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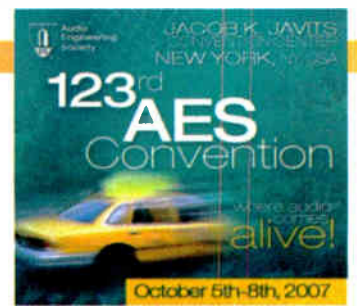
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\$2.50

The Newspaper for Radio Managers and Engineers

September 26, 2007

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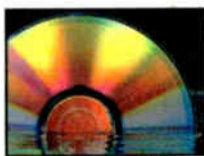
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NCEs Eager For Window To Open

Non-coms Ready to File For New Frequencies, Major Changes

by Randy J. Stine

WASHINGTON Next month's non-commercial filing window marks the end of a seven-year wait for nonprofit groups looking to file for new frequencies or to submit major change applications.

Existing broadcasters and non-com wannabes have eagerly awaited the opportunity to apply for new frequencies, and the commission is readying for an onslaught of thousands of applications.

As a result, consulting broadcast engineers and communications lawyers contacted by RW say they have experienced a surge of business from nonprofit groups planning to file for new FM reserved non-commercial broadcast band channels.

Industry watchers say many of the non-profits are spending up to \$10,000 on attorneys and engineers to help in completing their FCC applications and for guidance in the mechanics of the commission's elec-

See FM, page 8 ▶

NEWS MAKER

Tom Gibson Is IBS Technical Wiz, Teacher

VP of Engineering for the School Organization For 27 Years, He Also Runs a Student Camp

by Randy J. Stine

YORK, Pa. Tom Gibson has gone to summer camp for the past 50 years.

It's not really what you think; however, that is an indication of his passion for

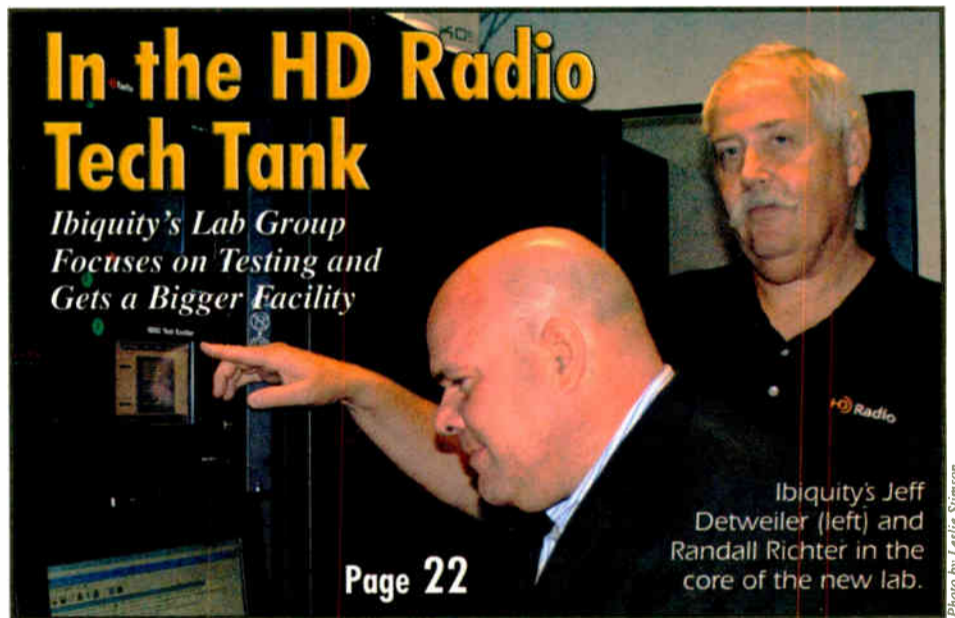
radio broadcasting.

Gibson, 59, is vice president of engineering for Intercollegiate Broadcasting System, a non-profit organization of more than 1,000 educational and

See GIBSON, page 6 ▶

In the HD Radio Tech Tank

Ibiquity's Lab Group Focuses on Testing and Gets a Bigger Facility



Page 22

Ibiquity's Jeff Detweiler (left) and Randall Richter in the core of the new lab.

Photo by Leslie Simson

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NEWSWATCH

VPR Expands Classical Service

BURLINGTON, Vt. Vermont Public Radio expanded its secondary classical service statewide. VPR closed Aug. 29 on its purchase of WAVX(FM), from Christian Ministries Inc. for an undisclosed sum.

VPR signed the station on 90.9 MHz back on Aug. 31 as WOXR. The addition extends VPR Classical to the greater Burlington/Plattsburgh region.

While the WOXR transmitter won't initially be digital, an IBOC upgrade is planned for the winter, VPR President/GM

Mark Vogelzang told Radio World. "We'll be providing an HD multicast service," at that time also, Vogelzang said.

According to the VPR Web site, VPR Classical debuted in 2004 on 88.1 in Norwich and is currently available in the Upper Connecticut River Valley, Sunderland, Manchester, Bennington, Newbury and Middlebury.

VPR also recently started broadcasting at WVTQ, 95.1 MHz, in Manchester on a full-power transmitter, and at 93.3 MHz, using a new low-power translator in Rupert; both translators serve the southwest part of the state.

VPR Classical is also available via HD Radio multicasts in northern Vermont at

107.9-HD2 and in the Upper Valley region at 89.5-HD2. The service is also streamed online.

Net Ad Spending To Surpass Radio

U.S. Internet ad spending is on the verge of passing radio advertising for the first time. That's according to a report by eMarketer analyst Ben Macklin in Forbes; radio ad spending in the U.S. is expected to increase 1.5 percent in 2007, to \$20.4 billion. Online ad spending is \$21.7 billion. Internet ad spending is up

22 percent from 2006.

Over the next few years radio station Web sites and online audio advertising "will be the principal drivers for radio advertising growth," predicts Macklin.

However, he doesn't expect to see much growth in the near future, predicting a slow increase for radio advertising to \$22.6 billion in 2011. At that point, Macklin expects Internet ad spending to have ballooned to \$44 billion.

News Roundup

GERMAN MOBILE TV company MFD and Fraunhofer IIS are teaming up to offer a text-based news and information delivery system. The NewsService Journaline system provides text-based information for systems built on the Eureka-147 DAB or the Digital Radio Mondiale platforms. Fraunhofer developed Journaline in collaboration with automakers. At the IFA consumer electronics show in Berlin, MFD transmitted the Journaline signal over its T-DMB mobile TV network, which covers 16 urban areas in Germany. The news service will be available on devices that can receive DMB mobile TV and Eureka-147 digital radio signals.

THE FEDERAL TRADE COMMISSION gave antitrust clearance to the \$5 billion acquisition of Wall Street Journal publisher Dow Jones & Co. by News Corp., according to both companies. The Associated Press reported that the companies said the FTC granted an early end to the 30-day waiting period required by

See NEWSWATCH, page 8 ▶

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Arbitron Looks Ahead With PPM

Improvements Planned As PPM Expands

by Leslie Stimson

COLUMBIA, Md. In development for more than 15 years, the Arbitron Portable People Meter is delivering "live" radio data now in Philadelphia and Houston. Arbitron was installing panelists in New York and Los Angeles in August, and San Francisco and Chicago installation begins this month.

At a recent meeting with program consultants about PPM, Arbitron executives discussed what's working with the rollout, what isn't and what they're doing about it.

LONGER LIFE, CELL PHONE AS METER

Arbitron continues to work on the next generation of PPM. Before the end of 2007, the company hopes to introduce a meter with more memory and a longer-lasting battery.

The batteries of today's units, when new, last about 32 hours, said Ron Kolessar, vice president of technology, in an interview.

The new one will last more than 60 hours, he said. The idea is to give the wearer the ability to wear the meter all weekend

some other personal digital audio device. Encoded audio could be captured this way. This new generation of PPM would also capture what's happening on the cell phone or PDA itself, if the phone is capable of acquiring and playing back podcasts, streaming audio or direct-to-mobile broadcasts, for example.

There remain issues with how people

'station-between-the-station' stuff is hard to understand."

ARBITRON CAUTIOUS ABOUT HD-R

Some markets will never go PPM, so Arbitron continues to improve its traditional diary-based survey.



Average Daily Sample Size, by Month (Persons 6+)

	Houston (1,361 target)		Philadelphia (1,530 target)	
	Actual	vs. target	Actual	vs. target
July	1,168	-193	1,351	-179
June	1,219	-142	1,411	-119
May	1,278	-83	1,476	-54
April	1,258	-103	1,541	11
March	1,276	-85	1,556	26
Feb.	1,297	-64	1,484	-46
Jan.	1,168	-193	1,541	11

From an Arbitron PPM presentation to broadcast consultants

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without having to dock it each night.

Arbitron is also working to change the shape of the meter, to make it more modern and attractive to young people, including the capability of putting "skins" on the unit. But the trick is to design it so that the meter doesn't stand out, so that the wearer doesn't change his or her habits.

The current PPM device uses a landline connection to report data back to Arbitron; the company will pay to install a landline for panelists who don't have one.

Longer-term improvements, over the next two to three years, include making PPM compatible with cell phones. Arbitron is developing a device that connects to cell phones for the purpose of relaying the data from the respondent household back to Arbitron.

Next, Arbitron is working on placing its PPM technology into cell phones. "We're studying what's going on with cell phones for viewing, for listening and using Bluetooth headsets. We'll be able to monitor all that and are studying how best to do that," Kolessar said.

The company is also looking at changing how it loads the algorithms that detect encoded audio so that software can be loaded onto a cell phone. Then, instead of carrying the meter, the respondent would carry his or her own phone, BlackBerry or

comply with actually undocking and wearing the meter, however, so the company is studying cell phone or PDA-type compliance with placebos to determine if this kind of measurement is practical, he said.

WE HAVEN'T MADE THE CASE' FOR HD-R

Some program consultants say listeners are confused about HD Radio and don't see the need to buy a new receiver.

Country programmer Joel Raab told Radio World that in recent focus groups, while listeners understood the "stations between the channels" concept in the HD Digital Radio Alliance multicasting ads, they want to know what programming they would receive before buying a new radio.

At consumer electronics stores, potential purchasers can receive pamphlets listing satellite radio channels; terrestrial digital stations would need to do something like this in each market to accomplish the same thing, he said.

Asked about on-air promotion of the multicast formats, he said stations are not promoting their HD2 Web sites enough.

Holland Cooke, news/talk specialist for McVay Media, summed it up: "We haven't made the case. People are focused on back-to-school stuff. This

Arbitron has designed and is testing the "all radio" diary, to include satellite, Internet, AM, FM and other listening. PPM knows the source by electronic encoding; diary keepers have to record it. The column heading is "source" instead of "band," as today's youth is more likely to associate "band" with a singing group than either AM or FM radio, said Dr. Ed Cohen, vice president of domestic radio research at Arbitron.

HD Radio is not yet part of this diary, said Cohen, because there aren't enough receivers in the market "and it gets confusing."

For example, he said, the company issued a diary that included a satellite radio choice before the XM and Sirius services actually launched, and 8 percent of the respondents who filled out this type of diary said they were listening to satellite radio.

ARBITRON: PPM DATA IS RELIABLE

Arbitron says data from its PPM is dependable — this after reports that "intab," or usable numbers, from Houston had dropped.

Bob Patchen, chief research officer, said See PPM, page 5 ▶

Digital Delight or Digital Doom?

A friend of RW writes to me, not for attribution, about IBOC. He's from the Midwest and has been around the industry a long time; his e-mail captures sentiments I often hear from some readers. The concerns are not new, but their persistence is troubling.

"Though they're mostly standing in the wings, there is a growing tide of those who think that IBOC is a big mistake. One very knowledgeable industry person calls it a 'fraud,'" he wrote, although he didn't name that person.

"We've all watched as the satellite boys and girls have demonstrated a business plan," he continued. "They've succeeded in spite of their failures. They're all over all kinds of media. Their compatible receive gear is in all flavors in the big and smaller box stores. And the stores' salespeople know XM and Sirius. They also don't know IBOC or HD Radio?"

"Radio seems to not be able to push IBOC over the transom. The announcements of receiver manufacturers are slim at best. Is it true that Boston Acoustics has had it and thrown in the towel? And, long-wire antennas? Think the Marconi Wireless Company."

One of this reader's favorite legacy stations has digital on during the day "only because the PD was made to turn it on" by corporate. "He and others will have to turn it on at night, too, soon." Then the writer fears that his precision, continuously tunable receiver with Schotz front end won't be able to sort out many of the stations he enjoys.

"Although this legacy station has been generating buzz at least 30 kHz wide (up to 70 miles away) during the day for several months, I've never heard even a hint in any terms about 'HD Radio' on this top-rated flame-thrower. I just happen to know what to listen for, and it was confirmed by the PD. I'm their perfect P1 listener. I'm one of their longest TSLers.

"But, that's just the big ones," he continued. "I don't have a fear that small markets will suffer. I'm sure they will!"

"So I have three issues: How can it work with all these other sidebands rattling? And if it will, why in the world isn't

radio out making deals with receiver manufacturers like XM and Sirius have? (Is Hugh Panero interested in a marketing and promotion position?) And why aren't they on billboards, city busses, TV and in newspapers, etc., etc.?"

"Oh, they'll typically use their own unsold inventory to promote, maybe. Among the first rules of promotion is that you cannot reach converts on your own air. There is no business model to be seen.

"Where is radio's proven intense-promotion-and-reinventing head? Now located in a corner of the CFO's office?"

'Radio seems to not be able to push IBOC over the transom.'

"Many kinds, brands and types of compatible receivers and full-force, broad media promotion could drive that bus, if it's not already broken down. Where are the leaders?" Recent research from companies like Bridge Reports, concerning the lack of consumer penetration, suggest to our friend that "the industry you and I love is perhaps too late with too little. The bus may have been missed altogether, and the line may be shut down."

Next time you're in a room of 20 or more average citizens, he suggests, take a survey. "Ask each one if they have a computer and if they have an IBOC receiver. I don't have to tell you the results. I'll bet that every one owns more than one standard radio. While waiting (and waiting) for IBOC to develop, we could be 'streamed' right into obsolescence.

"I'm sure XM and Sirius say 'Thank you, broadcast radio' every day.

"Why fix something that's not broken? I want my AM radio!"

I share this note because it demonstrates continued perceptions that plague IBOC in the U.S. radio industry.

Some of what he stated doesn't entirely hold up. For instance satellites have not demonstrated a successful business plan, though I concur that XM and Sirius do light the way when it comes to product penetration and creating hype.

He also repeats the concept of a "rising tide" against IBOC that is popular among critics who don't quantify it.

Yet he and I share deep concern over the failure of industry leaders to demonstrate that they understand the importance of a flat-out, coordinated, major-league marketing campaign to educate the American consumer about digital radio and multicasting.

To quote just one other observer on this topic, Holland Cooke, a news/talk programming consultant for McVay Media, states in Leslie Stimson's story on page 3, "We haven't made the case. ... This 'station-between-the-station' stuff is hard to understand."

Also, if we are about to enter an era when distance listening is sacrificed on the temple of better local signals through digital, all the more reason to educate our loyal listeners about the benefits of HD Radio before they notice any negatives.

Meantime, Boston Acoustics sent a mixed signal at best when the manufacturer decided to retire the Receiver Radio HD, the first tabletop HD Radio.

As Leslie reported in The Leslie Report this summer, the company said it was reviewing its radio lineup and hadn't decided yet whether to make a replacement, updated HD-R unit; it would make that decision by the end of the year. Whether or not this is a normal product cycle, the language about the market from Boston Acoustics, a pioneering digital receiver maker, certainly wasn't gushing.

Our industry needs to market this new service in a clear, intelligent, major-league way. To date, it has not done so.

Which is too bad, because there are some exciting things happening if you know where to listen.

The folks at Washington's WAMU(FM)

From the Editor



Paul J. McLane

aren't waiting around; they're grabbing what digital offers. It's "time to begin treating HD Radio multicasting as 'real' radio," General Manager Caryn Mathes stated in an announcement to listeners this month. "HD Radio is becoming eminently accessible to the general consumer, and we believe it is the future of terrestrial radio."

So the station is making program changes.

"WAMU's Bluegrass Country, the pre-recorded automated music service currently heard in HD at 88.5-3, will move to the full-stereo 88.5-2 and be transformed into a robust, comprehensive 'real' radio station — with up to 8 hours per day initially of live-hosted programs and opportunities for the audience to interact with the music hosts," the station announced.

"WAMU's Bluegrass Country will be among the first in the nation to offer live programming exclusively for HD Radio." (The station also launched an HD3 channel with extended BBC news coverage, NPR's "Talk of the Nation" and shared programming from a nearby AAA-public station, WTMD.)

Watch this situation closely as a case study. Local bluegrass fans are desperate to protect any piece of their treasured format; this is where an HD2 station may come into its own.

If WAMU educates its listeners and markets the new channel wisely, it could create the industry model of a successful multicast launch, one that really answers a local need not being met elsewhere and kicks off a true consumer buzz.

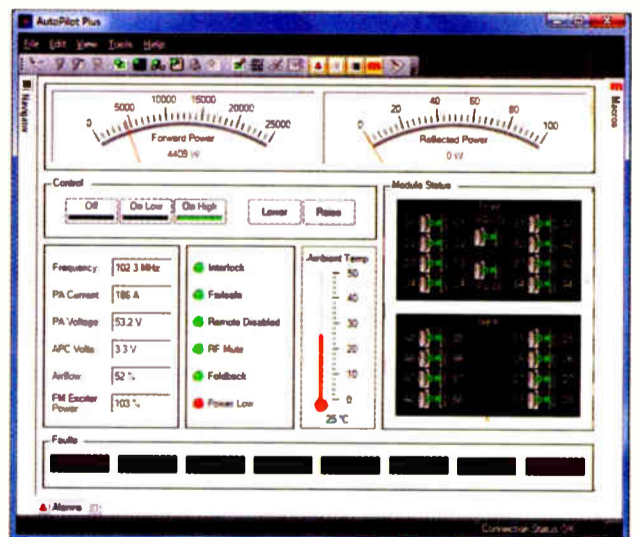
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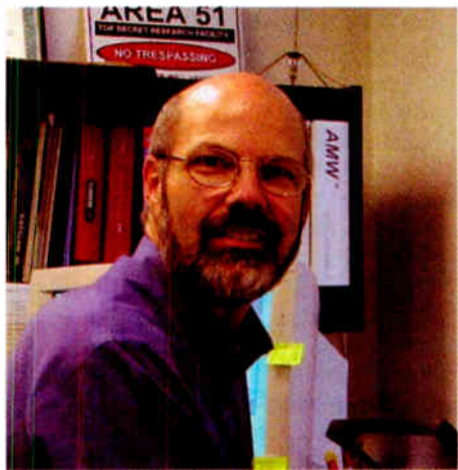
Hadfield Makes a Move

SEATTLE After 17 years with Entercom, Marty Hadfield is heading out on his own.

His move from vice president for engineering to independent consultant was expected to occur early this month.

In an internal memo obtained by RW, Entercom stated that the radio group owner is creating a new position at the vice president level, to oversee both engineering and IT functions for the company. Entercom hopes to fill that position in the fall.

Hadfield said he has projects lined up, both for Entercom and other companies. He believes his greatest strength lies in project management, such as new studio construction or determining the tower sites for best station coverage and seeing the project all the way through to completion.



Marty Hadfield

In a statement to his six regional engineers, Hadfield wrote: "When I think back over my past 17 years with Entercom, I am most proud of the accomplishments and contributions that each of you engineers have made.

"I believe that much of Entercom's strong market position is based on the incredible amount of hard work and commitment you have all given. Your involvement in SBE, the ARRL, energy and nature conservation, countless hours of volunteer work in local emergency planning and response in times of disaster, are excellent traditions that you should all be proud of, too."

Hadfield is also co-chairman of the RBDS Subcommittee of the NRSC; he will remain on the committee, but the group is expected to find a new co-chairman. Allen Hartle of BE's The Radio Experience is the other co-chair. The sub-

committee is currently on hiatus.

Hadfield had been in charge of Entercom's HD Radio conversion. About 68 FMs (out of roughly 79) are done. Those that are left "are the ones where we've been trying to come up with alternative transmission schemes for better energy efficiency," he said, noting that tower contracts don't always have options for extending antenna size or other solutions that might mitigate the costs of conversion.

As for the company's roughly 32 AMs, now that the new rules are in place, Entercom will start its AM rollout in 2008.

Explorer Scout

Like many in the business, Hadfield got into radio on a whim. What is unusual, however, is that he has only had about

six radio jobs, all in one market.

Marty's first experiences in radio were in Explorer Scouts (now called Sea Scouts) on a boat where his Third Class Radiotelephone Operator's permit allowed him to be a ship's radio operator. From there he eventually gained his First Class ticket.

Hadfield attended the University of Washington and majored in electrical engineering. During that time, he helped a friend whose radio station needed a transmitter babysitter due to loss of remote control lines at the Cougar Mountain site in suburban Seattle.

After graduation in 1976, he became assistant and subsequently the chief at KIXI(AM-FM), Seattle for about six years. Then he went to SRO Broadcasting, also in Seattle.

PPM

► Continued from page 3

there was a "glitch" in the reporting of the data, not a sample size change. Records from 200 meter-wearers that should have been counted in the ratings were not.

Arbitron re-issued the faulty PPM data.

"This is obviously a bad time for us to make a mistake," said Patchen. "It should have been caught in the quality control process and it wasn't. That process is being reviewed, and we'll go forward."

Arbitron puts the average daily sample size for the month of July at 1,168, which is 193 below its target.

Several factors have led to a sample delivery under target, Patchen said. In the diary, people cooperate for a week. With PPM, people participate for a year or more. Some people cooperate less over time, and Arbitron says it now realizes it needs to move faster to remove poor responders from its panel. Summer vacations affected this situation also, he said.

The company hopes to be up to its full average daily size target in Philadelphia this month and in early October in Houston.

Arbitron CEO Steve Morris said managing large panels of people carrying meters for such a long time is "unprecedented" for the company, however he said the glitch hasn't affected the validity of the data. "If it did, we wouldn't send it out."

Morris continued: "We'll never be per-

fect, but we will always be getting better. There is no leather-bound book telling us what to do. We're writing this book."

Some broadcasters have questions about the validity of PPM. Arbitron Advisory Council chair Steve Sinicropi

Arbitron says it now realizes it needs to move faster to remove poor responders from its panel.

has said the data processing glitch doesn't help make broadcasters more confident in PPM. Cox Radio President/CEO Robert Neil said in his Q2 conference call with financial analysts that the declines began earlier than the summer.

PROBLEMS-SOLUTIONS

As with the diary method, getting enough young adults and African-American listeners to wear a meter is more of a problem than with other demographic sub-groups. The National Association of Black Owned Broadcasters has criticized the PPM for this reason, saying all radio audiences have declined in Philly and

In the mid-'80s, he worked at RF Specialties designing FM boosters. His next stop was Fisher Broadcasting as a special projects engineer primarily evaluating coverage from various transmitter sites.

Entercom hired Marty in 1990 in the company's early growth years. He began as CE in Seattle, then became DOE for the market before attaining his current position 16 years ago.

One of his first projects for Entercom was devising the move and then managing the relocation of KMTT(FM) Tacoma's transmission equipment from a mountaintop near Mount Rainier to its current West Tiger Mountain site in suburban Seattle.

Hadfield plans to stay in Seattle and said he intended to remain at Entercom until pending projects are wrapped up, likely toward the beginning of September. Reach him at: marty@theadfieldgroup.com.

— Leslie Stimson

Houston, and urban radio station audiences have decline significantly, under PPM. NABOB says the PPM methodology is flawed and has called on Arbitron to delay the rollout.

Arbitron disputes this, saying the data is reliable; the company says it will continue to work with NABOB on the issues it has raised.

Arbitron is further trying to improve its sample through the DDI — Demographic Delivery Index. If 10 percent of the market is black, the sample should be 10 percent black.

The company is offering incentives to increase proportionality for under-represented targets. These include a \$50 gift card for some black males and "personalized meter carrying aids" for black women and in-person training visits. These are like cell phone cases in different designs and colors.

WHY USE PPM?

The main advantage to PPM over diaries as a research method, proponents say, is that PPM provides results faster. A station can make a program change and see results right away instead of waiting six months.

There is also more "granularity" in the data. Minute-by-minute data are available. PPM measures an average day over the course of a month; the diary, in contrast, measures the average week of a 12-week period. 🌐

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Gibson

► Continued from page 1

community radio stations. The group assists schools and community groups in their quest to upgrade facilities or get facilities on the air.

In addition, Gibson runs Camp Shohola in the Pocono Mountains, which features a Communications and Technology program each summer in which 7- to 15-year-olds spend weeks learning about radio programming and engineering.

And full-time Gibson teaches broadcasting at York College of Pennsylvania in the Communications Department. He is chief engineer and faculty advisor for student-run radio station WVYC(FM).

A family tradition

"I have a passion for radio," said Gibson, who as an 8-year-old roamed the halls of WMRF(AM/FM) in Lewistown, Pa., a station owned by his uncle, Tom Metzger. "I really got started in broadcasting as a kid thanks to my uncle."

Gibson's grandfathers also worked in the telecommunications business, he added, one for AT&T Long Lines and the other for Bell Telephone.

Intercollegiate Broadcasting System, based in New Windsor, N.Y., was founded in 1940; it provides support to its non-commercial members in radio, TV, Webcasting, podcasting and streaming. Sixty-five percent of the group's members are college radio stations. However, the organization has expanded its support to community radio stations, public radio stations and even high school stations.

Gibson, who joined IBS in 1972 and has been vice president of engineering for 27 years, supports members on technical matters and occasionally visits radio stations with engineering issues that can't be handled over the phone.

"We are a resource for people who are looking to get a station on the air or looking to improve their facilities. We give technical and FCC regulatory and licensing advice. Webcasting is a large area of growth for us. Approximately 20 percent of our members are Webcasting only. However, many are looking for broadcasting opportunities," Gibson said.

IBS is in favor of expanding the low-power FM 100-watt service. The commission continues to grant CPs from its original filing windows in 2000-2002, said Gibson, who hopes the agency will open additional spectrum in the future.

"Major broadcasters may be concerned about it, but we have Webcasters who are very interested in becoming non-commercial low-power broadcasters," Gibson said.

Portable radios to 'listening' devices

New, drastically increased copyright royalty rates that Internet broadcasters are scheduled to pay recording artists and record companies has many IBS members deeply worried, Gibson said.

"A manageable resolution is possible yet. Should the rates stand, the music industry is only hurting themselves," Gibson said. "We are diligently working on the issue."

IBS director and senior staff positions are voluntary and unpaid, Gibson said. However, they are reimbursed for travel and other expenses. Fritz Kaff is chief operating officer of the non-profit organization.

Gibson said he loves teaching and calculates he has taught more than 5,000

students about broadcasting during his 35 years at York College. Still, he worries about students seeking entry into the radio broadcast field.

"The entire broadcast industry needs to take a long look at the future. I believe radio is hurting. So many stations are voice-tracked now and FM has become a music service that people can find else-

where, either from satellite radio to iPods."

He continued: "There was a time when all the boys who came to our summer camp brought portable radios. Now most all carry a portable listening device, such as an iPod. We need to offer people what they can't get on the iPod, and that is localism," Gibson said.

