP from there until the power amplifier stage.

The results have caused a sensation in the audiophile community, and are particularly surprising at the affordable price points of these products. Substantially reduced distortion and markedly improved SNR and stereo separation are the most frequently noted points. (And this improved audio quality occurs immediately upon tuning in the station — you don't have to wait for seven seconds to hear it.)

Audio processing in these receivers is also handled in the digital domain, including the option of end-user audio compression. If this technology became the norm, FM broadcasters might be able to reduce the amount of audio compression they add to the signal at transmission, which could also go a long way toward improving perceived audio quality of FM. But we won't open *that* can of worms here.

Suffice it to say that relying on unilateral receiver technology improvements and subsequent product penetration for their digital revolution leaves broadcasters feeling out of the loop, because they have no control over the process — other than making changes to their own broadcast audio processing, as noted above.

But implementing the currently proposed IBOC format will require substantial time, expense and trouble (perhaps more of the latter than was previously thought) on the part of broadcasters, and it will *still* rely on subsequent consumer product penetration before any improvement can occur. Perhaps broadcasters' time and money would be better spent in other directions.

Postscript

As evidenced by the collection of comments regarding IBOC that keep coming my way, I have developed an identity of being "the anti-IBOC guy." While this is perhaps an unavoidable label, allow me to clarify that I'm not anti-DAB, or even anti-IBOC. Some readers will recall that I was

one of the earliest public supporters of the IBOC concept when the U.S. radio industry was considering Eureka-147 in the 1980s.

What I primarily object to today are Ibiquity's proposed protectionist constraints on IBOC technology. Although understandable from a pure broadcast-industry business perspective, I fear these artificial restrictions will reduce IBOC to insignificance in the consumer marketplace, and thereby cause it to fail. This would be a lose-lose proposition for consumers and broadcasters alike.

For any conversion to be successful, all involved parties must feel they will benefit equally from making the change. The current plan is unbalanced in commercial broadcasters' favor, and is therefore at risk.

I also don't object to Ibiquity reaping some reward for its substantial work in this effort. But well-proven mechanisms for doing so already exist, and they don't seem to be broken. I fail to see any compelling reasons to justify the unprecedented changes in the process that Ibiquity proposes. Meanwhile, I *do* perceive the dangers in moving to such methods.

IBOC may be the only bullet in broadcasters' digital conversion arsenal. If that one shot misses, the battle will likely be lost. If someone notices the weapon is misaimed, it is his duty to try to correct the problem before the shot is fired.

Skip Pizzi is contributing editor of Radio World. RW welcomes other points of view.

Workbench

► Continued from page 16

Starting each troubleshooting session at the power supply is a pretty good bet. Look at the DC lines using a scope. Voltage fluctuations from normal, or AC ripple can wreak havoc in electronic circuits. Consider the following.

★★★

Let's say you've decided to do some satellite troubleshooting because of loss of signal, interference or audio chirping. A typical installation might be using a Starguide II receiver that is a couple of years old.

Here are some points to check, compiled by Edd Monskie of Hall Communications stations WLP(A) and WROZ(FM) in Lancaster, Pa.

Remember the basics: check for wasp nests in the feed horn of the dish, and make sure the dish is aimed correctly.

Then check the coax to the dish as well as the jumpers. Look for water intrusion or corroded connectors.

Take a look at the LNB power. AC ripple on the LNB should be unreadable, but Edd has found cases in which the LNB voltage is right on 24VDC, but when the meter is switched to AC, the ripple measures anywhere from 1-2 mV and higher. Switch the LNB voltage to another receiver or another 24VDC supply with no AC ripple to solve the problems.

Edd says this is one test the satellite receiver providers miss. Remember, the LNB supply ripple should read less than 1 mV.

★★★

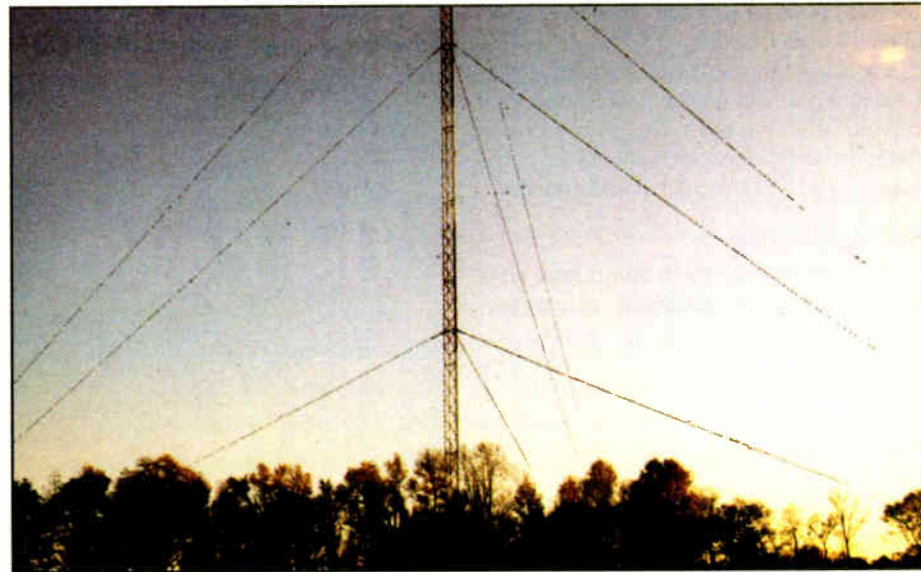


Fig. 3: WBIS(AM) in Annapolis is very popular with the bird demographic.

Gary Blau, engineering manager for Jefferson-Pilot's WLYF(FM) in Miami, offers a suggestion to engineers concerned about the weight of the Orban Optimod 8400 and whether to support the rear of the unit.

Let physics work for you. Put the rack screws in the two bottom holes (as with any equipment). The rack ears will not crack, and a rear support is not necessary.

Of course, using rack screws for all the holes is preferable. But if you support any equipment using the two bottom rack holes you will be fine, unless otherwise recommended by the manufacturer.

There's another benefit to using the bottom holes. As you support the equipment, screwing the rack bolts into the bottom holes first will help stabilize it. If you have had to mount an old Ampex 350 reel-to-reel machine by yourself, you know what Gary and I mean.

It's a simple tip from two of us who learned our craft at the knees of seasoned engineers. Thanks, Gary, for reminding us that sometimes the simplest tips are among the best.

★★★

Perhaps you've heard that AM guy wires are broken up to prevent reradiation.

Fig. 3 goes overboard with insulators on the guys — no, wait, those are birds!

Shortly before sundown at WBIS(AM) in Annapolis, MD, the birds congregate. Maybe they are trying to get warm from the RF before bedding down for the night.

Submissions for this column are encouraged, and qualify for SBE recertification credit. Fax your submission to (703) 323-8044, or send e-mail to jbisset@harris.com.

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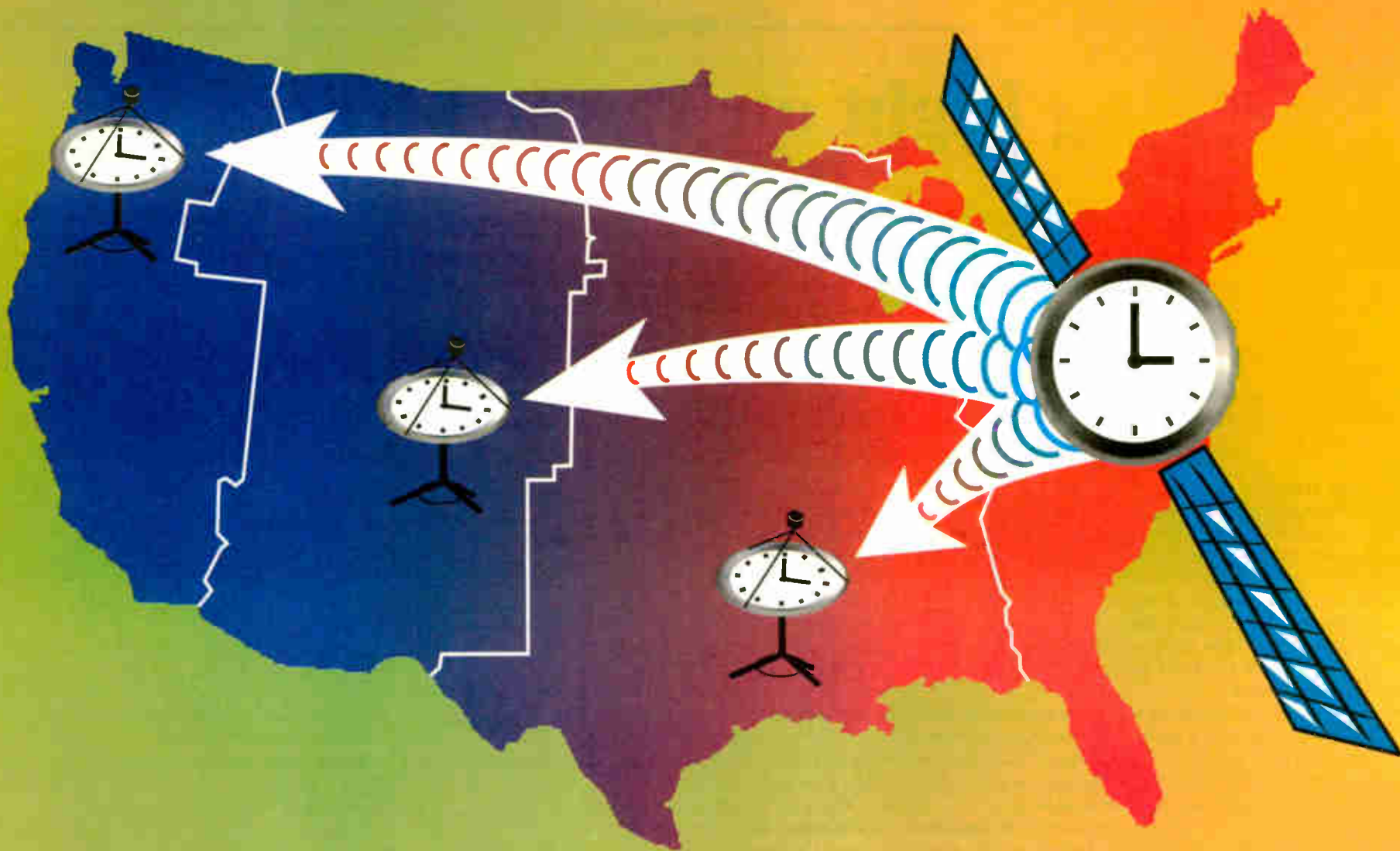
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World Radio History

Shedding Light on Tower Strobes

by Neil Lewbel

Today when someone talks about flash, most people think of computer memory chips or Web sites. However, long before electronic computers found their way into radio stations, there was another type of flash: electronic flash tubes.

Modern flash lamp technology is based on work by Dr. Harold E. Edgerton. In the 1920s he started working with stroboscopes to study rotating machines and enable high-speed photography. The same technology often is used in the electronic strobe lights found on radio towers.

Many uses

It may appear in other applications in your station, such as fire alarm indicators, electronic flash units associated with cameras, copiers, hazard lighting devices used on news trucks and stroboscopes for measuring speeds of rotating devices such as car engines or turntables.

Although devices using flash lamp technology are in widespread use, little has been written about how they work. Even less has been written about how to work with these devices.

In general, you should not attempt to repair flash lamp circuits unless you have had training or experience working on this type of system. The purpose of this article is to explain enough about this technology so you understand why you should not work on these devices.

If you still want to work on them, do so at your own risk and proceed with great caution. Even the smallest battery-operated units use dangerous voltages. In larger units, typically used for tower lighting, the voltage can be lethal.



Fig. 2 shows the flash tube in the lower part of a dual flash tube strobe light, which provides the white beacon for daylight operation.

The heart of these strobe units is a lamp known as a xenon flash tube, a long, narrow tube with three elements: cathode, anode and trigger lead. It may be straight, shaped into a half circle or wound into one or more circles. Typically, the tube is made of a high-strength glass material such as Pyrex brand or quartz, and is filled with xenon.

Xenon is an inert gas, similar to neon, but it ionizes at much higher voltage levels and gives off a much whiter and brighter light. The xenon flash tube is classified as a cold cathode device — one that does not use a heated cathode or filament to give off electrons.

A cold cathode device familiar to most radio engineers is the neon glow lamp, such as the NE-2, commonly used as a pilot lamp or voltage indicator on line-powered equipment.

In a cold cathode lamp, a voltage is used to ionize the gas. When the gas is in an ionized state, the gas is a low-resistance conductor of electricity. When an electric current travels through the gas, it remains ionized and it gives off light.

Ionized xenon gives off a very bright white light, similar in some respects to sunlight. (Remember that film is optimized for use in sunlight and that a primary

use of flash tubes is photography.)

There are several voltages important to the operation of cold cathode tubes. The first is the ionization voltage. Also known as a trigger voltage, ionization voltage is the voltage at which the gas begins to ionize and changes its state from an insulator to a conductor. Once the gas is ionized, it will continue to conduct electricity and give off light until the voltage drops below the extinguish voltage, which is always lower than the ignition voltage.

Xenon flash tubes may use ionization voltages up to 100 kV, although most use between 3 and 30 kV. Extinguish voltages typically are between 300 and 900 VDC.

In a typical flash tube circuit, a high-power charge between 300 and 1,200 volts is stored in one or more photoflash capacitors, connected in parallel with the cathode and anode of the flash lamp. Because the resistance of the gas in the lamp effectively is infinite, the charge remains in the capacitors. Photoflash capacitors tend to be very large, measured in hundreds of microfarads, and rated for hundreds or even thousands of volts.

When the trigger voltage (over 3 kV) is applied between the trigger lead and the cathode or anode, the xenon gas ionizes, effectively placing a short circuit across the charged up photoflash capacitors. The stored voltage is discharged rapidly until the capacitor voltage drops below the extinguish voltage, at which point the gas returns to its non-ionized state as an insulator.

The rapid discharge of voltage keeps the flash tube ionized so it produces a distinctive bright light for this brief period of time. The size (capacitance and voltage) of the photoflash capacitor and ionized resistance of the xenon flash tube will determine the power output and duration of each flash of light.

Control

There are several methods used to control the brightness or duration of each pulse of light.

One method is simply to change the number of photoflash capacitors. Various switches or relays may be used to select how many capacitors are discharged through the flash tube.

Another method is to limit the amount of energy actually sent from the capacitors to the flash tube, which may be done by diverting a portion of the energy through a separate circuit or limiting the discharge time or voltage.

Each method of controlling the light has advantages and disadvantages. Switching capacitors in or out of the circuit is simple, but the switch or relay contacts (or solid-state components) may be subject to arcing.

Diverting some of the power away from the flash tube means that some of the capacitor's charge is wasted with every pulse of light. Limiting the power sent from the capacitor to the flash tube is more energy-efficient, but may involve circuitry that is more complex.

Two other circuits are important in understanding the operation of electronic flash systems.

First is the charging circuit, which creates the high DC voltage and charges the photoflash capacitors. This can range from a simple one-transistor oscillator followed by a rectifier, to a complex series of step-up circuits. This may start with voltages as low as 3 VDC from batteries or line voltages such as 120 or 240 VAC. (Generally, tower strobe systems operate from power line voltages.)

If this were a conventional power supply, the photoflash capacitor would be the filter capacitor. A key difference is that filter capacitors are not designed to be discharged repeatedly and rapidly by a short circuit and recharged.

The other circuit is the trigger circuit, which develops the high voltage needed to ionize the gas. Typically this consists of a capacitor discharged through a trigger coil, which actually is a high-ratio step-up transformer. The high-voltage output pulse from the trigger coil is sent to the trigger lead of the flash tube to ionize the gas.

In strobe lights, the pulse typically is controlled by an oscillator or timing circuit, which determines the frequency of light pulses. This timing circuit may provide the pulses to the trigger coil instead of a capacitor.

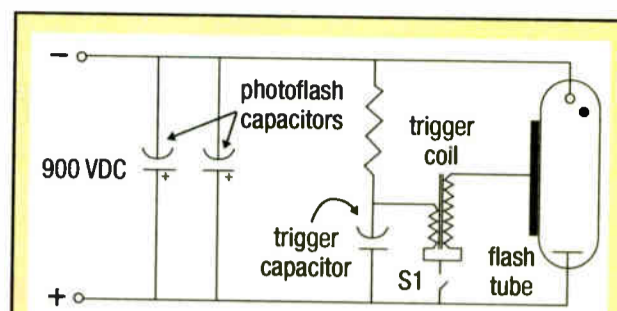


Fig. 1 is a simple flash tube circuit. When switch S1 is closed, a voltage from the trigger capacitor discharges through the trigger coil's primary winding, creating a trigger pulse of several thousand volts across the secondary. The pulse ionizes the gas in the flash tube, causing it to become a conductor, which discharges the power stored in the photoflash capacitors. During this discharge cycle, the flash tube produces a bright pulse of light.

Now it's time to talk about service and safety.

Standard electronics and safety practices state you should always place a bleeder resistor across high DC voltage capacitors at the output of a power source. In flash circuitry, the bleeder resistor could prevent the capacitor from reaching full charge, resulting in overworking of the charging circuitry, and lack of consistent light output from one flash to the next.

Although some manufacturers do place bleeder resistors across the capacitors, these can break or discharge so slowly that it can take a long time to reduce the charge to a safe level.

Some manufacturers have interlock or bleeder systems that discharge the flash capacitors when the unit is turned off or opened. Remember that these systems can malfunction. If you must work on these systems, always assume the capacitors contain a full charge and are dangerous.

Always make sure the power is turned off and then discharge the capacitors using a high-wattage resistor. Typical sizes for the discharge resistor would be from 5k to 75k ohms at 25 to 100 watts.

Also make sure to use well-insulated lead wires on the discharging resistor. Never use just a shorting wire across the photoflash capacitors as this can result in arcing and serious injury. It may also be a good idea to discharge the trigger circuit capacitor.

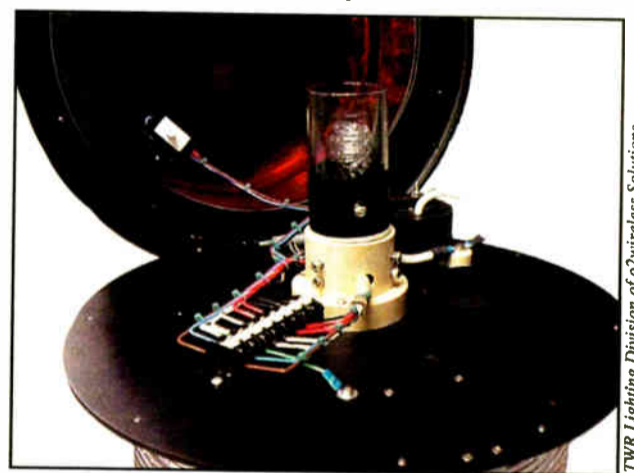


Fig. 3 is the flash tube assembly for the red night operation of a dual flash tube unit.

Remember that because the flash tube is always connected to the capacitor, any time you handle the lamp you are also handling the capacitor. As a precaution, you may want to discharge across the lamp leads (in addition to the capacitors) if you are working on that part of the circuit.

Remember the voltage levels used in strobe units can be deadly and are always dangerous.

Normal operation as well as short circuits and arcing can produce enough heat to burn you instantly. The high-voltage arcing can be loud enough to affect your hearing. Due to the brightness and spectrum of light, looking directly at a flash tube could affect your sight.

There have also been occasional reports that strobe

See STROBES, page 22 ▶



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Strobes

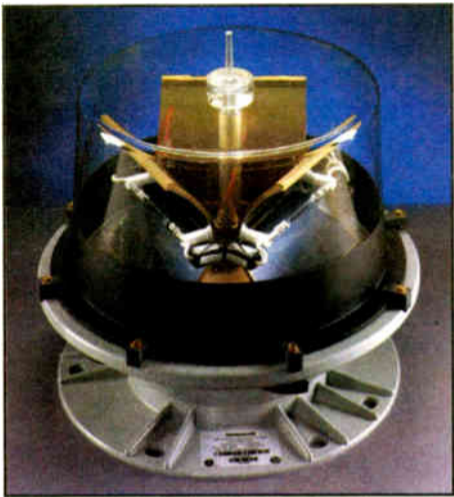
► Continued from page 20

Lights flashing at certain frequencies may induce seizures in some individuals.

