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RADIOWORLD

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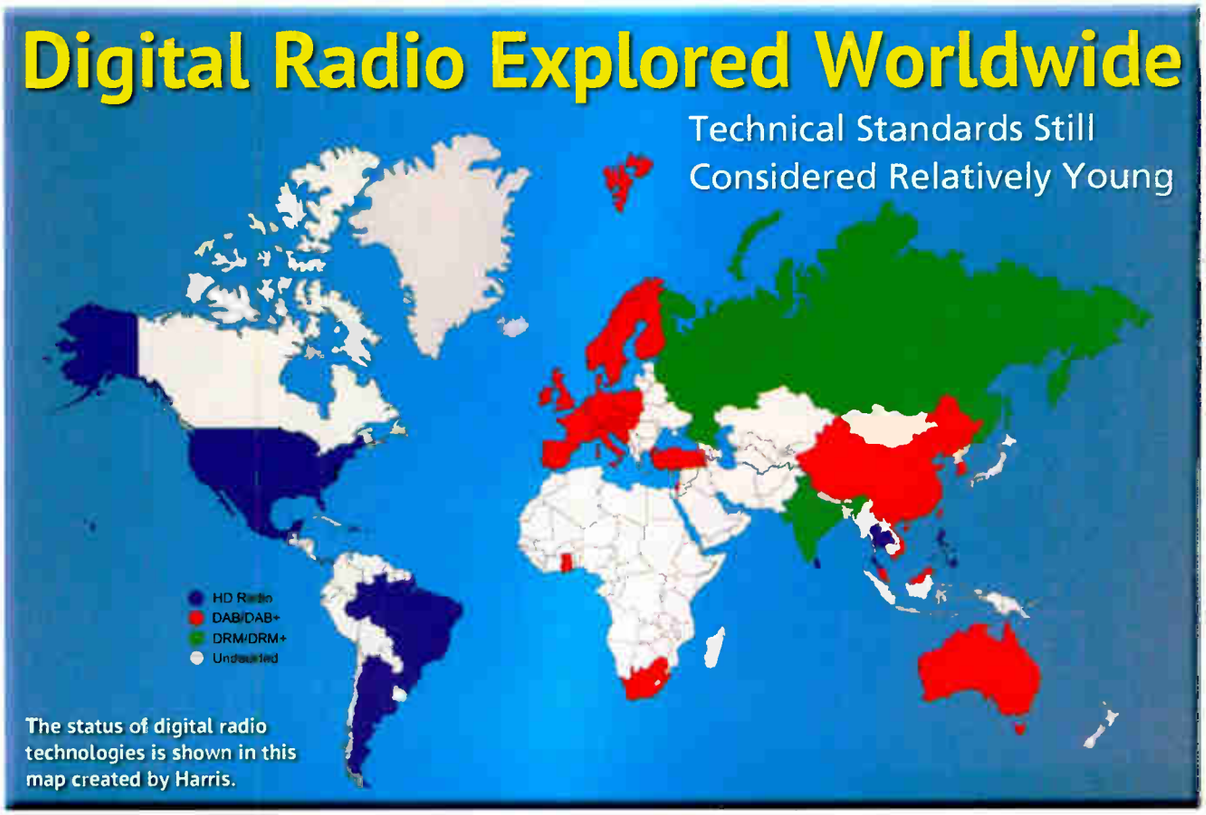
Digital Radio Explored Worldwide

Technical Standards Still Considered Relatively Young



The status of digital radio technologies is shown in this map created by Harris.

Courtesy Brian Clifford, Harris

BY DANIEL MANSERGH

In the United States, opinions of digital radio are influenced strongly by individual perceptions of iBiquity Digital's HD Radio system. While many broadcasters are impatient with its adoption rate, others consider it a fairly young technology. HD Radio really only became available to broadcasters eight years ago. Its older cousin DAB isn't yet 20.

Even over this relatively short period of time, we can learn a lot from the introduction of digital radio services in other parts of the world. Notable successes and stories of digital stagnation offer their lessons, which emerge from a comprehensive study of test reports, press releases and government data to give us a sense of the state of digital radio worldwide.

Veteran industry observer Richard Redmond felt that the time was ripe to conduct such a survey. The planners of the NAB's 2012 Broadcast Engineering Conference agreed, believing that Redmond's international experience — as vice president of product management and strategy for the Transmission Systems group of broadcast equipment manufacturer Harris Corp. — would provide a unique perspective on the realities of launching new broadcast technologies in different regions. Redmond presented the results of his research at the NAB Show in Las Vegas in April.

(continued on page 6)

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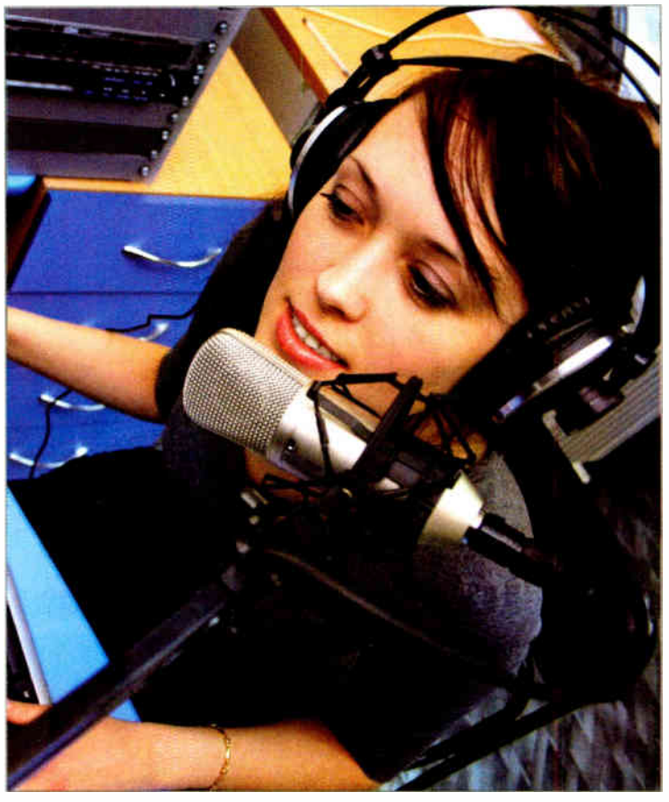

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World Radio History

DRM+ Tested in More Countries

Economical Receiver Development Still Ongoing

BY TOM VERNON

Though the Digital Radio Mondiale standard has yet to achieve its potential — and the DRM Consortium is trying to make receivers more affordable and more widely available — this has been a busy year for the open digital broadcast standard.

Among recent highlights: The International Telecommunications Union approved DRM+, the standard for transmissions above 30 MHz. DRM+ has been successfully tested most recently in the U.K., Italy and India.

The DRM Consortium in collaboration with Fraunhofer unveiled a multi-standard HD Radio, DAB/DAB+/T-DMB and DRM chipset for cars in January at CES. NXP designed and manufactured the chipset. New receivers were shown at the IBC and Asia-Pacific Broadcasting Union Delhi conferences.

Eight radio chipset manufacturers have become DRM members, bringing the membership to more than 100. Other DRM members include Continental Electronics, Nautel Ltd., Fraunhofer IIS, the BBC and Thomson Broadcast. All India Radio has doubled its DRM broadcast hours to 16.5 hours per day.

Voice of Nigeria has begun DRM tests on shortwave and Moscow radio has begun DRM MW broadcasts. In fact, the DRM Consortium released its first guide to the DRM standard in Russian in May, the first comprehensive DRM users' guide the consortium has produced in a language other than English.

Currently, some 600 hours of DRM programming are broadcast every week, reaching about half of the world's population, according to the consortium.

The years of hard work on DRM seem to be reaching critical mass, according to Hal Kneller, a regional sales manager for Nautel who's also a member of the DRM executive board.

This is an opportunity to show how much DRM has progressed,' said DRM Consortium Chair Ruxandra Obreja.

"With important news out of India where shortwave and medium-wave [AM] rollouts are underway, as the entire country converts to DRM, the consortium is confident that India will create a huge market for receiver manufacturers. With the leadership of the receiver task force, the commitment of the India government and All India Radio, and the chips etc. folks behind all of this, we could well see a big breakthrough for DRM."

DRM architecture permits up to four program channels per frequency, giving broadcasters multilingual capability or the opportunity to reach out to niche markets and audiences. Multimedia applications like Journaline, a Unicode-based text information service, and TPEG/TMC, a traffic information system, enable additional information to be sent via terrestrial broadcasts.

One of the biggest challenges for DRM30, an open digital standard for frequencies below 30 MHz, seems to be the availability of inexpensive receivers. DRM Consortium Chair Ruxandra Obreja said at the NAB Show that fewer than 4,000 receivers have been built, and many of these are software-based.

In developing nations, cost is a key factor in deployment. The least-expensive receiver is selling for $100, while the goal is to bring the retail price down to $50. Success comes down to economy of scale. Allen Liang, sales vice president of Chengdu Newstar Electronics, said, "If an order of 5,000 receivers is placed, that price can drop to $75. A $50 price point is possible for larger orders."

FUNDING LIMITS

Obreja, who also heads the digital radio development for the BBC World Service, said part of the problem lies in a lack of vision on the part of some governments.

"They are spending considerable money to build stations which transmit DRM30, but are unwilling to subsidize a DRM receiver company." She said many religious broadcasters build and donate receivers to listeners to build an audi-

(continued on page 5)

ABOUT DRM

Founded in 1998 to promote adoption of the Digital Radio Mondiale standards worldwide, the DRM Consortium is a non-profit organization with 100 members, including broadcasters, manufacturers, regulators and research institutes.

DRM is an open digital radio standard for all frequency bands. DRM30 covers frequencies below 30 MHz, including the LW, MW and SW bands. DRM+ is for frequencies above 30 MHz, including the FM broadcast band.

Countries with regular DRM30/DRM+ service include Austria, France, Germany, India, Australia, Canada and the UK. Trials and/or decisions to use DRM30/DRM+ are underway in Denmark, Hungary, Nigeria, China, Brazil, Mexico and the U.S.

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World Radio History

Why Axia and Ravenna Hooked Up

Will an Interoperability Mindset Catch on Among Purveyors of Products and Protocols?

Interoperability is a goal for many people who use IP-based pro audio networking. Here and in future stories we'll explore what this means for facility managers.

The trend is exemplified by recent news that Livewire and Ravenna protocols will talk to one another.

Ravenna was established in 2010 by ALC NetworX, which is owned by German console company Lawo. Livewire was launched seven years earlier by Axia Audio, part of the Telos Alliance and based in the United States.

I asked Axia President Mike Dosch why their arrangement makes sense; after all, it seems the two should be competitors. He said it benefits customers because it broadens the number of devices that can communicate on the network. It helps the equipment companies because, frankly, more connectivity means more sales.

It's an interesting case study in how manufacturers that have been competing with their own realms and protocols find it appropriate to step across the convention aisle and chat a bit. Will the interoperability mindset catch on among other purveyors of products and protocols? There are developments in that area too.

MASTER CLOCK

To be specific, Axia chose IEEE 1588-2008 as the primary synchronization standard for its new xNode IP-Audio Interfaces. This means the nodes can interact with Ravenna-enabled devices.

Dosch said that a goal of Livewire development has been to rely on "off-the-shelf" technology rather than proprietary components, but a suitable master clocking system didn't exist earlier so Livewire built its own.

A subsequent IEEE effort produced a clocking scheme distributed by the Ethernet master switch "fabric." And when Axia was looking to enhance Livewire, it spotted Ravenna, which uses 1588.