He is impressed with the programming



Tom Gibson says he's taught more than 5,000 students about broadcasting during 35 years at York College. Here he works an old Collins mixer board.

Radio Broadcasting Studios



Our AM radio station features a 1936 Collins, model 12H, broadcast console. It is recognized by broadcast equipment collectors around the world as the "oldest operating broadcast console" and is one of the first production broadcast consoles ever designed. Constructed by Art Collins and Arlo Goodyear just after he formed the Collins Radio Inc., it was called a "Speech Input Assembly". In use at Shohola since 1972, it was purchased new by WORK, 1350AM, in York, Pa., the first station in York County. Our AM station also contains two



vintage 1950's Spotmaster cart machines, two turntables, two microphones, an open reel tape recorder, and a PC based audio editing system. The studio microphone is supported by a 1950's RCA vintage boom mic stand from WSBA TV 43, the first and oldest UHF television station in the world. Your voice can go through the same console that passed the voices of Churchill, Roosevelt, Truman, Eisenhower and hundreds of other famous politicians and entertainers. Thousands of boys have learned to operate a broadcast console at Shohola.

Our FM radio station features a QRK 85 stereo broadcast console. It is one of the first stereo broadcast consoles ever designed and was used at WSBA FM 103.3, the first FM station in York and one of the first in the country. The control room also contains 2 broadcast cart machines, 2 Minidisc recorders, 2 turntables, 2 CD players, 2 cassette recorders, 2 microphones, an open reel recorder, and two PC based audio editing systems connected to the Internet.



You will have the opportunity to learn how to announce and manage a radio DJ programs, take telephone requests, and read the news, sports and weather. Please visit the WCSR web page for more information and a broadcast schedule. The Camp Shohola telephone system is connected to the broadcast consoles, allowing talk-in and discussion programs. We also broadcast live over the Internet allowing parents, friends and relatives to listen. If you would like to broadcast your voice around the world during your visit, tell your friends when you will be visiting the Shohola Museum and ask them to listen in. Links for the broadcast web streams are on the WCSR web page at <http://wcsr.shohola.org>.

Gibson runs a broadcast camp in the Poconos each summer.



Shohola campers at the WCSR(FM) control board.

some AMs are offering listeners. "It's two-way talk. Two-way communication. It can't be matched by any other medium," he said.

Meanwhile, Gibson feels broadcast engineers are becoming dinosaurs quickly.

"I'm a troglodyte in the industry. I still fix components, but that hardly matters anymore since today most electronics are not worth fixing. When a circuit board goes, you pull it out and put a new one in," Gibson said. "It doesn't take a broadcast engineer to see a fault light on a transmitter that tells you a module needs replacing."

Despite such pessimism from Gibson and others, young would-be broadcasters still flock to Camp Shohola every summer to write and produce radio dramas, read radio news, learn radio production and study electronics and robotics.

"Kids learn about every aspect of broadcasting. We even teach play-by-play sports broadcasting. It's one of the few places in the world kids can do this stuff," Gibson said.

Campers build radio kits, small low-power transmitters and even circuit boards, he said.

"We etch our own circuit boards and go through and do circuit design and then construct them. We do not just solder circuits to the board. It's really a hands-on experience for the kids," Gibson said. "They learn what an oscilloscope and a voltmeter are, too."

Shohola Museum

The camp, which has several carrier-current, restricted-radiation radio stations and generates six audio streams, also teaches video recording and editing, he added.

Yet another job for Gibson is that of curator of the Shohola Museum of Communications and Technology, located at the camp, which boasts one of the oldest working broadcast consoles in the world, according to Gibson.

The museum features operating vintage and antique broadcast equipment, including a 1950s Limpander compressor. The museum includes a Collins 12H broadcast console, recognized by many broadcast equipment collectors as the oldest operating broadcast console around, Gibson said.

"I've been collecting telecommunications equipment for almost 50 years. We have people from all over the world who come to operate the switches on the old Collins console," he said.

Gibson spent a decade in the Navy serving in radio maintenance; he is a Vietnam War veteran and an avid ham radio operator.

"I've been to a lot of places. I'm sort of a 'been there, done that' kind of guy. But I've always loved radio. It's been my true love."

Gibson lives with his wife Kelly in York, Pa. Camp Shohola and Museum information can be found at museum.shohola.org.

The Leslie Report

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FM

► Continued from page 1
tronic filing system. If successful, non-profit organizations are being told they could pay up to \$200,000 to get the new channels on the air.

Out of 9,083 FMs in this country, 2,817 are designated as noncommercial, according to the FCC's Web site.

The FCC is prepping for next month's filing window with a last-minute rules consideration of its own.

Hoping to prevent a repeat of 2003, when the agency was overwhelmed with more than 13,000 applications after opening a window for FM translator station filings, the commission is considering capping the number of frequencies individual nonprofit groups can apply for. The non-commercial educational (NCE) filing window is Oct. 12-19.

No spectrum hogs

The public notice, issued in August, seeks to discourage spectrum speculators by limiting applicants from having interests in more than 10 applications filed in the window. The commission was considering public comments in early September.

Nevertheless, industry watchers predict a "very heavy" number of applications during the filing window, marking the first time in seven years that parties have been able to file for a new NCE FM station.

John Crigler, a communications attorney specializing in public media with Garvey Schubert Barer, said, "It's been a long seven years since the commission froze the noncommercial filing process in 2000. We expect the number of applications to be well into the thousands."

Those applicants will include nonprofit organizations like educational institutions, governmental organizations, religious groups and community groups, said Crigler, who represents several clients expecting to file applications.

Crigler said the filing window application is accompanied by more than 40 pages of instructions and worksheets, which "typically can be confusing for the layperson, especially the technical part of the form."

The noncommercial filing window for FM reserved frequencies differs from the auction-based system the FCC uses to award non-reserved frequencies to commercial broadcasters.

"The current solution is that reserved frequencies are awarded through the application process and point system, while non-reserved frequencies are auctioned," said Crigler. "Nonprofits may bid on non-reserved frequencies. However, their bid will be dismissed if there is a competing commercial bidder for a specific frequency."



James Price III at the transmission site for WBFC(LP) in Boynton, Ga.

The FCC will use a new point system to determine mutually exclusive applications. While the point system includes various criteria in determining the successful applicant, Crigler said the new tiebreaker method favors local applicants who plan to originate local programming and who own no other radio stations.

"Some of the national religious organizations who are set up to apply for stations all over the country will be disfavored when compared to a group rooted in the community. [The point system] definitely will favor local entities. Likewise, a local nonprofit who has been long established in a community will have favor over a startup organization," Crigler said. "It's another tool to help the FCC make cuts."

'Finally here'

Crigler said the commission will be looking for "solid, substantially complete applications that meet their requirements and are technically viable."

Finding an available frequency typically requires the expertise of a consulting broadcast engineer and many firms say they have been busy preparing for the October filing window. Industry watchers expect most of the new non-com reserved channel assignments to fall outside heavily populated urban areas.

"The reserve-band noncommercial stations are really a jigsaw puzzle. Ultimately we draw in all of the existing frequencies to see if we can fit anything in. Wherever you can fit the contours in you can build a station," said Michael Brown, president of Brown Broadcast Services Inc.

Consulting engineers typically use specialized software from Dataworld, RadioSoft, rfSoftware, V-Soft and other companies to map existing stations' protected contours in search for available

channels.

Brown said his firm has approximately 60 clients considering applying for frequencies.

"We are investigating where frequencies may be available and preparing the technical and engineering portions of their applications," said Brown. "We have worked with some clients for over five years since we anticipated this filing window to originally be in 2002 or 2003. We are happy it's finally here."

Sterling Communications Inc. promised to do a frequency search and complete the FCC's application for a noncommercial station for \$4,445, according to the company's Web site.

"It's been very busy. We have a huge backlog of work that has been prepared in anticipation of being able to file again," James Price III, vice president of Sterling Communications. "Since the opportunity to file was announced we have worked seven days a week with each employee averaging around 90 hours per week."

Sterling Communications, which works

almost exclusively with independent Christian groups hoping to build stations in their respective communities, tells clients up front that the days of building big powerhouse FMs are gone.

"Most will be Class A FMs anywhere from 100 watts to 5 kW," Price said. "There are obvious markets where nothing is available. In others, we are basically locating channels that have been rejected by all of the previous station startups in that particular market."

Yet other broadcast engineers predict there could be some unexpected power levels available to non-coms in next month's filing window.

"There are powers available up to 100 kW in the less populated areas of the United States. Some surprising powers are available to serve some of the larger cities as well [up to 10 kW]," said Doug Vernier, president of Vernier Telecommunications Consultants.

Vernier developed and sells broadcast propagation software such as SearchFM and AM-Pro under the V-Soft Communications name. His firm is working almost exclusively with existing broadcast clients.

"We expect several dozen clients to file during the window. It's hard to put a number on it because the phone is still ringing [as of mid-August]," Vernier said.

When the FCC's Media Bureau announced it would accept applications for reserved noncommercial broadcast channels in April 2007, coordinators for the Prometheus Radio Project, a nonprofit resource center that helps nonprofit groups launch their stations, said they expected the agency to see a rush of non-com broadcast applicants.

"We had literally thousands of calls from groups and individuals since then asking about the filing window and hoping we can demystify the FCC application form. Many people see this as really a last chance to grab a frequency. Future spectrum opportunities within the reserved band may be even less frequent in occurrence," Libby Reinish, a coordinator for the Prometheus Radio Project, said.

Newswatch

► Continued from page 2
antitrust law, which is designed to give regulators time to review deals for competitive concerns. Pending shareholder approval, the AP reported, News Corp. and Dow Jones expect the deal to close in Q4.

XM SATELLITE RADIO will build new studios in Nashville. Its current studios in Music City are located in the Country Music Hall of Fame. Construction on the new space at the Sommet Center's arena is slated for completion later this year. The satcaster said the new facilities will include expanded broadcast and production studios, as well as a dedicated performance studio, full production suite and office space. XM will use its new Nashville studios to originate its country music programming, as well as content for other channels.

D&M HOLDINGS acquired Calrec Audio Ltd. Terms and price were not disclosed. Calrec, based in Hebden Bridge, West Yorkshire, England, makes digital audio mixing consoles, analog consoles and audio networking equipment for live production and live-to-air broadcast. Denon, Marantz and Boston Acoustics are

some of the product lines distributed by D&M Holdings. Others include McIntosh Laboratory, Snell Acoustics, Escient, Replay TV, D&M Professional and D&M Premium Sound Solutions.

SENNHEISER has created a consumer electronics subsidiary. With headphones now a major portion of its business model, the manufacturer announced it decided to launch Sennheiser Consumer Electronics. The division is split between branches in Ireland and Singapore. Tullamore, Ireland, is where transducer manufacturing, assembly of Sennheiser headphones and fulfillment are based. Singapore is home to product marketing, product development and purchasing.

The RADIOSOPHY board chose William Graber to replace Richard Skeie, who left about a year ago. Radiosophy spokeswoman Sue Nail said company attorney Jeff Garreans had been set to take over the role earlier. Garreans was killed in a car accident in April. Graber was marketing director for the commercial division of Corporate Express, an international office supply company. Prior to that, he held marketing director positions with Direct Alliance, an Insight Enterprise company, and DBL Distributing, a national distributor of consumer electronics.

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World Radio History



Radio World, September 26, 2007

Past columns are archived at radioworld.com

Ducting Isn't Figment of Engineer's Mind

by John Bisset

Perhaps one of the most difficult tasks I experienced as a chief engineer was trying to explain to my manager that the interference to our FM signal during morning drive was not our antenna or the transmitter, but rather tropospheric ducting.

There were times I know he thought I was making this up, trying to cover for some problem at the transmitter site! Perhaps you've experienced this frustration.

If so, enter the Internet and a tool that can't be doubted.

Cox Richmond Engineering Manager Jon Bennett sends a link to William Hepburn's Worldwide Tropospheric Ducting Forecast site. This site displays six-day forecasts, in map form, showing the degrees of tropospheric interference for the entire world. Although the current week's maps cannot be copied or published, you can certainly look at them and predict how bad the ducting will be.

Visti www.dxinfocentre.com/tropo.html.

In addition to the maps, there are several tutorials on the site that help explain this phenomenon. One is the Hepburn Tropo Index, which was developed by Hepburn, which displays the degree of tropospheric bending expected to occur over a particular area. This index gives an indication of how much signal bending is taking place overhead, and can help explain why your morning show can't be heard 5 miles from the transmitter site.

Most engineers are aware of this atmospheric phenomenon, but now there is scientific forecasting to back up the interference that seems to plague us this time of year. Thanks to frequent *Workbench* contributor Jon Bennett for sharing the site. He can be reached at jon.bennett@coxradio.com.

★ ★ ★

Speaking of the Internet, another frequent contributor, Paul Sagi, writes from Kuala Lumpur that he's found the

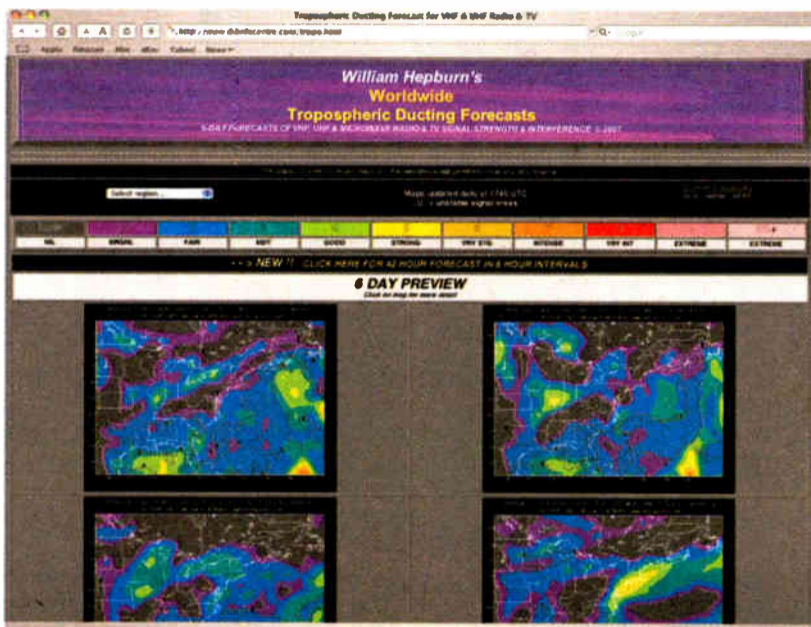


Fig. 1: Worldwide Tropospheric Ducting Forecast

Internet to be a useful tool as a broadcast engineer — especially when it comes to computers.

Even if the station has an IT professional, it's job security to understand broadband, virtual private networks (VPN) and even the TCP/IP and LAN settings for a station PCs and network.

Certainly you can pay for computer courses, but you can also find useful information on the International Engineering Consortium's Web site found at www.iec.org/online/tutorials.

The registration is free and required to download some of the material. You can view the table of contents without registration.

Some recent white paper topics include "The Evolution of Networks Beyond IP," and a neat tutorial on Fiber Optic Technology, prepared by Corning. Every engineer should have a basic understanding of the concepts and terminology of their IT plant, if for no other reason than to be able to deal intelligently with in-house computer staff and vendors during fault resolution and upgrades.

Head to the site, you'll find it useful reading. Thanks to Paul Sagi for the tip. He can be reached at pksagi92@gmail.com.

★ ★ ★

Our computer theme continues with Larry Langford of WGTO(AM) in Cassopolis, Mich.

Larry writes with information on a poor man's STL/remote audio system that really sounds good and is cheap. If engineers are expected to do more with less, this tip might help you out in a pinch.

Readers may have heard of *GoToMyPC.com*, which allows remote operation of any PC via DSL or other high-speed service. The latest version uses a sound feature that monitors any sound card or USB audio device in the host computer.

If you have a PC at your transmitter with GoToMyPC on it, you can access it from anywhere and then operate through the transmitter computer to again use GoToMyPC to access any computer anywhere that has audio on a sound card.

GoToMyPC is great because the sending computer does not have to be set up to stream or do anything other than operate normally.

This could be an office PC at the studio that has program audio on it for an emergency STL, or it could be used to put audio on the air from even a laptop. As a sports remote feature, you would access a laptop at the remote that has an air card or DSL connection. Once

See REMOTE PC, page 11 ►

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Remote PC

► Continued from page 10

the mics are plugged into the laptop, the audio would be available via GoToMyPC back at the studio.

The solution is great because the sending computer does not have to be set up to stream or do anything other than operate normally. The program will pick from any number of sounds cards or sources on the host computer, and there are two levels of quality to account for bandwidth conditions.

Latency is typically no more than a half second and the audio is reasonably flat but does show some rolloff at the bottom end.

The other major remote software, LogMeIn, does not do audio but Larry imagines it may in an upcoming version.

GoToMyPC charges for the number of host computers on line at any one time. The plans start at \$19.95 a month. This is cheap insurance. Larry has used the program at WGTO to back up the STL feed or monitor the program channel from hundreds of miles away, without dedicated streaming.

He's even remotely operated the production computer and edited spots using the program to hear the audition output sound card! This is a nice way to play a spot for a client if you are at their offices — you can gain access to any audio file back at the studio for audition in real time.

A neat twist on a new technology. Larry Langford can be reached at larrylangford@aol.com.

★ ★ ★

Dropping hardware or small parts can be an everyday occurrence for engineers, and a frustrating one at that. Fig. 2 shows a simple, effective way to locate the dropped items.



Fig. 2: Oh, *there* it is! Shine a flashlight parallel to the floor to locate dropped hardware.

Get down on the floor with a flashlight, holding the flashlight against the floor's surface. Shine the beam parallel to the floor's surface and slowly move the flashlight from side to side, illuminating the floor. The dropped item will usually be apparent, as seen with the dropped nut in Fig. 2.

★ ★ ★

Are you budgeting to replace your AM ground system next year? Here's something to consider as you plan.

Nott Ltd. of Farmington, N.M., has been approved by Copperweld Bimetallics LLC, to distribute the Copperweld brand of grounding wire.

This wire has been used in the electric utility industry for many years and just now comes to broadcasting.

Standard Copperweld wire is not annealed, making it springy to deal with. However, this ground wire is soft drawn and handles and bends just like pure copper. It can also be silver soldered like pure copper.

Tests indicate that erosion may occur at the ends of buried wires but go no more than two wire diameters into the

metal. In the case of #10 wire, this is less than 1/4-inch.

We've seen the tremendous rise in the price of copper. A few years ago, it was about 65 cents a pound, and took a leap last year to more than \$4; the price has now stabilized somewhere above \$3/pound, with the price changing daily. The increased worldwide demand demonstrates the price won't be coming down any time soon.

The rise in pricing also means that copper thieves are looking for copper in all forms including AM ground systems. The folks at Copperweld Bimetallics say that many copper thieves now carry magnets with them, so when they put the magnet onto your radial wire if it sticks, they won't bother it.

If the Copperweld is stolen, the first time thieves try to sell it as copper scrap,

the dealer will turn them down because it's mostly steel, which has little scrap value. Recall that RF current travels only on the outer surface of a wire, due to skin effect, so most of your current will be flowing in the outer copper skin. Bending the wire into a sharp radius does not cause the copper skin to crack. Wrap it as tight as you like, then silver solder it.

For information, contact Nott Ltd. at (800) 443-0966 or (505) 327-5646. E-mail to walt@nottltd.com.

John Bisset has worked as a chief engineer and contract engineer for 38 years. He is the northeast regional sales manager for Broadcast Electronics. Reach him at (571) 217-9386, or jbisset@bdcast.com. Faxed submissions can be sent to (603) 472-4944. Submissions for this column are encouraged, and qualify for SBE recertification credit.

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Whose Device Is It, Anyway?

Many Services Can Converge and Connect at the Personal Media Device, But Who Decides Which?

You may recall in the last issue that we considered the technical complexity of wireless digital media devices. To refresh your memory, a conceptual design of a next-gen device is presented in the diagram here. Note, however, that its convergence of various technologies is accompanied by an even more tortured intertwining of business elements. We'll discuss the latter this time, particularly as they apply to the coveted "personal media device" of the (very near) future.

First, put aside all notions of traditional broadcasting, where broadcasters transmit free services over their assigned channels, and consumers simply purchase any manufacturer's appropriate receiver and tune in. In the grave new world of wireless, service is via paid subscriptions, offered in a crazy quilt of plans with various tiers, roaming agreements and interface options. The user's terminal device is the complex instrument shown in the figure, but designed and configured as the service provider wishes, and typically available only from the service provider or its dutiful agents.

The L word

In this internecine maze, it's all about leverage and behavior modification, with the primary goal being to keep the consumer sending as large as possible a payment every month to the wireless service

but Apple insisted that it be sold only through Apple and the wireless carrier's own outlets.)

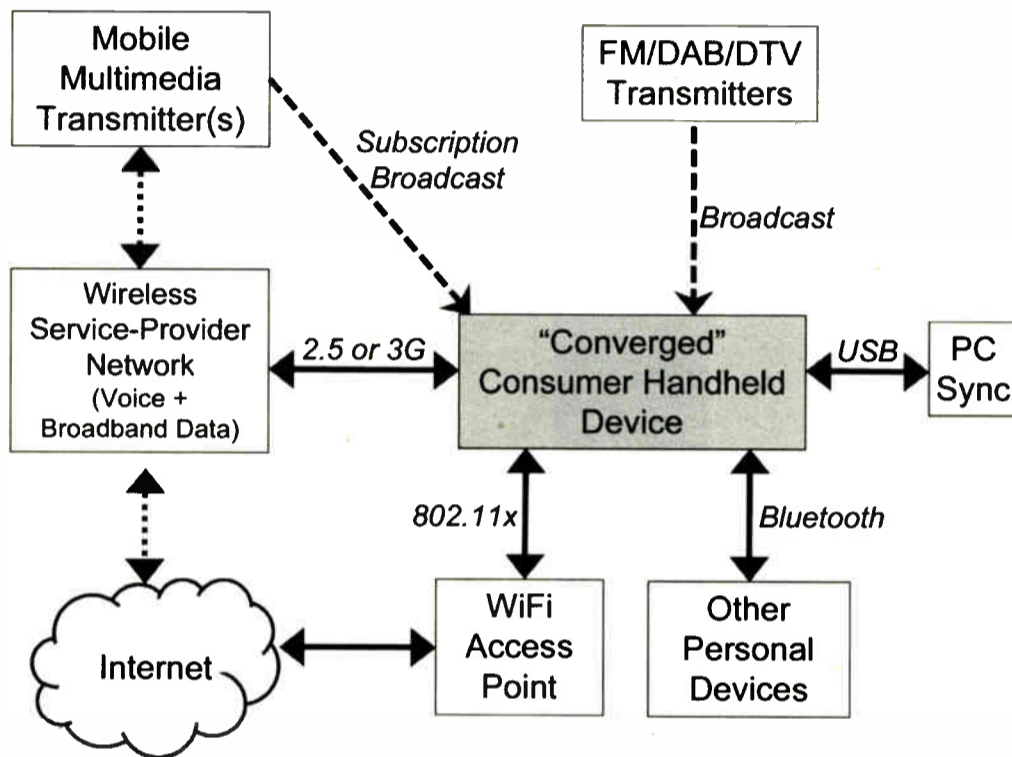
So a popular device's appeal can be used to get people into particular stores that have exclusive access to the product, and while they are there, perhaps they'll buy other items, and/or come back for more later.

As the diagram shows, these new

services developed for and/or by wireless telcos, but neither could properly arrange all the requisite pieces of the puzzle.

Movio was developed by British Telecom, and used DAB-IP (datacasting over the Eureka-147 DAB format) at VHF frequencies to deliver several premium TV and radio services to handheld devices in the U.K. The consumer device also served as a standard DAB radio receiver, in perhaps the one market where that service is successfully deployed.

Despite the service's use of a standardized delivery format, BT was only able to



The 'personal media device' can potentially connect to many services, primarily via wireless technologies.

The Big Picture

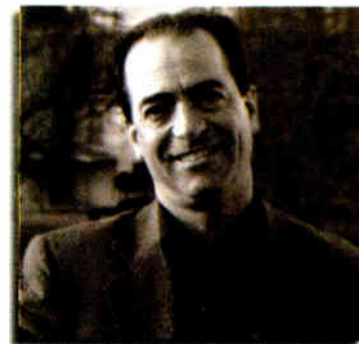


Photo: Gary Hoyes, BBC

by Skip Pizzi

Fox News and Discovery Networks, plus audio service from Music Choice.

Nevertheless, it failed to attract a single U.S. wireless telco operator to engage its services, and Crown Castle ultimately chose to terminate the project in July 2007. Most observers blame the failure primarily on Modeo's use of L-band spectrum, whereas competing services in the U.S. use the more advantageous 700 MHz band. (Verizon and Cingular/AT&T had already chosen Modeo's competitor MediaFLO, developed by Qualcomm, which will use the former UHF-TV Channel 55 with a proprietary delivery format. Meanwhile a firm called Aloha Partners is offering its Hiwire service, which plans similar services on former UHF Channels 54 and 59.)

Pay to play?


So even though radio broadcasting — analog or digital — is already inherently wireless and robustly available for mobile reception, some impressive business negotiations would have to be brokered for broadcast radio to

appear among the suite of services offered by the personal media device of tomorrow.

Consider that today some wireless phones sold in the U.S. actually include FM receivers, but they are disabled by the software that the service provider installs on the device. Reversal of such proactive blocking of radio reception capability on the platforms that the wireless operators control would require a pretty sweet deal, and it's unclear what broadcasters might be willing or able to offer in order to achieve it.

Another factor involves the recent decision by the FCC to auction some of the other reclaimed 700 MHz spectrum it will auction next year with a requirement that it be "open," meaning that the spectrum licensee could not control the devices that its customers connect with. This would make at least one slice of the U.S. wireless environment more like the rest of the world, and allow the deployment of innovative devices with designs not solely driven by wireless network operators' motivations. In other words, maybe we'll eventually see U.S. cell phones with radios in the open 700 MHz space.

Whatever happens, it's becoming clear that the pathways to tomorrow's listeners will traverse much new ground.

Skip Pizzi is contributing editor of *Radio World*. 

Some wireless phones sold in the U.S.

include FM receivers, but they are disabled by the service provider.

provider. So service providers try to leverage the consumer's desire for media and connectivity by providing an appealing service package under their own branding, and at the lowest possible price.

To do this, the providers attract customers with deals on monthly service and subsidized device pricing, then lock them in with long-term service contracts and constrained access to features and services on the devices. (Customers' desire to keep their same cellular phone number used to be another element of such leverage, but it was eliminated by wireless number-portability regulation in 2003.)

Even where to buy the device can be constrained and leveraged, as evidenced by the recent debut of Apple's iPhone, which is only available through Apple's and Cingular/AT&T's stores. (Apple's initial negotiations with Verizon as the exclusive iPhone wireless network broke down over this point, as Verizon wanted general retail availability of the device,

devices can serve as consumer access platforms for numerous wireless services, both one-way and two-way, but because network operators control the devices' design, only the services that operators want to include will be offered. This implies that the only services supported may be those with which the network operator has some beneficial business arrangement. So the likelihood of these devices including future free-to-air digital broadcast services (such as portable IBOC radio, or the envisioned Mobile/Handheld ATSC DTV service) is slim if the network operators aren't in on the deal somehow.