Common problems involve the flash tube, photoflash capacitor, trigger circuit and high-voltage arcing.

The actual flash tube must be handled with care. You should avoid touching the glass with bare hands; oils and chemicals from your skin can affect its operation.

Also never touch the flash lamp when the circuit is operating. High heat and voltage levels can be present on the outside of the flash tube.



Honeywell Obstruction Lighting

Fig. 4: A Standard Strobe Light Unit for Tower/Obstruction Lighting

Allow sufficient time for a flash tube to cool down after use, before you try to work on it.

Due to repeated high-voltage pulses, it is common for arcing to occur on the contacts or across insulators at the base of the flash tube. Often this arcing only occurs at high voltages. As a result, normal test equipment may not indicate this problem. A careful visual inspection may reveal signs of arcing, particularly around the solder joints that connect the flash tube to its base.

Also look for arcing between the contacts of the base and its socket. Fractures in the flash tube's glass body will cause it to



Honeywell Obstruction Lighting

Fig. 5: Dual Red and White Unit Strobe for Day and Night Operation

stop working.

Although it is quite rare, several situations can cause a flash tube to operate intermittently. Chemical changes inside the tube and extreme temperatures are two possible causes of intermittent operations. Kinks, breaks or hairline fractures in the trigger lead can also cause problems.

As with most lighting devices, flash tubes can degrade over time, causing decreased light output or other problems. Jay Smith, product manager at Flash Technology Corp. of America, recommends that flash tubes be replaced on a regular basis, such as every two to four years.

A common problem in strobe units is the breakdown of a photoflash capacitor. This may happen inside or on the surface of the capacitor. Often this is a high-voltage breakdown, in which the insulation between the plates can no longer withstand the voltage.

In this case the capacitor charges up to

several hundred volts and then the insulation material breaks down, sometimes with a loud bang that sounds like a firecracker. A capacitor that breaks down at 600 volts may still hold a charge to 599 volts, so remember to discharge even defective capacitors before inspecting or working on the circuit.

Sometimes a visual inspection of the capacitors will reveal a problem. Look for signs of arcing (typically seen as a black carbon build-up) at the solder or screw lugs, and where the contacts emerge from the capacitor's body. Sometimes when the problem is inside the capacitor, part of the shell will appear swollen or deformed. Smith suggests replacing the flash capacitors approximately every four years.

One potential technical problem in tower installations that is familiar to station engineers is the effect of RF, which can interfere with the circuitry for the strobe and its controllers. This can be minimized with proper shielding for the tower light circuitry and proper tower grounding according to Raymond Kraemer, the director of marketing for TWR Lighting Division of o2wireless Solutions.

Purchasing considerations

With system prices that can range from \$15,000 for a 500-foot tower to more than \$100,000 for large towers, station personnel must consider the business issues and trends when selecting or working with tower strobe lights.

According to Raymond Kraemer of TWR Lighting, the industry is moving towards dual flash tube units and increased serviceability. The TWR EI system houses a red beacon on top for night and a white beacon for day mode. Each beacon has its own flash tube, optimized for a particular mode of operation.

One aspect of improved serviceability in this unit is that flash tube replacement only requires removal of three screws. Kraemer said, "Ease of installation and long-term maintenance are key areas to consider when purchasing a tower strobe system."

Greg Miller of Honeywell Obstruction Lighting also detects a trend towards dual flash tube strobes.

"With white lights during the day," he said, "you can avoid painting the tower; at night red lights are less obtrusive than white strobes and may be easier to zone."

More Info

Several strobe manufacturers have excellent Web sites with detailed information about selecting, installing and servicing strobes on antenna towers.

Flash Technology Corp. of America
www.flashtech.com

TWR Lighting Division of o2wireless Solutions
www.o2wireless-twr.com

Orga Aviation Lighting
www.orga-aviation.com

Honeywell Obstruction Lighting
www.oblighting.com

The following companies provide flash tubes:

Advanced Strobe Products
www.strobelamps.com/index.htm

Amglo Kemlite Laboratories
www.amglo.com/Xenon/Helical.html

For a brief biography of Dr. Harold Edgerton, credited with developing useful applications for flash technology, see: www.britannica.com/seo/h/harold-eugene-edgerton/

Additional information about Dr. Harold Edgerton is available at the following sites:

<http://rleweb.mit.edu/rlestaff/P-EDGE-OB.HTM>

<http://libraries.mit.edu/archives/mithistory/collections-mc/mc25/index.html#biography>

www.edgerton.org/biography.html

www.invent.org/hall_of_fame/49.html

There are several alternative types of tower lighting devices, such as the LED-based unit recently introduced by Dialight and described in Radio World's issue of June 6, 2001, on page 62. If you know of alternative tower lighting technologies, please forward them to the author for a possible future article.

I thank the following for their help in developing this article: Jay Smith of Flash Technology Corp. of America; Greg Miller of Honeywell Obstruction Lighting; and Raymond Kraemer of TWR Lighting Division of o2wireless Solutions.

Neil Lewbel specializes in bringing new communications products to the market and occasionally writing about radio. The early portion of his career was divided between broadcasting and repairing flash and strobe systems.

Reach Lewbel via e-mail to neillew@aol.com.

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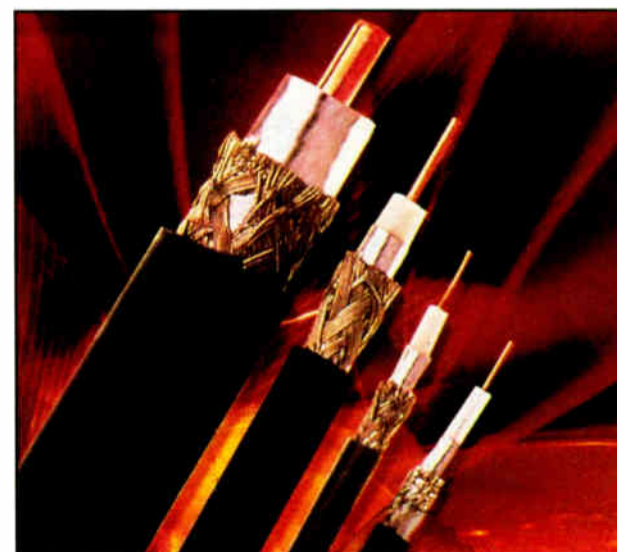
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PRODUCT EVALUATION

ComPack Covers All the Bases

by Skip Pizzi

The variety of telephone interfaces available today is vast, ranging from the simplest analog coupler to the multiline digital hybrid with all the bells and whistles. To be completely prepared for all possibilities, a broadcaster needs to have a stable of many such devices and accessories on hand. That is, until now.

The ComPack from JKAudio, retailing for \$545, provides interfacing to just about any type of POTS phone situation one is likely to encounter in the field or studio. It provides all of these capabilities in a simple, robust, no-frills package that engineers will admire for its flexibility and portability, and at a price point that everyone will appreciate for its value.

Interface choices

The device manages the POTS universe with three phone interface methods: an analog hybrid for direct interface to a phone line via RJ-11; a "universal" interface for connecting to the handset port on PBX, ISDN or key systems via RJ-22; and a headset interface to wireless or other telephones via a mini-phone (1/8-inch) TRS plug. (The connector for the latter on the ComPack is a 1/4-inch TRS jack, and the unit is supplied with an adapter cable from 1/4 to 1/8-inch TRS.)

The handset interface has three selectable settings to cover all possible transducer types one might encounter (electret, dynamic and carbon). A full-size DTMF keypad is included, which can be switched off to avoid errant tone bursts during audio feeds, or when the PBX or wireless phone interfaces are used.

The ComPack's form factor seems a bit unusual at first, but after some time with the unit, you recognize the efficiency of its design.

On the audio side, the ComPack features a balanced mic/line input on XLR, an unbalanced line input on mono mini-phone, a headphone jack on 1/4-inch TRS and a multipurpose output on XLR (more on this later).

The mic/line and line inputs each have a separate gain control, with an LED clipping indicator for the mic/line input. As this implies, the device includes 2x1 mixing capability. The headphone output level also is adjustable over a wide range.

The XLR output provides a full mix (i.e., phone line plus local audio) as a balanced mic level signal (-25 dBm), or with the flip of a recessed switch, becomes an unbalanced I/O port to most

intercom belt packs, for two-way IFB interfacing to any kind of telephone connection. The latter is a unique feature that may be quite welcome to some users, particularly those who want to extend their studio IFB to a wide variety of remote locations via telephone.



Side View of the ComPack

Power is supplied either by an internal 9V battery or an external wall-wart power supply included with the unit. The device is laid out cleverly to allow over-the-shoulder portable use with a supplied, adjustable shoulder strap. In this mode, level controls and the LED input overload indicator face upward for easy viewing and adjustment by the operator while wearing the device.

The ComPack's form factor seems a bit unusual at first, but after some time with the unit, you recognize the efficiency of its design. The device uses both horizontal and vertical space effectively, and it allows comfortable use in both supine (on a tabletop) and upright (over the shoulder) orientations. Its rugged construction should hold up well to the rigors of field work,

yet it weighs in at only 1.5 pounds.

The unit's simple and ergonomic layout makes it easy to operate by the typical engineer after only a few minutes' exposure. For the less technically adept, a clear and concise manual is included, which seems to have been written with English as its original language.

Audio and noise

While the device's audio quality might not match a state-of-the-art studio mixing console, it is more than adequate for the intended application, and beyond reproach for POTS usage.

The AC power supply does not add any audible hum, as occurs in some

similar devices, but the handset interface is susceptible to buzz, which is the penalty paid by any such RJ-22 interface. This is due to its insertion in the handset circuit path, which is unbalanced (i.e., no common-mode rejection) and at low level, making it partic-

ularly vulnerable to noise pickup.

In practice, this noise is audible only at the remote end; it is largely filtered out of the receive-end signal by the phone line's high-frequency roll-off characteristics. Nevertheless, for this reason the manual correctly advises that the handset interface should only be used if direct phone-line interfacing is impossible.

Indeed, the ComPack's direct phone-line and wireless interfaces work flawlessly. When using the latter with a wireless phone, however, it is important to follow the manual's recommendation to keep the phone unit at least one foot away from the ComPack to avoid audio RF interference pickup from the wireless phone's transmitter. The supplied connecting cable for the wireless phone interface is long enough to easily allow this.

Critiques

The level controls for inputs and headphone output could be labeled a bit better. Because the unit is designed to be used in both tabletop and portable applications, these rotary attenuators are viewed from a variety of angles. It is therefore difficult to know which way the taper runs (i.e., it's hard to tell which way is up or down in audio level), so some additional min-max labeling or +/- arrows around these pots would be welcome.

A more substantive complaint: If the operator is wearing headphones and listening at a typical level, loud pops are experienced when any of the unit's switches are flipped. Generally this wouldn't happen very often, and rarely when the unit is online, but it is an annoyance, nonetheless.

Overall, the ComPack delivers noteworthy performance and versatility in a single package. It can serve as an occasional problem-solver for broadcast

Product Capsule:

JK Audio
ComPack



Thumbs Up

- ✓ Interfaces to any POTS or wireless phone system
- ✓ Provides flexible audio or intercom I/O
- ✓ Simple yet versatile operation
- ✓ Robust and cost effective



Thumbs Down

- ✓ Function labeling could be improved
- ✓ Form factor takes some getting used to
- ✓ Switches not pop-filtered

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engineers, or as an everyday interface for radio reporters. Its rugged and simple design will make it a welcome tool at any station that covers local news.

It even allows a roving reporter to feed live to air via wireless phone while freely traversing a remote site. Clip the cell-phone to your belt on one side, hang the ComPack on the other shoulder, connect the two devices via a cable around the waist, plug in headphones and a handheld mic — you're doing your own two-way audio remote with interview or sound-gathering capability and you still have one hand free to open doors (or sign autographs). Substitute a headset-mic and *both* hands remain free for reporter-in-action feeds.



The control layout allows operation of the unit while you wear it.

JK Audio has provided another useful phone interfacing device with the ComPack. The unit is a veritable Swiss Army knife for remote POTS feeding, and ensures the broadcaster a win at every venue on the telco tour.

Skip Pizzi is contributing editor of *Radio World*.

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World Radio History

NEWS ANALYSIS

Exhibitors Upbeat After NAB2002

by Craig Johnston

LAS VEGAS The NAB 2002 convention threw some hurdles in the way of doing business for radio exhibitors.

Registration was down, and they had new neighbors as the television mobile trucks and ENG vans moved indoors at the north end of "their" hall.

Still, most vendors who spoke with Radio World gave the show at least a "can't complain," or better.

"It was definitely a good show for us," said Mark Tipton, national sales manager of Aphex Systems Ltd. "The first couple of days were very busy. The broadcast network seems to be opening up a little bit. The purse strings were tightened up for a while, but they're starting to open back up and people are actually really looking for some other things."

"The traffic was very good," said Tim Schwiager, president of Broadcast Supply Worldwide. "We felt that the show seemed to be about equivalent to what there was last year. We didn't really see a noticeable decrease in the audio traffic, the true audio traffic."

"We had a real good show, actually," said Jackie Lockhart, director of marketing for Prophet Systems Innovations. "The first day we were inundated with people, and then the last couple of days (were) good too." She noted that her company was introducing several new products that may have contributed to traffic.

"I heard the numbers were down a little bit from last year but we didn't see it," said Peter Burk, president of Burk Technology. "We had a steady stream of traffic that was more on the first day, but we actually wrote more leads this year than we did last year, and we had a great year last year."

The NAB reported a decline of 16 percent in overall traffic, to 95,000 this year. Most exhibitors agree that radio engineering attendance, at least, is down substantially from a decade ago.

Prior to NAB, an executive at the largest radio group, Clear Channel, said his company expected to send about 20 to 30 engi-

neers. "International's not a big part of our market, so it's not a real impact to us."

people here who are more than just looking at equipment, they're really serious about doing something."

"There was certainly a lot of interest in international," said Harris' Mowry. "We generally get a lot for radio, AM and FM, but IBOC is of high interest internationally."

Logitek's Borland said, "We had less international than we had in the past, particularly from South America, there was almost nobody. From Europe we had almost nobody, Australia ..."

The company's marketing manager, Elaine Jones, chimed in, "Even the contingent from Mexico was way down from what we used to see. We used to see hundreds of Mexican here, we've seen one or two dozen this time."

Based on the business they conducted in Las Vegas this year, many NAB radio exhibitors surveyed look for an improved equipment market in the year ahead.

"I think the economy is on the mend, at least in the U.S.," said Sacks. "You know, I think we're starting to see some very positive signs of comeback."

Outlook improving

"I think people are starting to loosen up with the money a little bit, but not (from) anything that happened here," said CartWorks' Thomas. "I had that impression a few weeks before we left for the show, we could see it turn around a little bit."

"Our business for the last three years has been steadily increasing, and I don't see it slowing down," said ERI's Davies. "I can see pretty much six months down the pipeline, and we're full. So it's a good outlook."

Octiv's Vice President of Marketing Amy Huson noted that while business was brisk, it was not for new facilities.



Radio booth traffic was busy at the start of the show, but tapered off by Wednesday. Still, exhibitors generally seemed pleased.

neers. The No. 2 group as measured by revenue is Viacom; its Infinity operation is no longer a member of NAB and officially sends no engineers.

Good 'quality'

If there were fewer attendees coming through the booths, exhibitors generally were happy with the quality of that traffic.

"I felt that traffic was down, but the quality was really great," said Dale Mowry, vice president, Transmission Systems at Harris Corp. "People are really interested, and I think the decision-makers are here. I think we met some

Noting Logitek Electronic Systems' traffic was a little slower than normal. President Tag Borland said, "The people that came had projects, had checkbooks, and they knew about us ahead of time and were interested. So we probably did less equipment demonstrations than we've ever done in the past, but a lot more sitting in the back, working on projects. So I'm quite happy."

Several exhibitors attributed the high quality of the traffic to radio's downturn financially.

"Right off the bat, if you're cutting back, you're not going to send people to a trade show on a frivolous whim," said Keith McMillan, CEO of Octiv. "So the people who had to go still went. But I think you start losing the tire-kickers as the economy downturns."

BSW's Schwiager agreed. "Obviously, with the consolidation, it's a prudent business move to not to send as many people, and then they can communicate within themselves. I don't hold anyone accountable for that, it's just a fact of life."

"We're a little disappointed by who we're not seeing, and that happens every year," he said. "We get more and more disappointed. I think that consolidation is probably the number-one factor in that."

Marty Sacks, national sales director for Telos Systems, said, "The real measure of a trade show — at least when you wear my shoes — is what sales opportunities come out of the show. We got tremendous numbers of opportunities and actually closed some business here in Las Vegas."

Exhibitors contacted for this story were split over whether they sensed more international traffic in their booths.

"I've noticed a lot more, the last couple of years, foreign visitors than Americans coming," said George Thomas, president and CEO of CartWorks/dbm Systems. He's hopeful that will translate into international sales.

"A lot less international," said Dave Davies, engineering manager of ERI-

The people who came had projects, had checkbooks.

—George Thomas



"When I looked at all the leads, I think there was only one person in that whole pile that was building a new facility, everyone else was expanding or refining existing facilities and distribution organizations," she said. "There's no major push on new initiatives there."

Next year, according to several exhibitors, NAB's radio exhibits will move out of the North Hall into the Central Hall — the area that had been called the South Hall until this convention. Exhibitors were also split on that change.

"I think it's a good move, especially for the audio companies that appeal to both television and radio," said Logitek's Jones. "When we were first moved over here, it was like, the TV guys aren't ever going to come over here."

"We are going to lose the familiarity, we've been in a good spot, this rather good spot, for three or four years," said Peter Burk. "We regret the decision of NAB to move us into less space in the other hall." ●

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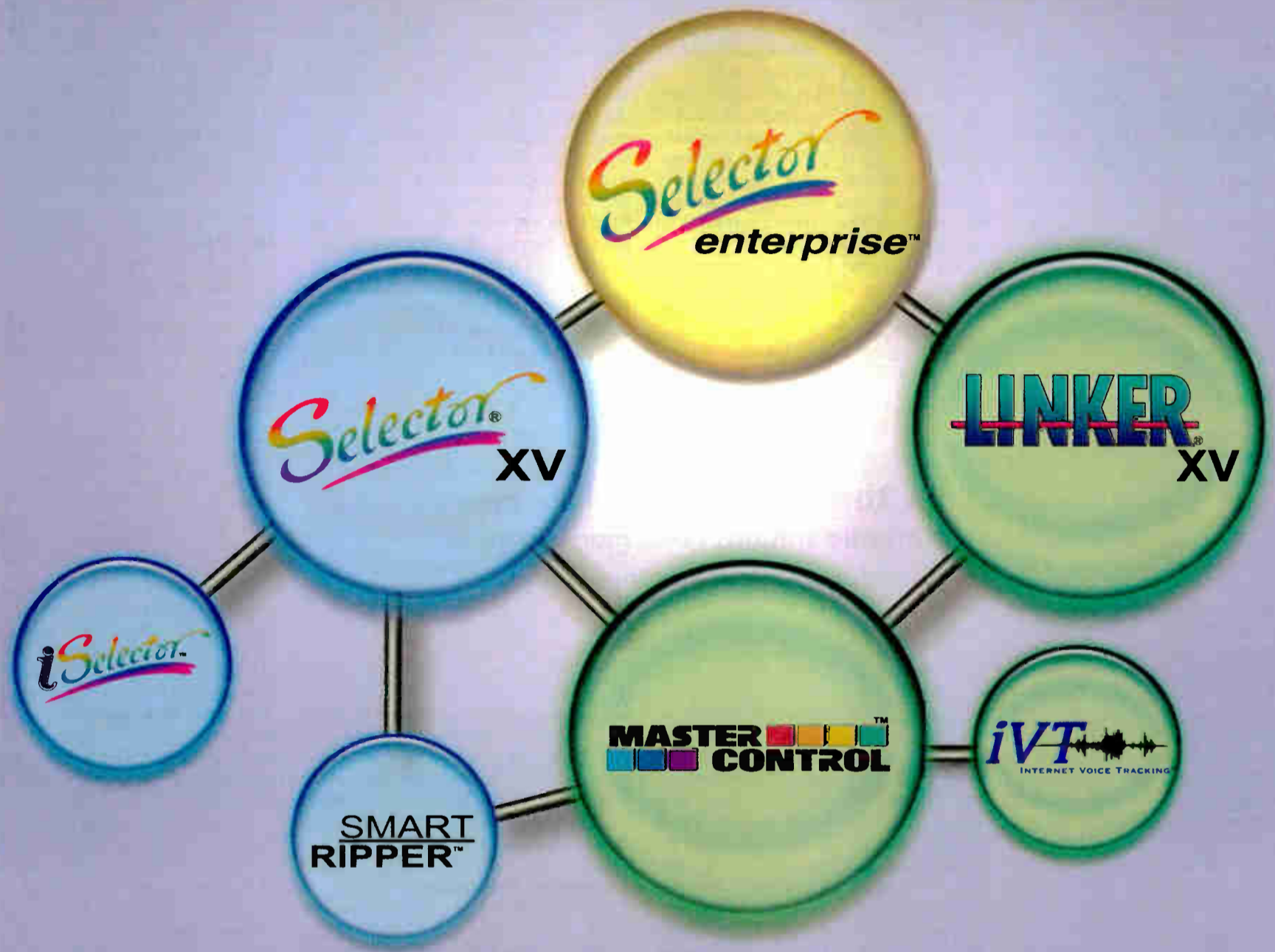
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GUY WIRE

A Bumpy Ride for Ibiqity in Vegas

by Guy Wire

Guy Wire is the pseudonym for a veteran radio broadcast engineer. His or her columns appear regularly at www.rwonline.com.