Dosch liked Lawo's philosophy of following as many open standards as possible. "If you try to compete on the idea that you have a better network than anyone else, you're doing the market a disservice because it's not compatible. Avoid proprietary protocols. ... Instead of doing that work on our own protocol, we've worked with them to reshape Ravenna into becoming what we think 'Livewire 2' would have been."

Axia, he said, will put both Livewire and Ravenna into future products. "But the direction we're moving, and the direction we're pushing even our manufacturing partners, is to move toward Ravenna because of the clocking technology."

Currently, he believes about 3,000 radio studios have Axia AoIP networks, and 25,000 devices in the field are Livewire-equipped. Some 41 companies make gear that can "talk" with Livewire; those products include automation systems, sound cards, processors and transmitters. Meanwhile ALC NetworX says Ravenna, which is an open technology standard without proprietary licensing, is implemented by 14 partners that include Lawo as well as companies like AEQ, Digigram, Genelec, Sound4 and now the Telos Alliance companies (Telos, Omnia, Axia, Linear Acoustic).

This announcement seems indicative of the direction that networking in general could be headed.

So now, if you have a digital microphone made by Ravenna partner Neumann and you want to hang it on a Livewire network, you can do so via an xNode that provides the clock translation. (These nodes can slave to an external clock for their reference; a big facility with a lot of Ravenna devices might need to do that. But the node can support enough devices itself so that most radio stations probably wouldn't need an external master, Dosch said.)

The agreement expands the universe of pro products that can be networked to about 70; and you can assume the two companies will be trying to grow the number of partners and interoperable products.

What about the matter of competition?

"A Euro customer wants to use a Telos phone system and Omnia processor on their Ravenna network but would not be able to do it in the IP environment," he said. "Now the customer doesn't have to choose sides based on which partner companies he wants to work with. ... We'll compete on other values, other attributes, better consoles, more interesting features. We're not competing on the basis of having a closed network that only belongs to us."

X192

This announcement seems indicative of the direction that networking in general could be headed.

The Audio Engineering Society Standards Committee recently chartered a task group to develop an interoperability standard for high-performance media networking. For now the project has been designated AES-X192 (the final product name will take the form AESxx, where xx is some yet-to-be assigned two-digit number).

The project is managed by Kevin Gross of AVA Networks, who developed the CobraNet standard. He told me the X192 effort has about 100 members and that the most active participants include Axia, ALC NetworX, QSC Audio Products, IRT, the BBC, the EBU, Swedish Radio, AudioScience and Clair Brothers. Costs are borne by AES, Axia Audio, AVA Networks and QSC.

The initiative aims to figure out how various proprietary and standard protocols could be interoperable. Gross said protocols of possible interest include Ravenna, Livewire, Wheatnet-IP, Dante, AVB, Q-LAN and N/ACIP.

"Inclusion as an X192 protocol of interest doesn't mean that that protocol will become interoperable — that's dependent on the protocol's purveyor making the necessary and presumably modest changes required to do things in an interoperable way," he said. "Telos and Ravenna have thus far been the most proactive in this regard."

Dosch thinks the X192 standard will be ratified within a year or so and "is going to look very much like Ravenna and Livewire." For his company, he imagines a time when Axia products will have three logos on the rear — for Livewire, Ravenna and the yet-to-be-developed AES standard. "Let's use the network to connect devices, not preclude devices."

I've heard engineers say that such interoperability is much to be desired. Will other companies move in that direction? Will some version of an AES-X192 logo become a gold standard for IP audio interoperability someday soon? We'll be asking that question and others. Stay tuned.

FROM THE EDITOR

Paul McLane

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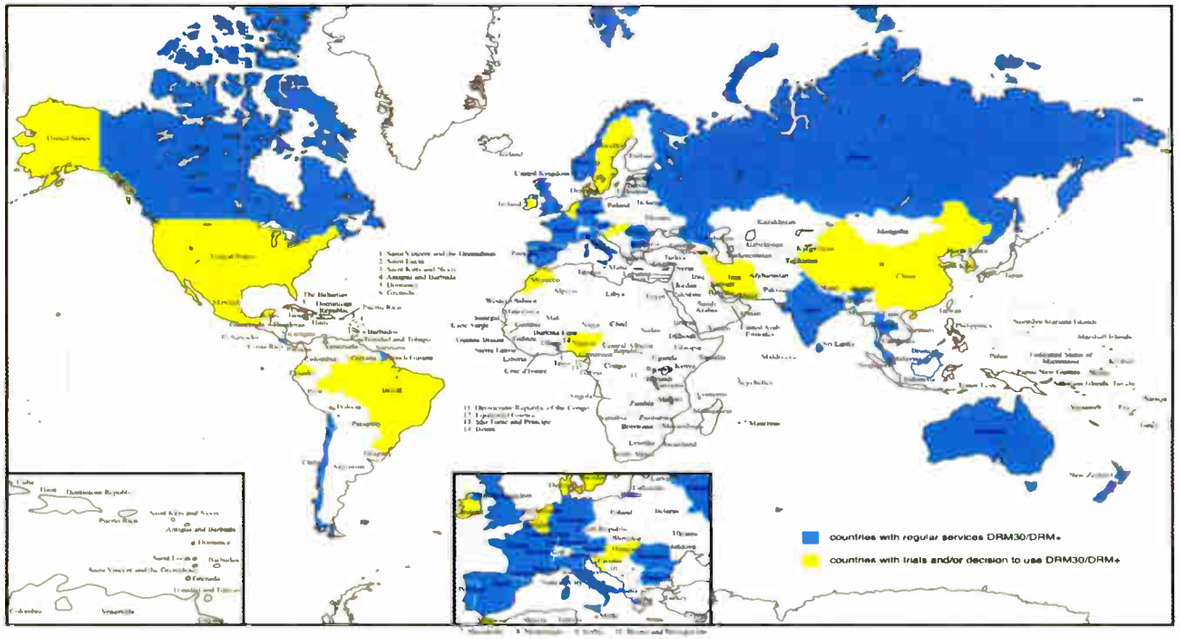
DRM IN THE WORLD



Courtesy Nautel

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DRM

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ence, a concept that could be adopted in the DRM community. Since the DRM+ standard only recently has been approved, no receivers are in production, although prototypes have been developed.

The DRM Consortium has developed "feature profiles" for manufacturers. These specify the minimum functionality to be expected for both standard and rich-media radio receivers. Standard receivers offer DRM reception in medium-wave, shortwave and FM bands, stereo decoding, as well as the emergency warning feature and text message display. Rich media receivers also include Journaline, electronic program guide and slide show presentations. There is also a receiver that can display Diveemo, a small-scale video application that can be broadcast over DRM30. Newstar Electronics DR111 standard and Uniwave rich media DRM receivers were displayed at the NAB Show.

DRM30 also can be used for program distribution and as a bridge to FM technology. Radio New Zealand International installed a 100 kW DRM shortwave broadcast transmitter in Raingitaiki in 2005. RNZI broadcasts 20 hours per day in DRM to all the Pacific islands. Receivers on the islands convert the RNZI signal to FM.

RNZI's low-power DRM-FM rebroadcast systems include an outdoor setup and may be solar-powered. A minimum of infrastructure is required, as the DRM receiver chipset includes two FM exciters. On smaller islands, a self-standing system is employed, while the RNZI rebroadcasts are integrated into local programming at the larger stations. The system provides two FM channels for local services.

DRM is the only digital broadcasting system designed to operate in the shortwave bands (3-30 MHz), and as the spectrum has become more crowded, there has been interest in using frequencies above 26 MHz for DRM30, according to the DRM Consortium. The ITU-R Working Party 6A has studied the concept.

The 26 MHz band is a 430 kHz wide

(continued on page 8)

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World Radio History

DIGITAL

(continued from page 1)

Beginning his survey in the Americas, Redmond finds some success in the introduction of HD Radio in the U.S. and its eventual selection as the digital radio standard for both FM and AM broadcasts. Since the rollout began in 2004, more than 2,000 stations — mostly FMs — are on the air with IBOC, reaching 249 million potential listeners. More than 1,300 multicast stations are being broadcast. By the international measures of digital radio adoption, he says these are good numbers in that time frame.

Canada, known in the 1990s as a strong proponent of Eureka-147, began winding down its L-band DAB network beginning in 2010 due to a lack of compelling unique programming and affordable receivers. Trials of HD Radio have been underway since 2006 but a national rollout of IBOC hasn't been planned.

"I wouldn't say it's a full-scale adoption," Redmond said, but he predicts that Canada will eventually move to HD Radio due to significant economic advantages to be realized by aligning with the larger U.S. consumer electronics market.

South of the border, Redmond sees a clearer picture. "After a number of trials and tests, HD Radio has been adopted" in Mexico last year, and he reports that approximately 20 stations are on the air or under construction in some of the largest cities.

In Brazil, HD trials have been underway since 2005 and now involve about 25 stations. The Communications Ministry is set to endorse a national standard formally later this year, but recent interest in DRM30 for AM stations has led to consideration of that system as well. Because of this, Redmond believes, "there may possibly be multiple standards for Brazil."

CENTRAL AMERICA

Smaller hubs of digital radio activity ring the Caribbean, with Puerto Rico, Panama, the Dominican Republic and Jamaica having authorized HD Radio. Colombia is conducting trials. The rest of Latin America is "still in the preliminary or trial phases" of digital radio adoption, according to Redmond.

Although there are a few broadcasters in the Americas operating shortwave services on DRM30, Redmond says HD Radio has a clear advantage in the region. He attributes this to similarities in regulatory and structural conditions that led to a system where individual broadcasters manage both their own transmission systems and programming, instead of large broadcast system operators leasing capacity on their network to independent program providers as is common elsewhere.

In the Asia Pacific region, Redmond finds an example of a digital rollout that others would do well to follow. "If one country, in my opinion, got it right," he observes, "it would be Australia." The introduction of DAB+ just a few years ago has been a great success, with full-power systems built out in five cities covering 60 percent of the population and attracting more than 1 million weekly listeners.

If one country, in my opinion, got it right, it would be Australia.

– Rich Redmond

Critical to the rate of adoption, Redmond believes, is the "significant number of receivers" available to consumers, with more than 100 models offered through 800 local retailers and online. More than 600,000 receivers had been sold through September 2011, he says.

But perhaps an even more important factor in the success of the Australian digital radio launch was the cooperation and commitment of all the parties involved.

"There was a concerted effort to provide a unified service" on the part of government regulators and both public service and commercial broadcasters, Redmond said. All aspects of the new service, including spectrum policy, transmission system design, the creation of digital-only programming, receiver availability and the marketing and public relations strategy were coordinated among the stakeholders.

In mainland China DAB, DRM and HD Radio technologies are all in play, although in Redmond's estimation "DAB is the most dominant." Chinese regulators approved the technology in 2006 and DAB/DMB services are now on the air in 11 cities, with a push to include receivers in cellphones and launch innovative new services. In Beijing, the largest local broadcaster has launched a DAB-based service called "Push Radio" that enables receivers to download audio from 25 program channels for later on-demand listening.

Although it has been in use on short- and medium-wave broadcasts in China for the past 10 years, Redmond said that the DRM system has struggled to win consumer adoption due to limited receiver choices and availability. Recently iBiquity has entered the fray, partnering with a Chinese technology firm to commercialize a China-specific digital radio system following HD Radio trials in 2008 and 2009.

Elsewhere in Asia, DAB systems are in use in Hong Kong, Indonesia, Malaysia and Laos; HD Radio is on the air in the Philippines, Thailand and Bangladesh.

DRM30

DRM30 is deployed on shortwave stations throughout the region, including Malaysia, Thailand and India. Government broadcaster All India Radio has broadened its commitment to DRM by announcing plans to add new shortwave transmitters and to replace all analog medium-wave transmitters with digital units. In Redmond's view, India represents "one of the largest potential areas for DRM deployment" in the world.