Where the pioneers went wrong

Even services that understand these business realities may not be successful, as the two early "Mobile TV" failures (Modeo and Movio) mentioned in the previous column exemplify. These were broadcast-delivered, mobile multimedia

engage one manufacturer to produce the converged device (the Lobster from the Taiwanese firm HTC), and had only attracted one wireless carrier (Virgin Mobile) to offer the service. (Another player engaged in the service's food chain was DAB national-frequency licensee Digital One, a transmission service owned and operated by a group of commercial U.K. broadcasters, from whom BT had leased 100 kbps of national DAB service.)

Less than a year after its festive October 2006 launch, and with reportedly fewer than 10,000 customers, BT announced it will shutter the service in January 2008.

Meanwhile, in the U.S., Crown Castle had developed the similarly named and positioned Modeo service, also using a standards-based approach (in this case, DVB-H), for transmission in L-band spectrum for which it had obtained a national license in a 2003 FCC auction of repurposed former weather balloon telemetry spectrum (1670-1675 MHz).

Earlier this year, Crown Castle received a rules waiver from the commission allowing it to use higher power than originally licensed for the service, thereby reducing its potential network costs (i.e., fewer transmission sites required). It built a trial network in New York City, and launched beta service there in January 2007 with live TV content from

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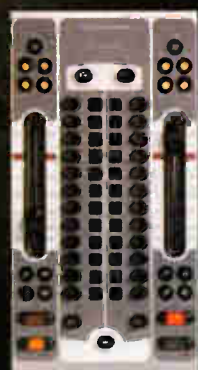
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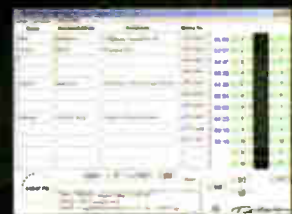
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World Radio History

WIRED FOR SOUND

I'm the Man Who Found the Lost Cord

by Steve Lampen

Do you understand the joke in the title? The "Lost Chord" is a serious piece of music, one might almost say a hymn, by Arthur Sullivan of Gilbert & Sullivan fame. The title of my column is a British music hall joke song adopted by Jimmy Durante, the "schnoz," here in the U.S. Of course, it should be the lost "chord" but I wrote the lost "cord," as we've been talking about power cords. We've talked about gage size, current draw, even the melting temperature of the jacket.

One other factor you need to consider in choosing power cords is ruggedness. Most power cords, certainly the ones you get free with a device, are almost always PVC. Simple, cheap and not particularly rugged, they work fine in a protected environment, such as a rack or other permanent install.

Rubber

In you're on the road, however, or plugging and unplugging constantly, or if people are stepping on these things, you might want to consider alternatives. Rubber, real hole-in-the-tree rubber, is extremely rugged and lasts virtually forever. There is artificial rubber, called EPDM, and similar artificial rubber-like materials made by others manufacturers. Some work well when wet, or in sunlight, or are scuff-resistant, or are very flexible.

Most of the artificial rubber compounds are "thermoset." These compounds are "cured" ("Vulcanized"). Thermoset is set, and can't be recycled. In contrast, plastics (correctly "thermoplastics") can be chopped up, re-melted and made into new cable (or pop bottles, plastic bags or park benches).

If you're a roadie or a truck guy/gal, you might want to get an example of each of these rubber or artificial rubber power cords and do some tests. If you are constantly throwing away cut and damaged power cords, you might give this more than a passing thought.

I don't have to tell you that damaged power cords represent a much greater risk than a damaged mic cable or speaker cable. The liability aspect alone should make you vigilant in making sure your power cords, extension cords, plug strips

and all things electrical are in perfect working order. Having someone injured or worse would buy a lot of power cords, if not the whole factory.

And, finally, we come to my favorite subject about power cords: length. In most rack installs, you have a plug strip right next to the device. You don't need a six-

The liability aspect alone should make you vigilant in making sure your power cords, extension cords, plug strips and all things electrical are in perfect working order.

foot power cord, you need a 3 ft., 2 ft. or even 1.5 ft. cord. So what do you do? Tie it up with a cable tie? Some installers (laboriously) cut down their 6 ft. cables and put on AC plugs at the length they need. A much easier way is to buy short power cords, such as those made by Volex (www.volex.com).

If you take any road trips outside the U.S., you can easily buy adaptors for each country. An adaptor might be fine for a laptop but it's probably not a good idea for serious audio, video or broadcast gear. An

adaptor adds yet another point of failure. And most adaptors are, shall we say, made to be cost-effective (i.e. cheap!). I shudder to think that a \$250,000 mixing console is dependent on a \$1.29 plastic adaptor.

The other end of a detachable power cord is most often the international standard IEC-320, rectangular hole with three flat pins, easily available everywhere. You might check your gear just to see what has removable cords and what doesn't.

While you're at it, what will run on 240 volts, as well as 120 volts, and what won't? There was a great two-page spread titled "Plugged In" by Peter Gwinn in the June 2005 National Geographic Magazine on the world of power plugs. It showed most of the plugs around the world.

The trick is, of course, to buy the correct cord for each box. Here's a checklist:

1. Gage size. Remember that, as you go up in voltage, you go down in current for the same wattage (VA), so you can often take smaller cords to Europe than American cords.

2. Ruggedness. If the cord you're replacing is extra-rugged, obviously its replacement better be just like it, or as close as you can get.

3. Length. There's nothing more frustrating than having the right plug, the right ruggedness and the right wire gage on a six-foot cord, only to realize the original cord was a ten-footer.

Steve Lampen's latest book, "The Audio-Video Cable Installer's Pocket Guide," is published by McGraw-Hill. He can be reached at shlampen@aol.com.



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MARKET PLACE

'Ice Detection Made Simple'

A Florida company is promoting a new ice and rain sensor that it says can handle every type of natural precipitation.

New Avionics Corp. said the ice detector for static-air applications eliminates moving parts to reduce cost, size and weight. The company says it detects clear or rime ice, frost, snow, dew, condensation and raindrops, and is suitable for use in hazardous, remote, unattended locations.

The Ice*Meister Model 9734 Industrial Ice Detecting Sensor System, according to the company, will also be attractive in applications where ice sensing has not been affordable before.

It lists uses such as roadway signs, commercial refrigerators, retail thermometers and rain gauges, heliports, irrigation controls, vehicle dispatch offices, sprinkler controls, windpower farms and industrial freezers.

"Once 'tuned' for the application at hand, Model 9734 operates as a digital ice/no-ice indicator," the company states. "At maximum sensitivities, it detects the incipient formation of any kind of ice, and even senses the condensation from human breath."

At minimum sensitivities, it distinguishes heavy ice from slightly heavier ice. It detects and "stretches" raindrops for efficient control of irrigation sprinklers, and it detects the point at which rain has turned to ice. It offers an optional de-ice heater for system reset.

The precipitation sensor system runs on about a watt from various types of power sources of any polarity including primary batteries, solar panels, six-volt motorcycle batteries and cell phone chargers, AC or DC.

The components include a sensor head, cable and interface board. Users provide input power and receive data output via indicator LEDs and isolating relay contacts. The user interface board "tunes" the sensor head to specific applications. Options available include a de-ice heater, heavy-duty cable for severe environments and weatherproof NEMA 4X enclosure.

Systems are priced from \$750 or less to \$3,750 or more, depending on configuration.

Contact the company at (954) 568-1991 or visit www.newavionics.com.





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Barry Thomas was elected the 25th president of the Society of Broadcast Engineers.

He is vice president of engineering, radio, for Lincoln Financial Media. A senior member of SBE, he most recently was treasurer; he also chairs its strategic planning committee. Thomas has served at the chapter level in several markets and is active with Chapter 5 in Atlanta. He has been a member of SBE since 1986. His one-year term begins Oct. 11 during the SBE's national meeting in Pittsburgh.



Barry Thomas

Vincent Lopez was elected vice president. The director of engineering for WSYT/WNYS-TV/Sinclair Broadcast Group in Syracuse, N.Y., he is a member and past chairman of Chapter 22 of central New York, and has been a member of the national board of directors since 2000, most recently serving as secretary. He has been a member of SBE since 1991.

Ted Hand was elected SBE secretary and Ralph Hogan treasurer. Hand is chief engineer of WSOC(TV) and WAXN(TV) in Charlotte, N.C. Hogan is assistant general manager, engineering services, Washington State University.

Additionally, six members were elected to seats on the board of directors. They include Cris Alexander, director of engineering, Crawford Broadcasting Co., Denver; Andrea B. Cummis, senior vice president, engineering and technology, American Desi TV; Dane Ericksen, senior engineer, Hammett & Edison Inc.; Clay Freinwald, RF systems engineer, Entercom Communications, Seattle; Hal H. Hostetler, senior engineer/IT director, KVOA(TV); and Jerry Massey, corporate regional engineer and director of engineering, Entercom Communications, Greenville, S.C.

Ted Nahil assumed responsibility for sales of ERI's RF and structural products to individual radio stations and radio group owners in the central region of the country. He was previously national accounts manager for Audio Processing Technology, and has held sales management and applications positions with Harris Corp.'s



Ted Nahil

Broadcast Communications Division. Nahil is a Microsoft Certified Engineer and Certified Professional Broadcast Engineer, and holds an FCC General Class License.

Sennheiser Electronic Corp. promoted Thom Salisbury to western regional sales manager, professional products. He had been market development manager for professional products.



Thom Salisbury

John Sheehan was named vice president and general manager of CBS Radio stations KEZK(FM) and KYKY(FM) in St. Louis. He returned to the company after having previously worked at its Kansas City cluster from

1993-2003, where he was director of sales. Most recently Sheehan served as vice president of Union Broadcasting's KCXM(FM)/KCTE(AM) in Kansas City, where he launched the station as an ESPN affiliate.

Sophie Lion-Poulain was selected to oversee worldwide press relations for Audemat-Aztec. Lion-Poulain has been responsible for press relations for the Americas for four years.

Sheila F. Kirby, president of strategic sales development for Interep, will serve as chairperson of the RAB2008 Planning Committee.

Salem Omaha appointed Greg Vogt as acting general manager for the Omaha, Neb., cluster, replacing retiring radio veteran and Salem General Manager Johnny Andrews. Vogt assumed responsibility for management of Salem's KOTK(AM), KCRO(AM) and KGBI(FM). He had previously been

Salem Omaha general sales manager.

The Corporation for Public Broadcasting welcomed its Emma Bowen scholars to Washington for a two-day workshop on public service media.

Scholars and participating stations include Desmond Dickerson and Andres Thomas, Georgia Public Broadcasting; Allison Worrell, WPBT(TV), Miami; Britny De Anda, Wisconsin Public TV-Radio; Jasmine Norwood, WHUT(TV), Washington; Peter Martinez, Jr., KCET(TV), Los Angeles; Ian Yue, KFAI(FM), Minneapolis; Kelsey Davis, KLRN(TV), San Antonio; Creshawna Wilson, MAET, Jackson, Miss.; Malcolm Johnson, Maryland Public Television; Joseph Flowers, WAMU(FM), Washington; Erica Edwards, WNYC(FM), Brooklyn, N.Y.; and Ashley Thurston, WABE(FM), Atlanta.



"Tomorrow arrived today!"

"I've built many, many studios all across the Midwest over the years, but our Knoxville Logitek installation was the cleanest, neatest and most advanced layout you can imagine! Almost everything is located in a centralized controlled-environment rack area. The control surface, mics, phone stuff and CD player backups are about the only things left in the studio outside of all the computer controls. The majority of the audio chain takes place within about five feet inside of one equipment rack for each station.

"My biggest problem today isn't how to set up for daily on-air operations, it's how to sell off all the old equipment like distribution amps that I don't need anymore. The Logitek system makes audio 'patching' just as easy as plugging in patch cables for everything. You don't even have to change the type of cable if you change from analog to digital—just re-plug a jumper into an appropriate engine input!

"I'd always dreamed of a studio that worked better for the jock, looked more like what the public thinks a radio star 'cockpit' should look like and yet was easy to take care of. The Logitek system made it possible to build it."

Mark Lucas, Chief Engineer
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Radio Society Seeks to Foster Excellence

by James Careless

The name "National Broadcast Society — Alpha Epsilon Rho" may not be familiar to many in radio. Yet since its founding in 1943, the NBS-AERho (www.nbs-aerho.org) has been an influential player in training American broadcast students.

Over the years, the NBS-AERho's ranks have included Edward R. Murrow, David Brinkley, Bob Costas and Dick Clark among its student and professional members. Today, this "radio society" has 89 active chapters at universities and colleges across the United States, and many alumni members who now work in the broadcasting industry.

"We currently have about 1,500 active members in campus and 200-300 professional members, plus 45,000 former members working in all levels of the media," said Jim Wilson, the NBS-AERho's executive director. "Our focus is on helping students make the transition to the professional world through media education, promoting excellence and responsible leadership."

"It is a wonderful organization whose only focus is encouraging students to go into electronic media," said Ned Waugmann, Arbitron's vice president of customer service and training. Since 2002, Waugmann has been involved with the NBS-AERho; first as a keynote speaker and then as a member of its National Advisory Council.

"I hope that I have the good fortune to remain engaged with NBS throughout my career and only regret that it was not available to me when I was an undergraduate. I have enjoyed my experience with NBS, both at the board level and the student/chapter level, immensely."

Timing is everything

The NBS-AERho can trace its roots back to 1941, when a small radio honorary society called Beta Epsilon Phi was



Veteran game show host Marc Summers speaks to the NBS-AERho audience at a recent convention.

NBS AERho

formed by radio students at Stephens College in Columbia, Mo. "They held their first induction meeting on Dec. 6, 1941 at the college," said Wilson. "Unfortunately, something came up the next day — notably the attack on Pearl Harbor! — that delayed their plans to organize similar societies on other campuses."

It wasn't until May 1943 that the "National Broadcasting Honor Society — Alpha Epsilon Rho" was announced. Besides Stephens College, the society (known as AERho) had chapters at the University of Syracuse, Michigan State University and Ohio State University.

See AERHO, page 18 ▶



Disney CEO Robert Iger addresses NBS-AERho 2007 convention.



Bob Costas shares a moment with NBS student members at a recent national convention.

SBE Unveils Digital Radio Certification

As broadcast technology keeps changing, the Society of Broadcast Engineers is keeping pace.

In addition to recently-added certifications in areas such as AM directional arrays and 8VSB digital television transmission, SBE is preparing to introduce its newest certification program: Digital Radio Broadcast (DRB) Specialist.

"We'd been talking about it for a little while," said Ralph Hogan, chairman of the SBE's DRB Specialist Certification Committee and assistant general manager, engineering services, Washington State University/Northwest Public Radio.

"But we decided not to act on it until just recently, because no formal FCC rulemaking had been made. Once the FCC put into place the rulemaking proceeding, we decided to go forward with it."

Good timing

The new specialty certification officially will be introduced at the SBE national convention in Pittsburgh, Oct. 10-11, and Hogan and SBE President Chriss Scherer will present information about it at the SBE Engineering Forum during The NAB Radio Show in Charlotte this month.

"We'll be going into some of the areas we'll be covering in the exam, including some of the FCC rules, now that there are rules," Hogan said.

Hogan notes that the timing of the announcement is nearly ideal, since the FCC's new digital radio rules

were published in the Federal Register on Aug. 15, to take effect Sept. 14.

He says many stations have been waiting for the rules to be formalized before adopting HD Radio, and he expects the pace of converts to the digital radio system to speed up now that it's official.

"It's always hard to tell, but there are more and more stations getting interested in digital radio," Hogan said.

While an official rollout schedule for the certification program has yet to be announced, Hogan said examinations for the specialty certification will likely be offered beginning with the January 2008 exam cycle offered through local SBE chapters. The examination will also be made available during the exam cycle at the NAB2008 show in Las Vegas. The exam will include 50 multiple-choice questions and one essay question, which will be covered in an updated version of SBE's CertPreview practice-test software to be released later this fall.

"The exam is going to include knowledge of importers, exporters, the various methods of combining analog and digital transmitters to antenna systems, delivery of digital audio signals and data to transmitter sites, transmitter emission mask measurements, AM and FM FCC rules, monitoring of digital signals and bandwidth requirements for AM antenna systems," Hogan said.

"It fits right in with the other specialists," he added. "It builds upon the existing certification program,

allowing those interested in a certain area to have specialty endorsements be added to their certifications."

Value

Hogan believes the new DRB specialty certification, which will be available to SBE members holding certification at the Broadcast Engineer, Senior Broadcast Engineer or Professional Broadcast Engineer certification level, will be valuable both to engineers and their employers, as they contemplate the expensive and somewhat risk-fraught move from analog radio into the digital world.

"There are a number of different ways you can put together a digital radio system, and it's important to know the pitfalls," Hogan said. "Having someone who's gotten the specialist certification gives management the knowledge that that person is well trained in the field."

While SBE shied away from specifying Ibiqity's HD Radio digital system by name in its initial announcements of the new specialist certification, Hogan says the FCC's subsequent official endorsement of the system will be reflected in the questions on the exam.

"At this point, it's just strictly HD Radio," he said.

This story originally appeared online on Radio World Channels.

— Scott Fybus

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World Radio History

SBE NEWS

'Tis the Season to Hit the Road

Autumn Brings Numerous Opportunities to Gather With Fellow Engineers in Friendly Settings

The author is chairman of the SBE Regional Convention Strategies Committee.

Summer car shows and ham-fests have waned; fall is upon us. Another season of SBE Regional Conventions and seminars is here.

In today's world, one cannot underestimate the value that these shows provide to SBE members and industry professionals. Given the economy and typically tight budgets, not everyone gets to go to the big dance in April in Vegas.

SBE regional shows and workshops can provide a valuable alternative and opportunities for educational experiences through a workshop or session; most also feature an exhibit floor overflowing with the latest technologies.

Many times the smaller, more relaxed pace of these events may lead to an equipment discovery or a chance to talk to an old friend whom you rarely see.

Marlborough

October is a busy month for regional conventions and our first will be held on the 4th and 5th. We go to Marlborough, Mass., for the 2007 Bos-Con.

Held at the Best Western Royal Plaza and Trade Center, the first day will feature an Ennes Workshop with radio, TV and joint sessions. Unique to this venue will be a "DTV Update" session by Mark Richer of the ATSC. Cost is only \$25, thanks to SBE Chapter 11 sponsorship.

The following day, the Bos-Con trade show is in the spotlight. Bos-Con was the site of the 2004 fall SBE National Meeting. It features a large exhibit floor, with more than 140 booths and 100 exhibitors. Admission to exhibits is free; lunch is provided at no cost. To register and get more information, visit www.bos-con.com.

Madison

Our grand SBE tour across this great country next goes to Madison, Wis., for the 2007 Broadcasters Clinic, presented by the Wisconsin Broadcasters Association and SBE Chapter 24.

Held Oct. 9-11 at the Marriott West Hotel, it was the site of the 1999 and 2002 fall SBE National Meetings. It features an exhibit floor as well as three days full of sessions for radio and TV.

Admission to the exhibits is free; there is a charge to attend the sessions depending on the number of days you wish to attend. Visit www.wi-broadcasters.org or www.sbe24.org for information on the Broadcasters Clinic.

Pittsburgh

The SBE spotlight will shine over western Pennsylvania on Oct. 10-11 for the 2007 SBE Chapter 20 Annual BroadcastExpo and SBE Fall National Meeting. Pittsburgh was also the site of the 2000 national.

The 2007 edition will be held at the ExpoMart in Monroeville, just outside of



Vinny Lopez

Pittsburgh. It will feature a day of technical sessions and an exhibit floor. New this year will be the opening of the exhibit floor on both days, from 5-8 p.m. on the 10th, with a reception following. Oct. 11 begins with a breakfast featuring keynote speaker Larry Thorpe of Canon USA.

Technical sessions start at 9 a.m., and the exhibit floor will be open from 9 to 5. Visit www.sbe20.org for more information.

The SBE national events will run concurrently with the local ones and will include meetings of various committees as well as the fall SBE Board of Directors meeting. The National Awards Dinner will be held on Oct. 11. Tickets for that can be obtained by contacting Debbie at the SBE National Office.

A special room rate of \$89 plus tax at the Radisson Pittsburgh Hotel has been established for this event. To make reservations, call the Radisson Hotels national reservation line at (800) 333-3333 and ask for the Society of Broadcast Engineers meeting rate. You may also call the hotel direct at (412) 373-7300 to make your reservation.

There are also a couple of exciting new things that are going to happen at this fall's national meeting.

On the evening of Oct. 9, we are planning an SBE National Web Conference streamed from Pittsburgh. It will feature SBE leaders discussing the Society and its plans. We plan to have call-ins and instant feedback so it will be a truly interactive event for SBE members all over the world.

It has been a while since SBE did something like this; the last one was in 1994, from Madison, and we are happy for the opportunity to do it again.

There also are tentative plans for an SBE Past Presidents' panel where past presidents will talk about changes to the Society and the industry through the years and what they see for the future.

Verona

Right on the heels of Pittsburgh is the 2007 Broadcast & Technology Expo, presented by SBE Chapter 22. It will once again be held at the Events Center at Turning Stone Casino Resort in Verona, N.Y., on Oct. 16-17.

One of the largest SBE regionals, the B&TE boasts more than 150 booths, 100 exhibitors, two days of technical sessions and almost 1,000 attendees. Admission to sessions and exhibits are free.

This event has been in place since 1972 and has hosted SBE National Meetings in 2006, 2001 and 1997.

A special rate is available at Turning Stone Casino Resort. Call (800) 771-7711 and ask for "SBE CNY Chapter 22 meeting" group rate of \$102; contact Turning Stone for suite rates or special accommodations. To register or for more information visit www.sbe22expo.org.

Tampa

The last fall event takes us to the

Sunshine State, where SBE Chapter 39 of Tampa will be presenting an Ennes Workshop on Oct. 19.

It features a day of radio, TV and joint sessions, including several unique sessions to this venue such as "Measurement Technology" presented by Nielsen and "Evaluating and Correcting Antennas for AM HD Radio Performance" with Ron Rackley.

Cost to attend is \$35 for SBE Members and \$45 for non-members. Contact Debbie at the SBE National Office at (317) 846-9000 for reservations for this event.

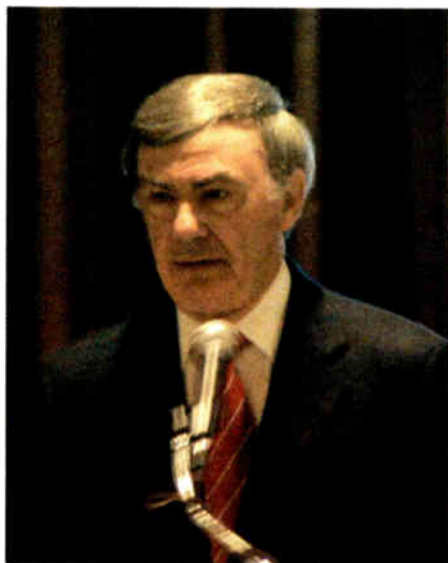
The SBE chapters mentioned take great pride in being able to present these opportunities for education, window-shopping and networking with friends and colleagues to SBE members and potential members throughout the country. 🌍



AERho

► Continued from page 16

AERho's original goal was to recognize outstanding scholarship in broadcasting. As the years passed, its mandate grew to include service to parent broadcasting departments and institutions, working with the broadcast industry on mutual projects, and ongoing self-improvement by AERho members. As part of this last process, AERho started gathering its members annually for national conventions, at which they could network and listen to talks by professional broadcasters.



Veteran ABC newsman Sam Donaldson addresses the serious side of news at the 2006 convention.

Today, that tradition continues: The 66th annual NBS-AERho convention is to be held in Anaheim, Calif., March 11-16, 2008. The last convention's speakers included TV anchor/reporter Ernie Anastos and Walt Disney CEO Robert Iger.

As times have changed, the organization has changed. Its scope was expanded to include television as this new medium grew up. In the early 1980s, as honor society enrollments declined across U.S. campuses, AERho was restructured into the current NBS-AERho. The NBS is

open to all broadcast students and professionals, while Alpha Epsilon Rho still operates as an honor organization.

Activities

Since the beginning, the NBS-AERho has focused on helping college students make their way into professional broadcasting. It does this by sponsoring awards and scholarships, providing educational opportunities and helping students network with broadcasting professionals. The NBS-AERho also helps its chapters arrange tours of broadcasting and production facilities, bring in speakers and raise money for their chapters.

Money matters, because traveling to conventions is a big part of what the NBS-AERho is all about.

"Fundraising events are a large part of each chapter's events, because this is how they can defer the cost of attending regional and national events," said Wilson. "For members, a big event is their Regional Convention. This is where a chapter holds a weekend convention for 10-20 chapters that includes seminars, speakers and other activities. But the biggest event is our National Convention, which is held every spring. This convention involves tours, speakers, seminars, and a job fair aimed at college electronic media students and early electronic media professionals."

The NBS-AERho holds Electronic Media Competitions, as well. These offer prizes, and are open to all college students. They can submit work in more than 40 categories covering production, scriptwriting and Web site development.

Determined to remain relevant

The NBS-AERho may have started in radio's heyday, but over the last 64 years the society has done its best to keep up with the times. "In the 21st century, we are committed to being a bridge between college electronic media and professional electronic media," said Jim Wilson. "That's why we now define 'broadcasting' as referring to any kind of media that involves an electron, rather than just radio and TV."

James Careless is a frequent contributor to Radio World. 🌍

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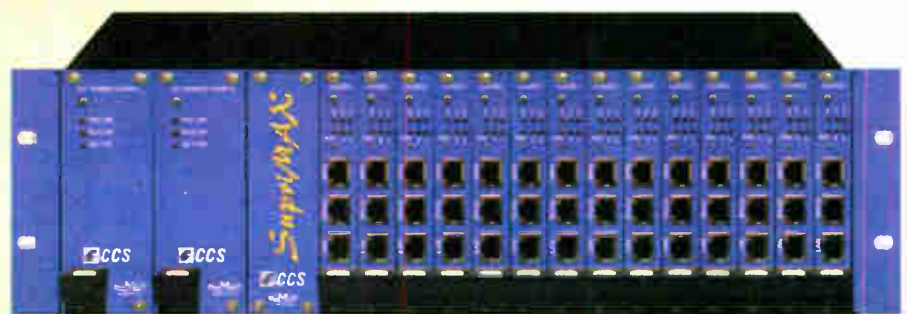


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Visit our website to view the MUSICAM USA Product Portfolio and contact MUSICAM USA, the IP technology leader, for more information about how easily our products can help you master the "audio over IP" direction for your station(s). We are already shipping products to major groups and small stations alike. Check our references and let's go!



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Train Your Advertisers Too

When You Help Your Clients Create Powerful Spots, They'll Be Successful, Happy — And on Your Station

by John Michelet

You are looking for new advertisers. Of course you are; all radio stations are always looking for new advertisers.

I am writing this article because I know the simple and surprising secret to getting new advertisers, and keeping the ones you already have. You are probably skeptical, but read the entire article before you scoff.

The secret is to teach advertisers how to create effective advertising campaigns.