It wasn't quite what the Ibiqity Digital brass had been hoping for.

The long-awaited official rollout year for IBOC at the NAB spring show hit at least two major snags: No NRSC endorsement for nighttime AM operation, and consternation over those nasty software licensing fees.

Not that broadcasters didn't have advance knowledge of the disappointing fee news, thanks to coverage in Radio World. But the fees took the glow off what has been heralded as technology to lead radio into its digital future — an uncertain and increasingly competitive future.

Just a few more tests

All of the Ibiqity boys at the show put a positive spin on the lack of an NRSC green light for AM IBOC at night.

"It's just a matter of doing some more tests and gathering some more data," they said. Yes, there will be increased skywave interference from and towards adjacent-channel stations, but they tell us it should not be a significant detriment to nighttime listening for most stations, considering the overall quality improvement achieved.

Ibiqity CEO Bob Struble thinks this bit of unfinished business will be resolved by late summer. Let's hope so.

Assuming Struble is right and AM IBOC is approved by the NRSC and the commission, we will hear a lot more hash on the AM band at night as stations start transmitting the hybrid mode.

But the band is mostly a lost cause after sundown anyway, so a little higher noise floor will not likely drive too many listeners away, except perhaps in those situations where a strong adjacent-channel skywave signal lands on top of a local station's coverage outside their primary contour. That's at least 5 mV/m and maybe 10 mV/m or higher with the addition of IBOC.

Just how well either analog or IBOC digital reception holds up in the presence of such interference has not been evaluated fully.

Remember that the primary digital carriers for AM IBOC sit right in the middle of the first adjacent passband. Because of that, some are now calling it IBAC, for in-band, adjacent-channel.

How many stations will be affected by this new form of interference, and by how much? Ibiqity predicts it won't be that bad. The digital carriers are 23 dB lower than the analog carriers, plus the analog sidebands will stop at +/- 5 kHz with Ibiqity's requirement that analog response using IBOC be cut off at 5 kHz instead of the present NRSC limit of 10 kHz. That alone will reduce splatter from first adjacents but will only be a benefit from those stations transmitting IBOC.

It is likely many stations will not add IBOC until it's clear the technology will be a winner. I wonder if the FCC would consider requiring that all sta-

tions limit their transmitted response to 5 kHz just to help out the IBOC hybrid transition?

The NRSC is looking for scientifically supportable evidence in its effort to reach conclusions and make recommendations. Anecdotal assumptions or estimates will not be compelling.

The 10-percent skywave curves long used by the FCC to predict how AM signals propagate at night only projects what happens 10 percent of the time. The ionosphere makes lots of shifty and unpredictable moves. Just ask the inventors of the various attempts at "anti-skywave" antennas.

Trying to quantify and then interpret the amount of interference and potential in lost listening due to the addition of IBOC AM will not be an easy task for Ibiqity nor for the NRSC.

It's time to mount the digital pony. But radio stations need more financial incentive to make the conversion.

The only preliminary conclusion we can draw on this issue is that the effective NIF (nighttime interference free) contour for many stations likely will go up. You will have to be sitting in a stronger signal contour area than you do now after IBOC digital is added for either clean analog or high-fidelity digital reception at night without interference.

How the IBOC digital decoders will behave in the presence of adjacent channel digital skywave interference is unknown.

Most high-power AMs are looking forward dearly to the dramatic increase in quality with IBOC digital that will allow them to better compete with FM. Music formats on AM stand to get a huge shot in the arm. Fifty-gallon clear-channel powerhouses are drooling over the prospects of expanded skywave listening audiences with the improved fidelity IBOC delivers.

Will they be disappointed?

Skiping the AM hybrid

The period of transition, in which some stations are transmitting IBOC and many others are not transmitting analog/digital signals, will be messy.

Some well-known industry observers think we should skip the hybrid mode for AM IBOC digital altogether. The FCC could mandate that all stations switch to pure digital together when receiver penetration at some point in the future is justified — something akin to Digital Radio Mondiale, the all-digital mode developed for international broadcasting. Its future looks promising although commercially available receivers are not yet on the market.

That would be theoretically possible, assuming IBOC works well for the FM

band, given that Ibiqity will only license receiver chips equipped for both AM and FM digital reception.

Such a scheme would require AM to wait maybe another 5 to 10 years before the fruits of digital could be enjoyed; but the prospect of having the band dramatically cleaned up for long-term benefit is enticing. Unfortunately the politics of placing AM at an even greater competitive disadvantage short-term would likely make this undoable.

The Continental booth at NAB had an impressive demo of Digital Radio Mondiale skywave reception. Let me tell you, that system works just fine day or night, and is damn impressive.

You can bet that the FCC will not authorize AM IBOC digital until the issue of increased nighttime interference is investigated thoroughly and

better for all digital audio conveyed in limited bandwidth media.

The thorny issue of broadcasters having to pay for both IBOC hardware and software licensing has many station owners and managers reeling, especially in the smaller markets.

As I reported in a recent online *tête-à-tête* on IBOC with Skip Pizzi, Ibiqity is following the Microsoft model and wants to charge stations 15 times the annual FCC license fee just for the privilege of using their software to transmit IBOC signals.

That's on top of the markup we'll pay to exciter manufacturers to cover their Ibiqity license fees, something like \$3,000 per box. We get to pay twice.

No deals?

And then of course we also have to buy and install a digital transmitter, plus add widebanding to many of our antenna systems. Paying for IBOC will be painful for many stations, especially with no assurance the investment will ever pay off.

We learned before the show that some members of the Ibiqity advisory board had warned the partnership management that charging the proposed software license fees would cause problems and could delay IBOC conversion for many stations and potentially jeopardize the entire venture.

A few unnamed Ibiqity managers privately think those fees should be waived for the first year, to encourage early adoption. They know that unless the majority of stations in larger markets add IBOC digital out of the gate, their technology may not succeed. But the marketing folks apparently won out and are holding fast to their rate card for the fees. No "deals" will be cut, they said.

It's a delicate balancing act for Bob Struble of Ibiqity, who knows he has to start making money for the partnership investors at some point. Apparently Bob is willing to risk the ultimate success of Ibiqity on the backs of broadcasters by making them pay for most of the \$50 million to \$100 million spent so far, even before receiver chip licensing fees start rolling in.

Somebody's gotta pay. Receiver manufacturers want broadcasters or Ibiqity to pay. Broadcasters want receiver manufacturers to pay. In the end, of course, consumers will pay, but only if they are convinced IBOC digital is worth buying. Before that happens, there will need to be lots of stations transmitting IBOC and affordable receivers that work very well, available almost everywhere.

In spite of the recent complications, I'm still supporting the Ibiqity Digital solution for radio's future. It's our best shot to get radio updated and competitive with all other electronic media.

Analog is a dying horse, folks. It's time to mount the digital pony. But to give this technology the best chance for success, stations need more financial incentive to make the conversion.

In the long run, waiving the licensing fee for early adopters during the first year will do much more to ensure Ibiqity's success than merely disappointing investors in the short run.

Strap yourselves in and stay tuned. This is going to be interesting.

RW welcomes other points of view. 🌐

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GUEST COMMENTARY

Developments in apt-X Technology

by Fred Wylie

Fred Wylie is a technical consultant to Audio Processing Technology. He writes here about developments in apt-X technology.

This is one in a series of occasional articles by proponents of audio coding systems.

Audio Processing Technology can offer substantially improved versions of its popular apt-X 4:1 data compression algorithm. Known as Enhanced apt-X, these new variants are implemented on a new platform provided by the Motorola DSP56362, a 144-pin TQFP package.

On board, in addition to the established Standard 16-bit algorithm, are three Enhanced versions offering further levels of operation with a choice of 16-, 20- or 24-bit resolution.

Existing users of the phenomenal number of channels of Standard apt-X based systems already in everyday use will be comforted to know that this new presentation can link directly with older system level units, using only the Standard 16-bit apt-X code set.

The Enhanced version delivers a significant improvement in audio and processing delay performance coupled with faster synchronization and a new method for embedding auxiliary data.

The apt-X coded output data rate can be extended, as required, to run at rates from 56 kbps to 576 kbps and is capable of delivering mono and stereo audio bandwidths from 3.5 kHz to 24 kHz with sampling frequencies from 8 kHz to 48 kHz.

The 56362 device is a smaller, very low-power CMOS device capable of operation at 100 million instructions per second. This implementation of four apt-X algorithms on a single device is coupled with its capacity to simultaneously deliver four discrete audio channels in real time, as compared with the original, much larger Lucent DSP16A device.

encode or decode channels, or two stereo encode or two stereo decode pairs.

Or, if set in full duplex mode, it can be configured as simultaneously two encode channels plus two decode channels, or in a balanced set-up enabling any two channels to be configured with a different bit resolution further increases the flexibility of operation.

Upgrades; latency

Enhanced apt-X is the outcome of the work carried out by the APT R&D department, which, with advances in digital filter and DSP technologies, was able to modify the digital filter and quantizer coefficients within the Standard apt-X algorithm.

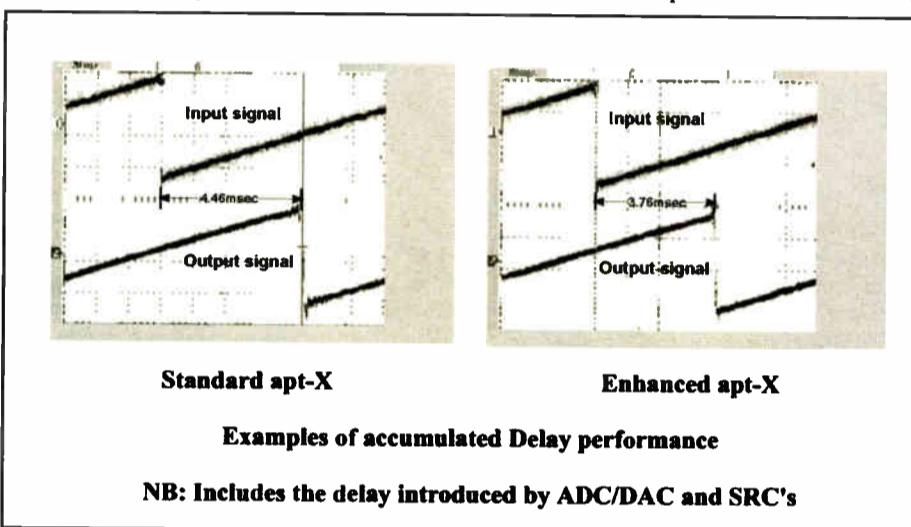


Fig. 1 shows examples of accumulated delay performance for Standard and Enhanced apt-X.

This has led to typical improvements in performance from the original 16-bit technical specification. Operating with 20- and 24-bit resolution the dynamic range capability of Enhanced apt-X has been increased by approximately 20 dB to 25 dB respectively, and the total harmonic distortion (THD) separation has been improved to -75 dB.

The signal processing delay introduced

In practice this means the filter requires fewer audio samples to achieve the desired filtering.

The first stage of the QMF for Standard 16-bit apt-X has a 64-tap filter separating the top and bottom halves of the audio frequency spectrum, followed by a second stage with a 32-tap filter to further divide these to produce the four subbands.

Fig. 1 shows examples of accumulated delay performance for Standard and Enhanced apt-X. Note: The delays introduced by ADC/DAC and SRC modules also are included for Enhanced apt-X. A new 32-tap filter design was used for the second stage. These filter modifications mean Enhanced apt-X now uses 90 audio

samples in the filtering process instead of the 122 required by Standard apt-X.

The time now taken to complete an encode/decode cycle at 48 kHz sampling is reduced from 2.5 millisecond to 1.87 millisecond. The reduction in delay is the same regardless of whether 16-, 20- and 24-bit Enhanced versions of apt-X are being used.

Resolution and transients

The ability to operate with 24-bit computations within the DSP platform has several positive implications. The first and most obvious is that 20- and 24-bit compression processes have more bits allocated to their related subbands.

This increases the accuracy of the compression and reconstruction of the source audio regardless of the sample length of the original source material. It follows that program material from a 16-bit compact disc will benefit from 20- or 24-bit compression techniques even though the source material has obviously a smaller sample length than the compression technique.

The Enhanced 16-bit code uses the same subband bit allocation of 7, 4, 3 and 2 bits, as used in Standard apt-X. However, the bit resolution of the 20-bit version increases this to 8, 5, 4 and 3 bits and the 24-bit version to 9, 6, 5 and 4 bits.

This addition, in each case, of 1 bit per subband directly leads to a 6 dB improvement in dynamic range, giving the 20-bit code a 6 dB advantage over the Standard version and the 24-bit process giving 12 dB improvement.

Meanwhile, the inherent limitation of Standard apt-X is its response to sudden transients in the audio signal content.

In Enhanced apt-X the "look-up" quantizer tables have been redesigned, optimizing their performance to produce a faster reaction to any large transient content.

This change allows a more accurate tracking of the audio material and improves the high frequency reproduction leading to a cleaner and more accurate representation of the audio program material.

Dither and synchronization

Applying dither to a quantizer removes any correlation of the quantizing noise with the incoming audio.

To avoid this, Enhanced apt-X implements a unique technique known as Subtractive Dither, whereby the dither is added before the quantization in an encoder and subtracted in a decoder.

This provides all the advantages of dither but without the noise penalty normally associated with its use.

Synchronization within any of the apt-X algorithms uses the proprietary autosync system. In Standard apt-X this is achieved by periodically inserting a unique 10-bit sync word into the compressed audio datastream.

These bits are spread over the first 10 16-bit apt-X code words in each successive data frame of 128 encoded samples. At the decoder the detection of three consecutive sync words is sufficient to achieve synchronization.

If a loss of lock is flagged, for whatever reason, then sync will be re-established through AutoSync in approximately 50 microseconds.

AutoSync is different in Enhanced apt-X. A sync bit is buried in every encoded sample; consequently it can lock much faster, approximately 3 microseconds at 44.1 kHz sampling.

The sync pattern carries information identifying the format of the encoded sample, making it impossible to replay the data as audio, thus eliminating any AutoSync noise. This feature coupled with the very fast synchronization ensures that in the event of any loss of signal there will be no noise at the output of the decoder and does not affect the audio quality.

The extremely fast synchronization of Enhanced apt-X is an important feature for wireless and IP applications.

The auxiliary data feature has also been modified. In Standard apt-X an auxiliary data bit replaced an audio bit in every encoded sample of the left audio channel only.

Enhanced apt-X makes use of a technique called "Subtractive Buried Data." Optimum performance is now achieved by inserting auxiliary data bits in a symmetrical manner over several audio channels. The decoder does not need to know whether data has been buried or not, in order to decode the audio correctly.

Benefits

A summary of the benefits thus accruing from utilization of the Enhanced apt-X algorithm are:

- Shorter processing delay times
- Faster response to sharp audio transients
- Increased stereo and mono audio channel capability
- Simultaneous full duplex operation with a single device
- Faster synchronization
- Wider dynamic range
- Improved noise floor

See APT, page 34 ▶

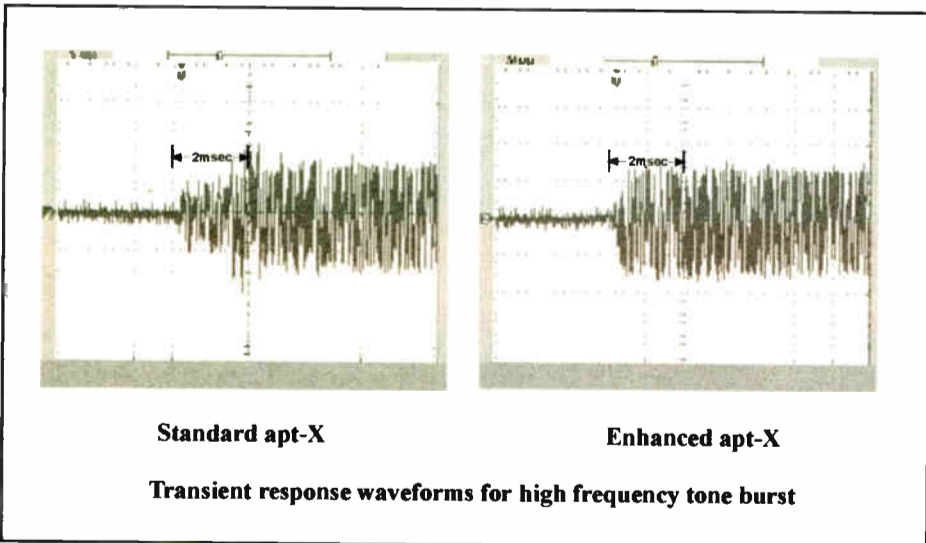


Fig. 2: Transient Response Waveform

That solution delivered two audio channels with a maximum stereo audio bandwidth of 15 kHz at 32 kHz sampling, or 22 kHz mono audio sampled at 48 kHz — to deliver 22 kHz stereo, it therefore required two DSP16A devices. The new Motorola device therefore offers considerable savings in PCB real estate.

In simplex mode the Motorola 56362 can be configured as four discrete mono

by a complete encode/decode cycle of Enhanced apt-X also has been improved. This has been achieved by altering the coefficients of the second stage of the input QMF audio splitting filter.

As with Standard apt-X the incoming audio is filtered into four frequency subbands. These digital filters have now been modified so that the transition bands are not so steep.



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The M367 is a rugged and quiet compact mixer with 6 balanced mic/line inputs; phantom power; input peak LEDs; balanced, 2-position mix bus; switchable output peak/limiter with adjustable threshold and limiter LED; battery, AC/VU meter and program monitor input selector; and metal chassis.

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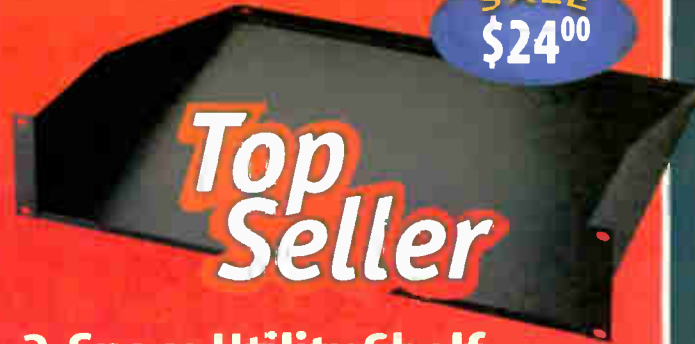
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TECH TRENDS

Radio's Next Great Technology Trends

by Michael LeClair

What does the technical future look like for broadcasting a decade from now? How will broadcasting systems change over the next 10 years?