Redmond noted the breakout success that one Asian country has experienced with digital broadcasting.

"South Korea is the largest deployment of DMB in the world," he said, highlighting the 27 million receivers purchased by Korean consumers. Most of these are used to receive mobile TV broadcasts, but the importance of these devices to the overall viability of the technology cannot be overstated. Redmond observes that "the DAB family of standards has the widest availability of cost-effective receivers" due in large part to the South Korean market.

More than 20 years ago, European engineers began developing a digital replacement for analog radio systems, so it's not surprising that some of the biggest successes have come from this region.

The United Kingdom is the poster child for digital success. Britain's DAB network "has been held out as the largest and leading deployment of digital radio" in the world, according to Redmond. But even there, significant obstacles needed to be overcome to get to this point.

Technological progress has alleviated many of the downsides of early DAB receivers, allowing part count, circuit complexity, weight, power requirements and cost all to decrease. Even "car radios are now becoming more available," notes Redmond.

But by far the most significant factor in Britain's digital success was the stead-

(continued on page 8)

THREE DIGITAL RADIO TECHNOLOGIES

Three main technologies are in use in various countries for terrestrial digital radio services. They share some aspects, such as the use of Coded Orthogonal Frequency-Division Multiplexing modulation techniques for reliable mobile reception and (in current incarnations) the use of high-efficiency audio codecs based on the MPEG HE-AAC format, but each also has unique characteristics driven primarily by spectrum and regulatory constraints.

HD Radio, developed by iBiquity Corp. and its precursors USA Digital Radio and Lucent Digital Radio, is designed to work within the FM band without requiring additional spectrum allocations. Digital sidebands are broadcast within the authorized spectrum mask of a 200-MHz channel alongside an analog FM signal, enabling backward compatibility with analog receivers while offering multichannel audio and robust data services in the digital portion of the signal. A variant of the system designed for AM broadcasting on MW bands offers similar backwards compatibility and spectrum efficiency advantages for a single digital audio service, adding additional digital carriers underneath the AM carrier to deliver roughly half of the FM system's data throughput within a much smaller 30 kHz occupied bandwidth.

The **"DAB Family"** of systems includes the original DAB, DAB+ and DMB variants. Designed for deployment on VHF Band III (174–216 MHz, occupied by TV Channels 7–13 in the U.S.) or L-Band frequencies (1450–1500 MHz) for terrestrial use, all three systems package several individual services into a single 1.5-MHz "ensemble," or multiplex. DAB, also known as Eureka-147, uses MPEG-1 Layer 2 audio coding, DAB+ uses more efficient HE-AAC coding, and DMB supports AVC (MPEG-4) mobile video in addition to audio services.

Digital Radio Mondiale was originally developed to revitalize transmitting bands under 30 MHz, which are particularly challenged by susceptibility to environmental noise, fading, narrow channel bandwidth, and skywave interference from distant stations. This system, now called DRM30, operates on SW and MW bands in standard 9- or 10 kHz channels or in wider 18 or 20 kHz allocations for increased data rate or robustness. A newer variant of the system called DRM+ offers a significantly higher data rate on 100-kHz VHF channels, enabling multicast audio, data services and a "simulcast" mode to support migration from analog to digital in the FM band.

— *Daniel Mansergh*

World Radio History

1664: Just what it looks like. Two tin cups and a string. But it transmitted sound!

1876: Alexander Graham Bell's commercially viable telephone.

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1920: Every home is working toward having a telephone!

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World Radio History

DIGITAL

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fast commitment of the BBC to DAB and introduction of digital-only services such as Radio 7 that drove consumer demand for receivers. Adoption has been so strong that British regulators are now considering an analog sunset date.

Another early proponent of DAB has had to rethink its strategy after tepid consumer adoption of the previous digital service. With the national re-launch of DAB+ last year, both public and commercial broadcasters in Germany have been driving the move to digital, Redmond said. They have formed a unique public-private partnership with government financing to fund the construction of a national multiplex with enough capacity to serve both public and commercial broadcasters. Additional support from the government in the form of a digital receiver requirement in the latest Telecommunications Law is being drafted.

Individual countries' response to the costs of digital migration can vary widely. In France, although the DMB standard had been approved and launch plans were in place, a digital rollout has been "delayed due to the economic crisis," Redmond says. Now that a formal report outlining the causes of the delay has been completed, a new series of digital trials have been planned with the intent to jumpstart the migration process.

However, a daily newspaper reported in July the new French government believes digital radio is too expensive and may decide not to preempt digital radio frequencies for public broadcaster Radio France. French media awaited official word from the government.

Norway, on the other hand, was one of the first countries to deploy DAB, and has now set a firm analog switch-off date in 2017 provided certain coverage thresholds have been met. The reason for the aggressive timeline comes down to Euros and cents. As Redmond puts it, "the digital future is significantly less expensive to operate, especially with shared transmission."

Denmark is another success story, boasting the "highest number of DAB users per capita in the world," according to Redmond, while Switzerland counters with claims of "the best coverage in Europe." Both countries are considering an analog sunset, with Switzerland already migrating its nationwide AM network to DAB with significant operating cost reductions in power alone.

DAB services are also deployed in the Netherlands, the Czech Republic, Hungary, Poland, Belgium, Spain and Sweden. HD Radio trials have been conducted in Switzerland, Bosnia, Ukraine, Poland and Romania.

The Russian Federation has announced plans to convert all analog long-, short- and medium-wave broadcasts to DRM30, Redmond notes, and DRM shortwave broadcasts are regularly scheduled in the larger regions of Europe, Africa and the Middle East.

In summary, Redmond sees significant growth in digital broadcasting in the 20 years of its existence. Internationally, "the DAB family of standards is in a leadership position," he said; HD Radio is particularly strong in the Americas, and DRM is gaining support in BRIC countries Brazil, India and Russia. In his opinion, adoption rates for digital radio worldwide will continue to be modest unless government mandates are enacted to spur the transition

Even this proponent of digital technology recognizes that it will take a lot more time to realize a completely digital future. Although millions of listeners can now enjoy the benefits of digital radio, Redmond cautions, "We can't forget that the majority of listeners around the globe are analog."

DRM

(continued from page 5)

broadcasting service allocation at the upper end of the high-frequency range, providing forty-two 10 kHz (or 21 x 20 kHz) channels that are currently allocated for broadcasting. International broadcasters however tend to favor the lower frequency broadcast bands below 21 MHz, partly because low-cost HF receivers do not pick up the 26 MHz band, and partly because there are few times in the 11-year solar sunspot cycle when the band supports long-range propagation.

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FM CHIPS: Prior to a meeting at the FCC over the issue of embedding FM chips in cellphones, NAB and its counterpart for the wireless industry, CTIA, disagreed on how many cellphones and other mobile devices on the U.S. market contain working FM chips. During a congressional hearing, CTIA estimated the number at 59 models; NAB believes it's far fewer. A CTIA official did not address RW's query about whose figures were accurate but said: "What seems to be lost on NAB, yet is evident to everyone else, is that consumers have numerous opportunities to purchase wireless devices with FM radio capabilities."

ONLINE PUBLIC FILES: The FCC denied NAB's request to stay the Aug. 2 implementation of new online public file rules for television stations, an issue also being watched for future expansion to radio. Anticipating the FCC's rejection, NAB asked a federal appeals court to stay the activation of the rules while the court considers NAB's request.

HD RADIO: The needle of HD Radio awareness isn't moving much as the recession continues to starve marketing budgets. So says programming consultant Alan Burns in a study of 2,000 women who listen to hot AC and CHR stations. About 25 percent have heard of HD Radio, which is flat compared to 2011.

MINORITY OWNERSHIP: The possible return of the minority tax certificate program to boost minority ownership received attention at an FCC reform hearing in July. FCC Commissioners Robert McDowell and Jessica Rosenworcel called for incentives for station owners to sell to minorities and women — such as congressional approval to bring back the minority tax certificate program, in place from 1978 to 1995. The commission is gathering data and finishing studies on possible incentives.

EAS: Bravo Broadcasting Co. faces an $8,000 fine for not having working EAS equipment at KIRT(AM), Mission, Texas. During an inspection, the firm admitted the station had not had EAS equipment since 2009 and had no EAS logs; the broadcaster told the commission it purchased new EAS equipment this March. KIRT can appeal or pay; it must also submit a sworn statement within 30 days that working gear has been installed.

SIRIUSXM: The satcaster expects its net new subscriber growth to approach 1.6 million, up from an earlier projection of 1.3 million for 2012. The company added about 622,000 net subscribers in the second quarter, up 38 percent from 452,000 added in the quarter a year ago. The company had 22.9 million subscribers as of June 30. The subscriber boost led the company to raise its revenue guidance to approach $3.4 billion, from $3.3 billion, in 2012. SiriusXM plans to release second quarter financial results on Aug. 7.

PURE: Radio designer and manufacturer Pure released an iPod, iPhone, iPad music dock with FM radio, called Contour 100i. With the companion Pure Lounge App, Contour 100i users

can access 18,000 Internet radio stations, on-demand programs, podcasts and ambient sounds. Pure Contour 100i also includes a slim line remote, two alarms, sleep and snooze timers, an Aux-input for MP3 player connection and a headphone jack. Contour 100i lists for $189 and is available from *brookstone.com* and *pure.com*.

TOWER FINE: The FCC upheld a $13,000 fine for tower owner James Davis for lighting and painting violations as well as not notifying the commission the structure's ownership had changed. Davis originally was fined in May; the FCC said in July Davis had not responded to the notice, which has now progressed to a forfeiture. Clear Channel sold the AM tower in Hearne, Texas, to Davis in 2008, according to the FCC. Davis had 30 days to pay and submit a sworn statement to the Enforcement Bureau specifying what steps have been taken to bring the tower into compliance with lighting and painting rules.

PIRATE FINE: The commission levied a $10,000 penalty against Michael Gregory for operating pirate station "Down South Radio 305" on 92.7 MHz in Miami. Agents tied Gregory to *www.whvy927.com* by finding his domain name registration as well as his photo online. They found Gregory, who admitted to operating the illegal station, and turned off the transmitter. He was given 30 days to appeal or pay the fine.

World Radio History

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World Radio History

MEET THE NEW AXIA xNODES!

IP-AUDIO JUST GOT AN UPGRADE.

Everybody knows that Axia introduced broadcasters to IP-Audio in 2003. 3,000 studios and 30,000 connected devices later, the competitors who said "it'll never work" are now eating their words. How do you follow up that sort of success? If you're us, you open up a case of Monster and go back to work. So we did.

The result: Axia xNodes, smart new AoIP interfaces that transform your audio devices into an intelligent network. Use them to turn analog, digital or mic-level signals into routable IP-Audio, with associated GPIO logic. They're so advanced, they won two major awards at their NAB debut.

WHAT CAN YOU DO WITH THEM? HERE ARE A FEW IDEAS.

» **BUILD A ROUTING SWITCHER.** One stand-alone xNode is an 8x8 (4x4 stereo) routing switcher. Connect 8 xNodes to a switch and make a 64x64 routing switcher. Need more I/O? Connect more xNodes. Like all Ethernet-based networks, Axia systems are naturally scalable, up to 10,000 stereo signals (plus logic).

» **STL OVER IP.** Today's cluttered RF spectrum makes IP a great alternative. Put an xNode at either end of a fiber run, OC-3 circuit or a pair of inexpensive Ethernet radios to send eight channels of uncompressed audio to your TX – and get eight channels of audio backhaul too.