That's right; don't just train your sales reps, train your advertisers too. Effective commercials will make advertisers more successful, and keep them coming back to the station that helped them achieve that success. A solid base of regular advertisers means your station and sales reps also reap the benefits.

It really is that simple.

Start by training your current advertisers, along with your sales reps. For maximum effect, you must train them both, preferably together. After that, start training advertisers not currently on

your station. It may be your most productive new business program ever.

Traditional training

Traditional sales training shows sales reps how to get appointments and sell airtime in a quasi-confrontational, I-win, you-lose atmosphere.

This misses a core truth of radio sales: You don't want just any advertisers; you want happy, successful advertisers who keep coming back. Twenty-first century sales training shows sales reps and their advertiser clients how to work in a cooperative relationship to create effective



John Michelet

advertising.

When you help your advertisers create powerful, persuasive commercials, they will be successful, happy and on your station.

Care about creative

Commercials are a sizeable part of radio programming. Radio station managers should be incensed about the abysmal quality

of the commercials on their stations. Most radio advertising is poorly conceived, badly written, boring and too weak to be persuasive. It is probably the major cause of two serious problems on your station: lack of client success and client turnover.

Radio stations cannot do much about ineffective commercials done by ad agencies, but they can do a great deal about the spots they produce for their direct clients. Most station-produced spots are written by people who have not been trained properly and who do not understand the difference between clever and persuasive.

Rather than treat commercial creation and production as an afterthought, stations should give a high priority to creating commercials that work hard for their advertisers and give their listeners the emotional and factual information they want to help them make smarter decisions.

Train clients, reps together

You need to give advertising effectiveness training to your station production people, sales reps and, most of all, advertisers.

It is imperative to train advertisers and give them the correct criteria to use in developing and evaluating commercials. Without it, they judge advertising by the useless "I like this" criterion, which is a big reason most commercials are ineffective.

When you only train your sales reps, clients still operate on little knowledge and many misconceptions, and continue to make bad decisions.

When clients and station personnel are trained together, they are able to create more effective advertising, they tend to bond in the process, and they develop ongoing, effective campaign that have the power to change minds and buying behavior.

Give them the details

Training must provide sales reps and clients the specific knowledge and processes that result in effective advertising campaigns.

This is not about writing cuter and funnier spots. It is about creating ongoing campaigns that build over time, rather than "onezie" spots that have neither initial impact nor residual effect. It is about making commercials that give something to both listeners and clients.

Client-sales rep teams must understand the specific directions and details. Delivering a long list of general guidelines and empty platitudes is a waste of everyone's time and money. They need to know specifics such as:

- The one question every commercial has to answer
- How to develop and deliver a Big Promise

See SPOTS, page 21 ►

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Spots

► Continued from page 20

- How to support your claims
- How to generate creative ideas
- How to demonstrate on radio
- How to use the listener's imagination
- The value of the advertiser's personality
- How to write a powerful story
- How to write emotional copy
- How to keep them listening for 60 seconds
- The secrets to small-advertiser success

Get serious

Most people greatly underestimate the difficulty of trying to persuade with advertising. When you underestimate the size of the hurdle, you don't jump as high.

If you are serious about increasing sales and profits, about keeping existing clients and attracting new ones, about offering something other stations do not, you must get serious about the quality of the advertising on the station. You must arm your sales reps and clients with the ideas, tools and processes required to create effective advertising campaigns.

That is the secret to getting clients who stay.

John Michelet is an advertising consultant, speaker and author of the book "Advertising: Industry in Peril." Reach him at (503) 539-2241 or via e-mail to john@johnmichelet.

MARKET PLACE

HDSpectrum Is TAP6 User Interface for Intermod Studies

SoftWright, which makes software for RF wireless system design, has released a new product called HDSpectrum.

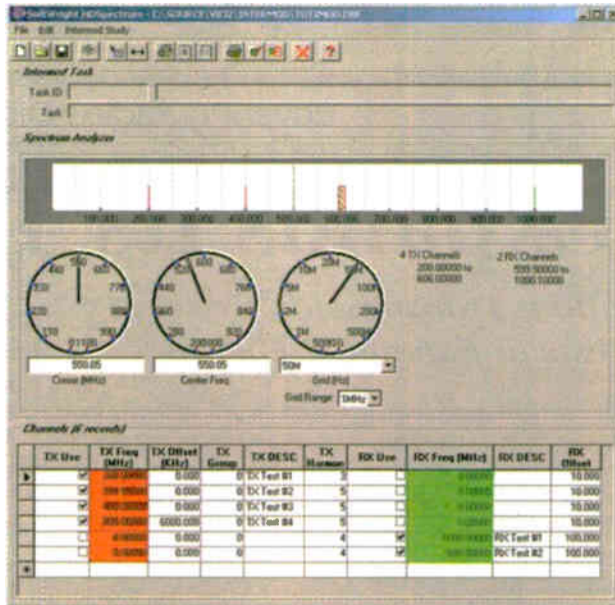
Users of the company's Terrain Analysis Package now can view transmitted and received frequency spectrum in the graphical display, similar to a spectrum analyzer using the TAP HD Spectrum interface.

"In the past, intermod software was often accused of generating reams of paper output that no one really examined," the company says.

The company said its tool allows engineers not only to generate lists of potential combinations of transmitted frequencies but to examine the potential hit frequencies in various ways.

Users can analyze potential intermodulation products as well as participating frequencies that can create the problems. It can consider broadcast, simplex, half-duplex and full-duplex facilities. The software can also take into account the deviation of the transmitted frequencies as well as user-specified bandwidth around a protected or received frequency.

"This provides a considerably more conservative protection than simply considering only the direct frequencies causing the destructive intermodulation products," it stated. "This newest capability also depicts all portions of the calculated intermodulation results in the format of the video display of a



spectrum analyzer."

The feature is provided to customers who have the TAP Intermod module as a part of a TAP system and a current maintenance subscription.

HDSpectrum has applications to broadcast. "When troubleshooting interference problems resulting from a combination of transmitted frequencies (or their harmonics), the HDSpectrum software can help identify the source of that interference. Only then can the interfering signal be eliminated by proper isolation or suppression at its source of generation," President Larry Ellis said.

The software facilitates a graphical, intuitive analysis of the potential interference problems relative to the protected frequency spectrum required by broadcasters.

"It is not only used when dealing with primary transmitted carrier frequencies but also subcarriers, RPU, ENG, STL and station two-way radio frequencies as well," Ellis said. "These problems can even arise with one's own RF transmissions, which can cause interference with each other, as well as the common problem of IM interference at antenna farms where there are often hundreds of transmitted and received frequencies."

For information visit www.softwright.com.

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Ibiquity Expands Its Test Lab

Receiver Characterization, Transmission Systems All Get 'Stressed' in Tests at Expanded Facility

by Leslie Stimson

COLUMBIA, Md. When Ibiquity Digital Corp. recently moved closer to both I-95 and the Baltimore/Washington International Thurgood Marshall Airport, it leased most of a floor in a larger building than it had occupied previously.

Now on Columbia Gateway Drive, close to one of Arbitron's three buildings in the area, Ibiquity has gained more space — particularly for its lab. Ibiquity's lab employees, currently at eight technical personnel and growing, conduct end-to-end testing of the IBOC transmission and receive systems, as well as quality control tests.

The lab group is busy testing smaller, more power-efficient chipsets for smaller IBOC devices, preparing for the technology to be included in portables and small digital devices next year. Employees also make test equipment for HD Radio receiver manufacturers.

Overall, the lab, under the direction of Randall Richter, director of the Test Commercial Applications Group, has morphed from a facility that focused on development of the IBOC system to one that focuses on quality control and the commercial application and testing of the IBOC system, as well as furthering the evolution of HD Radio technology.

The receiver side

The lab personnel in Columbia work closely with the company's software development personnel in Basking Ridge, N.J. The company also has test personnel in New Jersey and Detroit, said Richter.

A big part of the lab tests at the moment concerns certification of HD Radio receivers and receiver modules.

Ibiquity has licensed two test facilities near its receiver manufacturing partners: Toko in Japan and Intertek in Hong Kong. "People that have to take their radios in to be UL- and FCC-certified can

According to the Intertek Web site, every HD Radio it certifies has to fulfill Ibiquity's performance requirements, achieved by a certification process Ibiquity developed.

Briefly, the certification covers sensitivity, blend alignment, acquisition time, bit error rate testing, a functional check and audio quality verification.



Photos by Leslie Stimson

Overall, the lab has morphed from a facility that focused on development of the IBOC system to one that focuses on quality control and the commercial application and testing of the IBOC system, as well as furthering the evolution of HD Radio technology.

also go in there and be HD-certified," said Richter, in a lab tour exclusive to Radio World.

Intertek is especially convenient for the receiver makers based in China; some of them were having trouble getting out of the country to come to the U.S., but they have no trouble getting into Hong Kong, noted Richter and Jeff Detweiler, director of broadcast business development.

In characterizing a receiver, Ibiquity is primarily focusing on the IBOC reception, areas of the receiver that involve its intellectual property. "We focus on strong signal performance, weak signal performance, as well as can it support the various features or modes, or future features," Richter said.

In radios that offer satellite radio as well as HD Radio, does Ibiquity look at

whether the satellite signal interferes with the IBOC signal? Yes, to understand if there's self-interference with the HD Radio, said Richter. "To the extent that that would affect the performance of the radio, yes, we would look at that."

Ibiquity has a reference design that receiver manufacturers can use to help them get a jumpstart into the marketplace, much as the technology developer created for transmission manufacturers years ago. Manufacturers can follow the design exactly or alter it.

Generally, it takes between five to seven business days to verify a typical HD-R receiver, depending on how many features are incorporated into the unit.

Ibiquity also tests antennas, depending on what the manufacturer is going to supply with the unit. If the manufacturer specifies a specific antenna, Ibiquity has tested those; however, if the manufacturer says consumers would use a stock antenna or their choice of antenna, Ibiquity would not look as closely at that, said Richter.

Detweiler said much of the radio testing is done in ferrite cages (also called screen cages) where the receivers are isolated, and given a known signal level. "We know what we're inputting. We know how the receiver behaves."

Semi-anechoic chamber

Then the technology developer might drive the radio, or a reference platform, around in a van to check for multipath or signal overload when Ibiquity has a new software load.

To help with the development of portables, the lab is slated to install a semi-anechoic chamber from ETS-Lindgren; a portion of the floor has been reinforced to support the 12,000- to 14,000-pound chamber. "The screen room will have ferrite tiles inside to absorb RF radiation so Ibiquity can conduct antenna testing, portable development and work on receiver sensitivity," Richter said.

Ibiquity declined to give specific costs except to say it has added more than \$1

See LAB, page 28 ▶

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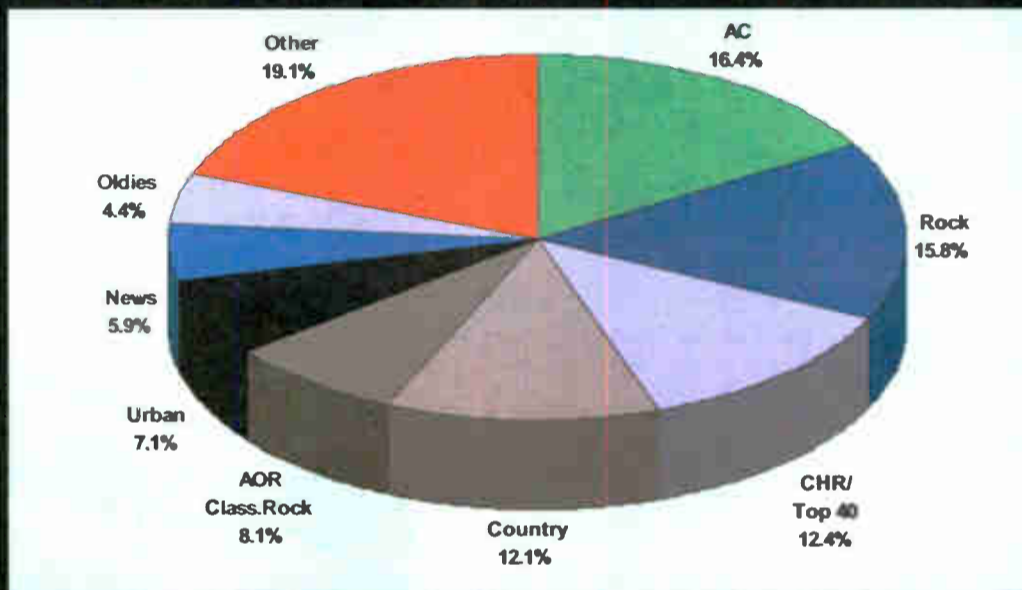
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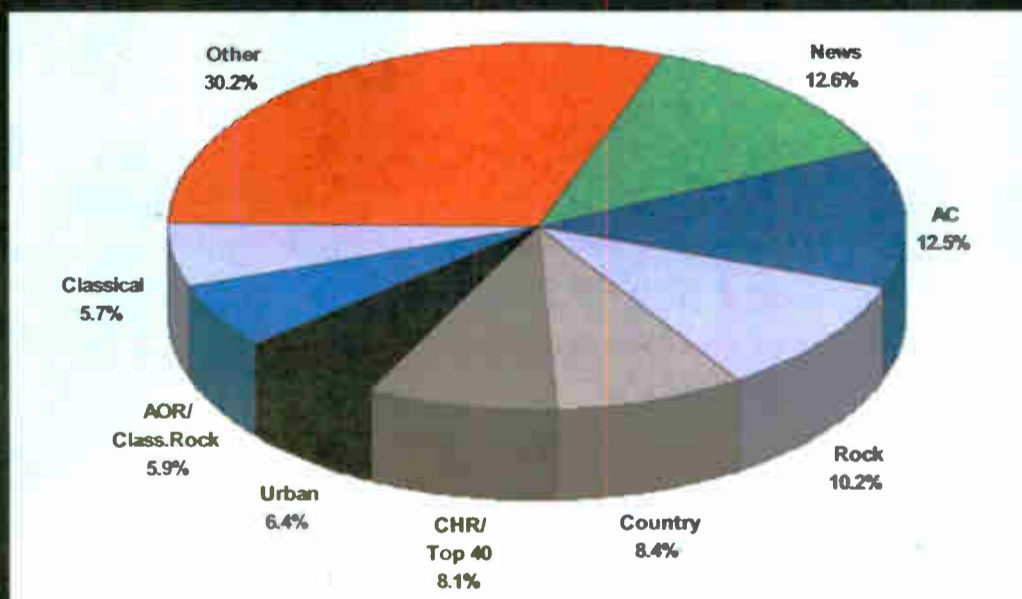
Radio World's HD Radio™ Scoreboard

The HD Radio Scoreboard is compiled by Radio World using information supplied by iBiquity Digital Corp., the HD Digital Radio Alliance, BIA Financial Network and other sources. Data reflect best information as of late August. This page is sponsored by Broadcast Electronics. HD Radio is a trademark of iBiquity Digital Corp.

HD Radio Stations Multicasting By Station Primary Format



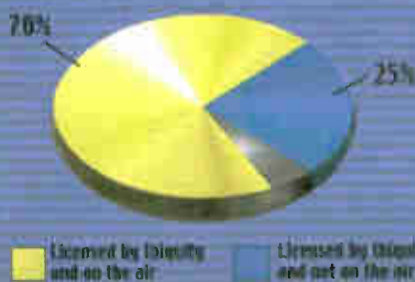
HD Radio Stations on Air By Station Primary Format



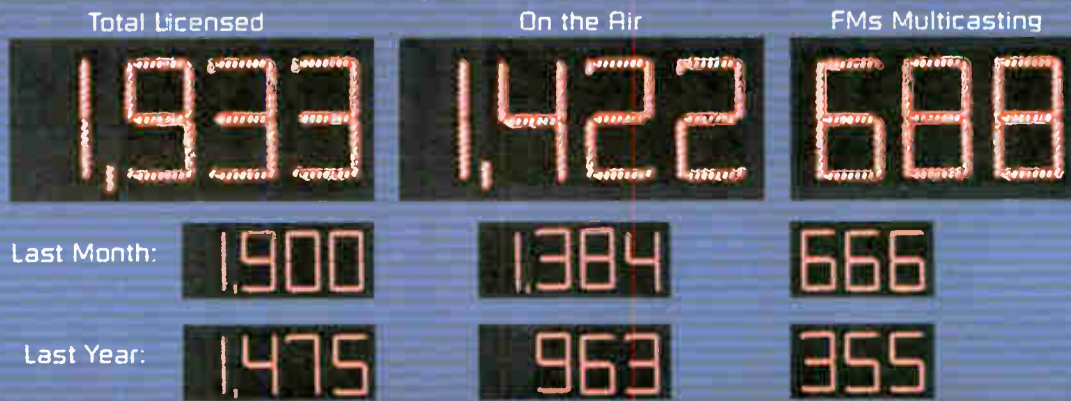
Source: Data shown is from BIA Financial Network's data service MEDIA Access Pro™ and also includes iBiquity information. Visit www.bia.com

HD Radio at Greater Media

Total stations: 20



The HD Radio Bottom Line



You think we have a lot to say? You should hear our clients.

When we asked our clients which Element features they liked best — well, you see the results. And this is the *edited* version. (Good thing we bought two pages.)

Go (con)figure • The folks at MPR say they really love being able to configure their Elements and keep tabs on their entire Axia network using standard Web browsers. You can set up and administer an entire building full of consoles from the comfort of your own office (where there's plenty of Cheetos and Pepsi). Put an Internet gateway in your Axia network and you can even log into Element remotely, from home or anywhere else there's a Net connection. Great for handling those 6 P.M. Sunday "help me!" phone calls from the new weekend jock.

Screen play • Element lets you use any display screen you choose, to suit your space and decor. Get a space-saving 12" LCD, or go for a big 21" monster. (This is Dave Ramsey's favorite Element feature, by the way. Anyone wanna bet he bought his monitors on sale?) Hook up a VGA projector and make a Meter Wall!

Perfect timing • You can't have too much time. That's why Element's control display contains **four different chronometers** to help keep talent in sync: a digital time-of-day readout that you can slave to an NTP (Network Time Protocol) server, an elapsed-time event timer, a countdown timer talent can set for any interval they choose... and there's also that big, honkin' analog clock right in the center of the screen (Big Ben chimes not included). We wanted to make it even bigger, but our screen designers charge us by the pixel.

Where's Waldo? • Hide-and-seek is a pretty fun game. But not when you're in a hurry, and definitely not when you're on the air. So every Element fader comes with a big, **bold 10-character LED display** right above it to show talent, at a glance, exactly what source is assigned to that fader. If it's music from a digital playout system provided by one of our partners, the display can even show the title or artist of the song that's active. Talent tells us that these displays are at the perfect angle for either sit-down or stand-up studios.

Black velvet • What's 100 mm. long, silky smooth, goes up and down all day and **lasts forever**? Our super-quality conductive-plastic faders, of course. (You have a filthy mind, mister. Shame on you.) We sourced the most durable, reliable, premium faders and switches for Element. And we added extra touches, like the custom-molded plastic bezels that protect on/off switches from accidental activation and impact. Because we know how rough jocks can be on equipment — some of us were jocks, not rough. And because we also know there's nothing more embarrassing than a sudden case of *broadcastus interruptus*.

Audio cards • Well, *um*, there actually aren't any. Not in Element, or anywhere else in an Axia network. Why not? Think about this: your production guy spends hours crafting exciting, finely-tuned bits of broadcast magic only to filter them through a cost-killing, in-a-noise-filled-PC. It's like wearing a wedding dress in the Hudson River. Not only that, broadcast audio cards are *expensive*. And they only work in PC's... how many of those are you running now? Get the **Axia IP-Audio Driver** installed on any Windows® PC to send and receive pure digital audio right through the PC's Ethernet port — no sound card required. You get better, cleaner PC audio that's sharable right to the network. And you save tons of cash on sound cards, and on the extra inputs you would have needed for that PC's audio cards — more than enough to buy that nice new network mixer you've been looking after

Options • Clients say they love Element's uncluttered worksurface. We kept it clean by placing an "Options" key over each fader to give instant access to all the advanced goodies. It makes customizing settings easier than selling fudge cake to Dom DeLuise.

Great Phones • We wanted the phones on Element to work like an extension of the board — on themselves. Unfortunately, talent objected to having Ethernet ports implanted in their skulls, so we came up with the next best thing. With Element, jocks never have to take their eyes or hands off the board to use the phones. Element works with any phone system, but it really clicks with the Telos Series 2301, TWOx12, or the new AX-12, which connects blue hybrids plus control with a single Ethernet cable. (Axia's Symbols™) These cool little information consoles tell talent at a glance whether a line is in use, busy, jammed, or locked up, etc. You can even dial the phone right from the board using the integrated keypad.

Who are these guys? • Why buy a console from Axia? Element was designed by Mike Dosch and his team of ex-PR&E renegades (who know a bit about consoles). And Axia is a division of Telos, the DSP experts.



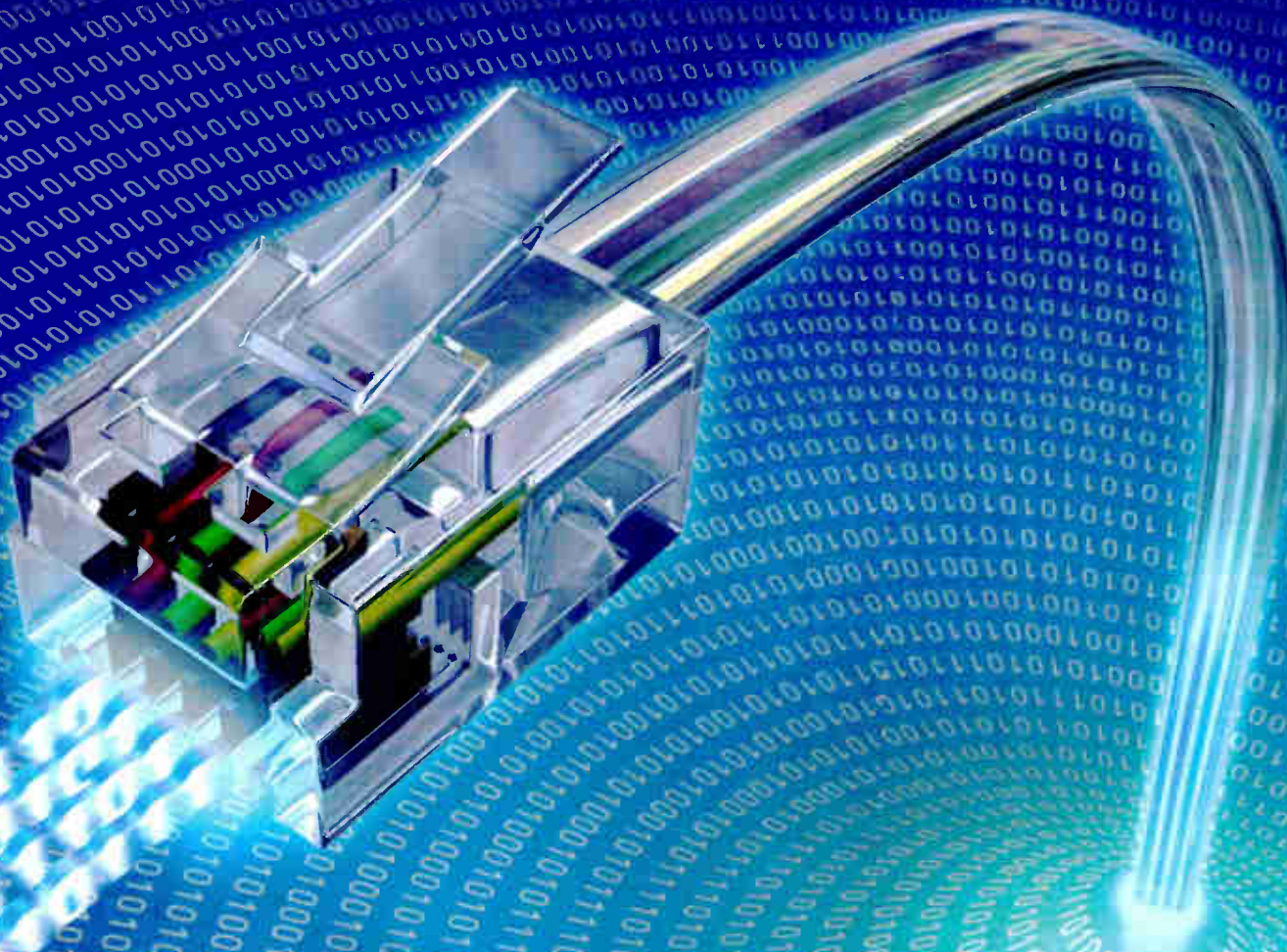
Fried Chicken •

Conductive aluminum bullnose & mounting for a 10.4" LCD. Storage capacitor that can be activated with a GPIO device. Set up a limiter mode toggle for the PC to give the jock a little "positive feedback."

Element

Shown: 20-position Element, nicely equipped, \$16,557.00 US MSRP. Not shown but available: 4-, 8-, 12-, 16-, 24- and 28-position Element. Dual exhaust and whitewalls optional at extra cost.

Real-World Tools & Tips for Broadcasters



A Special Technology Report

IP3: Transport for 21st Century Radio

A Radio World Supplement • September 26, 2007

ONE



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World Radio History

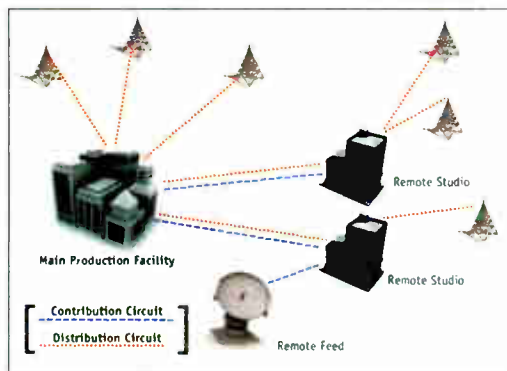
IP Audio Transport Permeates The Radio Environment

The Technology Continues Its March Into Mainstream Broadcast Applications

By James G. Withers

The author is chief technology officer for Koplax Communications in St. Louis.

Not so many years ago, if you needed an audio feed routed into a studio, or worse, across a field to the STL tower out back, you got out the shielded audio cable, a dirty pair of jeans and started pulling wire. Of course, that was only the first step. Ground loops, matching networks, level changes, terminations, bridges ... all added to the general angst of moving audio from place to place in the typical radio station. Even the most meticulous attention paid to "Good Engineering



Simplified depiction of a radio broadcast network.

Practices" was not always enough to prevent audio degradation. This all changed — and still is changing — with the advent and general implementation of IP audio transport.

HELLO IP AUDIO!

IP audio transport is a general term used to describe the ingesting, routing, transportation and delivery of digitally-based audio streams, using the TCP/IP and RTP/IP data transmission standards, over the Internet or packet-switched networks. TCP stands for Transmission Control Protocol, while RTP stands for Real-Time Protocol. IP is the generic Internet Protocol standard and applies to both subsets. IP-based Ethernet networks were created for nonreal-time data transfer to and from computer terminals and peripheral devices. Latency, or the delay exhibited as data packets were created, labeled, forward error corrected, transferred, and finally,

reassembled at the receiving end of a network, was a minor consideration, since it was (and still is) usually measured in milliseconds. However, even a few milliseconds' delay in an audio packet will interrupt an audio playback and cannot be tolerated in a live broadcast environment. Therefore, before TCP/IP could be used to reliably transport live audio, careful consideration had to be paid to packet sizes, so-called "jitter" compensation, buffering calculations and priority assignments.