To provide insight on these questions, Radio World contacted several industry visionaries and technical leaders and asked their opinions about where radio is headed.

listener responses. These would allow the listener to request more information and even download music for a fee.

Use of the ancillary data channel could include an electronic program guide, or EPG, which in turn would permit the use of time shifting by listeners, similar to the way a TiVo recorder works for television.

"With the ability to include metadata that identifies the associated audio, digital

broadcasters will compensate by emphasizing their localism and selling more local spots."

The technology of computer networking and telecommunications networks will continue to be deployed by broadcasters as a way of reducing costs while offering customized programming to local audiences.

Tech assists

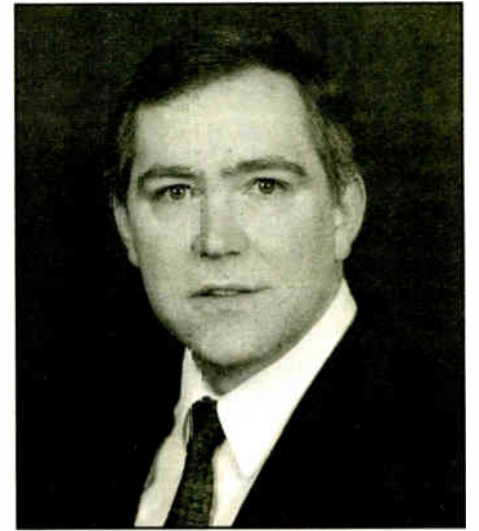
"The network and syndication model is sure to evolve," said Steve Church, president of Telos Systems. "We'll be seeing a lot more blending of live and recorded, local and network. Consolidation can only help this along, as the owners are constantly exploring ways to exploit the benefits of multiple station ownership."

Following this trend, Church foresees greater use of packet-based audio networks.

"Traditional ISDN and AES/EBU transmission have very limited support for program associated data," he said. "Audio broadcast technology has borrowed a lot over the years from telephony. Look to telephony again, where voice over Internet Protocol is now a billion-dollar-a-year business and growing."

Along this same line, new products will need to be developed to handle the need for controlling more than audio information.

"We are now seeing the transformation of the audio console into a routing switch-



Lynn Claudy

er. But there will need to be a way for these systems to also control program associated data, such as graphics that are synchronized with audio," Starling said.

Church also expects that the science of digital signal processing will continue to affect broadcast products. "We're not finished extracting innovative products from the ever-expanding capabilities and ever-lower prices of DSP-capable processors."

IBOC's time?

The experts also agreed that deployment of terrestrial in-band, on-channel digital audio broadcasting is pending.

"The time has come for the FCC to announce some fundamental decisions about digital terrestrial broadcasting, endorsing the IBOC approach to a digital

See TRENDS, page 36 ▶



Graphic courtesy, Impulse Radio

Impulse Radio foresees a future in which the IBOC data stream becomes an important revenue source for radio.

Their answers suggested that radio is in a cycle of change that will continue for the foreseeable future. Within this cycle are some wild-card technologies that could transform the radio industry into something quite different than it is today.

One thing on which our sources could agree is the continuing impact of digital technology on radio broadcasting. There has been a seemingly inexorable progress toward digital audio for the last 15 years, fueled by a revolution in computing that offers increases in power and flexibility at lower prices every year.

From the first CD player, to DAT and through to the "radio station on a hard drive" systems of today, digital techniques have moved into all aspects of audio storage and playback.

Now the industry appears poised on the edge of transforming radio transmission to digital channels as well. And the transition offers many possibilities.

Promise of digital

"Digital broadcasting holds the promise of exciting new ancillary services that can enhance the main program service, or launch entirely new revenue generating ancillary services," according to Lynn Claudy, senior vice president of science and technology for the NAB.

Alan Stillwell, senior associate chief of the Office of Engineering and Technology at the FCC, agreed.

"We can expect to see the digital features offered by broadcasters increasing. With digital broadcasting it is possible to link pictures and text to the audio programming," he said. "These elements will allow broadcasters to reach listeners and offer marketing tie-ins that we can only speculate about today."

Applications for digital ancillary services are numerous. Beyond simply sending out artist and title information for a particular piece of music, stations could include interactive links, using a wireless back channel similar to a cell phone for

transmission could eventually eliminate the dependence on time-based programming," said Mike Starling, vice president of engineering at National Public Radio.

"Listeners could also create 'personalized radio,' a blend of audio from different providers according to their own tastes," he said. "Producers may begin to find that 'chunking' of program content offers distribution benefits over traditional continuous streaming and a viable business."

Ancillary data also could permit paid subscription services to be delivered via radio along with the standard free programming supported by advertising.

Satellite radio

Accelerating the transition to digital transmission is the deployment of satellite radio services from XM Satellite Radio and Sirius Satellite Radio.

Satellite is able to offer a wider range of programming (100 channels) than is feasible for the conventional radio station or group.

"I feel that the most interesting trend right now is satellite-delivered pay radio because this provides the consumer with new content, the crucial factor for a new medium," said Bob Orban, vice president and chief engineer of Orban/CRL Inc.

To survive, however, satellite radio will need to attract a relatively large number of people who are willing to pay every month for a service that has a long tradition of being offered for free.

"It is going to be very interesting to see how the mass market responds to this," Orban said, "and whether XM and Sirius can get enough paying subscribers to reach critical mass."

Local content at terrestrial broadcast stations likely will be affected by the advent of satellite radio.

"Program differentiation becomes Job No. 1 for radio stations responding to the competition — and that means emphasizing localism," Starling said.

Orban agreed: "Nimble terrestrial

APT

▶ Continued from page 30

- Bit compatibility with current 16-, 20- and future 24-bit AES/EBU architectures
- Backwards compatibility with existing 16-bit apt-X systems
- Low complexity implementation and integration on a single DSP device.

SOFT apt-X

Since its release in 1989, some 2 million Standard apt-X audio channels have been traditionally supplied to OEMs, such as DTS, Computer Concepts and Scott Studios in hardware form on the Lucent DSP16A device and in the ACE100 audio card.

This has enabled these, and many other OEMs to develop a range of storage and telecom delivery products incorporating the apt-X algorithm. Now the company can license any prospective OEM to use a software version of the Standard 16-bit algorithm.

Written in the C programming language, this new presentation of the technology is supplied as a core .DLL file containing the apt-X algorithm. This enables all encoding and decoding to be carried out in real time on a purely software platform.

The software can run up to 15-times real time and is supplied as a multithreaded solution, allowing multiple, simultaneous encode/decode cycles, only limited by processor speed, e.g. a 450 MHz Pentium may provide up to three stereo play-out tracks and simultaneously record a fourth stereo track.

A demonstration version of the .DLL is supplied as a dongle-protected solution for use in a software development kit (SDK). This enables the .DLL to be seamlessly integrated into a wide variety of software based audio applications.

As such, the core software is supplied with all the necessary developers information including a demonstration Windows Graphical User Interface.

The SDK has expanded the accessibility of the DLL to include many of the major programming languages such as Delphi, Visual Basic, C, C++ and ActiveX. Example open source projects can be found on the password-protected Web site at www.aptdn.net/.

SOFT apt-X technology delivers the key benefits of the original 16-bit algorithm, including outstanding audio quality, negligible coding delay and immunity to multiple encode/decode cycles. Any hardware constraints are eliminated with this new software format of the technology.

Applications for the software include radio automation, CD rippers, archiving and file conversion.

In summary, not only can the traditional broadcast and inter studio sectors benefit from this release of apt-X but it also opens up the massive multimedia arena.

Before joining APT, Fred Wylie worked at the BBC for 33 years as a communications engineer and manager of communications and engineering services.

RW welcomes other points of view. 🌐

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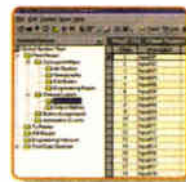
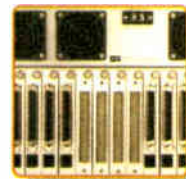
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Trends

► Continued from page 34
 future, adopting a technical standard based on the Ibiqity technology and setting the timetable for introduction of IBOC services," said NAB's Claudy.

Church said, "After many years, this technology is ready for prime time."

Is the FCC ready to proceed?

"We are prepared to listen closely to the recommendations of the NRSC regarding IBOC," said Stillwell. "After all the testing and system information is submitted, we will likely open this proposal to public comment as the first step toward a rulemaking."

While some felt that IBOC faced challenges in deployment, all agreed that the

advent of satellite radio will provide a significant impetus for broadcasters to go digital.

"XM and Sirius will provoke the terrestrial stations to get moving," Church said.

IBOC also may instigate a new philosophy of audio processing that differs from that of conventional radio stations.

"It will be less desirable to drastically increase audio density by aggressive compression because the perceptual codec will have a difficult time finding bits to encode spectrally dense material. Audio processing will also need to avoid using peak limiting technologies, such as clipping, that introduce new spectrum that was not present in the source material," said Orban.

Starling said, "The elimination of audio pre-emphasis under IBOC will affect the overall sound and IBOC audio processing."

IBOC has been developed with the unique capability to provide an ancillary data stream from the start. Many felt this ancillary capacity would be a major force driving IBOC deployment.

"The IBOC data stream will become an important new revenue source for broadcasters," states David Maxson, managing partner of Broadcast Signal Lab and a consultant to Impulse Radio, which is working with Ibiqity in developing a universal open standard for IBOC data.

"But it is important for us to develop a data protocol now that allows us to standardize on universal methods of delivering and generating revenue with IBOC," Maxson said. "We don't want IBOC data services fractured like today's subcarrier services."

There also is interest in the possibility



Steve Church

of dividing up the IBOC data stream into two audio program channels for those broadcasters looking instantly to expand their capacity to serve additional audience.

"There may be an opportunity for public radio stations to offer classical music on their main channel and continuous news services on a secondary channel at somewhat lower fidelity," Starling said.

Internet's role

Finally, several of the interviewees predicted that the Internet, while undergoing a period of financial difficulty, would come back to play an important role.

"The Internet will return as a Big Deal," said Church. "I don't know exactly how this will play out, but the Net is important to audio entertainment. Look at how quickly people took to downloading and rotating the MP3s they exactly prefer."

"I see Internet distribution of audio growing quickly," Stillwell said. "Copyright issues will impact the eventual shape but adequate bandwidth is already available for audio content."

Wireless Internet connectivity also could start to blend the role of the traditional broadcaster with that of the Webcaster.

"We are seeing a rapid increase in the number of people using wireless network connections over the 802.11 standard," Starling said. "Although these networks are currently of limited range, the technology exists to extend them out to serve larger geographic areas."

Church said, "Consider the growth of wireless Ethernet and the coming fast data rate mobile phones and you gotta know something interesting is going to come out of all this."

The underlying technology trend is toward using digital techniques to control and transmit the audio programming that is the heart of radio. This trend has been in place for more than 15 years and will continue, although analog radio will likely remain a powerful force for some time.

Driving the conversion to digital are the enhanced control features and ancillary uses that it offers. Accelerating the change is an environment in which computer and networking technologies offer greater capacity at lower cost every year.

The radio industry appears on the verge of taking the final step and moving to wireless broadcasting of digital audio. How this turns out is impossible to predict, but expect the Internet and satellite radio, through competition and inspiration, to affect the ultimate shape of the radio industry.

Michael LeClair is chief engineer of the WBUR Group of stations in Boston.

Have a thought about the future of radio technology? Tell us via e-mail to radioworld@imaspub.com.

Enter to win one of 26 great prizes in Radio World's reader appreciation contest giveaway!

Dear *Radio World* Reader: Last year, many of the greatest names in our industry teamed up with *Radio World* for a year-long sweepstakes extravaganza that resulted in almost \$50,000 in prizes given away. Due to the overwhelming response from you, we've decided to do it all again in 2002 as a way of showing our appreciation to our loyal readers.

Throughout 2002, *Radio World* will conduct 26 random drawings. Prizes and winners will be announced in every issue of *Radio World*. **That's 26 chances to win!**

To enter the contest you need to complete these three easy steps:

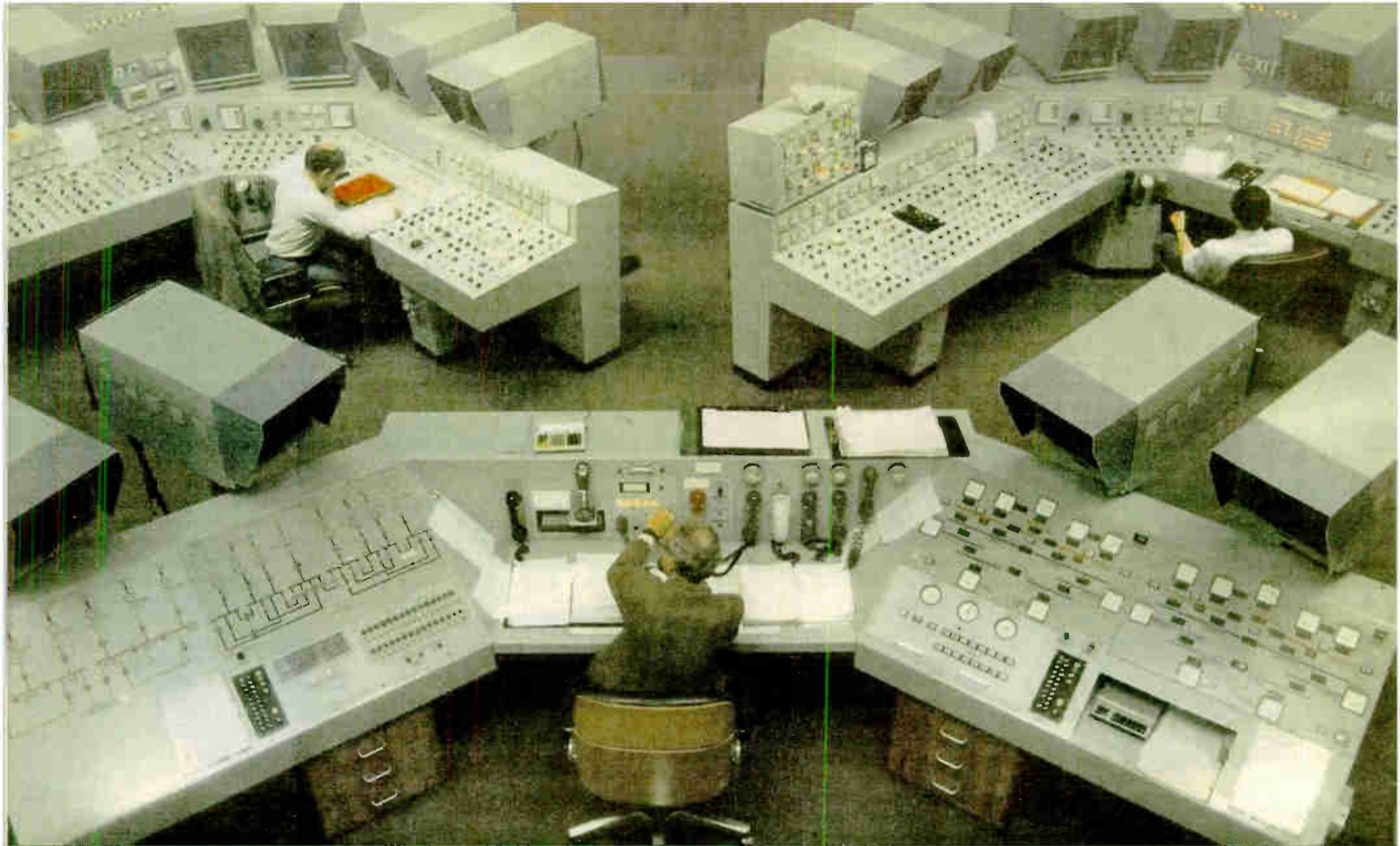
1. Go to our Web site: www.rwonline.com
2. Click the Readers' Choice icon on our home page.
3. Follow the instructions and fill out the electronic entry form — that's it, you're done!



This is your chance to participate in our Readers' Choice program and win great prizes from these fine *Radio World* supporters:



Contest Rules: To enter the drawing, simply register online at www.rwonline.com/sweeps. 26 drawings will be held throughout the year. Contest registration expires Dec. 4, 2002. Final contest prize announcement on Jan. 1, 2003. One prize per winner. All contestants MUST reside in the United States and have a valid mailing address. Winners should receive prizes within 30 days of notification; however, actual delivery time may vary and is not guaranteed by IMAS Publishing. Federal, state and local tax laws may apply to prizes and are the sole responsibility of the winner. Employees and affiliates of IMAS Publishing are not eligible.



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For 10 years we've built the world's best digital audio systems. No one matches CartWorks for quick, simple, reliable setup and operation. Today, we continue to build award winning products by combining superior hardware, software, feature sets, and support with the latest technology. Our customers win with affordable, no hassle, products that work.



- 1993** First digital audio system to fully implement Windows technology.
- 1995** First digital audio system to use the Internet for operation and file transfer.
- 1998** First digital audio system with support for Blind operators.
(Radio World Cool Stuff Award, honorable mention.)
- 2002** First digital audio system to offer handheld remote access and control.
(Radio World Cool Stuff Award, Thanks Radio World for recognizing us again.)

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Operate your radio station from virtually anywhere. Access and edit music and program logs, or take control of the station from wherever you are. Great for remotes, ball games, emergencies, elections, or anytime you need to get away. Connects by Lan, Wan, Phone, Cell Phone, 802.11b, Wireless Ethernet, IrDA, etc. Runs MS PocketPC 2002 OS. *This really changes everything.*



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COOL STUFF AWARD 2002



Congratulations to the winners of the 2002 Radio World "Cool Stuff" Award, chosen on the NAB convention floor by a panel of veteran broadcast engineers and radio/audio experts as notable for their design, features, cost efficiency and performance in serving radio users.

The products on these three pages caused our judges to stop in the aisles and say, "Oh, cool!"