» **SAY SO LONG TO SOUND CARDS.** PCI, PCIe, USB3, FireWire... who needs 'em? Load the Axia IP-Audio Driver onto your PC workstation and connect it to an xNode to get eight professional, balanced outputs and eight inputs. Use an industry-standard DB-25 breakout cable for pro XLR connections. You'll get studio-quality audio and save some green, too.

» **ADD MICS TO THE MIX.** xNodes make awesome multiple Mic preamps. They have ultra-low-noise, ultra-high-headroom, studio-grade preamps with selectable Phantom power. Put your Mics in, bring your analog line level out. And that IP-Audio network jack? Ready to be used whenever you upgrade to a full IP-Audio network.

» **MAKE AN A/D/A.** Take one analog and one AES/EBU xNode and rack-mount them side by side. Voila! Eight precision A/D converters and eight precision D/A converters, in just 1RU. Studio-grade, 48 kHz, 24-bit Delta-Sigma A/D and D/A convertors, with 256x oversampling, make difference you can hear.

» **SLIM DOWN YOUR SNAKE.** Connect two analog or AES xNodes with a single Ethernet cable for an instant 8x8 bi-directional snake and bid the multi-pair bundle goodbye. Add a few more xNodes on each end for a 16x16, 32x32 or 64x64 snake. Use off-the-shelf media converters for long-haul fiber connections.

XNODES ARE SMALL. Mount them on your wall, under the counter — mount 'em on the ceiling if you like. Optional rack- and wall-mount kits provide plenty of options.

CONFIDENCE METERS on every xNode mean you'll never have to wonder where the audio's at. Audio presence and levels are both displayed at a glance.

INFORMATION OVERLOAD? Not here. Sharp, high-rez OLED displays put all the information you need right on the front panel, without the need for a distracting multi-colored lightshow.

xNODES WORK WITH BOTH LIVEWIRE AND RAVENNA AoIP networks — making them compatible with IP-Audio gear from over 40 major broadcast companies.

Livewire RAVENNA

NO NOISY FANS HERE. Front-mounted heat s
xNodes calm, cool and collected using air-conditio
air (instead of that hot air in the back of the rack)

NOT AT
an xNo
entire
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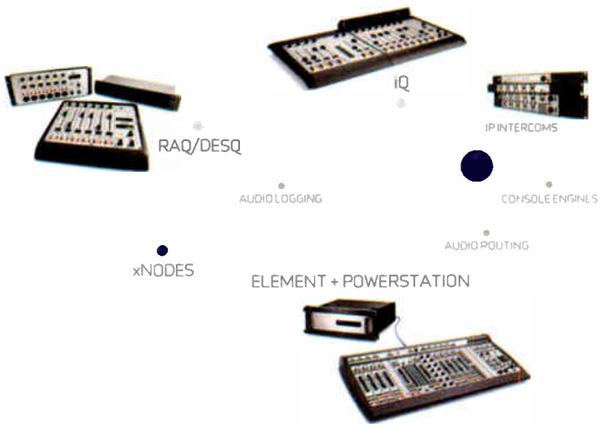
RAVENNA™ ALC NetworX GmbH

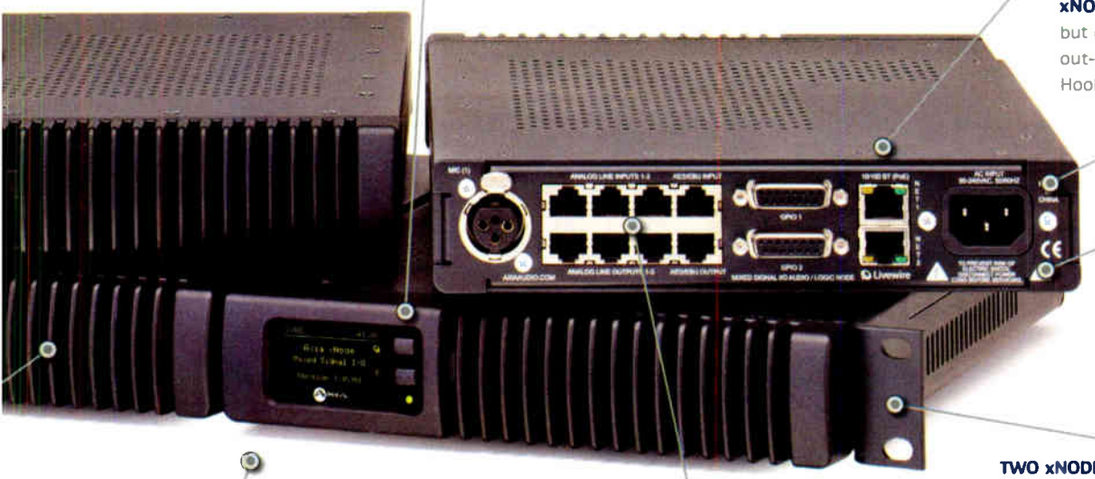
World Radio History



RJ45 OR DB-25? xNodes give you I/O both ways, so you can choose whichever industry-standard breakout cable you prefer.

DUAL ETHERNET PORTS for redundant network links. The overnight jock kicks out a connection? No problem; the other one takes over so your programming never skips a beat.

FAST, ONE-BUTTON SETUP. Hit the switch and plug 'em in — your xNodes will be streaming audio in under 30 seconds.



xNODES HAVE AUTORANGING INTERNAL POWER SUPPLIES, but can use PoE (Power over Ethernet) too. Perfect for those out-of-the-way places where a power cable is inconvenient. Hook 'em both up for redundant, auto-switching backup power.

VERY VERSATILE. 5 different xNodes handle nearly any signal type. AES/EBU, Analog, Microphone and GPIO xNodes are perfect when you've got a lot of one audio type to work with. But what if you need a little of everything? This is the Mixed Signal xNode. Think of it as your utility MVP, with a switchable Mic/line input, 2 dedicated analog ins, 3 analog outs, a digital AES/EBU input and output, and 2 GPIO logic ports.

TWO xNODES MOUNT SIDE-BY-SIDE, so you can create your own custom mix of I/O types within a single rack space. Pair up an AES/EBU xNode with a microphone xNode, or match a GPIO xNode with an analog unit. Or combine a couple of Mixed Signal xNodes for the ultimate mix of mic, analog, AES3, Analog and logic I/O.

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MONO OR STEREO ROUTING. Choose from 8-in, 8-out mono operation or 4-in, 4-out stereo. Both signals intermix seamlessly on your Axia network.

HE OFFICE? No problem; built-in webserver lets you manage from anywhere. Or, use Axia iProbe software to manage your ility – back-up and restore settings, automatically update and more.

AxiaAudio.com/xNodes

World Radio History

His Antenna Monitor Readings Changed

Also, Thoughts on Maintaining Phasors Using IR Thermometers

WORKBENCH
by John Bisset
Read more Workbench articles online at radioworld.com

Greg Richwine is a contract engineer out of Elkhart, Iowa. Greg just added his first AM directional to his list of clients. Of course, right out of the box, he had one of those head-scratching problems that we discussed in a previous column, related to regular inspection of the phasor and ATU cabinets.

When Greg took over the station, the array was in good shape; that is, until one tower's antenna monitor readings changed dramatically. Attention, engineers new to AM directionals: Big changes like that are usually not seasonal ones.

Greg checked the doghouses, expecting to find a roasted critter or blown capacitor, but there was neither. So he opened the phasor cabinets and found the shorting bar (J-plug) had fallen out of the J-plug jack feeding the tower in question, as shown in Fig. 1.

Over the years, the RF contactor's constant clanging pushed the shorting bar out of its socket. That fix was quick, but Greg spent a lot more time taking pictures, tightening loose hardware — note the loose nuts lying on the cabinet floor — and checking the RF contactors. His inspection of the contactors included replacing the finger stock contact cup on one contactor that had lost half its spring fingers.

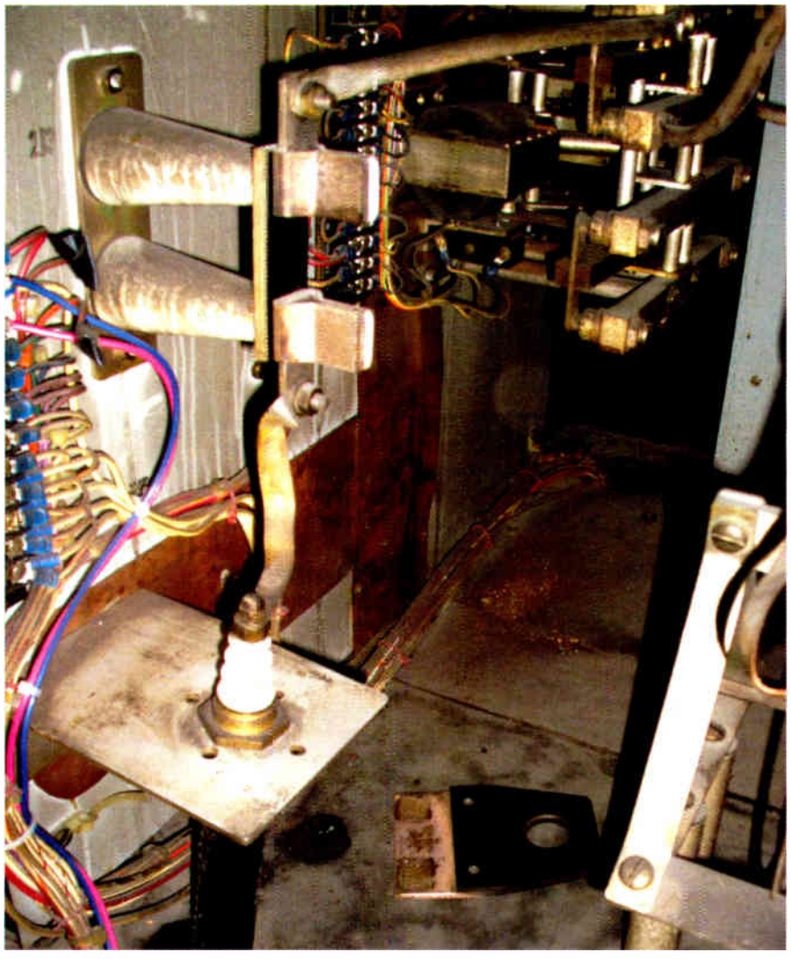

Fig. 1: Look for the obvious — in this case, a J-plug has fallen out of its jack.

Another notable aspect of this picture is the pile of shavings on the cabinet floor under the contactor. The manufacturer's specs for the contactor indicate that the contacts are made of beryllium copper; knowing beryllium is a carcinogen, Greg did not simply sweep or vacuum up the shavings. Instead, he hosed down the area with Formula 409, wiped up the wet shavings and disposed of it all in a bag.

Later, Greg also used 409 and a Scotch-Brite pad on the meter jack ceramic insulators in the picture. This station had a studio fire in the '70s, and the soot from the burned Fidelipac 300 carts still covered the inside of the phasor components ... a mess that will have to be completed in the months ahead. Keep in mind that insulators aren't efficient when they are covered with grime.

Greg, this is a great maintenance plan.

Workbench readers, keep snapping those pictures. You dramatically reduce your liability by photo-documenting the condition of things before you start working on them, especially if you are a contract engineer. Don't let it be your word against someone else's. Back it up with photos.

Have you experienced a situation in which photos saved your hide? Drop me a line and tell me about it: *johnpbisset@gmail.com*. And include a high-resolution photo, too.

Greg Richwine can be reached at *gmsnrich@huxcomm.net*.

Consulting Engineer Tim Sawyer posted a comment to the online version of the July 4 *Workbench*, regarding what's lurking inside electrical boxes. Tim writes that it's not just heated components inside the electrical box that the engineer needs to worry about.