Initially, TCP/IP, as well as Ethernet speeds, were simply too slow and fragile for the absolute reliability required, but with the advent of RTP/IP (Real-Time Protocol), and as Ethernet bandwidths have gotten greater and data buffering schemes have improved, IP-based audio is gaining favor among broadcasters in all size markets.

As with most new technologies, initial steps into IP-based audio have been baby ones: relegated to the periphery, rather than at the center of a station's operation. Now, though, stations are increasingly using IP audio as the core technology to move audio around the station and beyond: to and from remote studios, transmitter sites and throughout regional origination and distribution centers. Additionally, the point-to-multipoint capabilities of IP systems are making IP-delivered audio a reasonable alternative to dedicated occasional-use satellite feeds in many cases.

Johannes Rietschel CEO of Barix Technology, a Swiss-based IP equipment systems provider says, "IP technology is reliable, in wide use, and for many applications available at a much lower cost basis than traditional systems." As an example, he elaborates, "One of our clients, who operates radio stations in Guam, feeds them from the U.S. using Barix terminal equipment and the standard public IP infrastructure. How else could you possibly do this at a reasonable cost in quasi-real time?"

Ireland-based APT is a company built entirely around the idea of using IP transport as an

continues on page 4



APT Audio Codecs

Designed to deliver optimum audio performance and reliability over IP networks, APT's audio codecs are the professional broadcaster's choice for STLs and studio networking.

Ranging from the entry-level WorldCast Horizon offering Enhanced apt-X coding over IP Links to the richly featured, multi-algorithm WorldCast Eclipse offering IP, X.21/V.35 and ISDN transport options, the WorldCast line offers a wide variety of options to fit the needs of a wide variety of broadcast applications.

For those requiring multiple channels of audio, the WorldNet Oslo Audio Multiplexer offers a flexible, modular solution capable of delivering up to 28 channels over either IP or a T1 line. Features such as DSP-based architecture, automatic backup to synchronous lines, silence detection, alarms and contact closures, embedded auxiliary data and a highly sophisticated GUI ensure that APT codecs are truly professional solutions.

Contact APT at (781) 810-2260 or visit www.aptx.com.

AudioScience AS16585

The AS16585 Livewire sound card from AudioScience brings a new level of flexibility to IP Audio routing systems. It has all the sophisticated features of an AudioScience DSP accelerated sound card combined with the ability to connect directly to a Livewire network to dramatically reduce system costs.

Using a powerful Texas Instruments onboard floating point DSP with Axia Livewire networked audio protocol allows the AS16585 to simultaneously play up to eight stereo streams of audio which can be mixed to eight stereo outputs, and record up to eight audio streams fed from eight stereo inputs, over switched Ethernet. The feature set of the AS16585 extends to MRX multi-rate mixing, MPEG Layer 2 and 3 encoding and decoding, TSX time scaling and SSSX2 multichannel record and playback.

Contact AudioScience at (302) 324-5333 or visit www.audioscience.com.

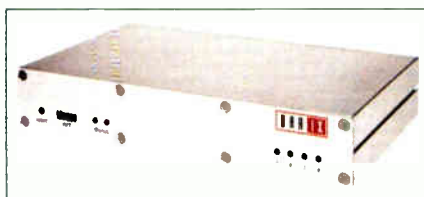
Product information is provided by suppliers



Axia Zephyr iPort

Broadcasters in different locations can now easily and transparently connect and share audio, thanks to the Zephyr iPort MPEG Gateway, a new multichannel IP codec from Telos and Axia. Facilities with Axia IP-Audio networks can use the Zephyr iPort to send and receive eight audio channels plus program data and machine logic over T1 or T3 lines, or other types of QoS network services. Broadcasters without IP Audio networks can use Zephyr iPort too, with the simple addition of an Axia Audio Node.

Contact Axia at (216) 241-7225 or visit www.AxiaAudio.com.



Barix Exstreamer 1000

Barix introduces the Exstreamer 1000, the first Barix device to combine the company's low-cost Instreamer IP encoding and Exstreamer IP decoding technology into a single, one-half 19-inch rack-mountable device.

Barix audio over IP technology is often used in STL, RPU and Internet radio applications. The Exstreamer 1000 adds several professional features to the existing technology, including balanced inputs and outputs, a high quality A/D-D/A signal converter to reduce noise and improve audio quality, eight relay contact closures to trigger local announcements, and a professional AES/EBU interface to capture a digital signal at the source and maintain it throughout the chain.

Contact Barix at (866) 815-0866 or visit www.barix.com.

IP Audio continued from page 3

audio routing technology. Jonny McClintock, commercial director of APT, says the idea has almost universal appeal among broadcasters.

"Every broadcaster, service provider and system integrator we deal with has either put in an IP network for networking between locations for distribution and contribution networks or are considering putting in a network." The reasons, he says, have as much to do with improved processing, as with cost.

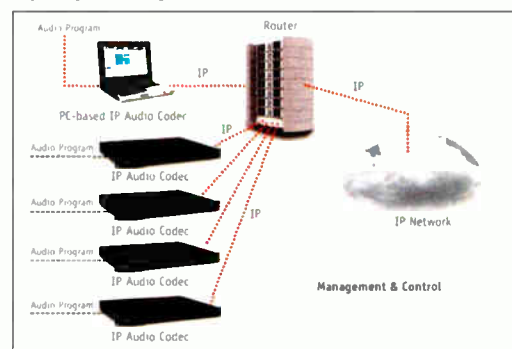
"The first generation of IP codecs was based on a PC architecture using an 'off-the-shelf' OS [operating system]. The hardware was consumer quality. The OS could cause instability and the system simply was not designed for 24/7/365 mission critical applications." He goes on to explain that APT recognized those issues and modified its offerings accordingly. "We use application-specific DSP architecture, based around professional-grade electronics. This supplies the long-term reliability that broadcasters require. The 'PC-in-a-box' was fine to prove a concept, but DSP is a fundamental requirement."

Axia Audio of Cleveland offers a broad suite of IP solutions. Long a player in the IP audio-for-broadcasters field, Axia markets their proprietary "Livewire" transport standard. According to its specifications, Livewire is a total networking system of hardware and software that can take a station from traditional analog audio routing to IP audio in incremental steps, or all at once. Using RTP/IP protocols, Livewire assigns packets priorities to all incoming data; small, high-priority packets for live audio are assigned the "Livestream" designation, while lower priority, larger packets — for offline audio file transfer, for example — are assigned the "Standardstream" designation. Since all Axia routers and source/destination equipment accept and can switch seamlessly between both standards, delays in routing mission-critical, live audio are minimized or even eliminated. Using standard Ethernet network hardware simplifies things even more. IP audio easily coexists with regular Ethernet data, so in many cases, stations can simply tap into their existing Ethernet networks and begin the conversion process immediately.

One company jumping onto the Livewire bandwagon is AudioScience, the sound card/computer interface maker. Stephen Turner, vice president and co-founder, says: "AudioScience has, for many years, been interested in supplying an audio over IP solution to

our automation customers in radio. However, we had been waiting for a standard to emerge. In the radio space at least, that standard now seems to be Livewire. We also had numerous requests from our customers to supply a Livewire solution that was compatible with their automation applications and contained all the functionality that our regular sound cards provide."

And IP is not at all limited to "wired" applications. Chris Crump, director of sales at Comrex, points out: "Major advances in wireless IP technology have significantly changed the options broadcasters have for establishing point-to-point audio links between two or more



Traditional approach to transporting audio over IP networks.

locations. In areas where traditional 'wired line' telco or IP services are not available due to phone company limitations, terrain or budget, services such as satellite, 3G Wireless and unlicensed 5.8 GHz IP products all provide robust connectivity solutions for both remote broadcast as well as STL applications. In fact, we are seeing increasing numbers of broadcasters that are deploying IP-based STL solutions using VSAT satellite technology and 5.8 GHz radios for transmitter sites in relatively inaccessible locations. In some cases, it's the only practical solution for their specific application."

MISSION-CRITICAL RELIABILITY

Rietschel of Barix Technology adds, "The whole world relies on IP in many applications, secure and mission-critical applications included. There is no problem relying on IP audio transfer and control." He says IP systems often have higher reliability and better quality than traditional technologies. But, he cautions, "Don't purchase the cheapest connectivity — service and quality has its price."

When considering making changes or additions to a system as critical as an in-house network, though, most of the vendors and engi-

continues on page 6

the professional broadcaster's choice for IP STLs

WorldCast Eclipse



At last! An IP audio codec that offers a reliable, DSP-based platform and automatic back-up for 24/7 reliability.

APT's WorldCast Eclipse is the ultimate in flexibility and choice offering IP, X.21/V.35 and ISDN interfaces and a selection of popular coding algorithms including Enhanced apt-X, MPEG Layer 2/3, MPEG 4 AAC, G.711 and G.722

All the features you expect from a professional broadcast codec are supplied as standard: analog and AES/EBU I/Os, adjustable silence detection, alarm ports, contact closures, speed dials, embedded auxiliary data and many more...

Configuration and control of the WorldCast Eclipse is straight-forward and simple thanks to APT's powerful and intuitive Codec Management System (CMS). Offering extensive real-time management of multiple codec units, the CMS enables alarm monitoring, logging and performance monitoring as well as configurable user and audio profiles.

To see the full functionality of CMS, download a trial version from www.aptx.com.



Also Available:



WorldCast Horizon
Bidirectional stereo audio codec offering Enhanced apt-X over IP



WorldCast Meridian
Multi-algorithm audio codec with both IP & X.21/V.35 interfaces



WorldNet Oslo
Professional, Modular Audio Multiplexing Platform offering up to 14 stereo channels over T1/ E1 or IP links with Enhanced apt-X or linear audio. Built-in redundancy, automatic back-up and hot-swappable cards ensure round the clock reliability for multi-channel STLs.



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IP Audio continued from page 4

neering managers contacted for this article recommend having a competent IT manager on staff. Phil Owens of Wheatstone Corporation agrees, saying, "We do advise our customers that want to interface our systems to IP networks to use a staff or contracted IT professional. Programming the network switch to partition audio from the regular business network data is not complicated, but if it is not done correctly, the first thing to go will be the audio." He adds, "Stations also need to be careful with priority assignments, so the GM's printer queue doesn't cause the air feed to hiccup!"

Harris/Intraplex is another vendor hoping to satisfy customer demand for IP equipment and systems. Harris first introduced Intraplex NetXpress in late 2005 as a managed platform for the transport of audio over IP. The platform can accommodate multiple services, including audio, data and PBX telephone communications, over a single IP connection. With the company's experience in providing solutions using dedicated T-1/E-1 paths, Bob Band, business development manager, Intraplex Products at Harris, says it was a natural next step to venture into IP-based audio transfer.

"NetXpress is our next-generation IP multiplexer. Stations ingest audio from any in-house or external IP network and NetXpress takes it from there, dynamically controlling packet size and jitter resequencing to ensure interruption-free audio." Jitter, Band said, is the term used to describe packets that arrive so far out of sequence that they cannot be successfully reinserted into the stream in the correct order. The result is lost audio packets; a disaster for live broadcast audio streams.

Harris is now on its second generation of IP-based audio equipment and this year, NetXpress is being expanded to include transmitter surveillance services, in which on-demand security video can be return-fed from a remote transmitter site to a monitoring point. That is exactly the kind of data-carrying flexibility that makes IP transport so attractive to broadcasters, according to Band. "Its ability to transport multiple audio programs in multiple formats — including HD Radio, along with data, and PBX telephone communications — over a single IP connection offers a more cost- and bandwidth-efficient transport network than separate wired T-1 circuits, microwave or fiber T-1/E-1 circuits."

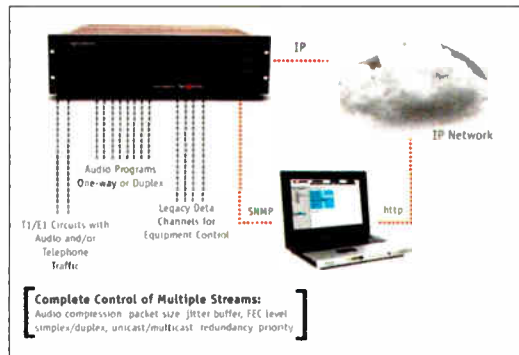
With regard to cautionary notes, Band

refers to a white paper he wrote that was published in Radio World Engineering Extra ("A Packetized Look at Audio Over IP," February 22, 2006) discussing the ins and outs of audio packets and IP audio. Implementing a successful IP audio network, he writes, gets down to a few basic issues: packet size, jitter buffering and resequencing, FEC, or Forward Error Correction, and correct packet labeling for priority assignments. If the system is designed to address those potential pitfalls, it will deliver pristine audio with complete reliability.

SIZE DOES NOT MATTER

Broadcasters large and small have adopted the technology. Sterling Davis, vice president of engineering for Cox Broadcasting, is a big fan.

"We are rolling it out in our stations that need a full makeover, particularly when routers and consoles are being replaced," he says. In addition to the improved quality of IP audio, Davis likes the flexibility of using IP audio as an intra-plant distribution method.



Managed platform approach to transporting audio over IP.

"It's also about the workflow benefits and rewiring ease," he says. "It makes equipment configurations and reconfigurations easy and the audio is available anywhere we might eventually need it. Flexibility really is the key for us." He adds that Cox has begun using Motorola Orthogonal spread-spectrum IP transport STLs, particularly in markets where traditional STL frequencies are congested. "The Orthogonal radios do not require a license, and being IP-based, they are the final link in keeping our audio in digital form all the way through the process, from origination to final transmission."

The benefits of IP extend to smaller markets. Bill Doerner, operations manager at KSIX Radio in Corpus Christi, Texas, says his station uses IP transfer all the time. "We get a lot of production done at the Radio Lounge

in Houston, and everything we get from them comes in as an MP3 to our FTP site." From there, he says, the spots are ingested into the station's automation system, which also lives on the network, and played back to air.

KSIX has other "islands" of IP audio, as well, Doerner explains. "We originate sporting events from all over the state using the IP feature on our Tieline Commander Codecs," he says. "We used to use the POTS connection ... but finally decided to give the IP feature a try, because our long-distance landline charges were getting out of hand." Doerner approves. "Once we changed, we just never went back. They've been rock-solid." As for "gotchas," Doerner says he cannot think of any.

"There is nothing that is different from the way we would set up a remote using a phone coupler or the codecs in POTS mode. We obviously depend on our DSL connection back at the studio, but if a station has a reasonably wide pipe at that end, the remote side is a piece of cake."

For a station considering converting to IP-based audio, the benefits are readily apparent: IP audio transport is easy to implement, maintains absolute audio quality, even over long distances and multiple generations, allows unparalleled routing and control flexibility, and saves money in the process. However, certain cautions must be understood and dealt with. For example, Owens of Wheatstone says, "Mixing AES audio with nonaudio-related data packets on an Ethernet network places special burdens on the network, since unlike regular data, audio streams cannot tolerate

any latency whatsoever." He adds that Wheatstone has taken a slightly different approach to IP audio transport to address those issues. "Although we use an IP-type 100baseT infrastructure, the transport is actually done via nonpacketized TDM audio stream between our router cages. That way, we do not have to use the data headers associated with packetized audio and our interconnections display very low latency."

However, he says, "Wheatstone does offer audio streaming in RTP format over Ethernet. This is mainly being used by engineers looking for an easy way to move audio into and out of their automation server PCs." In that case, he notes, "the only connection needed to the PC is a Cat5 cable running to a switch which in turn is connected to our system. That con-

continues on page 14

You're looking at a complete audio-over-IP routing system.

(Just add Cisco.)

Administer this • The beauty of the Web is that you're getting information anywhere. So anything with Ajax you can set up and administer an entire building full of Axia equipment (audio nodes, consoles, intercoms) from wherever you want, on any office chair. All you need is a standard Web browser (PC or Mac, we like em both). Put an Internet gateway in your Axia network and you can even do it from your home or anywhere there's a decent connection. Flex isn't a term, for a Mochochino.

It's not rude to point

• The Axia Web interface is so intuitive that you can point at things with your mouse and get things done. You can build custom button panels to execute complex operations with just one click. You can pop the console to control modules or elements or to interface with other applications. You can control everything from your computer screen. It's just what you need.



Automation station • Wouldn't it be nice to have a self-monitoring air chain with silence sense that can fix problems when it all status report? Or be able to switch your program feed from Studio A to Studio B with one button? Or build custom set list apps and scripted scenes that are based on people in logic and scheduling events? PathfinderPC software does all these things and more. But unlike PAL 9000, it doesn't talk back to you.

Nothin' but Net • Did you know you can plug a console directly into an IP Audio network to exchange audio? Can you do that with a standard router? Well, you could, but more appropriate to the main frame, buy high end audio cards and run them wiring that with a console just install the IP-Audio Driver on any of our Element Modules. Receive audio at 1 audio node through the Ethernet port. No sound cards required. A field of 100 inputs needed. The simple stream version is just for studio workstations. Multiple streams per line card and up to 16 stereo channels simultaneously. Perfect for digital distribution systems.

Put that in your pipe • How many discrete wires can a CAT-6 cable replace? Well, a T3/E3 data link has 44.7 Mbps of throughput. But Axia networks' Gigabit Ethernet links give 1000 Mbps of throughput between studios—more than 22 times the capacity of a T3—enough for 250 stereo channels per link—the equivalent of a 500-pair bundle on one skinny piece of CAT-6. Use media converters and optical fiber for even higher signal density. Think that might save a little coin in a multi-studio build-out?

Jammin' on the mic • Radio studios and microphones go together like Homer Simpson and donuts. It's for unity. Pre-amps, mic compressors, EQ boxes, de-essers... let's face it, most studios have more flying saucers than Air Force 1. Axia helps clear up the clutter by putting mic pre-amps with our Microphone Nodes. Not bargain basement units either, but studio grade pre-amps with headroom enough to handle Chaka Kahn. Phantom power too, and if you choose to use Axia Element consoles in your studio, you'll find world class mic processing built right in. You'll find mics, compression and de-essing from the audio processing gurus at Omnia plus three-band parametric EQ with SmartEQ available on every mic input. It's just what you need.

Very logical, Captain • Routing logic is what audio used to be as hard as performing the solo in Mud Meld. But Axia makes it simple, converting logic to data and pairing it with audio streams. So logic follows audio throughout the facility on Axia Element Ethernet backbone. Eight assignable GPI/GPO logic ports, each with five opto-isolated inputs/outputs are built into every Element power supply, so you can control on-air lights, monitor matrix, CD players, DAT decks, pre-amp delays, etc. Got more than eight audio devices? Add a GPI/D node like this one whenever you want to gear

Level headed • These green bouncing dots built into every Axia Audio Node are confidence meters. One glance and you know whether an audio source is really active—or just playing possum.



Push to play • Axia Router/Selector/Nodes are really advanced selector and monitor panels that you can put anywhere you need access to audio streams. Like newsrooms, dubbing stations, or even the stations TOC, so you can monitor any of the thousands of audio streams on your network at a moment's notice. The LCD shows signals, through a list of available streams, the high-contrast Access keys let you store and recall the streams you use most. There's even an input for convenient connection of an analog or AES device. Sweet.

AES yes • You like your audio to be digital, as much as possible, right? Well, that's our AES/EBU Audio Nodes. Let you plug AES4 sources right into the network. Studio grade sample rate converters are inside, anything from 32 kHz to 96 kHz will work. Oh, and there are 8 AES ports in each node. Digital distribution amp, anyone?

Heavyweight champion • This Axia StudioEngine works with our Element Modular Console, the most powerful console brand in the world by the way, to direct multiple multichannel inputs and outputs mix audio, apply EQ, fix voice dynamics, and generate multiple mix buses and intercom feeds on the fly. To make sure it delivers the reliability and ultra-low latency broadcast audience demand, we upgraded the StudioEngine with a fast robust event timer, so that the total input to output latency is just a few hundred microseconds. How can one little box do so much? It's a bit like a fast Intel processor in a small building, strong and fast. All would approve.

Brains in the box • The typical radio engineer for studio equipment about the same. The year old cares for a puppy haphazardly, if at all. That's why we took the CPU out of our Element modular console and put it in



Quick Connect • Axia I/O is presented on BNC and adheres to the StudioHub standard. A sample of the standard is here.

here with the power supply and GPI/D ports. That means you can easily reduce chances of being "kicked off the air" by a Coke spilled into the board. Because we know that you have better things to do on an air day night than trying to debug a circuit board in a heat driver.

You got to have friends • Delivery system provider like ENCO, Prophet, BSI, BE, Meditech, DAVE Systems, and more, all have products that work directly with Axia networks. So do hardware makers like AudioSense, Intercom, DataStudio, 255, V-Flo, and Omnia. Check out the whole list at AxiaAudio.com. It's there.



AxiaAudio.com



Comrex ACCESS

Comrex ACCESS Stereo BRIC/IP/POTS codec is a broadcaster's dream, especially for those who have long dreamed of complete flexibility and ultimate mobility for remote broadcasts without having to lug around unwieldy racks of gear or deal with clumsy setups too difficult to configure in the field. ACCESS PORTABLE delivers in a sleek, compact, Lithium Ion battery powered handheld unit capable of sending mono, stereo or dual mono audio over POTS, DSL, cable, Wi-Fi, 3G cellular and satellite.

ACCESS Rackmount is the perfect studio complement with stereo analog and digital inputs and outputs as well as a very easy-to-use Web browser interface for clear and simple control of ACCESS connections and settings. Your remotes will never be the same.

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



Harris Intraplex NetXpress

The Intraplex® NetXpress™ IP multiplexer from Harris Corporation takes IP audio transport to a new level of performance and reliability. As the industry's most advanced platform for professional audio over IP, NetXpress offers system level resiliency, sophisticated network monitoring, excellent bandwidth management and up to 32 simultaneous streams. In addition to real-time audio, NetXpress supports the transport of voice, data and surveillance video, in applications such as Studio-to-Studio, STL/TSL links, remote pickup, program and spot delivery, remote site confidence monitoring and emergency backup of program feeds.

Contact Harris at (513) 459-3400 or visit www.netxpress.harris.com.

Product information is provided by suppliers

How One Cluster Went About It

Profile of a Project: Univision Radio Moves Its Houston Stations Into the IP Future

by Marty Scruggs

The author is chief engineer of Univision Radio in Houston.

Several years ago we began plans to move radio and TV from separate leased facilities and combine them into one company-owned facility. As we researched location and design of the building, we started looking at what our technical plant should be.

With HD Radio coming it was important to implement a platform that would help us move forward and also allow us to grow and expand our capabilities while seamlessly integrating new equipment.

At the time we had six FMs and two AMs. Although most of the formats are music-intensive, we have special requirements in that one is a news/talk and one does live mixing. We also do commercial production and have network shows come to town so an additional requirement was that we needed the ability to reconfigure or move studios quickly.

DREAM

Every engineer hopes that sometime during his career he gets to build his dream facility. I have always been one to adapt to new technology; here was the opportunity to be leading the pack implementing it.

I brought together my engineering team for discussion.

Being able to move signals around without having to rewire was something we wanted so we decided our plant would have a router-based audio system. This would allow us more flexibility; we would also be able to share sources and eliminate DAs.

We had discussions with four vendors and even had them come demonstrate their systems to the engineering and air staffs. We sought to involve the folks who will be working on and maintaining this equipment; if a system overwhelms the staff, the technology is useless.

After careful consideration we decided that Axia would best suit our needs. Although sev-

eral of us were familiar with IP schemes, having worked with computers, putting together an audio network on IP was new territory. But we could see the direction of the industry.

PLANNING

With 10 air studios and 11 production rooms, this would be the largest project I had ever managed; and with a budget of more than \$1 million it was the most expensive. I knew that planning was important, and I was



Home sweet home.

fortunate that Mark Stennett, Univision Radio's vice president of special projects, was able to come in with advice and help. He showed me how to take software programs I already knew and adapt them.

One of his tips helped us figure out how much floor and rack space we were going to need: We set up rack templates in Microsoft Excel.

Using a line and a column in the spreadsheet to represent individual racks, we began with populating the spreadsheet racks with the existing equipment we planned to use. Knowing that heat would cause problems for new computer-based systems, we added additional rack spaces for cooling.

We also looked at areas we wished to upgrade or improve. We were able to fine-tune the estimates we had given to the architects and finalize floor plans via our spreadsheets.

Meanwhile we were making decisions as to equipment.

We had worked with Houston area-based Giesler Broadcasting Supply (GBS) during *continues on page 10*

500
~~250~~ studios already?



Time flies when you're having fun!

Hard to believe, but we passed the ~~250~~⁵⁰⁰ studio mark recently. We're told that it's a major milestone, but we prefer to call it a good start.

In fact, our clients have made Axia the **fastest growing console company** in radio. To you, we say "thanks" for your trust and enthusiasm. And to those of you who aren't yet clients: we're ready when you are.

Okay, back to work now. (Consoles don't build themselves, you know.)



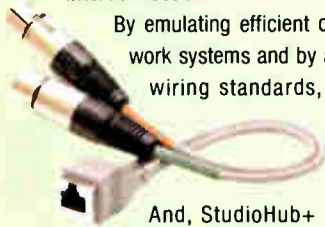
www.AxiaAudio.com

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Radio Systems StudioHub+

The StudioHub+ integrated analog/digital wiring solution From Radio Systems.

It's been eight years since Radio Systems developed StudioHub+ — now the broadcast industry's wiring standard for analog and digital interconnection.



By emulating efficient computer network systems and by adopting Cat5 wiring standards, StudioHub+ makes studios 100% digital ready.

And, StudioHub+ dramatically decreases installation hours required on site by providing plug-and-play connectivity with RJ-45 jacks, premade source cables, adapters and connecting Hubs.

StudioHub+ treats your studio like an IT plant, built to grow and change easily. It's the wiring system build to keep pace with your changing world of broadcast facilities.

Contact Radio Systems at (856) 467-8000 or visit www.studiohub.com.



Telos Zephyr/IP

Introducing the first dedicated Broadcast IP Codec from the company that brought you the Zephyr. IP done right.

Features:

- Complete suite of coding methods including Enhanced Low Delay AAC, the newest offering from Fraunhofer Institute, the inventors of MP3.
- ACTTM – Agile Connection Technology ensures the highest quality connection over the Internet.
- Hole-punching and NAT transversal so you don't have to worry about putting your Zephyr/IP outside your firewall.
- Z/IP Servers that maintain buddy lists and show online status of your peers.
- Wired, WiFi and Wireless connectivity to maximize flexibility during remotes.
- Built-in Livewire connectivity to quickly get on your Axia IP Audio network.

Contact Telos at (216) 214-4103 or visit www.telos-systems.com.

Product information is provided by suppliers

Univision continued from page 8

upgrades and changes to our STL systems, and we decided to use them to help us build new transmission paths. Dan and Tim Giesler provided new Harris Intraplex STL HD systems that were needed to facilitate the transition. GBS had them configured so that all we needed to do was to plug them into the T-1s, power and connect them to the other pieces of equipment.