Radio World



Company: Logitek Electronic Systems
Product: Remora Digital Console

A small, modular control surface for the Logitek Audio Engine, the Remora is so named because, like the fish, "it hangs on a SHARC." But the namesake is much cuter than the fish. Each surface can handle one or more pieces; the main module has fader input selection, monitor and headphone controls and stereo VU meters plus four faders. Expander modules have six faders. Suitable for news areas, production rooms and cramped air studios.
Info: (713) 664-4470 or www.logitekaudio.com



Company: 360 Systems
Product: DigiCart/E

E is for Ethernet. 360's latest recorder is aimed at TV but extends the company's neat line of audio devices in a way that will benefit other applications. The Ethernet Audio delivery concept makes networking a practical reality with a low entry cost. An AudioPort interface makes any audio product networkable. At least 24 locations can record or play audio concurrently. Users can add PC and Mac workstations to the network and move audio from a DAW to the Ethernet Audio network server. WAV and BWF files are native to DigiCart/E, and it is file-compatible with DigiCart IIs.
Info: (818) 991-0360 or www.360systems.com



Company: TASCAM
Product: Pocketstudio 5 Recorder/MIDI Arranger/MP3 Encoder & Player

Flash! Here's a compact four-track digital recorder that uses Compact Flash media. Internal MIDI tone module can play back sequences along with audio tracks; 100 MIDI files are included, as are 100 effects. Make a final stereo mix in MP3 and send it to your computer via USB. Edit with automatic punch in/out, track bouncing, copy/paste editing of audio and MIDI using bars and beats. Price: \$599.
Info: (323) 726-0303 or www.tascam.com



Company: Tieline Technology
Product: Patriot POTS Codec

No ISDN here. The Patriot is nuthin' but POTS. This affordable (\$2,595) codec gives 15-kHz audio over a standard phone line, and judges liked the way it handles even crappy connections without dropouts. Algorithms work as low as 24 kbps with 100 ms delay. Features send and return audio adjustment; one mic/line balanced input and one stereo RCA unbalanced input (summed to mono), both adjustable and controllable with a CMOS relay closure; RS232 interface; wireless compatibility using hands-free connection.
Info: (888) 211-6989 or visit www.tieline.com



Company: Telos Systems
Product: Xport

The newest Zephyr is a POTS codec with notable differences. It uses an enhanced version of MPEG AAC called AAC-SBR, for Advanced Audio Coding Spectral Band Replication, to enhance the efficiency of AAC by 30 percent. The box lets you dial ISDN-connected Zephyr Xstream transceivers using analog phone lines — so you get an ISDN connection at the studio while you call from POTS. That means better line quality and more convenience. Features include a mixer with selectable Omnia dynamics processing. Projected cost is \$2,390.
Info: (216) 241-7225 or www.telos-systems.com



Company: Comrex Corp.
Product: BlueBox POTS/Wireless Codec

Here's the audio quality of the company's popular Matrix and Vector at a new price point, \$2,800. BlueBox offers 15 kHz on a plain phone line and improves the audio sent over GSM wireless. A cellular interface is available for sending and receiving audio through the hands-free port of most mobile phones. Features include field upgradeability, last-number redial and compatibility with other Comrex POTS codecs including the Matrix, Vector and HotLine. Connect a set of headphones and a microphone to the BlueBox or hook up to a mixer.
Info: (978) 784-1776 or visit www.comrex.com



Company: Syntrillium Software Corp.
Product: Red Rover

Put recording controls for your Cool Edit Pro 2.0 or other compatible software at your fingertips. Do tracking and control any number of tracks without looking at the computer screen. It works from 10 feet away, and farther with optional USB hub or extension cable. The LCD screen shows session and track info. Features include foot-pedal jack, level meter, cue and metronome buttons, master and track volume control and mute/solo/record buttons.
Info: (888) 941-7100 or www.syntrillium.com

Company: ERI Electronics Research Inc.
Product: Axiom FM Antenna

Judges liked this very broadband system that helps stations solve crowded tower situations. The side-mounted antenna platform accommodates 10 or more stations. The design uses three-stage transformation, shape-factored elements and feed-point reactance compensation. A continuous solid-contact interbay connection system eliminates wear-and-tear bullet failures. Available in various configurations to satisfy gain and pattern needs.
Info: (812) 925-6000 or www.eriinc.com



Winner: Steve Hemphill

Product: 1946 GE Model BT-11-B 10-Watt Transmitter Replica

An honorary "Cool Stuff" Award goes to Steve Hemphill of Solid Electronics Laboratories, whose personal labor of love sat in the Belar booth. Hemphill is enamored with the Phasitron FM modulation concept, developed by Dr. Robert Adler of Zenith in the 1940s and commercialized by General Electric, which used the design in early FM transmitters. Thanks to a manual from Bill Gillman, Hemphill was able to replicate most of the circuitry and layouts of this unit. He found original tubes and some components online. He made production templates and silk-screens for the project, designed and hand-wound the RF multiplier coils and transformers and spent \$7,000 of his own money. We'll report on this project in detail in a future issue.

Info: E-mail to SHemp949@aol.com

Company: TASCAM

Product: SX-1 Digital Production Environment

It combines hard-disk recording, digital mixing, MIDI sequencing, plug-in effects, DAW-style editing and mastering in a package for top-end production. The best part is the price, only \$8,999 plus monitor. Mixer: 40 inputs, 32x8x8 digital console with dynamic automation and 16 phantom-powered mic preamps. HD recorder: 48 kHz, 24-bit, 16-track unit, adds IDE and SCSI drives easily. Editor: Waveform, MIDI and automation data editing. Lots more.

Info: (323) 726-0303 or www.tascam.com



Company: TC Helicon

Product: VoicePrismPlus Human Voice Modeling/Formant Processor

Voice Modeling is cool technology that allows real-time resynthesis and reshaping of the human voice. It offers a variety of ways to process a vocal input, including the ability to add breath, growl, rasp, head and chest resonance, inflection or vibrato. Provides direct editable control over a lead voice. It also includes effects, harmony and backing channel vocal processing. See RW's review in the April 24 issue.

Info: (805) 373-1828 or www.tc-helicon.com

Company: dbm Systems Inc.

Product: Pocket Radio Station

From the makers of CartWorks Digital Audio Systems comes something to make life simpler for busy radio operators. No more weekend or after-hour trips to the studio. Check and edit traffic and music schedules from home, run a remote broadcast or ballgame from the field with no studio personnel, or remotely perform broadcast tasks with ease using the Pocket Radio Station. Available with most new CartWorks digital audio systems. Price: \$1,500 to \$2,500.

Info: (800) 795-7234 or www.cartworks.com



Company: Harris Corp.

Product: Studioflex Furniture

Push a toggle and the furniture rises up. Push it the other way and it goes down. A simple idea, implemented gracefully by Harris using special hydraulics to help radio clients comply with ADA requirements or to satisfy both a stand-up morning team and a sit-down overnight jock. We've seen other raise/lower furniture systems on occasion, but none so easy to operate. Jackie Broo of Harris makes like Vanna White in the photo.

Info: (513) 459-3400 or www.harris.com



Company: Sierra Automated Systems

Product: RIOLink for 32KD Digital Audio Network

Provides remote I/O connectivity for the 32KD Digital Audio Network. A RIOLink module in the mainframe occupies one universal slot and interfaces 32 channels of audio, in and out, plus data to a RIOLink remote chassis. Connects to the remote location via CAT-5 or fiber optic cabling. Judges were similarly impressed with the 32KD itself, introduced last year and now shipping.

Info: (818) 840-6749 or www.sasaudio.com



NAUTEL XL12d TRANSMITTER



HARRIS DEXSTAR EXCITER



BE FXi 60 EXCITER

Company: Harris Broadcast Communications

Company: Broadcast Electronics Inc.

Company: Nautel Ltd.

The judges voted a special "Cool Stuff" Award for Technical Advancement of IBOC to the manufacturers licensed to implement Ibcuity Digital's in-band, on-channel technology in transmitters and exciters. These companies demonstrated products at the NAB show and have invested significant research and development to better the radio industry. Harris Corp. was licensed in the spring of 2001; Nautel and BE were licensed last fall. Regardless of how the IBOC rollout proceeds, our judges felt that the companies that are taking the lead in bringing it to market deserved their recognition.

Harris Info: (513) 459-3400 or www.harris.com

BE Info: (217) 224-9600 or www.bdcast.com

Nautel Info: (207) 947-8200 or www.nautel.com

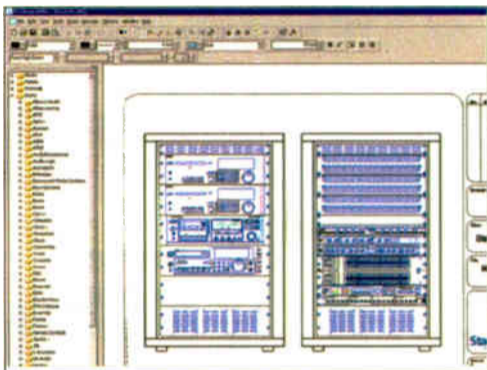
**COOL
STUFF
AWARD**

2002



Company: Digidesign
Product: Mbox

Mbox is a micro studio music production system, a 2-channel USB audio peripheral. It is powered by Pro Tools 5.2 LE software and integrates audio and MIDI recording, editing, real-time mixing and Internet collaboration. The purpose of Mbox is to make Pro Tools available to budget and home users. Getting started requires only a USB-compatible Apple Macintosh (Windows support is coming) and the Mbox unit, which costs about \$500.
Info: (800) 333-2137 or www.digidesign.com



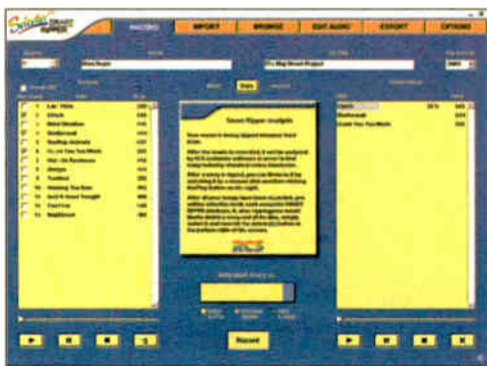
Company: Stardraw.com
Product: Stardraw Radio

Computer-aided design tools are all well and good. But here's a program aimed directly at radio facility designers and engineers. Create schematics, rack layouts, bills of materials, equipment quotations and custom panels. Pick from 10,000 product symbols and update the radio-specific product library every month. Design a system in block or pictorial schematic mode, and a cool rack layout is created automatically. Integrate with Excel to produce powerful reports. Read and edit DWG and DXF files.
Info: (212) 672-1855 or visit www.stardraw.com



Company: Gangverk
Product: Mayo Radio Interactive Music System

The Mayo Interactive Radio System, out of Iceland, puts music selection in the hands of listeners through a station Web site and mobile phone interfaces. The genres are chosen by the station; the exact selection is up to listeners, who can use the Web or mobile interfaces to view the playlist, choose music for broadcast, receive SMS notifications before favorites are played or when friends choose music, chat with other users and buy albums online. Useful for Web stations, it also could work on the air. A daring station might follow the example of some stations abroad and choose to air traditional programming by day and give listeners control at night.
Info: +354-511-1270 or www.gangverk.is



Company: RCS
Product: Selector Smart Ripper

This technology from the people who invented Selector music scheduling lets you record CDs onto a hard drive in minutes. It takes CD audio and rips it, analyzes it, then "Selectorizes" it, determining the song's tempo, energy, texture, beats per minute, what key the song begins and ends in, and whether the ending is fade or cold. This is all automatic. Edit songs to create different versions or overwrite the original file. New versions are reanalyzed with one click.
Info: (914) 428-4600 or www.rcsworks.com

Company: Mager Systems Inc.
Product: Touch-Sensitive Solid-Surface Keyboard and Switches

This furniture innovator isn't afraid to try just about anything to make a customer happy. The company is used to working with unusual solid surfaces that can make a studio table look like it came from the stone age or the 23rd century. But our judges were absolutely tickled by the way Mager implemented EAO-brand touch-sensitive switches into this countertop. That's not a rock, it's a computer keyboard! And Mager offers a 10-year warranty on solid-surface tops and applications.
Info: (623) 780-0045 or www.magersystems.com



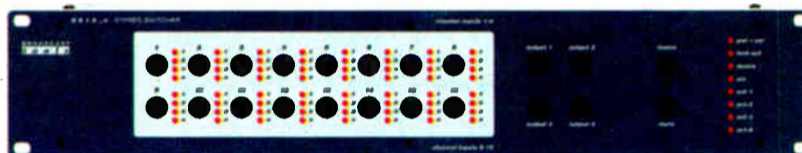
Company: Sabine Inc.
Product: SMW-5000 2.4 GHz Spread-Spectrum Wireless Systems

Why didn't someone think of this before? Use spread spectrum to solve interference problems. Up to 50 units in a single location. DSP allows custom processing on each mic. Mic SuperModeling lets users punch up their favorite elements virtually, without changing the capsule. Available in one- and two-channel models and includes FBX Feedback Exterminator, compressor/limiter and intelligent de-esser.
Info: (386) 418-2000 or www.sabine.com



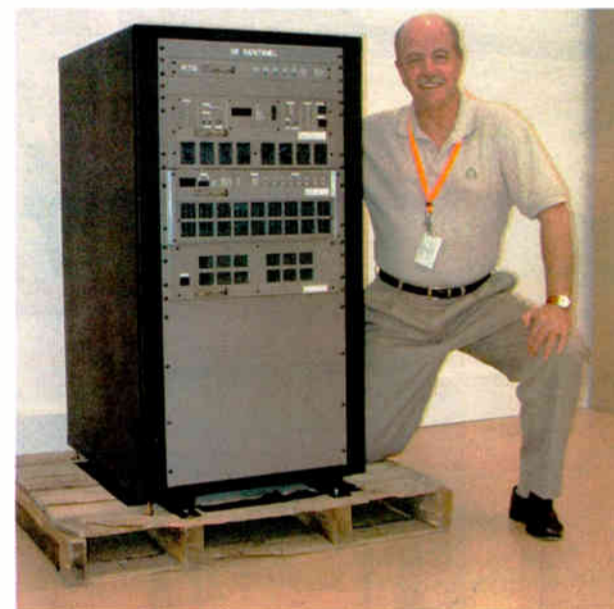
Company: AUDEMAT
Product: AM-Fieldstar

This is an automatic mobile AM field-strength meter that lets you carry out a full network coverage survey of the local AM band with ease. Set up the equipment on your car, configure the stations that you want to check and ... drive! It captures RF levels and allows the visualization and analysis of the results on your PC. Judges loved the calibrated AM receiver, integrated GPS receiver and rotating, directional calibrated antenna.
Info: (866) 283-3628 or visit www.audemat.com



Company: Broadcast Tools
Product: SS 16.4 Stereo Switcher

Kudos for a company that keeps cranking out great problem-solvers. Switcher accommodates 16 stereo inputs, four stereo and four monaural outputs. Buttons for input, output, macro and mute selection. LEDs give status of ins, outs, silence sensors, PIP and power. Configure for mix mode (any/all inputs to any/all outputs); overlap mode (any two inputs to an output); or interlock mode (selected input is connected while previous input is disconnected).
Info: (360) 854-9559 or www.broadcasttools.com



Company: Crown Broadcast
Product: RF Sentinel

Barry Honel's new baby offers full or semi-redundant protection without high cost. Typically, transmitter failure is in the power amp or power supply, so Crown developed a Redundant Transmitter Controller. One typical configuration uses the controller, FM500 exciter/driver, PA2000 amplifier and PS2000 supply. If the controller detects a fault, it will shut down the PA or PS and ramp the exciter/driver from 70 watts drive to a 500-watt output. This will result in a -6 dB signal loss but the station remains on the air. Ships as a wired rack system, with antenna switches and coaxial cables, or as components to upgrade existing Crown systems. Other configurations are available, as are optional cell phone control and notification.
Info: (877) 262-8900 or visit www.crownbroadcast.com

New Campaign Rules on Tap

by Frank Montero

As election season approaches, candidates for every possible elected office will start calling your station to request commercial time. It's also the time when station owners and sales managers have to start brushing up on that most incomprehensible set of FCC requirements, the political broadcasting rules.

That means relearning the equal time requirements and pulling out your calculators and slide rules to figure out lowest unit rates.

However, starting on Nov. 6, the day after this year's congressional elections, there will be a new set of rules to learn courtesy of the McCain-Feingold/Shays-Meehan Campaign Finance Reform legislation, which President Bush signed into law on March 27.

Many have heard about the new law and may know that it was aimed at narrowing the permissible limits and uses of so-called "soft money" contributions. Soft money is the name for the unlimited contributions that can be made by corporations, unions and wealthy individuals to political parties, that could be used to influence federal elections.

Provisions for radio

However, many radio station owners may not realize that the new law contains specific provisions aimed at radio and television advertising by candidates.

First, perhaps we need a brief and general refresher course on what the FCC's rules say about political advertising.

Many of the political broadcasting obligations stem from the "reasonable access," "equal opportunities" and "lowest unit charge" sections of the Communications Act.

While the subtle interpretations of these rules could easily fill a textbook, generally these rules are meant to ensure

that broadcast facilities are available to candidates for federal offices, that broadcasters treat competing candidates equally and that stations provide candidates with the rates they offer their most-favored commercial advertisers during specified periods prior to an election.

"Reasonable access" requires stations to provide "legally qualified" candidates

for federal elective office with access to "reasonable amounts of time" to promote their candidacies.

"Equal opportunities" requires that each opposing candidate for federal, state or local office be permitted an equal opportunity to buy time at the same rates paid by the first candidate.

"Lowest unit charge" (this is the

tricky one) prevents broadcasters, during the 45 days before a primary or primary runoff election and 60 days before a general election, from charging candidates more than the lowest rate offered to the station's most favored advertiser for the same class, length of spot and time period.

At all other times, legally qualified candidates are entitled, at a minimum, to purchase time at rates comparable to what other advertisers pay.

See CAMPAIGN, page 42 ▶

'Radio Wayne' Silent Auction Raises Nearly \$26,000

The now-annual "Radio Wayne" Silent Auction, held during RAB2002 in Orlando, Fla., raised \$25,602 to benefit The Broadcasters' Foundation and the Roaring Fork Conservancy.

The auction honors the late radio executive "Radio Wayne" Cornils, who served with the RAB and the NAB. He died in 2000.

The Broadcasters' Foundation assists broadcasters and their families in times of acute need. The Roaring Fork Conservancy is an environmental group that protects the rivers and habitat of the Roaring Fork Valley in western Colorado, a



Rickie Hall of Rickie Hall and Associates and Cornils' wife, Wendy Green of the RAB, flank a photo of Cornils that welcomes bidders to the Radio Wayne Silent Auction at RAB2002.



Green, Cornils' son Christopher and daughter Carrie stand with one of this year's hot auction items, the Crosley Sleigh reproduction radio.

favorite fly-fishing spot of Cornils.

RAB President and CEO Gary Fries announced that the auction, now in its third year, will be a permanent fixture at the RAB conference.

"This is a continuing legacy to the loves and the life of Wayne," said Fries.

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Campaign

► Continued from page 41

The campaign finance reform legislation places restrictions on the ability of federal candidates to invoke the lowest unit charge and equal access provisions of the FCC's rules. Specifically, under the new law, candidates cannot invoke the rights and conditions of access under the FCC's rules unless they certify in writing that they will not make direct reference to another candidate for the same office in any broadcast.

Once the candidate provides the station owner with that certification, the candidate personally must identify himself in the spot, state the office he is seeking and state that he has approved the broadcast.

If a federal candidate fails to provide the written certification to the broadcast station, the candidate forfeits his rights to the lowest unit charge during the periods of 45 days before a primary or primary runoff election and 60 days before a general election.

Likewise, when a candidate has made the appropriate certification, but nonetheless runs an ad without the proper identification and sponsorship information, he loses the right to the lowest unit charge for the remainder of the pre-election period.

Where a candidate forfeits the lowest unit charge, he also forfeits his rights to comparable rates during all other periods. However, broadcasters still must afford the federal candidate "reasonable access."

As such, a station will not be permitted to refuse a federal candidate's spot simply because a candidate has failed to make the appropriate certification or runs a spot without the new sponsorship disclosure.

The legislation also imposes restrictions on "soft money" expenditures for broadcast advertisements. The new law prohibits special interest groups from using soft money to purchase what are known as "issue ads" within 60 days of a general election, and 30 days of a primary.

Issue ads are advertisements that ostensibly speak out to a particular political issue but actually that are aimed at promoting or attacking a particular candidate. The law addresses issue ads by imposing restrictions on labor unions and for-profit corporations, which engage in "electioneering communications."

These are defined as television and/or radio ads that refer to one or more specific candidates. The law does permit such organizations to purchase such ads through a 501(c)(4) nonprofit political action committee, however, only if they are funded with individual contributions and only if the organization complies with specific sponsorship disclosure rules.

Caution

During the time that the new law was being debated in Congress, the NAB took a cautious position. In one of its position papers, the NAB stated "broadcasters have a direct stake in ensuring that campaign finance reform legislation does not cross First-Amendment lines by imposing constitutionally questionable 'free air-time' restrictions or drastically discounted advertising rates."

NAB opposed the original bill, calling it "an assault on the First Amendment" and citing industry-specific concerns. That concern was prompted by an earlier-introduced amendment to the bill known as the Torricelli Amendment.

If adopted, the amendment would have required television broadcasters to provide candidates with rates equivalent to the least-expensive spot in the same time period over the last year, regardless of class, and would have made those spots non-preemptible.

The amendment also would have granted national committees of political parties the same treatment for issue ads purchased on behalf of candidates in connection with their campaign. By removing the word "class" from the definition of lowest unit charge, the NAB argued that the practical effect of the Torricelli Amendment would have been the creation of a non-preemptible, "candidate-only" rate which would have

been substantially lower than the rate paid by even the most-favored commercial advertisers.

However, the amendment was dropped and the legislation as adopted and signed did not include the Torricelli language.

While the changes brought about by the new legislation have been described as the most sweeping campaign finance reforms in a generation, don't rush out to memorize them yet. Almost immediately after the bill was signed into law by President Bush, the new legislation was challenged in two separate court proceedings.

Sen. Mitch McConnell, R-Ky., filed a lawsuit in the U.S. District Court for the District of Columbia, arguing that the new law violates the First Amendment's protection of free speech. The National Rifle Association filed a separate challenge to the law.