As suggested in that column, Tim has often used a "spot infrared thermometer" with a spot/distance ratio of 1:8 or better (8-inch distance = 1-inch spot) elsewhere at the transmitter site.

Both Tim and Cris Alexander, Crawford Broadcasting's director of engineering and a Radio World contributor, have found these infrared thermometers great for checking tuning coils and other RF components for overheating in a phasor or tuning unit. It would have been interesting to see the heat generated in Greg Richwine's experience of burnt RF contactor finger stock.

Another consideration is that the high RF field interferes with the readings. If you have found one of these thermometers

(continued on page 22)

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World Radio History

Remaking Radio, With a Visual Slant

Two Ways That Stations Add Words and Images to Their On-Air Presence

BY TOM VERNON

Radio. It's not just about sound coming out of speakers. While the core function of radio is and always has been audio, graphics and multimedia are now part of the mix. If your station is only transmitting audio signals, you may be missing out on new revenue streams and ways to reach your audience.

The topic was among sessions at this spring's NAB Show. A session on "Graphics for Radio" addressed a couple of ways that stations are adding words and images to their on-air presence.

A READABLE PRESENTATION

"Understanding and Deploying Radiotext Plus (RT+)" was the topic of a paper by Alan Jurison of Clear Channel Media and Entertainment, who has written extensively on this topic in Radio World.

RT+ is an additional RDS ODA data stream. It identifies the text that is being encoded in the 64-character RadioText (RT) field. Before the RT+ standard was developed, there was no way to understand the context of the 64-character RT field. With it, there is a way to classify types of information and its location within the RT datastream. RT+ is an open standard, free for all to use.

RT+ makes a huge contribution to the experience of the listener/viewer. By showing artist, song title, album and notes on separate areas of the display, it makes for a more readable presentation. It also enables the receiver to perform actions on RT, such as tagging a song for purchase, linking to a website, or calling a phone number.

Receiver manufacturers have been swift to introduce compliant equipment. Kenwood has supported RT+ on various FM receivers with RDS since 2007, including 13 models in 2011 and 18 for 2012. Apple's fifth-, sixth- and seventh-generation iPod Nanos are compliant.

Jurison notes that in addition to artist, title and album, there are more than 60 RT+ content types, meaning that we are just beginning to realize the potential of this technology. An area under development involves enabling RT+ receivers to work more closely with the Internet.

Communications Research Center Canada (CRC) released a free FM radio app called "FM Two O" for the Samsung Galaxy S Android smartphone with RT+ support. CRC showed a proof of concept that RT+ could be used to encode a URL, and listeners could click on it using the smartphone to visit a webpage. This technology can be used to tag URLs, phone numbers, addresses, etc. An added benefit to listeners are the links to relevant content, as well as the ability to interact with the station (i.e., call-in numbers, SMS/texting, email, etc). For advertisers, value is added by providing a link to their website or phone number during their commercials.

Communications Research Center Canada released a free FM radio app for the Samsung Galaxy S Android smartphone with RT+ support. For a link to more about the CRC research, see *radioworld.com/links*.

While the potential of RT+ is promising, its future is uncertain. Clear Channel Media + Entertainment has been active in deployment of RT+, with implementation on hundreds of stations. Other broadcasters have implemented RT+. Nevertheless, many stations in the United States do not encode RT+. Jurison believes the reasons include a limited understanding of, and lack of communication about, what the RT+ standard entails.

A robust RT+ environment requires the cooperation of station owners, automation system developers, third-party software and RDS encoder manufacturers, according to Jurison. More broadcasters deploying RDS and RT+ will drive the development of more receivers with support for these standards.

Some broadcast automation vendors still do not directly support RT+ encoder features. Jurison urges broadcasters to request that manufacturers add them, noting that customer demand will drive more rapid adoption. Ultimately, interoperability between automation systems, third-party software and RDS hardware manufacturers will improve. Most importantly, he says, RT+ compatibility should be a requirement for any new hardware or software purchases.

VIDEO ON A SMALL BUDGET

Gordon Burnett and A.J. Janitschek of Radio Free Asia gave a presentation called "Creating Web Video With Virtual (Few) Resources."

What began as experiments with webcasts to an audience primarily in southeast Asia has evolved into a commitment

(continued on page 22)

Inside the Radio Free Asia Web video control room. Shown on the monitor is Yun Samean of the Khmer Service.

World Radio History

ROC YOUR WORLD

The new ROC console from Logitek

The ROC is paired with the JetStream, a powerful 128-channel networked audio node.

When Logitek introduced its first ROC console back in the 1990s, it marked a revolution in audio console design. One of the industry's first router-based digital consoles, the original ROC boasted simple wiring and access to multiple sources at each fader.

Over the years, the router-plus-console Networked Audio concept has become the standard in console architecture. Although the original ROC was retired years ago, Logitek has continued to develop systems for both TDM and AoIP audio networking. The new ROC takes the best of the original design and pairs it with the latest technology and styling.

Available in multiples of 6 faders (up to 24), the ROC is housed in an attractive tabletop enclosure. Durable Penny & Giles faders, OLED source indication and intuitive controls make the ROC a natural for on-air, production rooms or even in temporary studio setups. Two monitor feeds, front panel headphone connection and user-assignable softkeys will please even your fussiest operators.

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World Radio History

Hamvention Continues to Pack 'Em In

BY JAMES E. O'NEAL

No motel rooms available for miles, packed restaurants, slow and heavy traffic—all typical occurrences for a particular early May weekend here in Dayton. It's the annual "Hamvention," regarded as *the hamfest* of hamfests, attracting radio amateurs from virtually every state in the nation and many foreign countries — more than 20,000 people most years. This is its 60th anniversary, and despite the poor economy, high cost of gasoline, and the growing popularity of wireless Internet communication around the world, the three-day, in-person event shows no signs of slowing down.

And while this year's show was a little less dramatic than the last — in 2011 someone out on the parking lot accidentally hacked into a sewer main while driving a tent stake — there was still plenty of action and excitement throughout its three-day run.

Once again, indoor booth space sold out, and most of the outdoor tailgating spaces were filled as well. Foot traffic was high inside Hara Arena, the venue for this ham radio show of shows, making it hard to get around, just like in the NAB Show's glory days. An untold number of dollars change hands here, both for the latest shiny new radio gear from commercial venders and for the "junk" offered up by the flea market entrepreneurs.

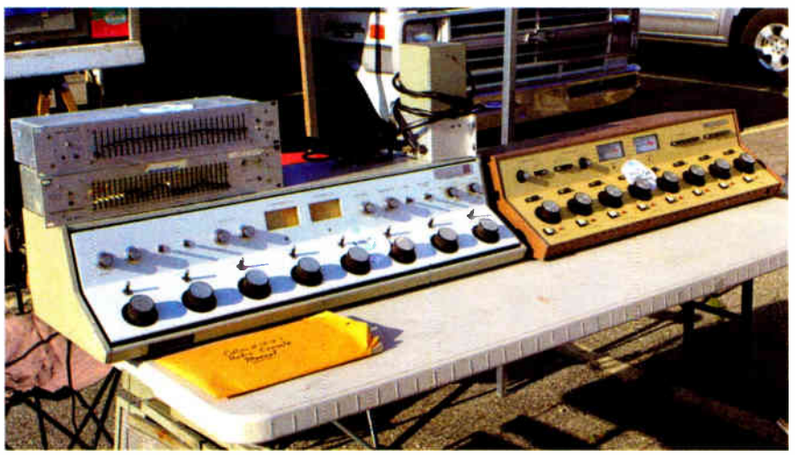
MANY THINGS TO MANY PEOPLE

So what's the attraction?

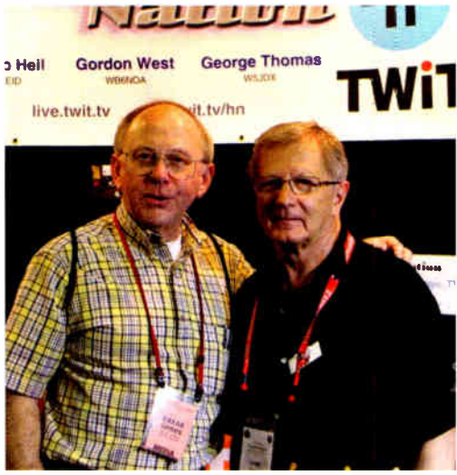
It's hard to say with any great degree of specificity. For many, it's a chance to browse the tents and tailgates, picking out some item that you coveted early in your ham experiences but couldn't afford; or maybe it's a part you desperately need in order to repair your 1960 Heathkit transmitter. For others, it's an opportunity to meet face-to-face some of those people with whom you've been "working" on the ham bands for years, but haven't met yet because you live a continent or a world away. For still others, it's a chance to show off your accomplishments in the area of

This sea of tents on the 2,000-vender space parking lot indicates the attraction of the annual Dayton Hamvention event.

If you build it (a better antenna), they will come! This young lady (YL) ham did and, as a result, had onlookers and shutter-clickers following wherever she went at the show. (No one was asking about gain or VSWR though.)



These consoles (Collins and Continental Electronics) and Urei equalizers were in somewhat better shape than some gear on display, attracting a lot of tire-kickers but no buyers, at least as of the second day of the show.



The Hamvention's Audio Arena is popular. Audio legend Bob Heil is one reason why. He's shown with the author recalling the influence that Paul Klipsch (of Klipschorn fame) had on him and his interest in playing theater organ.

Retired broadcast transmitters are relished by some hams who retune them for the HF bands and refer to them as 'big iron'. It's doubtful that Parker Gates would recognize this redecorated BC-1F as one of his own.

Yesteryear broadcast equipment was available to anyone wanting to pay the price. While this pair of RCA 16-inch transcription turntables have seen much better days and were all the worse for wear, the asking price was $1K each.

(continued on page 18)

World Radio History

SATELLITE SIGNAL LEVEL METER AND SAT IDENTIFIER

Our new "SAT-BUDDY" satellite signal level meter will measure 950 - 2150MHz L band signals. The unit powers the LNB, and provides digital signal measurement for carriers. The unit can

identify satellites by name, measure signal levels -70 to 10 dBm, plus display carrier-to-noise (C/N), signal quality, and Bit Error Rate. Confidently recognize the satellite a dish is aimed at, and peak the antenna to maximum performance.

SURGE SUPRESSOR FOR LIGHTNING NEAR SATELLITE ANTENNA

Place the "LNB-Zap-Stop" in the coaxial cable line that runs from the dish, to the satellite receiver. Think of it as an "insurance policy" to protect

expensive indoor equipment from lightning hits. Transient Suppressing Diode technology works to block high voltage surges. The lightning protection units can take multiple strikes, with no need for resetting or replacing.