We also had GBS provide us new STL dishes and coax to reestablish our shots. We wanted to upgrade our STLs to extend the IP network of the Axia system but we were not able to satisfy ourselves that the technology was robust enough to work in Houston's radio wave-saturated atmosphere. We also had budget restraints to consider.

We were, however, able to upgrade several STL systems to the Moseley SL9003Q. We took advantage of the fact that we could send two stereo signals across the new STLs, which allowed redundancy as we feed multiple signals to most of our transmitter sites.

For our Axia system we used Broadcasters General Store. Gary Tibbot, working with

budget turned into a major challenge. We were not willing to settle for lower quality or sacrifice programming requirements just to get a better price. That is where SCMS shone.



The studio buildout crew confer: AD Rigmaiden, Fred Morton, Sandy Johnson, Bill Hartman, Jim Hibbard and Orlando Valdivia.

They also arranged demos for unfamiliar equipment.

CAPACITY

We wanted the ability to move a station to a different studio without major reconfigurations; and this was one of the major reasons we chose Axia.

We had seven on-air studios at the old facility. We decided we needed more to accommodate the network and talk shows we originat-

Every engineer hopes that sometime during his career he gets to build his dream facility. I could not pass this one up.

Kirk Harnack of Axia, helped us put together the pieces; they made sure we had the right number of analog and digital nodes.



Morton at work.

The rest of the studio equipment was acquired through SCMS, where we worked with Tyler Callis and Mary Schnelle. Getting the equipment at a price that would fit into our

ed, and decided to build 10 on-air studios. This would also give us the ability to move a station from one studio to another in case of a major failure or problem. This has ensured almost no down time due to power supply or console failure. And yes, we have had some of each, but the Axia support crew was there to help by phone and in person.

Another challenge was having enough production time during business hours. We built nine full-fledged production rooms and made the production manager's offices functional too. This effectively gave us a total of 11 production rooms, one of which doubles as a mix studio for our hip-hop station.

MIXING IT UP

Because of the size of our installation, it soon became apparent that we needed to keep

continues on page 12



Impossible Remote? Nah, You've Got ACCESS.

Meet Another Real-World Super Hero...

Broadcasting a live Phoenix radio program from out to sea would be challenging for even the most seasoned veterans. Not for Attorney and Certified Financial Planner® (and world traveler) Keith DeGreen. Keith is shown here using the Comrex ACCESS Portable as he and his ship, The Global Adventure, approach Koror Harbor In The Republic of Palau—450 miles east of the Philippines and 7,200 miles from Phoenix!

ACCESS delivers mono or stereo over DSL, Cable, Wi-Fi, 3G cellular, satellite, POTS (yep, ACCESS is a full featured POTS codec and works seamlessly with Matrix, Vector and Bluebox)—plus some services you may not have even heard of. Given the challenges of the public Internet, it's no small boast to say that ACCESS will perform in real time over most available IP connections.

Contact Comrex today and find out how ACCESS can make you become a Real-World Super Hero—wherever you are!

Keith has been broadcasting his radio program, a unique mix of personal finance, economics, politics, and real-life "extreme broadcasting" adventure for 17 years. Listen live 8-11 AM Sunday mornings AZ time on NewsTalk 550, KFYI, or catch Keith's archived shows, and enjoy the amazing videos, photos and blogs at his open-ended round-the-world journey at his website, www.theglobaladventure.com.



Keith DeGreen says:
"Whether 'm a thousand miles out to sea, visiting unusual ports of call or exploring remote inland places, my Comrex ACCESS Portable empowers me to project a broadcast-quality signal back home at anytime from virtually anywhere."



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Univision continued from page 10

the Axia audio network separate from the building's other data networks. We would also need a separate network for the Telos Series 2101 phone system, and we would need to connect the two with a virtual local area network (VLAN).

This had to be done through a VLAN because we had to limit IP traffic to certain ports to keep the Axia system (which multicasts the IP information) from overloading the 2101 network.

This involved deciding upon an IP scheme, setting up routers and various VLANs, or virtual local area networks. We relied upon Mark's expertise here. We pulled up information on the Internet about setting up a network and how to allocate addresses and set up subnets. At times I felt like I was way over my head. Fortunately one of my engineers, AD Rigmaiden, was more familiar with IP networks and able to grasp the concept fairly easily. We also found a Web site that was useful in setting up our networks, [between rooms and route the correct audio down the line. Everything is programmed via a built-in Web page within each node, mix engine, control surface and IP switch or router.](http://www.sub-</p>
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A mix engine is a single-purpose computer that runs proprietary software allowing you to mix different sources of audio that come to it over a Cat5 cable in an IP stream. Sounds complicated? If I had to build it, I am sure it would be; but Axia makes it easy: all you have to do is plug in a few cables connecting it to the network and power, and give it an IP address.

TEAM

You might have noticed that I mentioned Cat5. I am not using that to run audio over in the traditional sense. Since everything on the Axia system uses IP packets, you can connect everything using Cat5 and Cat6 cables. This makes wiring much easier. By using Radio Systems StudioHub adapters we were able to build the systems using readily-available

We developed our own separate network to handle the Axia. This involved deciding upon an IP scheme, setting up routers and various VLANs, or virtual local area networks.

netmask.info.

Once the network configurations were determined, setup of the Axia system went quickly. Every connection to the Axia system is made using a "node." There are several versions of these nodes: analog, AES, microphone preamplifier or GPIO.

The standard analog or AES nodes come with eight inputs and eight outputs. This allows you to connect audio sources and destinations in one location that can be shared across the network. There are also router nodes that have one analog and one AES input and output. These have eight user-programmable buttons that can be changed easily according to your needs.

The router nodes display a menu of everything available on the network; you can scroll through and select the source you want to feed to the device connected to the output of the node. We use these in production and for our audio codecs. This lets us share codecs

store-bought cable, plugging it into the adapters and right into the node. Most connections to the audio nodes are made using a standard RJ-45 connector.

This does not mean we did not have to run



Jim Hibbard in Studio

any regular audio cables; but it sure cut down the amount.

For example, the audio from our BE AudioVault comes out of the servers. We purchased a StudioHub breakout box that allowed us to use a short prebuilt Cat5 jumper to go from the breakout box into the



Racks With Layout Sheet

hub. No punch blocks, no soldering and no terminal strips.

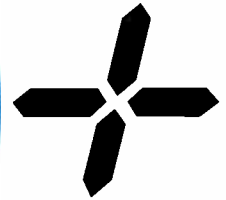
While this seems almost like connecting a home stereo system, believe me it is not. Due to the size of our plant, it took quite a bit of time to plan and configure everything. I spent many hours using Visio to create drawings showing how everything was going to connect together. I also developed spreadsheets assigning IP addresses, sources and destinations to each node.

I found it necessary to bring on Fred Morton, a local contract engineer, to make sure we had the equipment available and ready for installation as needed. Because so much of my time was needed to keep the overall project on schedule, the decision was made to bring in several specialists. Another call was to Mike Schweizer, a phone contractor. Due to the large number of T-1s, ISDNs and the PRIs required for the Telos 2101, we needed someone who could dedicate his time to making sure the installation of the phone services would be correct.

To oversee the day-to-day buildout, we brought in Jim Hibbard, a contractor who specializes in studio construction. Working with me to make sure that the look and feel of the project was what I had envisioned, Jim headed up the studio team.

This included in-house AudioVault expert AD Rigmaiden; studio guru Orlando Valdivia; Assistant Chief Engineer Bill Hartman; staff technician Thomas McDaniel; Sandy Johnson, a contract engineer; and Don Hackler, another contract engineer who works closely with Univision Radio. Rigmaiden and

continues on page 14



Brilliant!

Hi, I'm Rick Adams. I'm British, a StudioHub+ user, famous radio show host and (apparently) the new StudioHub+ spokesperson. But enough about me*.

StudioHub+ is now 8 years old and firmly entrenched as THE broadcast wiring standard (ok, there really is no other broadcast wiring standard – so we decided to call ours the standard first). Anyway, it's the only CAT-5 plug-and-play solution for broadcast and it works really well.

StudioHub+ is brilliant because it saves time and money with pre-made cabling and adapters for every type of broadcast gear. There are MatchJack pre-amplifiers, multi-pair tie-lines, headphone amps and talent panels – all fitted with RJ-45's to just plug together and work. I don't know why noone ever thought of this before.

Nothing is more digital ready than CAT-5. So plan for the future with Studio-Hub+ wiring and then take the weekend off. You deserve it.

* Though you will be seeing lots more of me in the coming months in trade publications and on the new and improved StudioHub+ web site at www.studiohub.com



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Univision continued from page 12

Valdivia are assistant engineers. These folks made my vision of a broadcast facility come to life.

Jim brought new ideas. He was able to take what I had in mind and expand it to create something more. He showed us ways to do things we had never thought about and things we could do that would make our lives easier. He was also a fanatic for quality control. I wanted a showplace and under Jim's guidance that is what we got.

LESSONS

Overall, building our new facility went pretty smoothly. We encountered unexpected problems but were able to overcome them and continue on due to the ingenuity of the folks involved.

Here are lessons I learned:

- Plan, plan and plan some more. This helped us find and solve problems before the buildout began and gave us the opportunity to develop backup plans in case something went wrong, as it occasionally did.
- Draw layouts and diagrams for everything, and post them. This proved invaluable and kept me from having to answer the same question repeatedly.
- Make sure you bring in the right people to help in critical areas where you or the staff may not have time or expertise — especially important if you are an early adopter of new technologies as we were.

- Find good vendors. You do not want to deal with just sales people. You want to deal with folks who can listen to your situation and help find solutions that fit. Do not hesitate to ask for a demo and for time for all involved



AD Rigmalden mounts BE AudioVault servers.

to evaluate their product. This is especially true when you are building a plant with new technology such as IP for audio.

- Delegate responsibilities. On a project of this size it is impossible to do everything yourself. Give others the opportunity to shine. Tell them the desired result and let them figure out what needs to be done.
- Keep communication between everyone

flowing. You need to know that others are achieving the results you need. This also ensures that everyone knows what areas need additional help and gives all the opportunity to share ideas for solving problems.

IP is the way of the future. Many stations are streaming and some are using private streaming as a multi-location distribution system over the Internet. As technology and the reliability of new equipment advance, we will be using IP as a replacement for Marti RPU systems, ISDN remotes and even plain old telephone call-ins. The cost, reliability and quality of these methods are going to surpass the way we have done things for years.

Today, more pieces of equipment come with some type of TCP/IP connection than ever. Being able to control a station from somewhere else in the world is now a reality. With a laptop, Internet access and a VPN (virtual private network) connection, we can do many things that once required a visit to the station. Changing audio sources, controlling audio codecs, reconfiguring console layouts are just a mouse click away.

IP is moving in fast; there are few stations, if any, not touched by it. If we want to survive we not only need to embrace the new technology, we must chase it. Waiting could leave us standing out in the cold.

Marty Scruggs has worked as a chief in both radio and TV and has been in broadcasting for more than 27 years. ■

IP Audio continued from page 6

figuration delivers up to 32 RTP streams [16 in/16 out]."

Cat5 cable is the pipeline of preference at Radio Systems. Dan Braverman, president, says their customers are intrigued by IP audio because of its efficiency and flexibility. "IP audio delivery is very attractive to stations already invested in business data systems — which is basically all of them," he says. "It's extremely efficient in terms of equipment costs, and the learning curve is very quick." Braverman really doesn't see a downside, saying, "A station can take one wire — a Cat5 cable — route it through a system like our StudioHub and mix and match analog, digital and IP over the same infrastructure."

Alan Maltagliati, IT manager at Koplars Communications in St. Louis has installed networks at both radio and TV stations across the Midwest. He says station managers need to be aware of a few fundamentals about

computer networks in general. "First," he says, "an assessment should be made about the amount of traffic the network will be handling. A live-to-air stereo audio feed is 192 kilobits/second, which cannot be interrupted, so a traffic analysis is a 'must.'" Maltagliati adds, though, that bottlenecks are quickly becoming "yesterday's" problem. "Gigabit Ethernet is rapidly becoming the new standard, and the telcos are rolling out MPLS (Multi-Protocol Label Switching), which allows IP networks to accept and sort any format data packet more efficiently, so network bottlenecks will just go away."

IP-based audio is not yet universal and implementing it properly does require knowledge of a whole new set of "Good Engineering Practices," but there is no question it has become another tool in the station engineer's kit for solving complex audio issues in an elegant and cost-effective manner. ■

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« Soundcards? How quiet! Our IP Audio drives for Windows suck audio right out of computers like proverbial vacuum cleaner tubes. Mmmm...ahhh.

Meter reader • LED program meters? How very 1990's. Element's SVGA display has lots of room for timers, meters, annunciators (*there's a five dollar word*) and more—enough to show meters for all four main buses at once. Reboot the console to 5.1 surround mode and the light show is even cooler. Any more bling and those fast 'n' furious types'll want it for their dashboards.

Status Symbols • There are those icons again. (We're in love with icons. It's the Telos way.) These Status Symbols alert talent to phone lines ringing, mix minus/minusing, talkback channels talking, etc. They can even display fader numbers, like you see here. Just one more way Element makes it easy for talent to do a fast, clean show.

How many? • How many engineers does it take to change these light bulbs? None... they're LEDs.

Swap meet • Element modules are easy to hot-swap. Remove two screws and a cable or two and they're out. In fact, you can hot-swap the **entire console**—implug it and the audio keeps going, because mixing is done in an external Studio Engine.

Can I play with your knobs? • Twist 'em, push 'em, make 'em click. Element comes standard with some pretty powerful production features, like per-fader EQ, voice processing and aux sends and returns. Context-sensitive 58fsKnobs let production gurus easily tweak these settings, while simultaneously satisfying their tactile fixations. (Don't worry: for on-air use, you can turn off access to all that EQ stuff.)

Memory enhancer • We know how forgetful jocks can be, so Element remembers their favorite settings for them. Element's Show Profiles are like a "snapshot" that saves sources, voice processing settings, monitor assignments and more for instant recall. Have talent set up the board the way they like it, then capture their preferences with a single click for later use. (Yes, make them do some work for a change.)

Stage hook •

This button activates the emergency ejector seat, (k, not really). It's the Record Mode key; when you press it, Element is instantly ready to record off air phone-ins, interviews with guest callers, or remote talent drop-ins. One button press starts your record device, configures an off-air mix-minus and sends a split feed (hot on one side, guest on the other) to the recording. (Like nearly everything about Element, Record Mode is completely configurable—its behavior can even be customized for individual jocks. Sweetest.)

Coffee? •

No console is spill-proof, but Element is easy to service and has no motherboard damage in the event of stupidity.

It's already in there •

Element comes standard with a lot of cool goodies you'd pay extra for with other consoles. Like custom voice processing by Omnia™ that lets you quickly build and capture compression, noise-gating and de-essing combinations for **each and every jock** that'll automatically apply when they recall their personal Show Profiles. (There's even a secret "Big Ball" setting that makes woody intakes sound like Jethro Teller. A Mod. of Choice to the FM jocks who high 5.)

Talk to me •

Need some one-on-one time with your talent? Talk to audio guests, remote talent, phone callers—talk back to anyone just by pushing a button.

Mixmaster •

Does the thought of conducting a complicated mix minus on-the-fly bring a big grin to your face? If so, you're biased. (Misochism 101 is dumb, the hell.) But if you have to mix mix-minuses manually as much as we do, you'll love the fact that Element does them for you. No more using all your buses for a hot-caller, no more scrambling to set up clean feeds for last-minute interviews. When you put a hot-call code or a phone call on-the-air, Element automatically figures out who should hear what and gives it to you—as many custom mix-minuses as you have faders.

Push my buttons •

You can program these custom button panels with any macro you want: from recorder start/stop to one-touch activation of complex routing switches and scene changes using Pathfinder™ software. You can probably even program one to start the coffee machine (think, no logic, think you).



www.AxiaAudio.com

HD2 Stations: What's in Your Radio?

by Ken R. Deutsch

Early AM and FM programmers had to make up the rules as they went along. The same phenomenon can be observed in the new world of HD2 today.

Even though the potential pool of listeners is miniscule by terrestrial standards, owners are forging ahead with niche formats and channels for kids, gays and lesbians and specific ethnic audiences. There is a NASCAR channel, and there are music channels for women. We can hear mild talk, wild talk and, yes, Beasley Broadcasting even has "The Beach," a channel for those of us whose favorite scents are suntan oil and coconut.

But what is the goal of an HD2 channel? "To offer something that is not on the regular dial," said Larry Rosin, co-founder and president of Edison Media Research. "Another goal should be to create enough interest to check out its stream on the Web and potentially, to get someone to buy a radio. However, most stations have no mention of their associated HD2 offerings on their sites."

Some program consultants who are critical of how HD2s are being promoted argue that while many stations have created separate Web sites for their multicast channels, talent is not talking up those channels on the air often enough, leaving listeners mystified about the "new" programming on those stations, and therefore, less willing to buy an HD Radio. See related story, page 3.

Of the nexus between HD-R and the Internet, Paragon Media Strategies SVP Bob Harper said, "You must find people who can provide great programming if HD Radio is to survive and get enough of a head start before everything is on the Web. That whistle and light up ahead rushing towards you is the Internet. The biggest question of all is 'Will HD still be irrelevant when all programming runs full-speed to the Web?'"

Mark Ramsey, president, Mercury Radio Research said the primary goal should be to leverage the audience of terrestrial stations and expand on their ability to deliver content to listeners, and then deliver those listeners to advertisers.

"What are we trying to do with these things?" he asked. "Do we want to just build a well-executed niche format? Do we want to create stations that will also work on the Web? Do we want to turn over HD2 channels to our advertisers? What is the priority of HD Radio today under the aegis of an industry organization, supported by an outside engineering company that has its own agenda? What matters to Ibiquity and the HD Digital Radio Alliance is one thing. What matters to our audience may be something else entirely."

Paragon's Harper thinks that one goal

don't we put on Ben & Jerry's Radio?" he asked. "In some ways this seems logical. Triple A has always been a format that sits right on the cut-line of format options for FM in many cities. But it has also had a very tough time cracking into the general consciousness in many markets. So instead of putting a Triple A station on HD, why don't we put on Ben & Jerry's Radio?"

Rosin said that this national chain could promote HD Radio in its stores, and that a well-known brand is something an audience could readily understand.

channel is associated with WRIF(FM), a Greater Media station in Detroit.

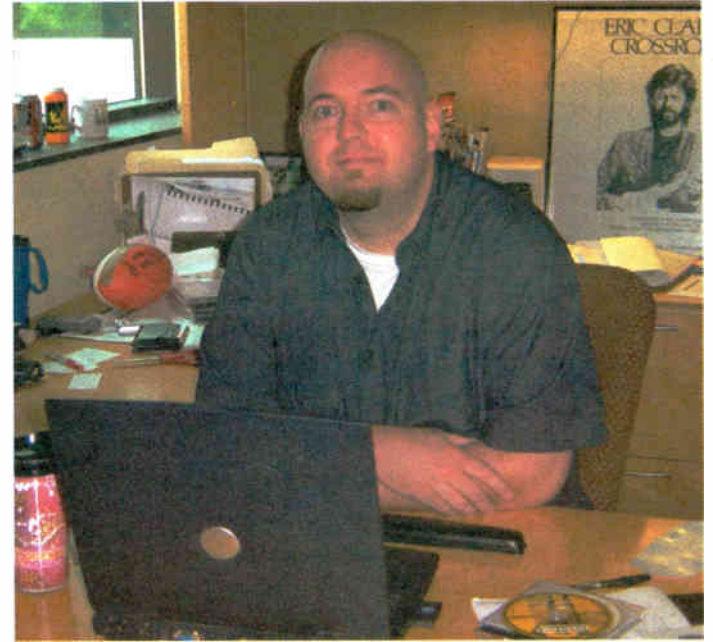
Riffin' on RIFF2

RIFF2 Program Director Mark Pennington doesn't see his channel as a music format, even though music takes up much of the airtime.

"We program for the whole male 18-24 lifestyle," he said. "I did a lot of talking to people to see how they live and what they do. If we're just playing music, we'll never get anywhere. Kids can get stations online and hear music on their iPods. But if we want them to embrace RIFF2 we have to talk to them on a level they understand and are comfortable with."



Ira Wolf



Mark Pennington

of HD2 programming should be to have a logical relevance to the main AM or FM station.

"Do you think that Animal Channel would have cuddly cubs and ferocious ferrets on cable Channel 39, but opt for 24-hour weather on the Animal Planet HD Channel 803?"

In a 2006 blog entry entitled "A Positive Plan for HD Radio: A Branded Audio Entertainment Strategy," Rosin made the case for turning HD2 channels over to selected advertisers.

"So instead of putting an adult album alternative (Triple A) station on HD, why

Mark Ramsey disagreed. "The flaw in that plan is that an advertiser-branded channel won't save HD Radio and it won't dazzle an audience. If I'm Nike, I can create my own channel with my own distribution and I can do it tomorrow."

Rosin is disappointed in those HD2 channels that are just "streams between the stations."

"Virtually none of them rise to the level of 'Oh, wow I have to go out and get a radio to hear that!'"

Having said that, Rosin went on to single out RIFF2 as an example of "a real station that happens to be on HD2." This

Pennington cited one small example of the language RIFF2 talent use on-air.

"When a new CD comes out, we don't say, 'It's in the stores,' we say, 'It's available for download.' We want to connect with the audience in their world of text messaging, MySpace, video games and concerts. A lot of alternative stations use a model that is 25 years old and doesn't apply to today's audience."

RIFF2 came about two years ago when WRIF General Manager Tom Bender approached Pennington with three guidelines for the new channel:

See HD2, page 27 ►

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World Radio History

HD2

► Continued from page 26

break the rules, target young guys and play 25-percent local music.

"We took a look at how our demo listened to music and discovered the format could be loosened up. We play indie music, hip-hop, punk and metal. We use voice-tracking, but keep it very current. I voice-track throughout the afternoon and if something is happening, I go in and change it."

In keeping with Alliance guidelines, RIFF2 is commercial-free.

"Greater Media is committed to HD Radio and is taking a short-term loss for the long-term gain," he said. "I work with [consultant] Fred Jacobs and we are both excited about re-inventing radio without the pressure of revenue or ratings. Our goal is to create a radio station, have fun and don't worry about it."

Regarding programming an HD2 station for teens, Rosin said: "Your target market will be 40 years old by the time everyone has HD2 radios."

The multicast station for WPOW(FM) Miami has a different way of programming "Dash-2."

"We do not use live talent, however that's done intentionally as we feel it enhances the station's overall sound," said Ira Wolf, program director of Beasley Broadcast Group station. "Dash-2 is a dance channel and the goal is to offer a product that entices dance music fans to escape from the stresses of everyday life and lose themselves in the music. To our listeners, Dash-2 is an adventure in music, not just a radio station."

Also beaming from Miami is another unusual multicast format from Beasley, "Gretchen," which claims to be the first country radio station inspired by, named after and voiced by a country star, Gretchen Wilson.

Beasley offers the above-mentioned "The Beach" format as an HD2 in Fort Myers, Fla.; the channel plays classic reggae, tropical sounds and beach music.

According to the HD Digital Radio Alliance, there were about 700 HD2 stations on the dial as of late August.

"Many of the formats are unique," said Alliance President/CEO Peter Ferrara. "WTOP's HD2 channel in Washington is playing global unsigned bands. Denver's KBCO has 'The Studio C Channel' which plays all live music. WKQX, Chicago offers Q2, a young punk/next generation alternative."

In five years, Wolf said he expects to see HD Radios included as original equipment in American and foreign autos, which he says will force the entire country to catch up to the technology.

"After listeners hear what's going on in between their favorite radio stations, they are going to love it and wonder why they hadn't discovered it until then," he said. "I also see a resurgence and excitement with new niche formats in 'free' radio that I believe have been missing over the past few years."

A caveat from Bob Harper: "Don't let the HD Digital Radio Alliance or any other group dictate to you what should be on your HD channels," he cautioned. "Your HD2 should line up with your main channel when possible and your HD2 programming should be something the listener cannot hear anywhere else in town."

The site www.hdradio.com has the Alliance list of HD2 channels. ●

◆ NEWS WATCH ◆

SOUNDEXCHANGE reached agreement with several of the largest Webcasters on its proposed cap on the minimum fee charged against royalties for sound recordings played on Internet Radio. The Digital Media Association, DiMA, called it a good first step. Recently enacted regulations by the Copyright Royalty Board require each Webcasting service to pay a \$500 minimum fee "per station or channel" regardless of the overall number of stations/channels they are streaming.

The agreement addresses the concerns of certain Webcasters about their liability for per channel minimums by


calling for a cap of \$50,000 per service on the \$500 per station advance against royalties, according to SoundExchange.

DiMA and SoundExchange said the agreement calls for census reporting (i.e., reporting all tracks played by a service as opposed to a sampling) and cooperation on discussion and assessment of anti-stream-ripping technologies.

HARRIS is expanding its presence in Brazil. It said it has a growing customer base in the South American broadcast product, systems and services market. In September it will move its Alphaville office to a larger facility in the Brooklin

neighborhood of São Paulo. The expanded office will serve as regional headquarters for Harris Broadcast Communications' Caribbean and Latin America operations.

Also in Brazil, **DIELECTRIC** hopes to expand its business through a new deal. It will work with Trans-Tel, a manufacturer of RF products that designs and installs systems. Dielectric will provide RF antennas and components that complement Trans-Tel's line; the latter will provide engineering support and service in its market while acting as Dielectric's certified technical consultant in the country.

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Lab

► Continued from page 22 million in test equipment for the lab over the past two years. Some 10 to 12 technical personnel have been added in the past nine months, bringing the company total staff to about 120, according to a spokeswoman.

The lab also has a thermal chamber, used to heat up or cool down automotive receivers from -30 to +50 degrees Celsius (-22 to +122 degrees Fahrenheit).

Ibiquity is up to "v17, p5" for the "352" receiver chipset platform, meaning there are five versions of version number 17 (though only one will be released).

The new set of receiver chips planned for next year will be low-cost and low-power for use in HD Radio portables and other digital devices. Smaller devices mean smaller, more efficient antennas, which is another project Ibiquity is working on.

While Ibiquity currently builds a lot of test equipment for its receiver manufacturing partners, begun in the early 2000s to help jumpstart the market, it hopes to back out of that and return to its core business plan of a licensing model. Ibiquity has licensed two test equipment manufacturers, MindReady and NoiseCom, and expects both to release gear shortly, said Richter. One additional test equipment



Ibiquity's new lobby features some of its technology patents on the wall.

company Ibiquity is working with may be announced in the next couple of months, he said.

The transmission end

Lab personnel test the transmission end of the system as well, certifying excitors, and to some extent, the performance of the importer.

Detweiler showed what he characterized as "our core": all the excitors and importers from various manufacturers, plus Ibiquity's own designs, in the lab. Personnel can bring up each system on a PC via an IP connection and run 24/7 tests on the software loads for stability and durability, he said.