The law itself provides for expedited review, so some believe that an initial court ruling may come down before the law would go into effect.

In the interim, political candidates and broadcasters will stand by to see how their relationship will be affected by the new legislation.

Frank Montero is a communications attorney with the Washington office of Shaw Pittman, LLP. He was director of the FCC's Office of Communications Business Opportunities and co-chair of the Federal Communications Bar Association's Transactional Practice Committee. Contact him at (202) 663-8936 or send e-mail to frank.montero@shawpittman.com.

Local Ad Billings Drag Down Sales Numbers

After a one-month trip into positive territory, the Radio Advertising Bureau reported another decline in radio revenue for the industry in February. The month was down 5 percent compared to the same month last year.

National ad revenue actually was up 1 percent, but local dollars, which make up the bulk of radio billings, fell 6 percent, due primarily to the lack of TV sweeps advertising in this Olympic year.

Looking at year-to-date numbers, national sales figures grew 1 percent, while local dropped 3 percent during the first two months of the year.

Gary Fries, RAB president and CEO, stated, "Radio has a broad range of advertising categories which have sustained the medium through the recent turbulent economy. Radio revenues are strengthening each month, and as we look forward, the industry is poised for a steady growth recovery."

— Sharon Rae Pettigrew

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With a host of automation features designed to save both time and resources without breaking the bank, our iMedia software family has received multiple industry awards for innovation. Maybe that's why over 400 radio stations around the world choose OMT for their broadcast automation software. Why not join them?

In the broadcast industry, you can't afford to divert your attention away from driving your business. But you can afford iMediaTouch, and we're just a call away: 1-888-665-0501.

iMediaTouch broadcast automation software.
Completely dependable. Completely affordable.

'Don't Block the Door Open'

Radio Managers Are Urged Not to Relax Attention to Security as 9/11 Fears Retreat

by Paul Kaminski

On Sept. 10, 2001, station security was probably the last concern on the minds of most broadcasters.

In the months since the terrorist attacks on 9/11, it has received much more attention.

At an NAB2002 session called "Station Security: Precautions, Practices, and Procedures," panelists and attendees discussed theories and tips on making the bricks, mortar,

equipment and people of a broadcast stations safer in the post-Sept. 11 world.

The session was co-moderated by Radio World Editor Paul McLane and TV Technology Editor Tom Butts.

Price to pay

Panelist Leon Long, vice president of operations for The Liberty Corp. and general manager of WLOX(TV) in Biloxi, Miss., said broadcasters might well be in the crosshairs of those "looking for a high-profile target."

Kevin Cassidy, corporate director of security and safety for Reuters America, said, "There would be a price to pay to protect (assets and people). Security is an evolutionary process."

Al Kenyon, Clear Channel Radio's senior vice president for projects and technology, said, "For a while after 9/11, people were very careful about security. Now it seems doorstops came back into fashion."

In other words, staffers are leaving doors unlocked or propped open, returning to old habits.

Although many of the security measures discussed involved technology, such as card readers, alarm systems and

CCTV camera monitoring, some of the most-effective security measures discussed cost nothing to implement.

"You have to get your entire organization involved in security," said Long. "Don't block the door open."

Cassidy said managers might "consider having the facility managers report to the security department, since they share common responsibilities."

Kenyon said, "The key thing to protect is your people, and that's done through planning."

On camera

Panelists took questions about keeping computers and servers safe, privacy issues surrounding monitoring by CCTV cameras, transmitter security and access vs. openness in radio station design.

Cassidy said the process of welcoming visitors can be incorporated in the screening process to make it quick and professional.

Long said Liberty is going to a "bank-teller" style of lobby, and has them at 10 of his facilities.

"It protects that 22-year-old receptionist. Perhaps it seems like a fortress mentality, but we can sleep a lot better at night."

Broadcasters might well be in the crosshairs of those looking for a high-profile target.

— Leon Long


Kenyon added some suggestions for the station emergency plan.

Have a meeting place 300 to 500 feet away from the building where staff can meet after an evacuation, he counseled.

Keep a current list of key people with telephone and cell phone numbers in a place outside the building.

"Let the local emergency management people know who should be in the building. Most of all, get another set of eyes on your plant."

What steps does your organization take to assure the security of people and the facility? Tell us via e-mail to radioworld@imaspub.com.

This story originally appeared in the NAB Daily News and is copyright NAB. 

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AM Success Strategies Shared

by Alan R. Peterson

“Have we become a trash dump? AM radio should be alive and well!”

This was the message delivered by moderator Rick Sellers at “You Can’t Spell ‘America’ Without AM,” an NAB2002 panel addressing owners and managers of AM radio stations.

Joining Sellers was Red Pitcher, general manager and sales manager of WJBC(AM), Bloomington, Ill., and Kevin Potter, who heads up KWON(AM) in Bartlesville, Okla.

Don’t do anything on the air unless it’s sold.

— Kevin Potter, KWON(AM)

Sellers and his panel shared business strategies and moneymaking concepts that have made winners of their AM stations.

Strategies, concepts

“In a perfect world, we’d all make money and have 100 shares,” said Sellers, president of KMRY, a stand-alone AM station in Cedar Rapids, Iowa.

Sellers stressed the importance of affiliating with a news network almost immediately, and not to underplay local news and sports. With patriotic underpinnings, Sellers also spoke of “Project Pledge,” where recordings of local schools reciting the Pledge of Allegiance are aired on KMRY, the feature underwritten by local advertisers.

Potter’s own station is situated near Tulsa, which he said has helped him considerably.

“I can’t compete with Tulsa stations,

but they can’t compete with me!”

Potter punctuated his declaration by emphasizing his station’s extensive focus on local news, hometown sports and weather — the latter being of great importance in the tornado-prone region.

Summer concerts, information features, lost pet segments and school sports are all sponsored. Yearly promotions have netted the station up to \$145,000 in business.

“Don’t do anything unless it’s sold,” Potter said, a business strategy echoed by Pitcher.

Pitcher’s own task was to make viable an AM station that had a percep-

tion of being “too old,” employing FM broadcasters to give it a more modern feel. He airs gardening tips and back-to-school safety advice, all sponsored.

Pitcher also airs an ESPN-type sports package reporting from several games simultaneously rather than the play-by-play of a single event.

When questioned by an audience member about local competition offered by non-commercial low-power FM stations arriving in their markets, Potter said, “I don’t feel threatened. We will outwork everybody. We’ll roll up our sleeves and get involved.”

Sellers offered to “help the little

guy,” in his words.

The events of Sept. 11 were defining moments for each station. Pitcher’s station generated \$883,000 in victim-support donations at a local supermarket, while Sellers scooped his news-intensive competition.

“They were parked on the network, while we interviewed the mayor and the chief of police,” he said.

Potter spoke of a local group visiting Washington that managed to get out one phone call.

“Who did they call? Us, not the newspaper, not their families. But they did ask us to tell their families they were all right.”

This story originally appeared in the NAB Daily News and is copyright NAB.



STATION SERVICES

NBG, NBC Bring 'Access Hollywood' To Radio

Fans of TV’s “Access Hollywood” soon can hear the feature on the radio. NBG Radio Network and NBC Enterprises have launched the radio syndication of “Access Hollywood on the Radio With Nancy O’Dell.” The two-minute daily vignette features celebrity news from the daily televised entertainment magazine “Access Hollywood.”

In a related deal, Nancy O’Dell Enterprises Inc. has penned an agreement with NBG to provide two to five minutes of daily live commentary to radio stations in the top 25 markets each week.

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Internet Radio



See Page 49

Radio World

How to Succeed in the Dot-Com World

NEWS ANALYSIS

May 22, 2002

Industry Ponders Streaming Future

by Dee McVicker

NAB2002 conventioners gathered on the floor and in sessions last month to discuss the latest twists and turns in the ongoing streaming media saga.

"If you have been on this ride since 1998, you know that it's very much like the roller coaster ride at the Stratosphere," said Marshall Eubanks, CEO of Multicast Technologies in Fairfax, Va., and a panelist for an NAB Xstream session.

Heads bobbed up and down in the audience and attendees gave each other knowing looks as they recalled the highs and lows of Webcasting — from the high-roller days of Napster to the gravity-defying drop in bandwidth costs.

But it was the recent turn of events concerning content fees that supplied the adrenaline rush for broadcasters and media companies this NAB show.

CARP issues

Copyright and talent fees set separately by the Copyright Arbitration Royalty Panel and the American Federation of Television and Radio Artists threaten to send the cost of Webcasting through the roof.

So far, streaming portals and those companies who support them have been hit the hardest.

"A lot of our customers went broke," said Mark Warner, director of broadcasting for RealNetworks in Seattle.

Last year, union costs took their toll on Webcasting profitability when AFTRA decided its members would need additional compensation for ads originally recorded for radio but played over the Internet.

AFTRA's stipulation for what could amount to an additional 300 percent collected in talent fees was like throw-

ing sand in the face of broadcasters, who were already feeling the slum in over-the-air ad sales.

Clear Channel temporarily pulled the plug on streaming in the spring of 2001 and other stations followed suit. Radio

mentation has been palpable. There was talk on the convention floor of a coup by Radio One and Clear Channel to start charging record companies for their promotional use of radio airwaves.



Last year Broadcast Electronics purchased SoniXstream, a Webcasting package for broadcasters that includes encoding, stream hosting, audio processing and digital asset management applications. Miami's WPOW(FM) Power96 employs the full suite.

groups are streaming again, but many are eliminating over-the-air spots from their Webcasts and replacing these timeslots with ads not under AFTRA contract or, unfortunately, sometimes with "dead air."

In February, CARP issued a recommendation that Internet radio stations pay copyright holders 0.07 cents per song, per listener.

Broadcaster resistance to the recom-

"Broadcasters have a lot more clout than they might think," said John Schaab, general manager of On Air Digital USA, based in Dallas.

Schaab isn't alone in his thinking that stations should negotiate a more equitable arrangement based on percentage of revenue. Broadcasters attending the show appeared united in their pursuit of a per-revenue fee structure that would give them the opportu-

nity to grow streaming into a mature market instead of a per-song/per-user fee structure that would squelch growth.

Given the chance, most broadcasters said they'd be interested in making the investment in what they recognize as exploding opportunity. But again and again, in NAB sessions and on the exhibit floor, they voiced frustration with the cost, and technology, of Webcasting.

"The existing infrastructure has never been built for this," said Jay Haynes, CEO of Blue Falcon Networks in Los Angeles and an Xstream panelist.

Although bandwidth costs have fallen through the floor in the last two years, streaming's large appetite for bandwidth remains a costly proposition for broadcasters. Many, like Haynes, pin their hope on a solution known as peer-to-peer IP multicasting.

Many users

Instead of sending a dedicated stream for each user, the predominant streaming method today, IP multicasting lets broadcasters send one stream for many users, eliminating the additional bandwidth needed for each user.

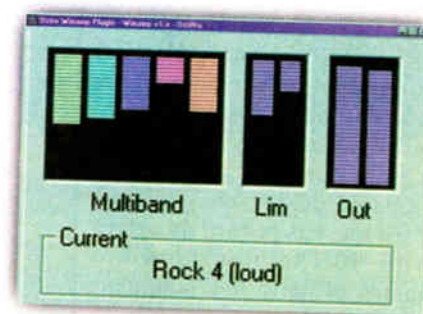
Peer-to-peer IP multicasting takes the concept a step further and uses distributed networking to hand off the stream from one user to the next, which, according to Haynes, is saving Virgin Radio — considered the fastest-growing Internet radio station — anywhere from 40 to 75 percent in bandwidth costs each month.

No one offered any such quick fixes for the so-called last-mile problem at this NAB convention, but plenty offered opinions.

Attendees talked openly, at times bitterly, of their disappointment that the majority of Internet radio listeners still are dialing into the Internet at speeds that can't deliver enough bits for good quality mono, let alone stereo music.

See STREAMING, page 48

The Ultimate 5-band Audio Dynamics Processing Software



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Streaming

► Continued from page 46

Following an upbeat dialog on new streaming technologies, panelist Doug Mohny, the principal for Vegas Commando in Alexandria, Va., broke in with what he characterized as the negative reality of the marketplace.

Even though a great deal of fiber has been installed in recent years to get high-speed data rates through the last mile and to the end user, he said, a majority of that fiber remains dark because broadband providers have reined in capital expenditure.

Mohny voiced the growing speculation that the enterprise sector, with its wide area networks and wide T1 pipes ideal for streaming, may be the early adopter of streaming instead of broadcasting.

"It's good to be in the enterprise right now. Narrowcasting appears to be the way to make money right now," he said.

Broadcasters have a lot more clout than they might think.

— John Schaab

The absence of streaming media equipment on the radio exhibit floor certainly supported that speculation. A handful of companies brought streaming media products, but RF and traditional radio wares still dominated the radio hall by a wide margin.

Yet, in the streaming media hall, new media products were practically jumping off their display racks.

Divided as much by geography as by philosophy, conventioners across the hall from broadcasters showed marked differences in their perception of Webcasting.

Division, contrast

The contrast was evident in sessions covered, in group discussions, in product designs. But perhaps the most striking example of just how far apart in thinking the two had become was found in the broadcast hall, at the Broadcast Electronics booth.

Show-goers gathering around a display of Broadcast Electronics' new acquisition, SoniXstream, were instructed on the many customized features of what sales reps referred to as "tuners." Broadcasters at once understood the meaning of the term: This software version of the radio tuner for audio or video playback on the PC could only be, well, a tuner.

But those who hailed from the computer camp weren't so inclined, thinking of it instead as "media player" and revealing a fundamental difference in their understanding of the technology.

"We're each coming at this from a very different perspective," said Ray Miklius, Broadcast Electronics' vice president of studio systems, who hopes to bridge that distance with the compa-

ny's new acquisition.

It recently purchased SoniXstream, an end-to-end Webcasting package for broadcasters that includes encoding, stream hosting, audio processing and digital asset management applications.

Just as revealing at this NAB show were the topics *not* discussed. Noticeably absent were the usual heated debates on codecs (coder-decoder), a surprising omission given RealNetworks' announcement to support MPEG-4 after attempts to own the tuner — er, media player — market using its proprietary codecs failed last year.

Apple also had announced earlier in the year its support of MPEG-4, an open-standard that has itself taken an interesting new turn in recent months.

High fees?

In January, MPEG-4 patent holders set codec fees that many claim are simply too high. The debate bears a striking similarity to the digital content rights debate, except at issue is the price of codecs used in media players for reduc-

ing the bit-rate of streamed content.

Two of the three major media player vendors now support MPEG-4, while Microsoft remains the odd man out by continuing to push its proprietary codecs. The company appeared to dig in its heels all the more with its codec advancements demonstrated under the company's technology codename "Corona" this NAB convention.

Even so, attendees paid little attention. It seemed broadcasters were less interested in the competitive specifics of codecs and more interested in how they could compete in this fresh new marketplace. More than one attendee invoked memories of Napster — a painful reminder of untapped consumer demand.

Conversations inevitably turned to subscription vs. advertising models as ways to capture the business.

"It's still about cost vs. audience," said Warner with RealNetworks, which promoted its Real Broadcast Network to help broadcasters implement online subscription services by reducing the entry cost and time required to build their own infrastructure.

Neither business model will get far, however, without a resolution as to the method and amount of payment made to copyright holders. The broadcast industry is holding its collective breath until the time when the Librarian of Congress will review the CARP recommendation.

But even as they're pondering the possibilities, they're bracing for other twists and turns in the ongoing saga of streaming — or *screaming* media, as one astute broadcaster calls it.

Dee McVicker can be reached at (480) 545-7363 or via e-mail to deemcv@qwest.net.

VIRGIN RADIO CONTINUES WEB GROWTH

The leaders of MeasureCast's recent streaming rankings have familiar names. For example, Virgin Radio finished the week of April 15 as the top Web radio station based on hours streamed. MeasureCast said the London-based broadcaster streamed 303,100 hours of entertainment to 52,161 people.

JazzFM, the previous week's top Webcaster, came in second; classical stations WQXR(FM) and KING(FM) were third and fourth.

Overall Internet radio listening through mid-April was up about 99 percent for the year, as monitored by the MeasureCast Internet Radio Listening Index, a representation of the trend in total time spent listening across a spectrum of online stations. The index has increased more than 560 percent since the beginning of 2001.

Clear Channel Worldwide continued as the top-ranked network of Web radio stations measured by MeasureCast, by streaming 1.6 million hours to 264,000 listeners.

"There is no doubt that consumer demand for Internet radio is growing," said MeasureCast CEO Ed Hardy.

— Paul J. McLane

TOP 10 INTERNET RADIO NETWORKS (MONDAY, APRIL 15, 2002 - SUNDAY, APRIL 21, 2002)

Rank	Network	URL	Total TSL ¹ (in hours)	Cume Persons ²
1	Clear Channel Worldwide	www.clearchannel.com	1,605,127	272,361
2	Radio Free Virgin	www.radiofreevirgin.com	751,058	163,352
3	Warp Radio	www.warpradio.com	682,366	119,813
4	StreamAudio	www.streamaudio.com	502,826	97,817
5	Virgin Radio	www.virginradio.co.uk	453,905	91,316
6	Internet Radio, Inc.	www.internetradioinc.com	332,630	145,456
7	SurferNETWORK	www.surfernwork.com	271,376	43,611
8	Public Interactive	www.publicinteractive.com	176,880	49,621
9	New York Times - WQXR	www.wqxr.com/cgibin/iowa/index.html	170,348	28,709
10	KING-FM	www.king.org	130,408	21,879

THE MEASURECAST WEEKLY TOP 10 (MONDAY, APRIL 15, 2002 - SUNDAY, APRIL 21, 2002)

LW	TW	Station	Format	Owner/Network	URL	Total TSL ¹ (in hours)	Cume Persons ²
2	1	Virgin Radio/1215 AM & 105.8 FM (London)	Hot Adult Contemporary	Virgin Radio New Media	www.virginradio.co.uk	303,100	52,161
1	2	JazzFM/102.2 FM & 100.4 FM (London)	Jazz	Clear Channel World Wide	www.jazzfm.com	261,911	68,613
3	3	WQXR-FM/96.3 (New York)	Classical	New York Times	www.wqxr.com	170,348	28,709
4	4	KING-FM/98.1 (Seattle)	Classical	Classic Radio Inc. Real Broadcast Networks	www.king.org	130,408	21,879
5	5	MEDIAmazing (Internet-only)	Listener Formatted	MEDIAmazing	www.mediamazing.com	80,019	49,606
6	6	KKDA-FM/104.5 (Dallas)	Urban Adult Contemporary	Service Broadcasting	www.k104fm.com	72,383	6,769
8	7	3WK Undergroundradio (Internet-only)	Alternative Rock	3WK	www.3wk.com	72,019	19,640
7	8	KNAC.COM (Internet-only)	Pure Rock	KNAC.COM	www.knac.com	60,498	13,243
11	9	BeOnAir Rock (Internet-only)	Rock	BeOnAir.com	www.radio.beonair.com	56,131	6,386
14	10	WFZX-FM/93.7 (Wilmington, NC)	Classic Rock	Sea-Comm Media / Warp Radio	www.937thebone.com	55,583	7,269

Notes:

- Total TSL (Total Time Spent Listening) is the total number of hours streamed by the broadcaster in the reported time period.
- Cume Persons is an estimate of the total number of unique listeners who had one or more listening sessions lasting five minutes or longer during the reported time period. This estimate is derived using an algorithm that takes into account unique media player GUIDs, unique IP addresses, and other variables during the reported time period.

About MeasureCast, Inc.