COVERSAT AND HEATSAT MAKE YOUR DISH RELIABLE IN BAD WEATHER

The COVERsat will prevent most signal outages caused by snow and ice. It is wrapped over the front face of a dish, creating a steep and slippery surface to prevent the accumulation of ice & snow. The cover is made to exactly fit the customers specified dish type. The HEATsat satellite antenna

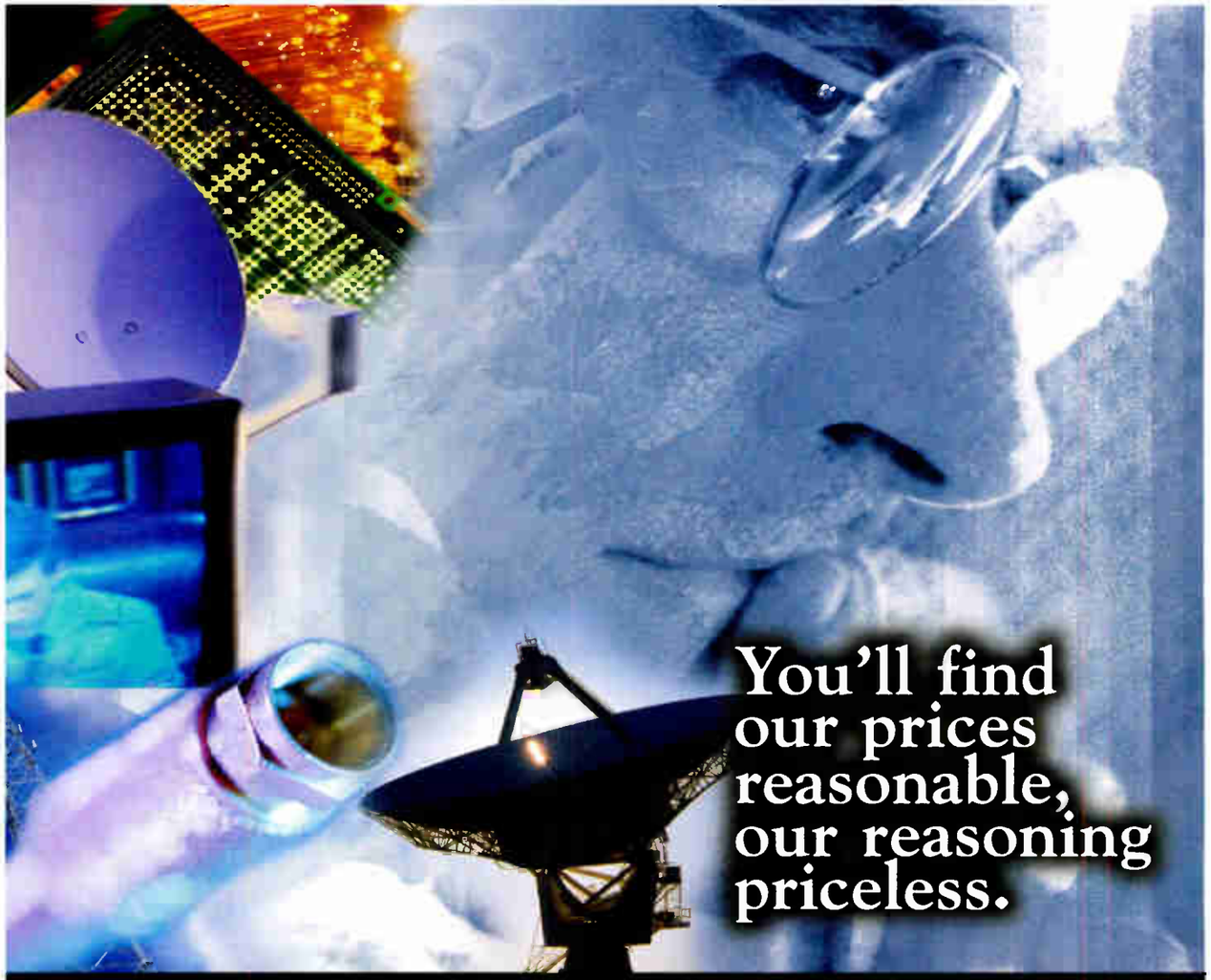
heater will completely stop signal outages caused by snow and ice. This reliable dish back-side electric heater keeps snow & ice from forming on the dish, by heating the reflector when snow and ice conditions are present. Purchase the HEATsat to upgrade existing satellite antennas, and ask for it to be included with your new dish purchases.

HD-GRADE SATELLITE LNB WILL BOOST EBNO ON RECEIVERS

Invest a FEW-HUNDRED-DOLLARS into upgrading your satellite antenna-mounted LNB, to the new DAWNco "L series" LNBs, and watch for improved EbNo readings on your digital satellite receivers. DAWNco's latest generation of C and Ku band LNBs have best-in-industry specs for "1dB gain compression." Install these units to make a real difference in the reception of HD and other MPEG4 or DVB-S2 satellite channels. Internal circuitry has been completely redesigned for reduced power draw, so that indoor receivers and power supplies will never be overtaxed. In order to prevent signal outages, when outdoor temperatures fluctuate, DAWNco's best LNBs feature a highly stable +/- 5 Khz rating.

IMPROVE RECEPTION WITH 3.7 METER SATELLITE DISH FOR LESS THAN $2K

Keep your dish cost under $2K, and permanently improve your satellite reception capability, with our fiberglass 3.7 meter satellite antenna. This is the perfect dish for rooftop or island locations, where the 8 petal design offers easy transport to site. Ground mount USA sites may prefer our HIGH-GAIN aluminum sat antennas, in sizes up to 5.0 meter. The customer will specify stationary or motorized configuration for the dish, and DAWNco offers all other items needed for a complete system.



You'll find our prices reasonable, our reasoning priceless.

Keeping track of all the satellite and fiber optic communications products out there is a full time job.

That's why so many people come to **DAWN**CO. They count on us for everything from satellite antennas, receivers, LNBs, and position controllers to fiber optic broadband links, satellite links and data links.

We offer the broadcast TV, cable TV, radio and educational fields high quality equipment at down-to-earth prices.

But more than equipment, we offer expertise. We can examine your situation and your budget, and recommend exactly what you need. You save both time and money by making the best possible buying decision.

Call a **DAWN**CO expert with your questions by simply dialing **800.866.6969**. Use the same number for our free catalog, or find it all on the web at www.**DAWN**CO.com.

DAWNCO

Reasonable prices, priceless reasoning.

World Radio History

HAMVENTION

(continued from page 18)

ham radio, or conversely, to view the absurd—cars so plastered with antennas that mpg is probably cut by 10 percent or so, or humans so bedecked with solar cells that they could probably supply the power needs of a third-world village. For some, it's an educational opportunity, with presentations on everything from digital radio to "Working DX From Your Bicycle."

The exhibits floor is an interesting mix of all the big manufacturers of ham-related gear — companies that publish books and periodicals for the amateur crowd — and niche groups such as the Morse Telegraph Club, which demonstrates what the Internet equivalent of a century and a half ago was all about. Conversely, others groups are there with information on amateur radio satellite communications, moonbounce, and the latest in digital radio technologies.

Such diverse groups as the Boy Scouts of America and Salvation Army have a presence at the Hamvention.

"I've been a scout for 27 years, a ham since 1995, and have been doing this booth for the past five years," said Matthew Murphy, a Scouts on the Air administrator. "Our mission is to encourage ham radio among scouts."

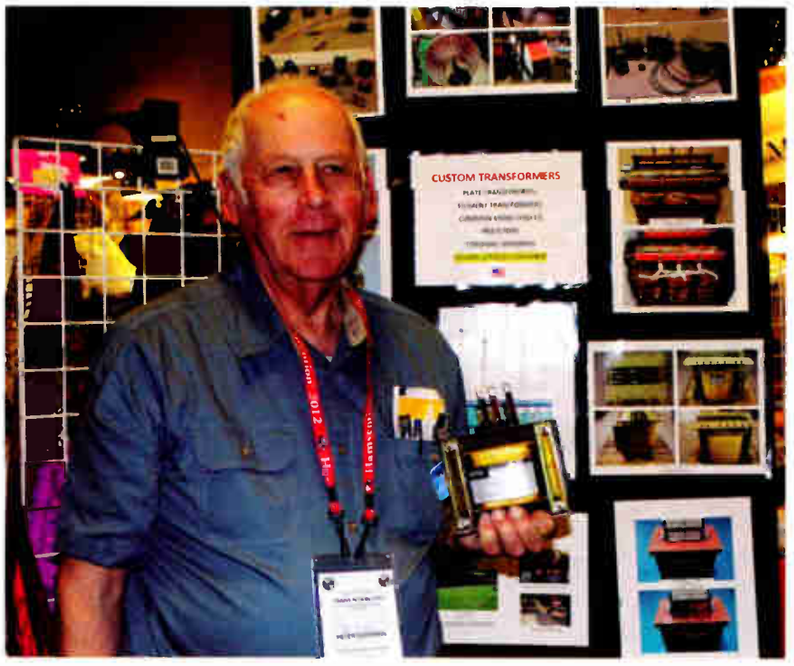
Scouts on the Air is a group dedicated to furthering amateur radio activity at Boy Scouts of America-owned camps and camping activities. Murphy said that he's looking forward to the next year's Boy Scout Jamboree, which will be held in New River Gorge, W. Va. It's expected to attract more than 40,000 scouts from all over the world, and preparation and testing for amateur licenses will be part of that activity.

The Salvation Army wouldn't miss out on the Dayton Hamvention experience either, as the organization places high reliance on the amateur radio bands for communications in aiding victims of natural and manmade disasters. A contingent of Army regulars was on hand to explain the organization's SATERN (Salvation Army Team Emergency Radio Network) system to attendees and to encourage new membership.

Regardless of their reasons for attending, everyone questioned at this year's event said they wouldn't have missed it for anything and were already making plans to travel back to the Hara for next year's show (May 17–19).

Even though mainstream production of vacuum tubes ended decades ago, there was no shortage in Dayton.

Attendees also had a chance to purchase surplus tower strobes. They might come in handy as spares, or perhaps there's a next-door neighbor you don't get along with. Possibilities were endless for some of the items available for sale at the Hamvention.



If you wanted a transformer rewound for your 'big iron' rig or maybe needed a special design for experimental work, transformer expert Peter Eggimann of Electronic Product Design was there to help.

The Salvation Army is a user of amateur radio in disaster relief operations and has a regular presence. Staffers at the booth included Shirley Feist, Maj. Carmella McPherson and Maj. Jane Shirran, from left.

Matthew Murphy, administrator of Scout Camps on the Air, is a fixture at the Dayton Hamvention, staffing the organization's booth since 2007. The organization's goal is to encourage interest in radio among young people.

World Radio History

WHERE GREAT RADIO BEGINS

The Harris® Flexiva™ FM Transmitter

The Harris® Flexiva™ FM solid-state transmitter family provides today's broadcaster with a transmitter platform capable of analog and digital operation. Incorporating field-proven Harris technology, the Flexiva family of products delivers world-class performance, reliability and quality.

Flexiva is designed for low- and high-power requirements, up to 40 kW, while utilizing the most compact design on the market today. Flexiva continues the legacy of the highly successful line of Harris FM transmitters and combines innovative, new Quad-mode RF amplification and software-defined exciter technology to take FM transmission to the next level.

Featuring Harris PowerSmart® technology in its transmitter architecture, the Flexiva line offers unmatched efficiency that makes it ideal for all FM applications and delivers a dramatic increase in power density, lower operating costs, servicability and reduced cost of ownership over the life of the transmitter.

Learn more at broadcast.harris.com or (800) 622-0022.

harris.com

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World Radio History

RADIO VISUAL

(continued from page 16)

for up to eight webcasts daily and a five day/week production schedule. There are also ad hoc requests for live streaming to and from studio/field locations and encoding/transcoding support for producers in the field. The project was featured in the story "TV Production on a Radio Dime" in the March 28 issue of Radio World.

Burnett and Janitschek note that RFA faced a number of challenges in the early days: few staff experienced in video, no equipment or budget for video, and the need to prioritize radio and streaming. By using year-end surpluses, trading equipment and repurposing audio resources, RFA was able to acquire basic video gear such as a tripod, camera, DV gear computer and Adobe Premiere 4.

All that was left to find was the studio. A seldom-used conference room was repurposed as a green screen studio. A low-profile Brightline lighting system was installed and calibrated by the staff, which also designed the set and set up the video equipment.

At the same time, there was a growing need to provide video capability in the field. RFA used LiveCast to provide live coverage of the 2011 Tibetan election debate, with two candidates in different parts of India, and one at RFA headquarters in Washington.