"What we are testing is the stability of

the software on the excitor, making sure it's bug-free. If we identify bugs, then we release patches to fix those features," said Detweiler. "This allows us to beat up the software a little bit. We run specific scripts to make it change modes and do things a station wouldn't normally do in operation. And we find the breaking points."

In end-to-end testing, lab personnel run the technology through STL systems, audio processors, automation systems and, now, conditional access systems.

"We're looking to see if anything we introduce as a new feature set breaks any of the old radios or any of

mal business traffic of computers, said Detweiler. With HD Radio, a station is sending a lot of real-time information. "You can't lose information in the network, because when you lose information, you lose audio."

Ibiquity learned a lot about IP networks, and eventually was able to guide broadcasters on how their IP networks should perform. A 100-page document on the Ibiquity Web site (www.ibiquity.com) has details.

Asked whether the networking issue could also be related to engineer complaints of "bursty" data and packet loss, Detweiler said packet loss is usually caused when a delay in the IP network audio distribution system causes information to be held off too long, a buffering issue.

What about the perennial complaint from some engineers that receiver manufacturers do not invest in the AM portion



Technician Rick Cardwell

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Radios are isolated in this screen box for testing.

the new radios," said Detweiler. "We're looking to ensure there's performance integrity to make sure that something isn't introducing artifacts."

Ibiquity characterizes system performance in a known environment in the lab, and then verifies it in the real world. If the company finds an anomaly, personnel return to the lab and test for that specific situation, fix it and then deploy patches as necessary, he said.

What about AM?

When asked what the group is typically finding in these tests, Detweiler and Richter said early on in the deployment, broadcasters' networks weren't as robust as they needed to be, and some with automation systems were not working optimally.

IBOC takes a much higher level of network performance than just the nor-

of the receiver front end, causing degradation to that portion of the radio?

Detweiler said the issue is more complex due to more environmental interferors that can harm reception quality for AM coupled with a complex transmission system. For example, if a station's antenna system knocks down one of the IBOC sidebands, it's going to be more difficult to receive that signal in high interference. The fix would usually be optimization of the AM antenna system.

The newest portion of Ibiquity's transmission tests involves the NDS conditional access system.

Ibiquity has automation systems feeding excitors with the NDS encrypted signal. Each encrypted channel needs an Initiator and a Protector. The signal is scrambled in the importer, and the conditional access protection keys are generated in the Protector.

A computer is running simulations every five minutes, authorizing and de-authorizing channels — more than what consumers or stations might do with the system — to stress it and find failures.

Richter said there have been a number of software revisions for conditional access and the system is now "very stable."

Radio World's HD Radio Scoreboard is published in alternating issues. Selected data is from BIA/fn's MEDIA Access Pro™; the scoreboard also uses information supplied by sources including:

- iBiquity Digital Corp., the HD Digital Radio Alliance and RW's own research.

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AES Stays on the Broadcast Track in New York City



Javits Convention Center

by Ken R. Deutsch

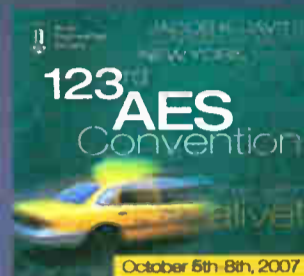
More than 20,000 people will converge upon the Javits Center in New York on Oct. 5 for the 123rd AES Convention. Attendees will speak to each other in their own parlance, debating the finer points of the Fletcher-Munson curve, the Zen of

metadata, the best methods of content repurposing and the tricky and politically sensitive implementation of HD Radio.

Of the attendees, about 2,000 will be particularly interested in the Broadcast Audio Conference, a show-within-a-show dedicated to radio and television engineering.

"The biggest challenge is to stay on top of the trends," said Convention Chairman Jim Anderson. "We're now running eight continuous tracks throughout the four days, but we lay it out so that if you have an interest in a particular topic, there are no related seminars going on at the same time."

What: 122nd AES Convention



Where: Javits Convention Center, New York

When: Oct. 5-8

Who: The AES in 2006 attracted more than 21,000 attendees and more than 420 exhibitors to San Francisco

How: www.aes.org

Additional radio highlights include tours of WQXR(FM) and the broadcast facility atop 4 Times Square.

Executive Director Roger K. Furness added that AES takes careful notes each year.

"We add more sessions based on whatever was most popular the previous year," he said.

The demands on studios increase, as clusters add multicasting, streaming and podcasts. In "Considerations for Facility Design," a session moderated by Radio World U.S. Editor in Chief Paul McLane, these issues will be addressed.

Broadcasters' staffs are not increasing, yet the destinations for their content are expanding.

— Neil Price

"Engineers are concerned about digital compatibility, low cost and speed of construction," said Dan Braverman, president of Radio Systems. "The word 'digital' is becoming a synonym for 'multi-channel capable.' It is a rare studio that is just used for one function. We have to build radio plants like IT plants, meaning flexible and expandable."

And as many of us have discovered, we are no longer just in the radio business.

"Good broadcasters think of their facilities as program origination sources," said Braverman. "Whether or not there is a stick connected to a station doesn't define it anymore. There is no limit as far as the simultaneous audio programs that need to be generated, which presents us all with new challenges. Studios are now two-way interactive control centers."

I can't hear you!

Loudness is on the agenda.

"People are going to ask, 'Why are my CDs so loud?' 'Why are my stations too loud?' And 'Why does it have to be that way?'" said Frank Foti, Omnia president and founder.

See AES, page 32 ►

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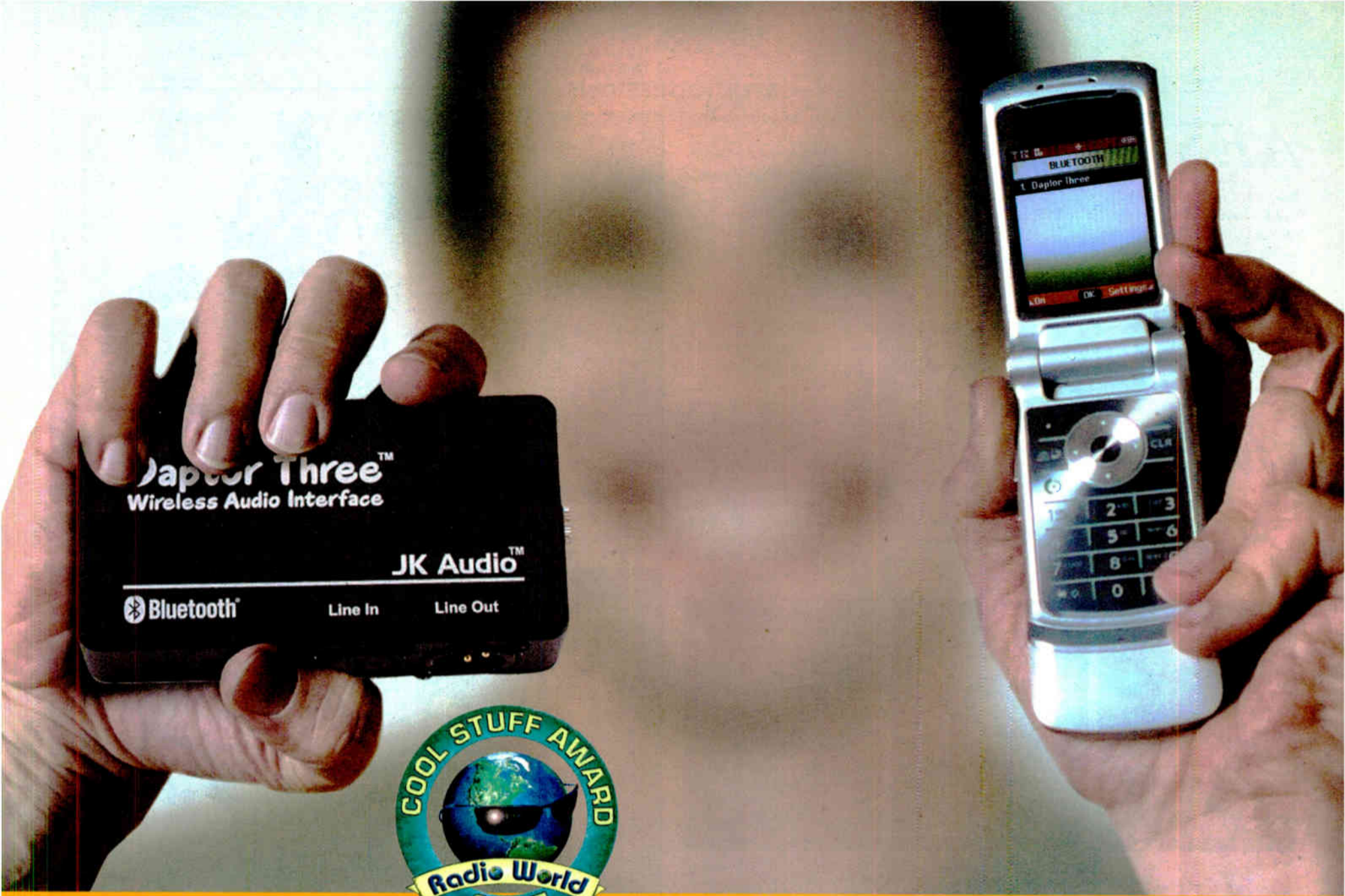
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AES

► Continued from page 30

In a loudness workshop, he and several others will address the topic.

"It dates back to AM radio and the need for higher modulation levels to get better fringe coverage," Foti said. "That rolled over to FM and the psychological belief that the loudest station sounded the best. The trend has now carried over to the mastering of CDs. There are complaints about it, not because of the volume but because of the side effects.

"Most D-A converters, CD players and iPods aren't able to handle square waves that well because they generate added distortion. There is brute force clipping and some aliasing distortion that contributes to poor sound. We have to keep trying to educate those that are willing to listen, and come up with ideas to make audio loud but less offensive.

What are you going to do with another 2 dB of volume?"

Broadcast Audio Conference Chairman David Bialik will participate in several sessions including "Internet Streaming — Audio Quality, Measurement and Monitoring."

"Now that the copyright and royalty issues have separated the big boys from the small, we not only have to deliver content that is appealing, but we're going to have to please the ears technically," he said. "When I listen to streaming now I hear a huge disparity between different Webcasters. The levels are all over the place. We reached the point where we can disseminate the streams, but here we are back in the mid to late 20th century again, trying to deal with audio fidelity."

Sharing the dais with Bialik in that session will be Art Constantine, DaySequerra/ATI Audio director of sales.

"I think that broadcasters should be able to monitor the quality of Internet audio and metadata," said Constantine.



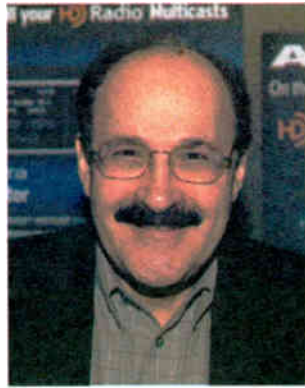
Dan Braverman of Radio Systems trains new broadcasters at the first community station in the Mchinji province in central Malawi, Africa.



Broadcast Audio Conference Chairman David Bialik



AES Convention Chairman Jim Anderson



DaySequerra/ATI Audio Director of Sales Art Constantine



Standing, from left: Historical Committee Co-Chair Irv Joel; Committee Chair Jim Anderson; Executive Director Roger K. Furness; Papers Chair Agnieszka Roginska; Technical Tours Chair Lou Manno; Facilities Student Assistant Michael Leikin. Front: Facilities Chair Michael McCoy; Tutorials and Workshops Chair Alex Case and Live Sound Events Co-Chair Henry Cohen. Not pictured: Live Sound Events Co-Chair John Kilgore; Papers Vice Chair Veronique Larcher; Masterclass Chair Alan Silverman; and Education Co-Chairs Dottie Kreps and Yujin Cha.

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AES Executive Director Roger K. Furness



ENCO Systems COO Neil Price

a technical one," Bialik said. "It's marketing. The engineers have developed a system and it works. We're trying to deliver the best audio we can but we may have created a field of dreams. We had AM stereo that also worked, but was never marketed. The same with Quad FM and Dolby FM. We are ruled by consumer acceptance and the best system might not win.

"When someone walks into a store and asks for an HD Radio, the sales person just doesn't know what to do."

"When I talk to people at stations, they tell me that their stream provider usually tells them if there is a problem. Sometimes the stations don't find out about problems until a listener calls. With regard to streaming, station engineers need to be the first to know if there is a problem, not the last."

To HD or not to HD

Another session, "Innovations in Digital Radio," has been growing in popularity over the past few AES conventions.

"The most important issue in HD isn't

an HD Radio, the sales person just doesn't know what to do."

Neil Price is chief operating officer of ENCO Systems, and he will be part of "Audio Playback and Automation for Radio," a session moderated by Skip Pizzi of Microsoft and Radio World.

"Broadcasters' staffs are not increasing, yet the destinations for their content are expanding," Price said. "The whole idea of HD1-4 and Web streaming places demands on broadcasters that affect the architecture of the entire plant.

See AES, page 33 ►

PRODUCT GUIDE

RDL Gets Twisted' With Module Line

Radio Design Labs' Format-A twisted pair products send, receive and distribute audio. Modules are available for mounting in walls, cabinets and racks. Sending and receiving modules have connectors and terminal blocks for standard -10 dBV unbalanced and +4 dBu balanced line levels, and standard microphone levels.



It is often inconvenient to power the modules at one end or the other, according to RDL; the flexibility of the twisted pair products allows power to be applied at the most efficient location in the installation.

The TX-TPS1A is a single-pair audio sending module compatible with RDL Format-A twisted pair products. One line-level source may be connected to the module using either the -10 dBV unbalanced RCA phone jack or the +4 dBu balanced detachable terminal block. A buffer amplifier feeds the RJ-45 output at the correct operating level.

The TX-TPS1A is a single-pair sender, feeding the input signal to the cable pair set on the front-panel switch during installation. The module drives only one cable pair, therefore a loop-in RJ-45 jack is provided to accept signals and power from other mic-level or line-level Format-A senders.

For more information, contact Radio Design Labs at (928) 778-9678 or visit www.rdl.net.

Element: She Comes in Colors Everywhere

Axia Audio says its Element modular consoles are now offered in three color schemes to better blend with



Bronze on Charcoal

modern studio décor: silver on charcoal; bronze on charcoal; and the original gray on silver combination.

For more information, contact Axia Audio at (216) 241-7225 or visit www.axiaaudio.com.

AES

► Continued from page 32

"The ability to adapt rapidly without looking to suppliers for solutions is important because broadcasters need to become empowered to address the needed changes themselves. We need tool sets created in the broadcasters' language because we just don't have six months or a year to wait for a supplier to create what we need."

Swahili, French or English?

Radio in some countries is much different from what we are used to in the United States. Think unstable power grids, lack of replacement parts, no access to FedEx and very low budgets.

That is the reality in countries like Africa, where Dan Braverman has built stations. In a broadcast tutorial, "Building

What are you going to do with another 2 dB of volume?

— Frank Foti

a Radio Facility in the Developing World," he will share tales of hourly lightning strikes and other challenges unfamiliar to Americans.

"My personal experience is in Africa. It depends on the country, but radio gives you a great bang for the buck there," he said. "Often TV and the Internet aren't available, but everyone has a transistor radio and batteries. Nothing keeps a new country democratic better than radio and only now are some of these countries allowing private broadcasting."


In spite of the difficulties he faced there, he loved the experience.

"I had a joyous time building these stations," he said. "This is the reason I got into radio."

For a complete listing of all the AES sessions, visit www.aes.org.

Ken R. Deutsch is a former broadcaster who says his biggest challenge occurred when he encountered a snake on the way out to the station mailbox.

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PRODUCT EVALUATION

ADAM A7: No Subwoofer Required

Closefield Monitors 'Nail' Bass, Kick Drum; A.R.T. Ribbons Deliver Crisp, Non-Fatiguing Transients

by Strother Bullins

I had my first experience with ADAM studio monitors several years ago during a mix session at producer/engineer Michael Wagener's Nashville-area studio, Wireworld.

Wagener, known for constantly improving his personal arsenal of recording gear, had recently acquired a 5.1 set of S3A active midfield monitors.

I became intrigued with the ADAM brand, specifically with its signature A.R.T. (Accelerated Ribbon Technology) tweeter. I was admittedly listening to Wagener's own tracks and mixes at his personal studio (and the man mixed "Master of Puppets," folks); lots of monitors would sound impressive in that environment, I reasoned.

Now I fully understand what Wagener was experiencing with his S3As.

I have had ample time to evaluate the company's latest, the far more affordable A7 closefield monitor, in my own production/critical listening environment. I have listened to my own recorded tracks and mixes, as well as other all-time favorite mixes I know intimately and/or have heard in a variety of great acoustic environments through great monitors. And I have had an impressive experience indeed.

Features

The ADAM A7 (\$999 per pair) is a two-way, ported, active studio monitor featuring the A.R.T. ribbon tweeter and a 6.5 inch mid/bass woofer. Each transducer has its own internal 50 watt RMS amplifier. Maximum power consumption of the A7 is 100 watts. Frequency response (+/- 3 dB) is 46 Hz–35 kHz, maximum SPL at 1 meter is 105 dB and the internal crossover frequency is set at 2.2 kHz. The cabinet measures 7 x 13 x 11 inches and weighs less than 22 pounds.

The front of the A7 features the centered A.R.T. tweeter directly above the



also-centered woofer. A bass reflex port is below the woofer and to the bottom right. Then, to the right, is a control panel featuring a power switch, blue LED on/off/standby indicator and a handy detented volume control. (Cheers amongst the "mouse crowd" for that last one — woo-hoo!)

On the back of the A7 is the AC input, voltage selector switch, two signal input types — XLR and RCA — and a three-knob control panel. The panel offers tweeter voltage gain adjustment and two room EQs: shelving filters located at either end of the frequency, 150 Hz and 6 kHz cutoffs, respectively.

The most notable feature of the ADAM A7, as mentioned, is the A.R.T. ribbon tweeter. This, truthfully, could warrant its own article. The A.R.T. ribbon, based on the original works of Dr. Oskar Heil in 1972, moves high-frequency sound waves by the design of its fold-

ed diaphragm, essentially squeezing air in and out of the monitor.

In use

The two DAW-based rock re-mixes I performed using the A7s — ones in which I made a few crucial EQ adjustments, mostly on vocals and acoustic string instruments, plus one "thick wall" rhythm guitar — were clear improvements on my original mixes, and took a surprisingly short period of time to complete.

Elements of the mix that had originally struck me as potential "slackers" — things that simply could have been recorded better — were more obvious than ever, and I appreciated the tip. Those mixes in the end proceeded to translate well onto every other system where I played them (and, in direct A/B comparison, better than my original mix did).

The A.R.T. ribbon, based on the works of Dr. Oskar Heil, moves high-frequency sound waves by the design of its folded diaphragm, essentially squeezing air in and out of the monitor.

Once I was sold on A7 production performance, I brought out my trusty evaluation reference CD; a disc filled with music I love that also represents a few personal production standards on a variety of musical styles.

The fun began with Urge Overkill's "Sister Havana," which really stood tall as I listened to it three or four repeats in succession. "Sister Havana" is a great kick-drum song, and to my ears my favorite "standard" modern rock mix/production of all time. The A7s nailed it, as expected, and it was just as I had recalled it in some of the best mastering studios and tracking rooms I've had the opportunity to use.

Sometimes it was even better. The crisp, non-edgy, non-fatiguing and pleas-

Product Capsule:
ADAM A7 Closefield Studio Monitors

Thumbs Up

- ✓ A.R.T. ribbon tweeter
- ✓ Accurate, non-fatiguing and pleasing performance
- ✓ Most affordable ADAM monitor available
- ✓ Versatile small size and front-panel volume control

Thumbs Down

- ✓ None

PRICE: \$999 per pair

CONTACT: ADAM Audio at (818) 991-3800 or visit www.adam-audio.com.

ant transients that the A.R.T. ribbons uniquely deliver carried the production honorably. And, despite their small size, the A7s didn't slouch on this particular song's full, tight/punchy and well-balanced bottom end.

Yonder Mountain String Band's "Bloody Mary Morning" and Sergio Mendes' "Berimbau/Consolacao" next showed the fine, unique acoustic detail of these live bluegrass and Latin music performances, respectively. Banjo, guitar, mandolin, bass and fiddle — with appropriately full, round bottom end and nice string transients throughout — sounded exceptionally detailed, not hyped. On the Mendes tune, the bass-heaviest and busiest cut on the disc, the A7's tight bass performance was controlled and lots of fun to hear.

I may have thought in this particular case for a moment or two about having a subwoofer. A sub coupled with the A7s could likely make your grandmother dance spontaneously. A sub, however, was far from necessary.

Summary

Simply said, everything I heard during my A7 evaluations seemed to be the truth and nothing but the truth. Some engineers can't handle the truth and, most likely, they are the few who wouldn't enjoy what the A7s have to offer anyway.

Therefore it is my opinion that constant seekers of acoustic truth who need a fairly affordable powered closefield monitor should give the ADAM A7 a try. It works well for critical listeners in a variety of differently sized control rooms, recording environments, post-production and broadcast suites, or wherever more accurate, non-fatiguing and pleasant audio is considered a virtue.

Strother Bullins writes for Radio World's sister publication, Pro Audio Review.

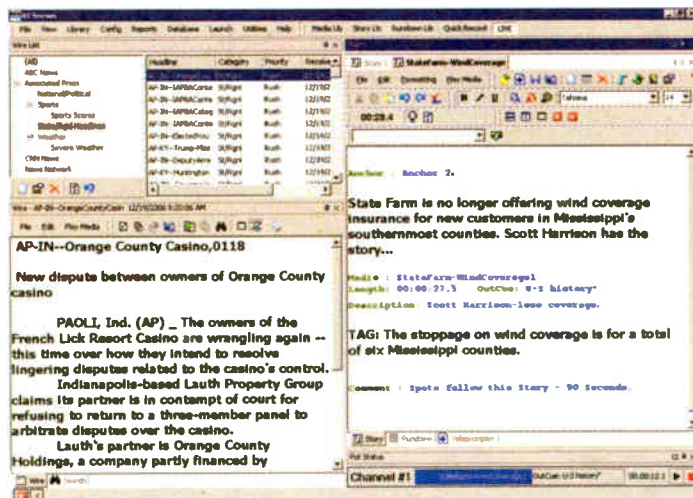
PRODUCT GUIDE

RCS Updates, Releases RCSnews, AFC

Version 3.0 of RCSnews software includes updates RCS says were requested by news writers and directors of radio.

Users can create custom fields in the Story and Rundown libraries; drag and drop columns into new positions; ingest RSS and FTP feeds; and access embedded hyperlinks in wires of stories in an internal browser.

Features include a single-track audio editor; international language support, which enables reporters in reading wires and creating copy and media in any language; and enhanced spell check.



RCSnews Main Screen 2

RCS also upgraded and released its Audio File Converter with the ability to write embedded tags for WMA files. Additional highlights include Broadcast Wave Format support; improved schema for handling the embedded ID3 and cart chunk; support for more than eight groups so more folders can be handled during auto-processing; and Inno Setup, which the company says makes the install package more user-friendly.

For more information, contact RCS Sound Software at (914) 428-4600 or visit www.rcsworks.com.

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Radio World

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September 26, 2007

TECHNOLOGY CORNER

Extreme Makeover: Physical Media Edition

Forget PCM. The Super Audio CD Boasts DSD Coding, Six Signals, Analog Warmth and Playback Flexibility

by Randy Hoffner

It has now been more than 25 years since the compact disc was introduced to the world. Might we remember that there were — and still are — those who disparaged the sound of the CD, preferring the venerable vinyl disc, which has become a collector's item?

The CD was revolutionary, of course, because it is a digital audio recording. Although digital audio recorders had been used professionally, the CD was the first digital medium available to the general public.

Way back when

The technical characteristics of the CD reflect the state of the technology at the time it was developed.

The audio data on the CD is in the form of pulse code modulation. In PCM, the amplitude of the analog audio waveform is sampled periodically, and the samples are quantized: Each sample is assigned one of a number of specified values, or quantization steps.

The number of quantization steps available depends on the bit depth, which is 16 bits in the case of the CD. Each sample has to be represented by a specific

quantization step, but any given sample's value may not fall precisely upon a step; in which case the step closest to the sample's value is assigned.

The distance between the sample's actual value and the nearest quantization step is called quantization error, and the aggregate of quantization errors is known as quantization noise.

It can be seen that quantization errors are really signal-related distortion components, not uncorrelated noise. The greater the number of quantization steps available, the closer any given sample is likely to be to a quantization step, so quantization noise is an inverse function of bit depth — the more bits available, the lower the quantization noise. The bit depth of CD audio is 16 bits, which means that there are 216 or 65,536 discrete quantization steps available.

PCM audio is subject to the Sample Theorem, which states that in order to perfectly reconstruct a sampled waveform, at least two samples must be taken per cycle. This means that no frequency higher than twice the sample frequency may be accurately represented in the reconstructed analog output.

In the case of the CD, the sample frequency is 44.1 kHz. Half of 44.1 kHz is

22.05

kHz, and

in order to

avoid aliases, signals

input to the sampler/quantizer must be limited to this frequency or lower. If the foregoing conditions are met, the reconstructed analog output waveform of such a system will be a perfect representation of the original analog waveform, with some quantization noise added.



Photo courtesy of iStock.com/© Peter Mlekuž

In addition to the anti-alias filtering required before the analog signals are sampled and quantized, there must be reconstruction filters on the digital-to-analog conversion side to remove the images, which are harmonics of the sampling frequency. Note here that the above principles apply to any waveform that is sampled and digitized using PCM, including audio and video.

New sensation

The developers of the original Compact Disc, Sony and Philips, have developed the Super Audio Compact Disc, which uses a coding technology called Direct Stream Digital, or bit stream coding, instead of PCM. DSD makes use of sigma-delta 1-bit conversion.

Conventional CDs

contain about 750 MB of data, while SACDs, like their high-density relatives DVDs, can contain about 4.7 GB of data.

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Delta modulation has been with us for some time, having been developed in the 1950s. As its name implies, it takes account of the signal's amplitude delta — the amplitude change between a sample and the sample that precedes it.

In essence, the sigma-delta A/D converter is a simple device. It uses a negative feedback loop to accumulate the analog audio waveform over each sample period. If the amplitude of the accumulated waveform over a given sample period is greater than that of the previous sample period, the converter outputs a "1." If the amplitude of the accumulated waveform over a given sample period is less than that of the previous sample period, the converter outputs a "0."

This is a kind of pulse density modulation, as positive-going waveforms will produce many 1s in a sequence, while negative-going waveforms will produce many 0s in a sequence. The sigma-delta

See SACD, page 39

Take a peep

at our new website

The screenshot shows the Broadcast Warehouse website interface. At the top, there are navigation links for TRANSMISSION, STUDIO, MODULES, and SOFTWARE. A sidebar on the left lists product categories: TRANSMISSION, Audio Processors, FM models, AM models, HD Models, FM Transmitters, RDS Encoders, FM Amplifiers, Transmitter Packages, Levellers, Link transmitters, Antennas, and FM Re-Broadcast receiver. The main content area features a large advertisement for a 'Digital Microphone Processor' by ORSIS, with a 'In Stock' badge. Below this, there are sections for 'New', 'Popular Products', and 'Manufacturers'. The 'Popular Products' list includes: 1. DSPxtreme Audio Processor, 2. DSPxtreme FM Audio Processor, 3. 150W Amp Module (1W), 4. 12 Watt power supply, 5. AMP1000 1kW FM Amplifier, 6. DSPX FM Audio Processor, 7. 300W FM pallet amplifier, 8. PLL+ 1W Exciter, and 9. Inovonics 631 Re-broadcast FM Receiver. Other sections include 'Low cost IP' and 'Air 2+'. The footer contains logos for Coel, YAMAHA, and Ingram, along with navigation links for TRANSMISSION, STUDIO, MODULES, and SOFTWARE.