MeasureCast, Inc. is the first company to provide Internet broadcasters, advertisers, and media buyers with true third-party audience size and demographic information with the MeasureCast Streaming Audience Measurement Service™. MeasureCast employs patent-pending Active Event Monitoring™, a unique server-side technology, to record the exact number of streams requested from Internet broadcast-site streaming servers. Accurate, secure reports are available to customers within 24 hours of a webcast via a password protected web site. MeasureCast supports Microsoft Windows Media Technologies, RealNetworks RealSystem servers and other proprietary streaming technologies. MeasureCast products and services are available through its direct sales force, and through Nielsen Media Research as part of a strategic partnership with Nielsen Media Research and NetRatings. MeasureCast issues a weekly MeasureCast Top 25™ ranking of Internet radio broadcasters, a weekly MeasureCast Internet Radio Index™, which tracks the growth of on-line radio listening, and a monthly Top 50 ranking of Internet radio broadcasters. For additional information and a demonstration, visit www.measurecast.com. Corporate headquarters is located at 921 SW Washington St., Suite 800, Portland, Oregon 97205.

measurecast

BIA: 2001 Deals Saw 'Screaming Stop'

BIAfn says pronounced slowdowns in the overall economy — especially in advertising — led to the "screaming stop" of radio station transaction activity in 2001.

After "several years of previously unimaginable numbers of stations sold for breathtaking prices, the number, and more significantly, the total value of radio stations that were sold in 2001 noticeably decreased," states BIA in an analysis of radio deals in 2001.

While the number of stations sold in 2001 dropped by 46 percent, the total value of those sales decreased by 85 percent to just below \$4 million.

In large markets, the average price paid for a station dropped by nearly \$10 million.

The report — "Radio Transactions 2001: Where Did All the Deals Go?" — indicates the slowdown was well underway prior to the events of Sept. 11.

— Sharon Rae Pettigrew

The CARPing Won't Stop Soon

by Craig Johnston

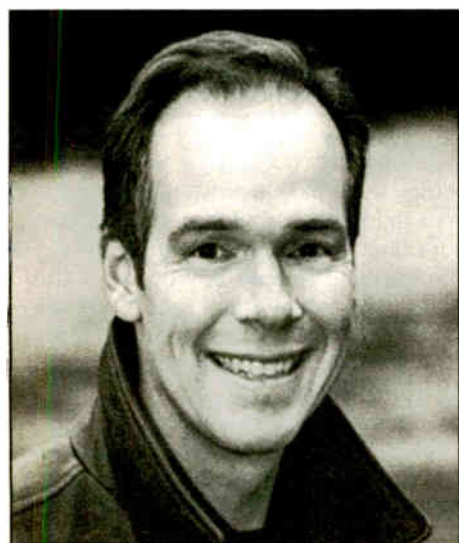
Web Watcher knows when he's at a disadvantage.

With the Librarian of Congress required to rule on the Internet Radio music royalty rate recommendations of the Copyright Arbitration Royalty Panel just about the time you receive this copy of Radio World in the mail, Web Watcher isn't going to lay odds on what the librarian's decision is going to be.

I am going to make one prediction, however: no matter what the Librarian decides, all heck's going to break loose.

Sleepy proceedings

The CARP's proceedings over the last half of 2001 and the first part of this year have been sleepy, inside-the-industry news. Only Internet radio operators, who would pay thousands, and record companies, which would receive millions, were paying close attention.



Sven Haarhoff



Erin Cullen

However, once "per-song/per-listener" rates were announced by the CARP in late February, prompting Internet radio operators to predict the demise of the fledgling ad-supported radio over the Internet industry, it's been Page 1 news.

Web Watcher has never seen such a blitz. From the New York Times to the smallest Valley News, they've chronicled the attack of the big, bad record companies, represented by the Recording Industry of America Association, on Internet radio.

"The cost could force most out of business," said a New York Times news story.

"A Sword Over Web Radio," read the headline over a Los Angeles Times editorial.

It led the RIAA to post a rebuttal on its Web site: "In recent weeks, the CARP rates have become the subject of an intense misinformation and propaganda campaign (so called 'grassroots' but really ginned up by sophisticated lobbyists in D.C.) — waged through the news media, e-mails to Capitol Hill and numerous Internet sites. The goal is to scare non-commercial Webcasters — including college radio stations and so-called hobbyists — and their members of Congress into thinking that the CARP rates are going to

drive non-commercial Webcasters out of business."

Which led at least some college radio stations that felt they'd been muscled out of the CARP proceedings by the RIAA to start their own campaign.

Fallout

"Unless Congress steps in to restructure the copyright law, many Internet radio stations will not be able to continue to operate," states Joel Willer, general manager of KXUL(FM) at the University of Louisiana at Monroe.

"Student-operated noncommercial radio stations are particularly hard-hit



because they have very limited financial resources and their volunteer staffing restricts their ability to comply with the regulations."

And what effect might all this hullabaloo have?

"I think members of Congress and the Librarian of Congress are people who read newspapers, and are aware that this is an extremely controversial decision," NAB's Dennis Wharton, senior vice president for communications told Web Watcher.

See WEB WATCH, page 50 ▶

Only one thing could endanger the reliability, durability and quality of an OMB equipment

(ok, movie monsters are rare and unusual ...but it could happen)



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**RW NEWS
BYTES**
from the editors of
Radio World

Web Watch

► Continued from page 49

"Eddie Fritts has said, on occasion, ultimately Congress might have to become involved in this issue." Fritts of course is CEO of the NAB.

In fact, standing at the PR equivalent of the Little Bighorn may have already taken its first toll on the recording companies. Through the RIAA they've scaled back their requests for reporting requirements on music played on Internet radio.

"RIAA has simplified its proposal by dropping the listener log, which resulted in considerable confusion and criticism," stated RIAA's Steven Marks, senior vice president, Business and Legal Affairs. "We look forward to working with Webcasters on having these reasonable regulations adopted so that record labels and artists can begin receiving royalties."

Identifying listeners

Web Watcher has been told by engineering types that technically, tracking listeners by a "unique user identifier" is a do-able, if demanding, deal. However, you don't have to be a lawyer (or play one on TV) to suppose that the user ID would have been dead on arrival from a privacy standpoint. So the olives on this olive branch may have already been spoiled.

The PR firestorm did spur 20 U.S. representatives to send a letter in late April to James H. Billington, Librarian of Congress, expressing fear that the per-song/per-listener fee formula could "stifle the industry and force hundreds of small Webcasters out of business." The letter was drafted by Rep. Jay Inslee, Democrat from Washington state.

In real-world business terms, the uncertainties of the copyright fee situation may have already taken a significant toll on Internet radio.

Congress of the United States

Washington, DC 20515

Honorable James H. Billington
The Librarian of Congress
LM 608
101 Independence AVE SE
Washington DC, 20540

Dear Mr. Billington:

We are writing regarding the Library of Congress's ongoing review of a recommendation of a Copyright Arbitration Royalty Panel (CARP), which proposed Internet radio sound recording performance and reproduction royalty rates pursuant to the Digital Millennium Copyright Act's (DMCA) statutory licensing provisions. We are concerned that the CARP proposal is contrary both to the intent of the DMCA and Congress's general policy not to stifle innovation on the Internet. Many of us have already been contacted by webcasters in our states, particularly small webcasters, who are concerned that the recommended royalty rate would force them out of the business of creating and webcasting innovative music programming over the Internet.

As you know, a portion of the DMCA modified statutory sound recording performance and reproduction licenses to ensure their application to Internet radio. In doing so, Congress intended that (a) creators be fairly paid for commercial uses of their creative works; and (b) the media promise of the Internet, including the opportunity for new cultural and competitive programming that generates value to creators and citizens, should be realized. As the legislative

Twenty U.S. reps sent this letter to the Librarian of Congress, expressing fear that the per-song/per-listener fee formula could 'stifle the industry and force hundreds of small Webcasters out of business.'

BRS Media Inc., a multimedia e-commerce company targeting radio and the Internet, estimates the number of Internet radio stations has dropped from more than 5,700 a year ago to 4,633 at recent count. BRS Media CEO George Bundy told Congress in a letter that the CARP decision on Webcasting royalties has already stunted the business.

Bundy told me his company found the reason many Webcasters ceased streaming

today than it was this time last year."

Hmm ... let's do a little Web Watcher math: We have more listening to fewer stations, which sounds like it equals audience aggregation. I checked his answer with Internet radio ad-specialists HiWire Inc.

"Not only are there more listeners going to 'fewer' (since it's not fewer by much) stations," said HiWire Spokesman Wayne Hickey, "but also we're seeing the proliferation of advertising tools, like Hiwire's Ad

was stated clearly to their listeners on their Web sites. He also noted that the year-over-year decline of Internet radio stations actually began with the AFTRA talent fee issue, and that some stations had returned after solving that problem, only to go offline again because of the looming copyright fees.

Even if there are fewer stations stream-

Network, that allows advertisers to buy specific demographics, dayparts or metro areas, irrespective of the station.

"For example, (an advertiser) can buy time on a dozen stations in L.A., Boston and New York through Hiwire that are owned by different groups — from Clear Channel to Salem."

Having copyright fees and other issues



Rep. Jay Inslee, D-Wash., drafted the letter he and 19 fellow congressmen sent to the Librarian of Congress.

ing, that doesn't seem to have interrupted the stampede to listen to Internet radio. Ratings service MeasureCast Inc. reported Internet radio listening rose 99 percent over the first three months of 2002. (See page 48.)

"Despite the beating (Internet radio is taking on) the AFTRA issue, CARP recommendations, few advertising dollars and the weak economy, consumer demand for Web radio is skyrocketing," MeasureCast Communications Director Sven Haarhoff told Web Watcher. "In fact, Internet radio listening is growing faster

threaten Internet radio is too bad just at a time when there are two more bright spots on the technical and financial horizons.

The first ray of sunshine is the impending release of Microsoft Corp.'s upgrade to the audio side of Windows Digital Media, code-named Corona. (Why does Web Watcher become thirsty writing this?)

"Corona will bring what we call Fast Stream, and that delivers an instant-on, always-on streaming experience for broadband users," Erin Cullen, product manager for Windows Digital Media Division told me.

"With Corona for broadband users, there's the complete elimination of buffering, so that will give you instant-on, always on, like turning-on-the-radio-in-your-car-type of experience."

At NAB2002, Microsoft released a list of companies developing products incorporating Corona, including Creative Labs Inc., Echo Audio, M-Audio/Midiman, Steinberg Media Technologies AG and Syntrillium Software Corp.

Take comfort

Another source of comfort is that the price of bandwidth, Internet radio's incremental cost of delivering a stream to each individual listener, is dropping.

"There's plenty of bandwidth; bandwidth prices are dropping," Tony Greenberg, CEO of Ramp^Rate LLC, said. Ramp^Rate offers procurement consulting for IT outsourcing. (Yes, the symbol is part of its name.)

"We see storage costs down about 6 percent over the last year, and bandwidth costs down about 40 percent," he said. He credited a new wave of content delivery networks "that are starting to deliver excellent quality, excellent prices."

Greenberg spoke at a Streaming Media West's roundtable session.

So Internet radio can expect better sound at a lower cost. That's the best deal since "tastes great; less filling."

Craig Johnston is a Seattle-based Internet and Multimedia developer who is a frequent contributor to RW. Reach him via e-mail to craigjohnston.com.

Studio Sessions

**ARP's Disaster
Avoidance
Advice**

See Page 57

Radio World

Resource for Radio On-Air, Production and Recording

May 22, 2002

PRODUCER PROFILE

Jim Wilson: A Love Affair With Radio

by Ken R.

Not everyone can walk into his or her job day after day and get the same electrical charge as the first time through the doors. But Jim Wilson, production director at WAKR(AM), WONE(FM) and WQMX(FM) in Akron, Ohio, is one of those guys.

The stations, owned by the small Rubber City Radio Group, provide Wilson with a friendly, family environment he would not find at one of the large conglomerates.

"The company is very cool," said Wilson. "If I'm done with all my work by 6 p.m., they don't mind if I use the studio for my own freelance work. It's like

another fringe benefit."

Wilson has a heavy workload because there are about 30 sales people in the building and he is charged with overseeing all commercial production. His creative director, Barry Heazlitt, handles station liners and imaging, leaving Wilson free to concentrate on spot production.

Heavy production load

"We have a traffic person who, along with the sales people, writes the spots and in a typical day we produce between 25 and 30 commercials," said Wilson. "A lot of it is local and direct with the advertisers, even more so since Sept. 11. The day's events made our advertisers feel like they should get on the air and talk."

fees if his voice runs in other cities. These bonuses may range from \$75 to \$150 per spot for himself and his fellow announcers.

Wilson does most of his editing on two workstations from Orban, the DSE7000 and the Audicy. He has access to software such as Sound Forge and SAWPro. The station uses a Scott Systems Maestro as the main audio management system.

"We designate which stations the spots are available for from here in the production room, and I just load it in," said Wilson. "We're totally digital."

He also uses a Mackie 24-8 and a Yamaha 02V board, both of which can accept analog and digital signals.

Unlike many facilities that use rugged, almost abuse-proof microphones, the Rubber City properties opt for more delicate and nuanced Neumann U-87s.

"I am one of those people who wants

PERSONAL BROADCASTER

JK Audio Cell Phone Adapter to the Rescue

by Frank Beacham

It was shortly after the collapse of the World Trade Center when New Yorkers rediscovered the value of cell phones. For journalists, working from makeshift newsrooms throughout the chaotic city, the portable phone became a lifeline to the breaking story around them.

It was during this period of iffy landline service that I confronted a serious shortcoming in my reporter's sound kit: I had no simple way to record clean, two-way audio interviews over a cell phone.

Interface experts

I called JK Audio in Sandwich, Ill., to see if they made an adapter for such a purpose.

JK makes a line of professional-quality phone recording devices for just about every application. These should not be confused with the plastic gizmos sold at Radio Shack. Not only do JK interfaces work reliably, each is built into virtually bulletproof metal box that will probably outlast its user.

The good news is JK had two new cell phone interfaces near completion. A short time later the CellTap, a simple wireless telephone tap, and the Daptor Two, a more sophisticated tap for remote broadcasts, arrived at my door for evaluation.

The CellTap (\$79) is a winner. Every journalist that works with sound needs this tiny portable interface that allows the recording of cell phone audio with an automatic mix of both sides of the conversation.

When landlines are down, or a reporter is working in isolated field

See JK AUDIO, page 55 ▶



Jim Wilson in Action at Rubber City Radio Group

There are about 10 other voices within the building, including a secretary, who contribute voices to commercials in this nonunion shop.

Unlike many stations that put production employees on a limited salary, Wilson is able to command additional

to hear my voice, not a bunch of effects, and this mic is one of the most natural-sounding and has an awesome low end," Wilson said.

"I use a Yamaha SPX990 voice processor if I want a DSP intensive

See WILSON, page 53 ▶

Olympic Gold

DIGITAL AUDIO ROUTING POWER

The Impact and Caddy were the preferred equipment used in the Audio Switching Control Room in Salt Lake City.

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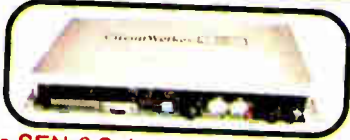
Caddy ADDA Converter:

- A companion to the Impact digital router, it is also an ideal stand alone AD DA Converter.

SH SHOWCASE SE

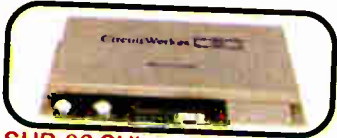
Products & Services

Control Solutions by CircuitWerkes



The SEN-6 Subaudible Tone Encoder

The SEN-6 is a single channel Subaudible tone encoder with integral audio filtering that can produce 25Hz, 35Hz and combination tones from external closures.



The SUB-03 Subaudible Tone decoder

The SUB-03 is a single channel subaudible tone decoder that can detect 25Hz, 35Hz and combination tones on audio channels. Each tone gives a distinct relay closure. Integrated filters strip each tone from the SUB-03's audio output so no one hears it.



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The DTMF-16 and DS-8 DTMF tone decoders provide economical remote control over audio lines. The DTMF-16 decodes single or dual codes while the programmable DS-8 accepts up to 8 four-digit sequences. Silencer option removes DTMF tones from audio.



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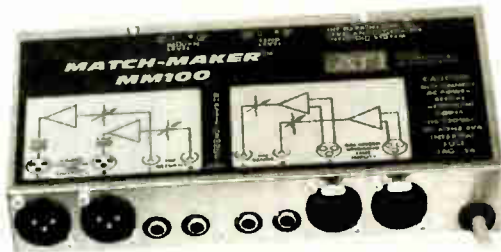
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The 16x2, Sixteen input, Dual Output Stereo Switcher/Router passively switches or routes any one of 16 stereo inputs to either or both stereo outputs or vice-versa through gold contact relays.

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8x1 DAS
Routes any one of eight AES/EBU digital inputs to three common outputs.

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6x1
Passive switcher/router with six stereo inputs and one stereo output, or vice-versa.

3x2
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SM-6
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SS 2.1/BNC
Passive switcher/router with two composite audio, video, or AES/EBU inputs to two composite video, or AES/EBU outputs, or vice-versa.

SS 2.1/TERM
Passive switcher/router with two stereo inputs and one stereo output or vice-versa.



SS 12.4



SS 8.2



16x2



8x2



16x1



8x1 DAS



10x1



6x1



3x2



SM-6



SS 3.1



SS 2.1/BNC



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Designed by broadcast engineers for broadcasters, our audio and digital audio switchers offer excellent sonic quality, removable I/O connections, contact closures, serial remote control capabilities, and flexible mounting accessories.

Wilson

► Continued from page 51

effect, then I can dump it into my spot as one piece of audio.”

Wilson uses some compression, but he likes to mix each spot and EQ it individually without resorting to presets.

“You have to do that to get the voices to stand out over the music,” he said.

“My dad owned his own business, and I learned that you need to do whatever the customer needs,” he said.

Wilson is comfortable talking to the dozen or so local business owners who come to the stations each week to record their own spots.

“They may not have the best announcer skills, but I make them comfortable, and with editing I can keep them from looking stupid,” Wilson said. “They must be successful or they wouldn’t keep coming back.”

One example is Tim Godard, proprietor of Godard Auto Sales. His verbal style is folksy and he just talks about things going on at the dealership.

“It’s almost an anti-sell,” Wilson said. “He uses our country format station,; last February he sold 14 cars and this February he sold 34. He told me, ‘Don’t tell my salesman because he’ll raise our rates!’”

Wilson believes that the key to keeping these amateur talents happy is to make them comfortable in the studio.



Jim Wilson

Digital magic

“I’ll just sit down and start chatting for 10 or 15 minutes, asking about their families, and their hobbies,” said Wilson. “Then in the middle of it I’ll start rolling and they’re already at ease. Digital editing can make them sound great.”

Wilson learned that these spots can’t be rushed. He tells his clients not to watch the clock and not to worry about making mistakes; those can be edited out.

The clients in turn have come to trust him.

“I came from a background of on-air work, but got tired of freaking out every times a new rating book would come out,” Wilson said. “I noticed that the production directors I worked with had always been there about 15 years, through several sets of program directors and jocks, so I made a conscious effort to get off the air and into production.”

When Wilson did not stay late on a Friday night to record an important client, his boss said, ‘You’re young enough, you’ll be sure to find other work somewhere.’

Wilson loves the organization of his job and the details. He tries to farm out voicing chores fairly so that no one talent is overloaded.

Wilson’s first radio job was at a small station in Ashland, Ohio. One late Friday afternoon he was looking forward to getting away from the station for a little socializing.

“Our biggest client, a car dealer, called me at 5 p.m. and wanted to come down and record a spot,” remembered Wilson. “I told him if he could be here within about five minutes I could record him. He wasn’t, so I rolled out of there.”

On Monday morning the station manager asked Wilson why he didn’t stay and wait for the client. Wilson explained the situation and his boss said to his production director, “You’re young enough, you’ll be sure to find other work somewhere.”

Now Wilson stays until the job is done. Every time he worries about being home late for dinner, he remembers back to 1979.

“Employment is always better than unemployment,” he said. “Stay the extra half hour if you need to!”

The Rubber City Akron cluster has a soft rule that anything that needs to be produced should be turned in by noon of the day before.

“But realistically, we are a small station and we do whatever we have to do to get it on the air,” said Wilson.

Wilson said that the first time he walked into a radio station, he couldn’t believe anyone would let him in.

“I was a kid who loved listening to the radio and it was my life,” he said. “The beauty is that I still have that feeling every time I come to work. I’ve tried manual labor and didn’t like it.”

Wilson considers himself lucky to have a job he really enjoys.

“Even on the worst days it’s still fun,” he said.

Tell us about the production wizard in your life. Write to the author at ken@kenr.com.