Just as important to the success of the video project as the facilities overhaul, is the culture of Radio Free Asia. Intense curiosity about new ideas and technology seems to be the norm, the speakers said. After being beset by numerous requests from audio support and language service staffs for training, RFA University was established, formalizing education into a series of workshops, seminars and hands-on demonstrations.

Of course, all is not perfect when you are working with limited resources. The floor of RFA's repurposed studio is not level, leading to numerous tweaks to make everything appear level on camera. Radio still has first priority, and this often conflicts with video production. The "bigger and better" syndrome leads staff to yearn for CNN-level facilities on RFA's shoestring budget.

Out of their first year of webcast experience at RFA, Burnett and Janitschek offer some advice on budgeting:

- Start small; think one camera, greenscreen, video editor, basic lights.
- Use the Internet as a resource to educate yourself and staff about video fundamentals for free.
- Use video editing software demos to try before you buy.
- Look for solutions and skills in-house.
- Be ready to move when surplus funds become available.
- Finally, consider barter arrangements for equipment when possible.

WORKBENCH

(continued from page 14)

that works well in a high RF field, let us know. Otherwise, Tim writes, simply try it and take it back if it doesn't work.

RFI immunity is important, but equally important is the spot distance ratio. You want to be able to zero in on the overheated component.

If you have one of these thermometers and RFI is a problem, all is not lost. Stand at the ready to measure the components as soon as the transmitter is turned off. If things are overheating, it will take a few minutes for them to cool, so problem areas should be obvious.

In addition to "looking" at the temperature of coils and capacitors, be sure to check the nuts and bolts that join junctions of tubing to the components. Every junction and component should be checked for tightness.

Cris makes it a point to check coil clips and rollers on variable coils too. Many times, mica transmitting capacitors fail after developing some internal resistance between the series and shunt capacitor elements inside the package. This often produces a steady or intermittent parameter shift that can be tough to track down.

Resistance, in the presence of significant current, produces heat, so an IR thermometer often will disclose a failing capacitor. In an AM tuning network, the one cap that's considerably warmer than the rest is suspect and should be investigated.

Then there are the FM RF elbows, and anywhere there's a bullet in a rigid line system. Tim has had tower crews climb with one of these IR thermometers, mapping out each 20-foot section of rigid line. You'll find these little gizmos are invaluable to reliable operation of an RF plant.

Thanks, Cris and Tim, for the great ideas. Reach Tim Sawyer at *tzsawyer@tzsawyer.com*. Email Cris Alexander at *crisa@crawfordbroadcasting.com*.

Contribute to Workbench. You'll help your fellow engineers and qualify for SBE recertification credit. Send Workbench tips to johnpbisset@gmail.com. *Fax to (603) 472-4944.*

John Bisset has spent 43 years in the broadcasting industry, and is still learning. He is SBE certified and is a past recipient of the SBE's Educator of the Year Award. He recently joined Elenos USA, an FM transmitter company based in Miami.

GR
Gorman Redlich Mfg. Co. is CAP-able

The CAP-DEC1, Gorman-Redlich is a stand-alone CAP-to-EAS converter for use with your existing emergency alerting equipment. This cost-effective device allows broadcasters to easily meet Common Alerting Protocol (CAP) compliance requirements mandated by the FCC without requiring the purchase of an additional encoder/decoder system or other costly equipment. The CAP-DEC1 is CAP 1.2 compliant and requires only one unit of rack space. Trust the experts with over 35+ years experience in the emergency alerting industry to help you meet your broadcasting needs. Visit our website or contact us today for more information about the Gorman-Redlich CAP-DEC1. We continue to support equipment we made 35 years ago.

PRICE $1350

- Compatible with any existing EAS encoder/decoder made by any manufacturer
- Powerful 1.6GHz dual core processor and 1GB of memory
- Built-in text-to-speech conversion functionality
- FAST Gigabit network capability with built in firewall for security
- Options to print, store or email logs via built-in email server
- Nearly limitless storage capacity for logs and audio messages
- Five (5) USB ports for peripherals
- Automatic clock synchronization via NTP servers
- Software can be updated via LAN or USB
- Print alert reports to USB or network printer
- Polling 3 URL's currently with room for future expansion
- FEMA independent lab affirms CAP 1.2 compliance
- Built-in email server to send log information

Gorman-Redlich Mfg. Co.
www.gorman-redlich.com
257 W. Union Street, Athens, OH 45701
Phone: 740-593-3150

PEOPLENEWS

Miami-based **305 Broadcast** appointed **Sergio Gelonch** as its new director of finance and operations. Gelonch previously has been director of finance for Discovery Communications Miami.

WorldCast Systems announced the return of **Josue Rodriguez** to the company, assuming the position of vice president, sales, Latin America, a position based in Miami. Rodriguez previously worked for WorldCast as an area sales manager, 2008–2010.

IP audio equipment specialist **Barix** made **Frank Frederiksen** its new vice president, product marketing and strategy.

Frank Frederiksen

Jeff Joseph returned to the **Consumer Electronics Association**, as senior vice president of communications and strategic relationships. Joseph had previously been vice president of communications for the **Biotechnology Industry Organization** since 2006, where he developed and implemented strategic communications and media outreach campaigns to support BIO's public policy advocacy agenda and develop a brand the biotechnology industry.

Cumulus Media promoted three senior managers. **Chuck Bortnick** will take the reins at KRBE(FM) as regional vice president. **Donna Baker**, will move to Chicago as market manager of WLS(AM/FM). And **Dave Crowl** will take on additional regional vice president duties in his region.

World Radio History

High summer is when many companies begin shipping the new products they introduced in the winter and spring convention season. Over several issues, Radio World is featuring new notable products that manufacturers have introduced to serve the U.S. radio broadcasting industry.

AEQ: THE POWER OF THE PHOENIX

The AEQ Phoenix Studio is a versatile rack-mounted IP audio codec equipped with software remote control. AEQ Phoenix PC is a software application that turns a Windows PC into a high-quality audio codec. The application connects with the Phoenix audio codec with coding algorithms for bandwidths from 44.1 kHz to 384 kbps and with RTP traffic over UDP, direct SIP or proxy-based SIP signaling protocols.

Phoenix PC allows reporters to transmit their interviews back to the studio and offers an efficient solution for regular collaborators to participate live from the field in programs using their own PC as the only technical equipment.

AEQ's family of audio mixers now includes the Grand Forum. It offers up to 20 physical channel faders in a self-contained, compact format based on the standard Forum model. Just like the Forum, it incluces the features necessary for a radio broadcast on-air operation.

AEQ Olympia is a digital commentary system and successor to the AEQ DCS-10. Also this spring, the AEQ Capitol console took a Radio World "Cool Stuff" Award.

Info: www.aeqbroadcast.com

MXL HIGHLIGHTS VARIETY OF MICS

MXL promotes its range of broadcast and USB microphones including the BCC-1, BCD-1, V69XM and the Tempo USB condenser microphone, which is iPad-compatible, as well as a variety of ribbon microphones.

The BCD-1 live broadcast dynamic microphone (shown) promises to deliver a bright sound as well as to provide quality side rejection, helpful for use in noisy rooms. The mic, which also is suitable for recording vocals for music, also has a tuned grill that eliminates internal reflections, and a built-in shockmount that prevents unwanted noise.

With its small-diaphragm capsule for detailed recordings, the BCC-1 live broadcast condenser microphone promises balanced sound, a tuned grill for the elimination of internal reflections and a bass roll-off switch, which gives extra clarity to lower voices. It is equipped with built-in shockmount that prevents unwanted noise.

For those requiring a smooth sound that sweetens voices for music and broadcasts, the V69XM vacuum tube condenser microphone can do the trick. With a 12AT7 dual-triode tube that pours vintage tone into vocals as well as Mogami cable and wiring for audio fidelity, the V69XM features transformer-balanced output for warm mids and full lows.

Info: www.mxlmics.com

World Radio History

this simple setup runs rings around any other AoIP network - at any

Meet the LX-24...Wheatstone's flagship, multi-award-winning advanced modular networkable console control surface

The design initiative behind the LX-24 was to create the world's finest control surface. The result is a console that redefines the entire genre. The LX-24 is an intelligent surface that can store and recall all your settings. Its totally modular design lets you configure it exactly as you like – you can even hot-swap modules at any time without having to reconfigure.

Assign any source of any type anywhere on your network to any fader. Each input channel can be assigned to four stereo busses, plus four pre/post-selectable aux sends, a stereo CUE bus, four mix-minuses and the panel's own bus-minus. Full Vorsis EQ and Dynamics let you sculpt and control your sound with the quality of the finest dedicated outboard processors. The visually-stunning meter bridge features up to four sets of bright, high resolution LED meters, as well as circular LED displays for auxiliary send levels and pan control. A digital count-up/count-down timer is also included.

The LX-24 is made in the USA in our home town New Bern, NC facility and it's advanced in ways that can make a HUGE difference in your capabilities But it's also immediately familiar to anyone who has ever sat behind a board at a radio station. Use it to make your programming the best it can be Just plug it into your WheatNet-IP Intelligent Network – with it, and the BLADES across the page, you can, dare we say it, rule the world.

THE LX-24 CONSOLE CONTROL SURFACE FEATURES

Low-profile table-top design - no cutout required

Meter bridge with up to four bright, high-res LED meter sets

Control room and headphone outputs with level control and source selection

Two independent studio outputs

Stereo cue speakers and amplifier, built-into meter bridge

Onboard VGA and USB-Mouse connectors

Event storage (snapshots) and recall

Each input channel features:
- Four stereo bus assigns
- Four pre/post-fader aux sends
- Four mix-minuses
- Bus-Minus©
- Source name display
- A/B source selector
- 2 programmable buttons
- Vorsis EQ and Dynamics including 4-band parametric EQ, High- and Low-Pass filters, Compressor and Expander/Noise gate

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World Radio History

NT NETWORK

price. it's called The WheatNet-IP Intelligent Network, and it rules.

Our BLADES carry out your orders network-wide at Gigabit Ethernet speeds - no bottlenecks

As an integral part of the WheatNet-IP Intelligent Network, BLADES interface, move, bend, shape, route and control everything you want to do with your audio. If it's audio, a BLADE will handle it – at lightning speed.

Use them organically with our control surfaces, run them from our Glass-E software wherever you have internet access, or control them from the front panels. BLADES make your life incredibly easy and secure. And just like our control surfaces, they're made right here in the USA.

As you need more functionality, just plug in more BLADES – they come in configurations to handle whatever you need (analog, digital, a/d, mic, MADI). Each BLADE is self-configuring and has the DNA of the entire self-healing network.

With BLADES, you can do everything from a simple (or complex, if you like) snake to STL-over-IP to full-on multi-studio/facility networking – even processing. And because of Wheatstone's partnership with the top suppliers of automation and remote gear, you'll have control over your entire system right from WheatNet-IP. Ruling the world has never been easier.

And this is ALL the extra stuff you need to wire-up the Intelligent Network:

Four CAT-6 cables and a low-cost switch that handles the gigabit speed WheatNet-IP runs at. Let's do the math – plug in eight connectors, power up a console and three BLADES, add your audio and you are ready to rock, roll and rule the radio world. Brilliant, you ask? Nah – just really, really intelligent.

Want to know more?

WheatNet-IP outperforms the other AoIP systems exponentially and is, by far, the most reliable network you can get. Log onto **wheatip.com**. There is a world of *real* information there. Or, give us a call. There's nothing we like better than talking about this stuff.