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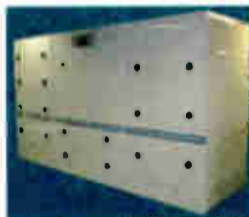
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USER REPORT

Deva Adds Faders for Tweaking Inputs

by Wayne Brissette
On-Location Sound Recordist

AUSTIN, Texas When I first started audio work, everybody used analog tape. Not too long after that, DAT promised to deliver a superior sound using tape. Then Zaxcom introduced its non-linear Deva series recorders.

onto CDs. I also created a sub-mix, which was then used to broadcast the show on the radio. Because we were in tight working conditions, we didn't have the space for racks of gear.

Having the ability to mix multiple inputs and output them, while recording each channel to the internal hard drive, allowed me to provide a dedicated mix for



Wayne Brissette uses the Zaxcom Deva (and Mix-12) during a musical production.

I do a lot of on-location music recording and when I wanted to step into the non-linear recording, it was recommended to me that I look at the Zaxcom Deva. It didn't take long for me to figure out it was exactly what I was looking for: a device that allowed me to have multiple inputs and was compact.

I was able to get rid of my external A/D converter and my portable mixer and use the Deva IV as a replacement for those items.

As a bonus, I went from recording 16-bit digital audio on DAT to recording up to 96 kHz, 24-bit audio direct to the Deva.

Zaxcom recently introduced an update to these recorders. The Deva 5.8, which replaces the Deva IV and Deva V, adds some much needed hardware faders to the front. This is a huge benefit when having to adjust multiple inputs.

On the older Deva IV and V, only four hardware faders were available. Other faders were available through the touchscreen. The "software" faders were functional; however, you had to make sure you assigned them to inputs that didn't need constant adjusting. Now, the additional hardware faders allow you to adjust levels easily.

On the list

Looking at the feature list of the Deva 5.8 would typically be enough to make any on-location sound mixer or sound recordist drool: 10 track recording on built-in hard disk, DVD-RAM or Flash media; eight hardware faders; eight analog mic/line inputs with 48 V phantom power; eight digital inputs; eight digital direct outputs; and a 16 channel mixer. But the features really don't touch on the versatility of the unit.

This past year, I used the Deva to record a benefit show so it could be put

the airwaves, while providing me with the individual tracks so I could remix the audio in post-production for CD.

One nice feature of the Zaxcom Deva is the ability to label the inputs on the screen. These labels are placed in the metadata of the broadcast WAV files. When I pull these tracks into my audio workstation, all I have to do is look at the metadata to figure out exactly what inputs were used on a track.

If you hate filling out sound reports in the field, or ever lose a sound report, this can be a blessing, as the data is always connected to the file.

This past weekend, the Deva demonstrated to me how flexible it was. Friday night I was finishing up a film. For that I used a single boom mic and assigned that single input to two outputs. Those went to the camera's left and right channels. Meanwhile, I recorded the boom mic so the 24 bit high-quality audio can be used to replace audio sent to the camera.

We wrapped up shooting at 6 a.m., but I had already scheduled a steel drum recording session before we rescheduled the film, so at 12:30 p.m., I showed up with my decca tree and Deva recorder for an hour-long recording session. This session was recorded at 24 bit/96 kHz, so it can be placed on a DVD and CD. I was able to quickly make the changes from film to performance hall in a matter of minutes using the Deva's touchscreen.

For somebody who wants a single device for mixing, recording and routing, the Zaxcom Deva really has few rivals. While Zaxcom's sales seem to be stronger in the film marketplace, many of us on-location recorders also use it for music and other multimedia needs.

For more information, including pricing, contact Zaxcom (973) 835-5000 or visit www.zaxcom.com.

TECH UPDATE

Multi-Format Denon DN-C640 Plays Back CD, DVD

Denon Professional debuted the DN-C640 slot-in network CD player. It is housed in a 1 RU enclosure and offers playback format options using largely untapped system resources found in many of today's standard audio, network and computing devices, according to the company.

The unit enables audio data file playback from both CD and DVD discs, and access to network playback capabilities. It is suitable to serving as a fully networked audio playback control center.



The DN-C640 is compatible with audio data file formats such as CD-DA, WAV, MP3, MPG and WMA, allowing for up to 20 hours of MP3 or similar audio playback from a CD, CD-R or CD-RW.

Additionally, Denon says the unit reads these files directly from a data DVD, with its enhanced storage, increasing continuous single disc playback to nearly six days of uninterrupted audio. For users requiring the fidelity of uncompressed WAV audio files, this feature allows disc playback to be unrestrained by the normal 80-minute CD-R time limit.

Various file types may be combined on the same disc to accommodate different source formats of program material.

Audio outputs include two analog unbalanced (RCA L/R fixed level, RCA L/R variable level); one analog balanced (XLR L/R output with trim control); two digital (RCA AES/EBU or S/PDIF, XLR AES/EBU or S/PDIF) and one 1/4 inch front-mounted headphone output.

The Denon DN-C640 is available at an MSRP of \$899.

For more information, contact D&M Professional in Illinois at (630) 741-0330 or visit www.d-mpro.com.

SACD

► Continued from page 36

decoder performs the inverse operation.

It is apparent that if we have but a single bit to express the amplitude change between samples, as opposed to 16 bits for traditional CDs, many more samples must be taken in a given period of time in order to accumulate the requisite information density. In the case of SACD, the sample rate is 64 times the 44.1 kHz sample rate used by CDs, or about 2.822 million samples per second. This yields an analog frequency response up to 100 kHz, and a signal-to-noise ratio of about 120 dB.

What's available today?

There has been a general trend in recent years regarding consumer equipment of all quality levels away from the traditional resistor-ladder type of D/A converter to the sigma-delta type converter; not in the least because it can be made smaller and at lower cost.

Many of these are 1-bit sigma-delta converters, which first interpolate and up-sample the 16 bit, 44.1 kHz CD data to 1-bit, 2.882 MHz data, then use a 1-bit sigma-delta DAC to convert the data back to analog audio.

The advantages cited for these converters, and for the entire DSD A/D-D/A system, are the elimination of the requirement for anti-alias and reconstruction filters, wide frequency response and high signal-to-noise ratio. Nothing is free, and the penalty exacted by the 1-bit sigma-delta process is a high noise level; but the perceptible noise is reduced by aggressive noise shaping, in which the noise is pushed up above the audible spectrum.

It also must be said that newer high-end

sigma-delta DACs are increasingly of the multi-bit variety, frequently in the range of 3 bits.

SACDs of course, use high-density recording techniques. Conventional CDs contain about 750 MB of data, while SACDs, like their high-density relatives DVDs, can contain about 4.7 GB of data. SACDs on the market today are typically hybrid discs. They contain a layer of conventional CD data, and also a layer of high-density data, so that they may be played on conventional CD players as well as SACD players. The SACD signals can contain up to six audio channels, as opposed to the two-channel capability of CD signals.

There are those who ecstatically praise the sound of SACD audio as a tremendous advance over CD audio. For a different technical opinion, the reader is referred to Audio Engineering Society Convention paper 5395, "Why 1-Bit Sigma-Delta Conversion is Unsuitable for High-Quality Applications," by Stanley Lipshitz and John Vanderkooy. It was presented in 2001 at the 110th AES Convention in Amsterdam.

It is well known that in the digital process, the addition of a small amount of uncorrelated noise, called dither, can reduce or eliminate correlated quantization distortion components from the signal, leaving a benign floor of uncorrelated noise.

Lipshitz's and Vanderkooy's contention is that 1-bit sigma-delta converters are in principle not perfectible because when they are properly dithered, they are operating in constant overload, while multi-bit sigma-delta converters are infinitely perfectible, as they do not have the 1-bit headroom constraint.

Randy Hoffner is a veteran TV engineer and writer for RW's sister publication TV Technology.

USER REPORT

Broadcaster Manages FX Library With IR²

by Geof Greenway
Assistant Chief Engineer
Liberman Broadcasting

BURBANK, Calif. Liberman Broadcasting Inc. is the largest, privately held, minority-owned Spanish-language broadcaster in the United States.

We have created radio and television clusters in Los Angeles, Houston and Dallas, and have more than 25 stations in our system. We manage, operate and produce more than 53 hours of television programming per week tailored to the needs of each specific market, and most of our radio stations are live and local, 24 hours a day.

As assistant chief engineer for radio at our Los Angeles headquarters, I help oversee engineering operations at six AM/FM radio stations in the Los Angeles market. To manage our library of sound effects and other "instant sounds," we were looking for a product that we could plug in and play, something we could take out of the box and have ready to go.

We already had five 360 Systems Instant Replay units, and they were reliable and trouble-free, so it was only obvious to choose the Instant Replay².

Once and again

Our studios are in Burbank and Santa Ana, and each uses sound effects, liners, jingles, drops and bed music. In the past, this kind of audio was trouble. Cuts would be on our digital audio playout system or we would attempt to use CDs, which would take a beating in the rough hands of DJs and board operators, and eventually wear out.

The IR² helps divide tasks between several devices, gives us more audio sources and has made us more productive. Once we install a device, I never want to hear from it again. I can install the Instant



'The IR² helps divide tasks between several devices, gives us more audio sources and has made us more productive,' said Greenway, shown.

There are sound effects we use all the time, and IR² gives us the ability to play a cut again and again, instantly with the push of a button.

Replay and not have to give it another thought because board operators and DJs are able to figure out how to use it without extensive training or assistance.

There are six Instant Replays sprinkled

throughout our Los Angeles facilities, one for each station or day part. There are sound effects we use all the time, and IR² gives us the ability to play a cut again and again, instantly with the push of a button. With the loop feature, DJs can chat on with a music bed behind them that keeps repeating.

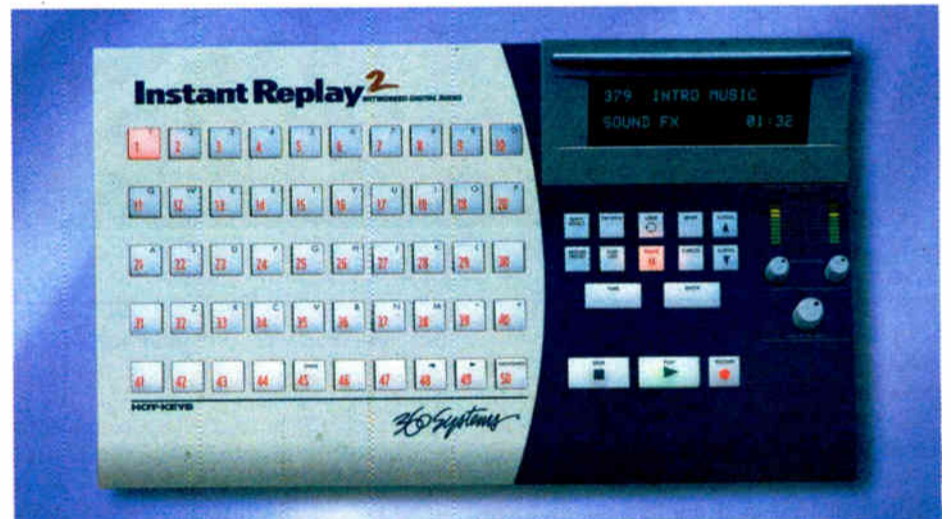
The new recording formats on the IR² are great because that expands our choices beyond the original model. We can select the quality needed for each cut, or play back cuts originally recorded in a different format that have been transferred to the IR² via FTP.

We're excited about being able to FTP files using the IR² Ethernet capabilities. We can isolate our Instant Replays from the production studio and transfer files without adding hardware or physically moving the units.

We've enjoyed the performance of the Instant Replay for our radio stations. It is used in our TV production facilities too, for sound effects, intros and outros, music beds and theme music.

The IR² retails for \$2,995.

For more information, contact 360 Systems at (818) 735-8221 or visit www.360systems.com.



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TECH UPDATES

HD16CD Has 10 Virtual Tracks, 240 Hours Record Time

The HD16CD digital multi-track recorder/control surface from Zoom features a large, 80 GB hard disk and provides about 240 hours of recording time using 16 bit/44.1 kHz sampling in WAV format. Each track has 10 virtual tracks so users can record multiple takes to get each track right. It allows recording on up to eight tracks simultaneously.



Zoom HD16CD

Once individual tracks have been captured, push the mixdown key to bounce tracks to a stereo track. In addition to audio track contents, the rhythm track and effects return signal can be included, which frees up tracks for the recording of additional instrument or vocal parts.

The phrase loop function enables the building of a loop track by lining up audio phrases. Create the backing for a song by specifying the playing sequence and repetition count. Use parts of recorded data or WAV/AIFF files as loop material, or get sources from a computer via USB or from the CD-R/RW drive. The HD16CD comes with 96 preset loops containing drum, bass and guitar phrases.

For more information, contact Zoom distributor Samson Technologies Corp. at (631) 784-2200 or visit www.samsontech.com.

CD-RW901SL Adds XLR I/O, RS-232

Incorporating many features of the CD-RW900SL, the CD-RW901SL CD Recorder from TASCAM adds RS-232; XLR balanced I/O; a wired remote; AES/EBU digital I/O; and a timed track increment, selectable from 1 to 10 minutes, for adding CD track ID markers during recording.



CD-RW901SL

The CD-RW901SL has dedicated input level controls and its digital inputs are equipped with automatic sample rate conversion for compatibility with nearly any signal, according to TASCAM.

Pitch Control (+/- 16 percent) on playback is a standard feature along with key control, MP3 audio playback, and power-on-play. The front-panel PS/2 keyboard input lets users name tracks, and provides one-key access to frequently accessed menu functions.

The latest upgrade to the CD-RW901SL adds continuous recording between two decks; Index Search and new Time Skip functions on Skip mode; selectable disc reading speed; and an MP3 Action setting, which prevents accidental termination of continuous MP3 playback.

For more information, including pricing, contact TASCAM at (323) 726-0303 or visit www.tascam.com.

MR-16/CD Boasts 33 EQ Presets on Each Input

The MR-16/CD from Fostex offers 16-track recording to hard disk with CD-RW, and 33 EQ presets available to each input. Also included are two aux sends for connecting to external gear.

Features include more than 7.5 hours of 16-track recording; 16-bit resolution at 44.1 kHz; track bouncing; input EQ library; digital and mastering effects; and mic simulation.



MR-16/CD

The MR-16/CD also is available without internal CD-RW (MR-16HD).

Fostex also offers the MR-8HD digital multi-track recorder, features of which include four-track simultaneous recording; phantom power on four XLR inputs; digital effects including reverb and delay; a push-dial button for easier menu navigation; and USB host functionality. The company says in order to take full advantage of this feature, the MR-8HD software needs to be updated to V1.27.

For more information, including pricing, contact Fostex in New Jersey at (973) 394-0015 or visit www.fostex.com.

Torq Xponent Lets DJs Mix Without Touching PC

M-Audio says the Torq Xponent is designed for the computer-based DJ and combines the features of a standard two-channel DJ mixer with the controls of a pair of DJ CD players, allowing DJs to cue, mix and scratch digital files without touching the host computer.

Features include Torq DJ software, hardware controls that are pre-mapped to corresponding software functions in Torq, MIDI control surface and integrated USB audio interface.



Torq Xponent

The integrated four-output USB audio interface includes four RCA outputs for independent control of the house system and booth monitors; 1/4 inch TRS headphone output with cue and volume controls; 16 bit/48 kHz maximum sample rate; and compatibility with ASIO and Core Audio.

The MIDI control surface mixer controls include two vertical volume controls; two three-band EQ control knobs with mute buttons; horizontal crossfader control with transform buttons; and two LED volume meters. Player controls include two touch-sensitive scratch wheels, and two 100 mm pitch adjust controls.

Additional highlights include two virtual decks for loading and playing files; snapshot function for instant recall of mixer and effects settings; integrated real-time stretching and compression; and a 16-cell tempo-synced sampler.

For more information, including pricing, contact M-Audio at (866) 657-6434 or visit www.m-audio.com.

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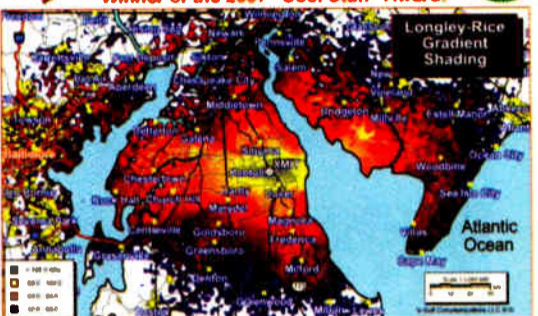
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GUEST COMMENTARY

Premium Subscription Service Questions

by Tom Ammons

WQED(FM) is a fine arts radio service for Pittsburgh that is, frankly, just getting by and cutting corners. I am happy to see Skip Pizzi write about subscription radio because I think it could answer many of our funding problems ("Waiting for the Third Shoe to Drop," Aug. 1). I have taken the idea of a premium subscription service to our management to no [avail].

From what I can tell there is no public radio buzz about it at the national level either. Even if management showed an interest, I suppose we radio engineers should be more concerned about how we could make it work.

What are our options?

Help desk

Let's say I want to create a premium surround sound classical subscription service. What delivery mode do I use? HD or FMeXtra; a combination of both; or something new like mobile TV or even a yet to be realized option like drive-by WiFi radio?

How much bandwidth do I have and how do I allocate a bit budget? Should it be file transfer or real-time streaming service?

Lots of ground to cover here. When I look at actual options things clear a little, but I see challenges ahead.

FMeXtra could give me a generous bit budget but require giving up the stereo carrier to get it. Anyone willing to do that? Will an FMeXtra+HD combination radio ever exist? How well can FMeXtra cope with multipath? It has to work well with a car radio in a hilly multipath area like Pittsburgh. Before I could go any further down this path, it's "show me the receiver" time.

HD Radio in hybrid mode has bound me into a 96 kbps audio delivery bit budget. Is it enough? I know the NRSC has said that a 48/48 HD1/2 split is viable, even for delivery of surround sound, but I hear other voices.

Dan Danko recommends 64 kbps for matrixed surround, and Fraunhofer says its MPEG surround system works acceptably at 48 but better at 64+ kbps. Looks to me like I would need a 64/64 kbps split to do main and subscription services justice in surround, and I can't bind bits in the extended hybrid spectrum to the main hybrid 96, so something has to give. Forty kbps main stereo and 56 kbps for a CA premium with surround? Or can I get

away with a 32/64 split? That's what I'd like to try.

If I use the Fraunhofer MPEG surround and put the CA and steering channel in the extended band, can all of this synch together? Will anyone build such a receiver? Do I have to build subscriber interest first and then get a receiver manufacturer to go along? That seems unlikely.

I note that the rules for HD will now allow experimental transmission in an all-digital mode. Perhaps I could use the 300+ kbps bandwidth in this mode to do file transfer in overnight hours, say 1 to 5 a.m. I estimate that I could transfer 15-20 hours of good quality audio that way each day, and that about a week's worth of radio programs would fit in one 4 GB SD card.

Even if management showed an interest, I suppose we radio engineers should be more concerned about how we could make it work.

I imagine the management of those files with personalized playlists at the listener end. It would finally create the customized non-synchronous listening that Negroponte talked about 15 years ago. Ten thousand subscriptions at roughly \$10 a month to such a service would generate more than our existing pledge dollars. Anyone really toying with this option?

Or maybe we should leapfrog: Look at mobile DTV bandwidth for audio and video file delivery and streaming. If a 4 Mbps part of a DTV channel could deliver 1-2 Mbps of throughput and be robust enough for mobile service, we could stream audio and video and do file transfer at the same time. Or not. Are mobile TV planners even considering a service such as this? Will drive-by WiFi or WiMax technology ever become workable?

I pour this stew out on the trough for your consideration. I hope it doesn't give you indigestion. My bets are with an HD Radio CA stream big enough for surround. Is that too much to ask, or is it too little?

Tom Ammons is a broadcast technician for WQED.

◆ READER'S FORUM ◆

No Gray Area

Paul, relative to your editorial concerning indecency rules ("Indecency Rules Need to Go," Aug. 15), you either forget or ignore the fact that you are a part of a pressure group that feels the opposite of those you are criticizing.

It is my opinion (never forget to use those four words) that as long as people are indecisive as to whether or not the

"f" word and the "s" word should be freely allowed — keep in mind, it is the free use or none at all — then we need those who will keep us out of the language gutter. Call them pressure groups or whatever; there is no such thing, contrary to Ambassador Reid, as a "little obscenity."

*Dave Freelan
Producer, "Sounds of Joy"
Greentown, Ind.*

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FM Translators Should Be Granted to AM Stations

Since giving up its dominance to FM in the late 1970s and early '80s, AM radio sometimes seems to have been relegated to the status of a poor older relative. Those who worry about the future of the band note that only a comparatively few stations — the big 50 kW Class I-As, of course, plus a few regional Class Bs — have managed to carve out audience and revenue shares that rival those of FM stations in comparable markets.

This migration was predictable, since the problem is one of inherent technical inequality. AM radio has a much narrower bandwidth, with correspondingly lower fidelity than FM, and is prone to both predictable, and random, atmospheric disturbances. From "skip"-induced co-channel interference, to electrical storms and leakage from RF gadgets of all shapes and sizes, static and co-channel crosstalk are a fact of life on AM.

FM, on the other hand, relies on a modulation scheme capable of reproducing full 15 kHz stereo sound, on a band of VHF frequencies essentially immune to such anomalies.

Periodically, the FCC, sometimes with prodding from the marketplace, has tinkered with the AM rules and standards in an attempt to reverse, or at least diminish, the flow of listeners from the band. AM stereo, Pre-Sunrise/Post-Sunset authority, critical hours operation, the Expanded Band; all have been aimed at retaining or recovering listeners to AM radio, and all have more or less failed to stem the tide.

(The jury is still out on AM IBOC, but even if it is successful, the technical limitations of the IBOC standard on AM, compared to FM, are significant.)

Now comes a boost for AM in the form of a new Notice of Proposed Rulemaking released by the FCC in August. This proposal, in which AMs could get authority to operate FM translators, holds promise to correct these otherwise unsolvable technical problems.

The FCC wants comment on the advisability of allowing licensees of AM stations to own companion FM translators within the AM station's coverage area, to augment the AM signal and programming. Furthermore, the commission asks if priority consideration should be given to daytime-only stations, as well as stations with very limited full-time power levels.

It is notable to us that in issuing the NPRM, the FCC itself pointed out that although the band was, and remains, the public's first localized mass medium, it has fallen on hard times.

Specifically, it wrote, "the AM band's viability has been threatened by a well-documented shift of AM listeners to newer mass media services that offer higher technical quality and superior audio fidelity" — a polite way of saying if the current pattern of declining listenership does not change, the AM band eventually may go away completely.

The FCC previously considered similar proposals, one in 1981 and a second in 1990. In both cases, it declined to act. Now, though, the commission obviously thinks the problem is severe enough to warrant this new proposal's consideration. AM broadcasters need help. We agree on several levels.

Without doubt, AM provides the backbone of the radio communications infrastructure in the United States. With the benefit of the clear-channel frequencies noted above, there are essentially no "white," or unserved, areas in any part of the country.

AM radio is much more likely to provide news and informational programming on a daily basis, not just during national or regional emergencies. AM radio is both ubiquitous and local.

And finally, AM radio is always available. "Always" is a definitive word, and not used lightly here. But as experimenters knew 80 years ago, all it takes to receive an AM radio signal is a two-cent diode, a coil of wire and a headphone.

For these reasons and more, AM radio deserves the economic boost that its richer FM relative can provide through the use of FM translators by AM stations.

To date, comments received by the FCC on the proposal have been overwhelmingly in support of allowing AM broadcasters this foothold into the FM band. Some commenters have voiced concern about the NPRM's effect on current proposals regarding LPFM operations, but RW believes the majority has it right: Fixing, or at least ameliorating, the AM band's technical imperfections, and thereby adding to its economic viability, vastly outweighs any enhancements that might have to be postponed or even eliminated from the LPFM service.

RW notes that the proposal is just that: a Notice of Proposed Rulemaking. The changes contemplated may, or may not, be enacted, and the path from proposal to regulation is not certain. RW encourages all interested broadcasters to weigh in with comments supporting these changes.

— RW

◆ READER'S FORUM ◆

'A Gold Mine'

Paul, thanks for another great issue. Love the stories on pages 20 and 28 of Aug. 15 on radio's past ("Where are the Oldest Tower Sites?," "WCAU Used Shortwave in Philadelphia"). Appreciate your efforts in bringing us this paper.

Andy Eliason
WVCY(AM-FM-TV)
Milwaukee

Scott Fybush's tour of historic transmitter sites included a photo of the WTIC(AM) building on Avon Mountain. Having lived in Hartford, but never having seen that structure, I'm struck by its close resemblance to Connecticut's Old State House, in downtown Hartford. Leave it to the Hartford-based Travelers Insurance Co., which owned the station then, to make the grand gesture.

As always, Fybush's articles surprise and delight.

Chuck Crouse
Lancaster, Pa.

Paul, the Aug. 15 issue is a veritable gold mine!

NJOEM just purchased a second Sage ENDEC unit and this time we purchased it from SCMS ("A Key Radio Dealer

Changes Hands"). I had the pleasure of speaking with Bob Cauthen a couple of times on a minor issue related to SCMS being the sole vendor (now) for Harris/Sage equipment. Sole vendor letters are something that could likely arise with other state offices of emergency management, especially if they want to purchase EAS equipment. (Government purchasing departments can be anal that way.) Getting a price quote and doing business with Pam at SCMS was a pretty easy matter.

The "oldest tower site" article was very interesting. Our old 146 MHz SuperStationmaster that NJSP used for amateur radio back in the 1960s could have won the Phelps Dodge "oldest Stationmaster contest" years ago, but we couldn't find the invoice or packing slip for it. The Jersey shore has some very historic shortwave and marine tower sites that so far have been spared from the developers.

And it's a shame that Ed Kushner, W3HKZ, isn't alive to see the nice article on WCAU ("WCAU Used Shortwave in Philadelphia"). The N.J. State Police used to use shortwave for dispatching its cars. We have photos of the old HF transmitters, and the trapped dipole is still up in the attic of the 1921-era administration building. From the looks of it, NJSP operated on 3 or 4 MHz or thereabouts.

Lastly, the article about Alex Magoun ("Sarnoff Library Recovers From Flooding") was very interesting as well.

We hams in Mercer County knew about the disaster right after it happened because of our relationship with the Sarnoff radio club. Alex is also a personal friend of mine, so I was on his e-mail list when he put out the call for the recovery effort.

H. Robert Schroeder, N2HX
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