Affordable Power Monitors From McCave

The ADAM P-Series of powered analytical monitors is available from McCave International.

The P-Series is aimed at professional project studios, broadcast facilities and post-production facilities.

The P-Series monitors feature the ADAM folded ribbon HF driver. This technology is claimed to provide an improvement in effective diaphragm area and transient air-pressure time when compared with conventional voice coil, electrostatic or magnetostatic transducers.



According to the company, the ADAM monitors have excellent precision in imaging and high-frequency detail.

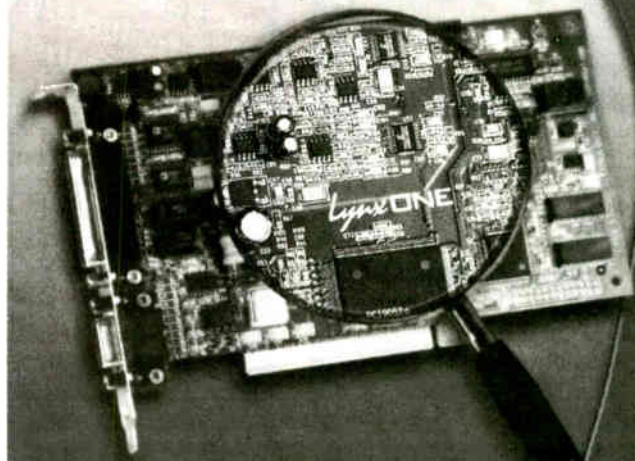
The line of powered monitors includes the P11-A (pictured), the P-22-A, and a matching subwoofer, the Sub-P.

Prices: P-11-A: \$1,895/pair; P-22-A: \$2,495/pair; Sub-P: \$1,695 each.

For more information from McCave International, contact the company in California at (925) 283-6020 or (800) 218-6305, e-mail sales@mccave.com or visit www.mccave.com.

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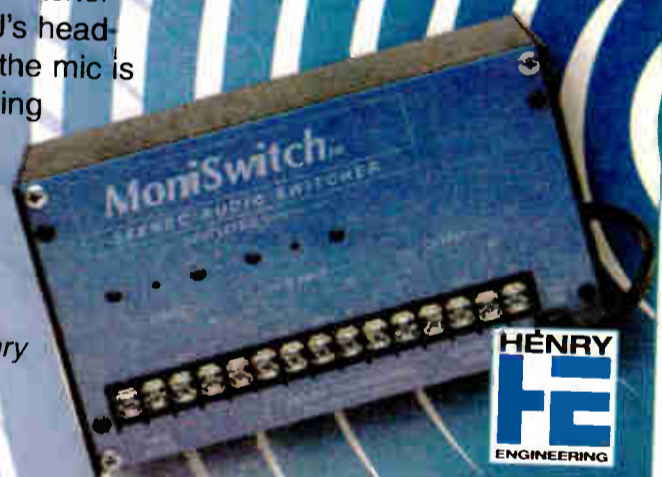
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JK Audio

► Continued from page 51
conditions, the CellTap allows interviews to go on in a completely mobile newsroom.

A 2-inch by 2-inch by 1.3-inch die cast aluminum cube, weighing only 3.5 ounces, the CellTap links together your cell phone, recorder and earpiece. It comes with two cables. Plug one into the 2.5mm earpiece jack of the phone and the other into the recording device. Then plug your earpiece into the CellTap. That is it — no levels to set. Just hit record. It is passive; no AC or battery power is needed.

My tests using a Motorola V60 phone on the Verizon network and a Sony MZ-B3 MiniDisc recorder worked flawlessly. The audio was clean and the conversation mix was perfect.

The CellTap also allows a group to listen to a conversation. Simply connect

a powered speaker to the audio output jack and, presto, you have conferencing capability. Everyone in the room can hear the cell phone conversation, but only the person wearing the earpiece can talk to the distant party.

While it is not a substitute for a speakerphone, this setup may be more suitable in that it limits the number of talkers and avoids confusion.

Audio transit

Daptor Two (\$179) adds the capability of sending and receiving audio from a mixer or tape recorder through the cell phone.

As with the CellTap, your cell phone will recognize the device as a headset, which will disable the phone's internal mouthpiece and receiver. Since Daptor Two replaces the headset, the user must provide a microphone and preamplifier, and a headphone and amplifier to allow a cellular conversation.

Encased in a 4.4-inch by 2.7-inch by 1.2-inch aluminum case that weighs seven ounces, the Daptor Two has both XLR and 1/4-inch input and output connectors. Only one type of connector can be used at the same time, however.



common 2.5mm jack. For models with proprietary headset connectors, the manufacturer often sells a 2.5mm adapter as an option.

Niche filled

JK Audio has again filled an important niche in the journalist's continuing

free at (800) 552-8346; or visit www.jkaudio.com.

Frank Beacham is a New York City-based writer and producer. Visit his Web site at www.beacham.com or e-mail to frank@beacham.com.



When landlines are down, or a reporter is working in isolated field conditions, the CellTap allows interviews to go on in a completely mobile newsroom.

The device was designed to take advantage of the increasing number of wireless phones that accept third-party headsets and earpieces. It includes a circuit that emulates the electrical characteristics of these headsets.

Both CellTap and Daptor Two can be used only with phones equipped with a

struggle to conquer the slings and arrows of our nation's telephone system.

CellTap and Daptor Two are important additions whose value will be most appreciated in times of emergency.

For information about JK Audio products, contact the company in Illinois at (815) 786-2929 or toll

Auditronics Names New National Seller

Auditronics has designated Creative Studio Solutions Inc. of Wheat Ridge, Colo., as a national seller for its broadcast audio console systems.

CSS will provide consultation, integration and installation for the Auditronics models ALM, 2660 and 220. CSS also has been made "Authorized Installers" for Wheatstone, Audioarts and Auditronics Broadcast Consoles, as well as the new Wheatstone Bridge Audio Network.

For information from Creative Studio Solutions, contact the company in Colorado at (303) 425-5004 or visit www.creativestudiosolutions.com.

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I've Seen Fire & I've Seen Rain

by Alan R. Peterson

It seems like only a few months ago that I wrote in these pages of my experiences with a radio station fire. Looking back on the date, I am astounded to see the event was nearly a decade ago.

It was during the early 1990s. I, a newly divorced PM drive jock, was staying late at WLAD(AM) in Danbury, Conn., hanging around the production room and chatting up a storm with evening FM jock Susanna Palmer, now a familiar face on Bloomberg Television. In short order, fire bells in the hallway started going off — a fairly common occurrence in the building we were in.

But that time it was real. Oily smoke began coming out of the elevator shaft while residents and workers throughout the building began emptying out of their suites. Palmer and I made on-air announcements regarding the condition, put on long CDs and got out.

The fault was in the boiler room, where furnace motors had begun pumping oil but failed to ignite it. When it finally did ignite, there was an awful lot of it and it stunk up the joint something fierce. No real damage, but the walls of the radio station five stories above felt like the inside of a french-fry cooker.

This led to one of my favorite articles from the earliest days of this column, especially describing how it was possible to thoroughly clean a smoked-up ITC cart deck by running it through a dishwasher. Honest.

Back to the present

I am revisiting this old tale to set up a recent mini-disaster that had the potential of being as bad — if not worse. In fact, after reading this, you may wish to take a closer look down the hall yourself.

Long and dry was our winter in Washington this year, with a precipitation shortfall of 5 inches or worse. When the spring rains came, it was a welcome sight for all.

But one day in mid-April, the rains came fast and furious, driven by heavy winds and accompanied by hail. My station, located in a highly visible office

building across the Potomac River from the nation's capital, was just beginning a special listener-participation program to sponsor Third-World children.

That is when the outside came inside.

In a hallway leading to the engineering shop, a recessed light fixture began to weep. It then began to dribble. In fairly short order, there was a cascade of water pouring out of this light fixture that would have made the owner of a splash theme park proud.

As we rounded up large trash pails from wherever we could, our computer gurus pointed and exclaimed in a panic, "The ENCO servers!"

Only a few feet away from our micro-Niagara sat a cluster of racks containing our ENCO DADpro32 system.

Indeed, only a few feet away from our micro-Niagara, inside the engineering shop, was a cluster of racks containing the brains and storage of our ENCO DADpro32 system.

All we needed was just one pint of water on those puppies and we would have had up to four radio station audio libraries — *plus* three XM Satellite channels originating from our facility — knocked completely out of service.

While several employees were scrambling with the pails, others quickly brainstormed how to protect the servers. A plastic sheet covering the rack was out of the question, as the servers would have overheated without adequate ventilation. We could not have powered them down to protect them, as our entire audio inventory would not have been available to us.

Fortunately, the storm cell moved off and the flow of water through the ceiling diminished quickly. We were on the air, but soaking wet and not terribly pleased as to what had just happened to us.

Dry off, look back

What we had just experienced was the culmination of a fairly improbable sequence of events.

Above the studio is an intermediate-level parking garage. Drainage pipes from that level run through the space between the building structure and our suspended ceiling on their way to large vertical standpipes, as they do in countless office buildings around the world.

Sometime during the winter, a pipe had apparently developed a crack. With small amounts of rain to divert, everything was kosher. But when the floods came, the pipe could not handle it fast enough. Water poured forth from the split, through our ceiling and into our workspace only two yards from our nerve center.

So what possessed us to put our audio servers — elements so crucial to our survival — into such a high-risk area? Simply this: Until that moment, it was

not a high-risk area, and was actually the *best* overall place in the station to put our servers.

There was plenty of electrical capacity there, the servers abutted our audio processing rack and had only a short hop to our telephone and network circuits, and represented a logical common point for feeding and linking all of our studios up and down our halls.

Code worthy

Given the internal layout of the building by itself, there really was no better place to have installed the racks. In fact, a peek up inside the ceiling reveals sev-

eral crossovers of water drainage pipes, plenum-safe network cabling and galvanized electrical conduits of considerable capacity. Apparently, everybody was satisfied with the integrity of the infrastructure at this point, and the building code groupies seemed happy.

And yet, *ker-pow, splash*.

I am reminded of a disastrous building explosion in New York City some years ago, where a basement water tank became over-pressurized, blew out its bottom and launched up like a rocket.

It ruptured a badly fitted gas pipeline running overhead, which filled the building with natural gas. A spark inside the building took care of the rest. There were no fatalities, but there certainly was an awful big pile of bricks left to sweep up.

At any other moment in time, an arrangement of pipes such as described here might have been overlooked by all but the most conscientious of inspectors and safety experts. Water pipes, gas pipes, electrical lines ... who knew?

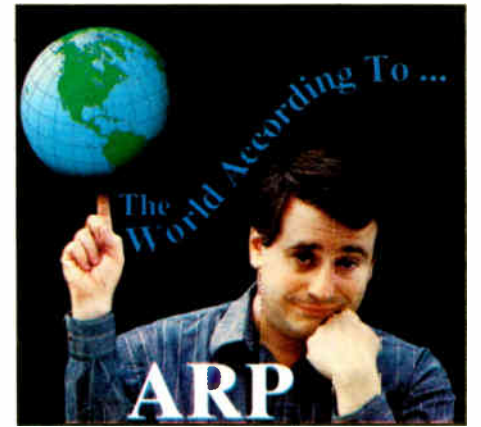
Yet, the introduction of that random occurrence — the tank failure — caused a cascade of events that turned a sturdy building into gravel.

Which leads me to several points, all of which I hope you will consider seriously if you are hip-deep in a consolidation buildout or are now suspiciously eyeing an installation you recently finished and thought you were proud of.

First, if you installed your station's expensive new server in an unused broom closet (the *last* place left in the station), you may wish to consider exactly *why* it was a broom closet in the first place.

Pop the ceiling tiles and follow the plumbing lines; those closets are invariably located near restrooms, and a ruptured fresh water supply is a lot more relentless than rainwater.

Look higher. Is there an air conditioner chiller unit mounted through the roof above your rack? You are likely to have future condensation problems that could



drip through the ceiling onto the \$200,000 heart of your station.

Do not count on a drip pan to save your hide, either — they clog up fairly fast. And if your core ices over and requires a service call, you are not going to like what happens when that block of ice melts.

Sure, it is tempting to mount both the HVAC system and the station's audio network at a central "star" point in the mid-point of the building to simplify design. But trust me, you do not want anything over your server rack except a nice big exhaust port through the ceiling.

The same goes for drain standpipes fastened parallel to vertical support columns in your new building. Keep your servers a good distance from them. While those pipes may not crack, they could clog and force pooled water around the flashing or roof seal around the drain.

This is generally revealed as an icky stain on a ceiling tile next to a chase built around a column and is a sign of things to come.

Alternative location

It can get mighty snug these days at the ol' hometown station, what with a pile of rackmount computers driving the show now, and no place to put that pile where it might be safe. But I have a suggestion I think might be worth it.


Back in the days of reel-based automation, the old cast-iron monster used to sit close to the lobby or reception area, dramatically lit and viewed through large glass plates. It was impressive to look at and it was safe there, with practically no plumbing or HVAC lines overhead or close by to bring the station to its knees should an accident occur.

I see no reason why we cannot bring back this concept, especially where there is not a whole lot of mechanical activity going on in the racks in the first place.

Imagine two racks, one with a cluster of hard drives flashing and flickering; the other with the CPUs and network hubs and routers necessary to make it happen. Add some neon tubing to the insides of the PC cases to look cool, pop in some cheapie limiters just to watch the dancing LEDs, glass it all in, then top it all off with the biggest VU meters Dorrough makes.

You've got the greatest slice of eye candy you could have ever wished for. It is safe from prying fingers, it looks slick, it is secure behind the glass, and it is safe from the floods.

I *hope*. You did look up inside the ceiling first, right?

Read about the New York City explosion in the book "Why Buildings Fall Down: How Structures Fail" (W.W. Norton, 1994) by Matthys Levy and Mario G. Salvadori. 

Audio Theatre Workshop Correction

The April 24 issue of Radio World included incorrect information about the upcoming National Audio Theater Festival workshop.

The dates of the event are May 26 to June 1, culminating in a live performance. The workshop takes place at the campus of Southwest Missouri State University in West Plains, Mo.

Anyone can attend. Students represent a range of ages and backgrounds; no prior involvement in audio theatre is necessary.

The cost is \$425. A limited number of fee waivers are available for those who need financial assistance.

For information contact Sue Zizza at (516) 483-8321.

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Greg Frank, 512-636-4898. Recent ABS graduate. Very ambitious. Willing to do whatever it takes to do the job the best. Will relocate for any job.

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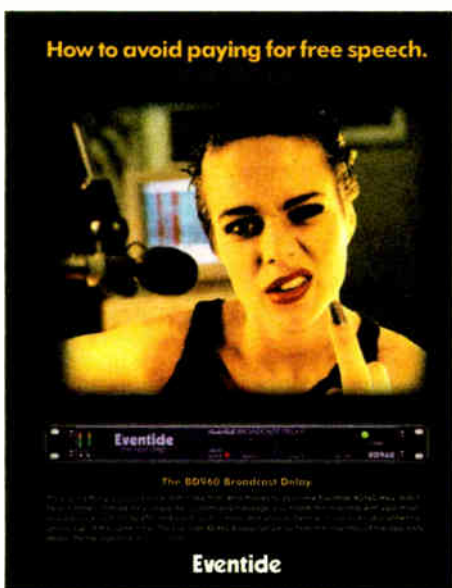
◆ READER'S FORUM ◆

Offensive ad?

I am writing to you in regards to the ad for the Eventide digital delay (March 27, page 29).

Radio World has always been one of the finer publications I read, so I was surprised to see this ad with a woman, full page no less, flipping us "the bird."

I find this very offensive. Why didn't you just print "F***" in 3-inch letters? It's the same thing. There were so many other ways in which to get the ads point across, but you choose "the low road."



While I fully understand that it is not your product, *you* as editors have the responsibility to decide what is appropriate for your readers. In my opinion, you let us down. My respect for your publication has dropped several notches.

Shame on you.

Cindy Sue Brooks
Cleveland

Ed. Note: The decision to publish a given advertisement is not an editorial matter; it is made by the publisher, who opted not to exercise censorship of the ad in question.

We invited Eventide to comment; the company's reply appears below:

Dear Ms. Brooks,

I wholeheartedly agree with you. I too find the woman in our BD960 Broadcast Delay ad rude and offensive. You obviously understand the point of our putting her in our ad.

While I can't repeat the four-letter word you put in your letter, I'm guessing that the woman in the ad is at least as familiar with the term as you are. Which is exactly the reason we started making

Broadcast Delays back in 1977 — so that we don't actually have to hear such utterances, at least not on the radio.

Marc Lindahl
VP Marketing & Strategy
Eventide Inc.
Little Ferry, N.J.

Call it IBAC

Call it a pet peeve, but the technology that everyone has been calling IBOC really should be called IBAC: in-band, adjacent-channel digital radio.

The digital carriers are not underneath the analog carrier, as was originally espoused in the Project Acorn days, but are actually in the wings of the FM mask, and on adjacent channels.

Language matters. Outmoded issues have lived on to taint the prospects, like much of the "bad rap" IBOC has suffered (deservedly so in 1995 when an earlier incarnation produced objectionable interference).

I suggest Ibiqity ban the term "IBOC" and go with iDAB or IBAC to reinforce the fact this is a fundamentally different system design than the flawed embryo of IBOC.

Mike Starling
Vice President for Engineering &
Operations
National Public Radio

Systems have been proposed by Ibiqity Digital Corp. to allow all AM and FM stations in the United States to add digital sidebands to their transmissions. The new carriers will allow listeners equipped with new and specially designed receivers to enjoy much better fidelity (in the case of AM) and much less multipath fading (in the case of FM) — positive steps for the broadcast industry. However, certain engineering trade-offs are involved.

The systems, as conceived many years ago, would "bury" the digital data beneath the primary analog signals. Specially equipped receivers would then recover the digital data using sophisticated signal processing techniques. This approach was called in-band on-channel ("IBOC") digital audio broadcasting ("DAB") and it was hoped that full compatibility would be provided with existing analog-only receivers. Unfortunately, IBOC was not sufficiently robust to do the job.

Today's approach to DAB involves in-band, adjacent-channel ("IBAC") techniques where the digital data are transmit-

**IBOC
Exciter-ment**

development effort in the hardware.

These are the men and women working to make sure that, once IBOC gets an FCC green light, your station can order the necessary equipment.

Notable among them are the three companies now licensed to use Ibiqity Digital Corp. technology in their excitors and transmitters. These manufacturers recently got behind IBOC in a big way, recognizing its potential importance to the industry. Harris Broadcast Communications was licensed in the spring of 2001; Broadcast Electronics Inc. and Nautel Ltd. were licensed in the fall.



Competitors and IBOC Supporters: Geoff Mendenhall of Harris; Scott Campbell of Nautel; John Pedlow and Tim Bealor of Broadcast Electronics.

The three companies were singled out by Ibiqity at the recent NAB convention, and attracted attention from attendees with their displays of IBOC gear. The companies earned the recognition of our judges, who gave each a Radio World "Cool Stuff" Award for Technical Advancement of IBOC.

Right now, these guys get the headlines. But we also salute the other companies that are working to prepare the digital air chain, suppliers that plan to license IBOC for transmitters or who manufacture IBOC linear amplifiers, antennas, combiners, filter injectors and related gear like IBOC-ready STLs, ATUs and processors.

Our industry is built on the efforts of companies like these.

— RW

ted almost exclusively on the first-adjacent channels to the analog stations. For example, a station assigned to 1050 kHz will transmit DAB carriers in the spectrum ordinarily assigned to 1040- and 1060-kHz stations. An FM station on 104.3 MHz will transmit its DAB data in the 104.1 and 104.5 MHz channel spectrum.

While some may argue that the DAB carriers continue to represent an "IBOC" (on-channel) approach because the new carriers will fit within the "emissions mask" of the primary stations, the new digital data will, in fact, largely reside in the first adjacent channels for both the AM and FM DAB systems.

The understanding that we are now dealing with IBAC (adjacent channel) DAB systems is crucial to understanding why, under certain circumstances, the

AM and FM DAB systems will cause interference to neighboring stations.

Robert Gonsett
Editor

The CGC Communicator Newsletter
Fallbrook, Calif.

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