EVERY BLADE FEATURES

Two 3x2 stereo virtual Utility Mixers that can be used for a wide range of applications; for example, using Wheatstone's ACI Automation Control Interface, your automation system can control the mix for satellite or local insertion switching

Front panel bar graph meters switchable to display source input level or destination output level after gain trim

Front panel routing control — any system source to any destination on that BLADE

Front panel headphone jack with source select and level control — monitor any system source

Flexible GPI logic — 12 universal logic ports, programmable as inputs or outputs, routable throughout the entire system

Built-in web server so you can configure and control locally or remotely without having to run dedicated software

SNMP messaging for alerts

Silence detection on each output that can trigger alarms or make a routing change

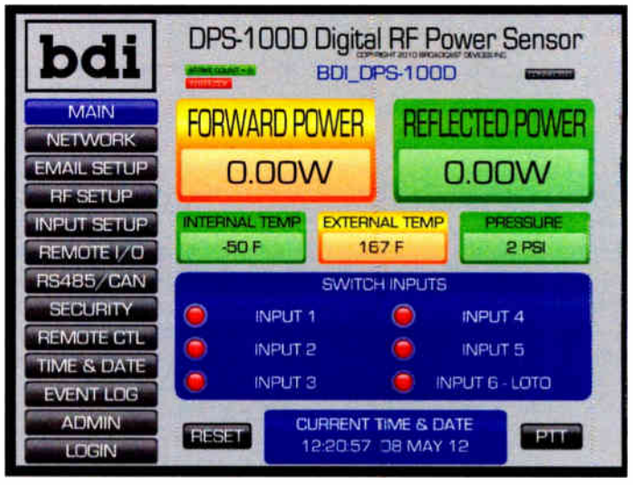
Silent — no fans — can safely be located in a studio with live mics

Wheatstone

Made Where We Live
Made in the USA

World Radio History

BROADCAST DEVICES DEBUTS FM PRODUCTS



The new RF Site Management Dashboard from Broadcast Devices Inc. is designed for master antenna sites or engineers who manage multiple transmitter sites.

This hardware/software system can integrate with BDI's DPS-100D RF Power Meter via its SNMP interface. Multiple DPS-100D sensors at different remote locations can be monitored simultaneously on the Dashboard, which consists of an LCD display in a 19-inch rack-mount panel.

A one-page spreadsheet view consolidates each sensor's data in the main body. Data from sensors showing an alert or alarm condition is displayed in the "Needs Attention" area. Out-of-tolerance items are highlighted in red. Clicking on a single sensor displays a detailed view of that sensor's complete data.

The RF Site Management Dashboard is also an HTTP server, allowing data to be viewed by multiple users on any desktop, laptop or portable device using a standard browser.

Also new at BDI is the RF Status/Safety Panel. This provides up to 12 channels of RF Presence and RF on/off safety sensing when interfaced with BDI's DPS-100D RF Power Meter. Red, green and yellow LEDs indicate the status of each channel. The panel is designed to be an integral part of a facility's RF Safety Program. The AC power range is from 100 to 240 VAC, 50/60 Hz. Rear connections are via RJ-21 connectors. One external audible/visible alarm via a relay contact is provided.

Info: www.broadcast-devices.com

FRAUNHOFER OFFERS DRM, DAB TECHNOLOGY

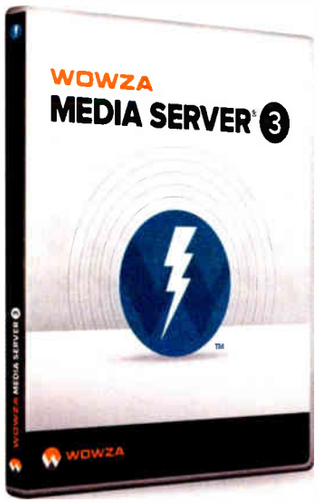
Fraunhofer IIS develops and implements technologies needed to build and support DAB and DRM radio systems and the standards and devices along the digital radio broadcasting chain.

The transmission side of Fraunhofer's digital radio broadcast solutions includes OEM radio broadcast encoders for DAB and DRM. The solutions range from individual audio and data service encoder components to Fraunhofer's ContentServer technology.

The DRM ContentServer combines a DRM audio encoder, data service management and DRM multiplex generator. It supports all DRM modes for DRM30 (shortwave, medium-wave and long-wave broadcast) and high frequency transmissions, including FM (DRM+.)

The DAB ContentServer combines a DAB, DAB+ and Digital Multimedia Broadcasting audio encoder, DMB gateway, multimedia and data service management and a DAB multiplex generator. The unit supports real-time audio encoding for DAB Layer-2 (DAB classic), DAB+ and DMB, including DAB Surround and SX Pro for stereo-to-surround enhancement.

Info: www.iis.fraunhofer.de/en/bf/db/



WOWZA SERVES UP MEDIA SERVER 3

Wowza Media Server 3 is the next generation of the company's software platform for streaming live and on-demand audio or video to multiple clients and devices simultaneously.

According to Wowza, the platform simplifies media streaming while being more cost-effective, with a variety of AddOn components. It helps radio stations and other media enterprises implement features such as time-shifted live playback and content protection for premium services.

New capabilities include an integrated live adaptive bitrate (ABR) transcoding enabled by Wowza Transcoder AddOn, which the company says eliminates provisioning complexity typical of adaptive bitrate streaming, reduces needed access bandwidth by up to 80 percent and enables better utilization of network resources such as routers and switches.

The transcoder takes advantage of standard hardware to convert incoming live streams from encoders, IP cameras, IPTV headends and other live sources into multi-stream sets for Flash RTMP and HTTP Dynamic Streaming (HDS), HLS, smooth streaming and non-adaptive delivery for RTSP/RTP and MPEG-TS.

According to Wowza, it works with Flash- and Silverlight-capable computers, tablets, phones, set-top boxes, media players and game consoles; Apple iPhone/iPad and other HLS-capable devices such as Apple TV with AirPlay; Android devices; Roku media players; and Internet-connected TVs including Samsung Smart TV and Google TV-powered sets.

Also included is delivery of live linear streams as time-shifted services with Wowza nDVR AddOn.

Info: www.wowza.com/media-server

NETIA UPDATES CONTENT MANAGEMENT SYSTEM

Netia has showcased a new version of its Content Management System, which allows users to manage processes in a production environment, from editing to post and distribution.

Updates include enriched features within its metadata management module, as well as in its indexing functionality. The CMS GUI includes a greater number of fields that can be personalized, and users can customize the system's metadata template.

The CMS now also features a multilingual thesaurus module for accurately describing content, easy access and retrieval of specific content, as well as an enhanced administration application that further simplifies system management.

Also, the Netia Radio-Assist 8 family of digital audio automation software features tools for multimedia production, broadcast and publication workflows. The company added a new integrated music scheduling application and new video editing capability from within one user interface. Radio-Assist audio software programs allow the user to record, edit or prepare a playlist. They include tools for acquisition, sound-file editing, commercial and music production, newsroom systems, scheduling, multicasting and administration. The software also features new browse and publishing tools for multimedia functionality.

Info: www.netia.com

World Radio History

Drops jaws. Not audio.

Broadband Internet is everywhere. Which makes it ideal for live remotes.

Unfortunately, the internet is also notoriously erratic. Even if you're lucky enough to get a good connection, it might deteriorate during your show. So you dial back the bitrate, sacrificing sound quality to play it safe.

There is a better way.

Meet the amazing new Z/IP ONE codec.

Telos and Fraunhofer collaborated to develop a unique coding algorithm that adapts to changing network conditions on-the-fly.

If your connection quality drops, the Z/IP ONE uses error concealment, elastic buffers, and bitrate adjustments to keep audio flowing at maximum quality.

The Z/IP ONE now makes it possible to use the internet for great sounding remotes.

The convenience of the Internet. The sound of Telos.

Telos
AUDIO | NETWORKS
www.telos-systems.com

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BROADCAST TELEPHONY

Telos is the trusted World Leader in single-line hybrids and multi-line phone systems.

ZEPHYR IP & ISDN CODECS

With more than 20,000 in daily use around the world, Zephyr is The Best Way to Hear from Everywhere.

STREAMING AUDIO

Hardware and software products for processing, encoding and streaming your audio content.

AUDIO LOGGING

PC Software for archiving and logging all of your stations audio.

World Radio History

Global Radio Services Likes Glensound

HD Voice Mobile Phone System Delivers Audio in Crowded Central London

USERREPORT

BY SIMON PRICE
Broadcast Engineering
Services Manager
Global Radio Services

LONDON — We at Global Radio Services first experienced the Glensound HD Voice system in 2011 when we received a demo system on loan.

First impressions were very good. The system consists of a portable battery-powered unit (GS-MPI004HD) about the size of a paperback book, which contains an audio input and headphone output, together with a keypad and minimal user controls. It's built like most other traditional Glensound kit, in that it feels like it will work for many years to come, despite the rigors of daily use.

The studio base unit (GS-MPI005HD) is a 1RU rack-mount box, with controls that replicate the portable unit, together with a power mains socket and external antenna socket.

Both units have to connect to the same mobile network to operate in Glensound HD Voice mode, and they feature a full-size SIM card slot. Careful positioning may be needed to make sure the base unit is located somewhere where there is good mobile reception.

Once the kit was installed, it was simply a matter of dialing the number of the opposite unit. This is great as it works just like a mobile phone, which means there really is minimal training required. Our reporters usually dial from the portable unit to the base unit using the 10 presets we've assigned to the built-in programmable memory, meaning it's a case of pressing two buttons to connect to the studio.

Over the years our news and speech-based station, LBC, has tried all sorts of technologies to enable its reporters to broadcast-quality audio back to the studio. At first the traditional 3G data-based units were good, but as time has progressed, and more and more people acquired a data device, particularly in Central London, it's become increasingly difficult to find a connection stable enough to use on air. As the Glensound unit utilizes the 3G voice channel, once you've initiated the call, the data is yours, meaning that it's far more likely to work in areas where there are lots of other 3G users. This has meant that the journalists have grown to like and trust the system.

So far it's been in use daily since we bought the units in November last year. We've also used them at many events and news stories including last year's Royal Wedding and the recent Queen's jubilee events in central London, which were attended by many hundreds of thousands of people.

The sound quality is fairly good, maybe not quite as good as some of the 3G data units, but for speech-based radio this is more than made up for by the reliability of the connection as the low latency of the system.

Overall the system has worked very well for us, and for less than half of the price of other 3G systems, represents good value.

For information, contact Marc Wilson at Glensound Electronics in England at 011-44-1622-753662 or visit www.glensound.co.uk.

TECHUPDATE

SOFT CODEC FROM ATC LABS

ATC Labs is a new name for many to the codec game with its IP software codec for professional use, ALCO Professional.

It works with Internet connections and aims at optimizing 2G/3G wireless connections. The codec operates as an SIP client using an ATC Labs SIP server for flexibility in connecting from the field. Bitrate selection provides 32/64/128 kbps performance including high-fidelity stereo. ALCO uses its own low-delay audio coding and processing algorithms for enhanced sound fidelity, clarity and robustness, according to the company. Standard codecs such as G.711 are supported.

A chat channel allows for text messaging to field users while they are connected. The ALCO Professional also has a mixing function for creating conference calls with multiple users in the field; bitrate selection can be configured independently for each user and the return channel.

On the maintenance and updating front, ALCO Professional allows for centralized updating of field installations from a chief broadcast engineer at the home studio.

ALCO Professional is being used with Windows PCs, netbooks and tablets.

For information, contact ATC Labs in New Jersey at (973) 624-1116 or visit www.atc-labs.com.

World Radio History

Summer Sale of the MILLENIUM

Buy any one of our 4 Millenium Console models and get a **FREE INSTALLATION** with the StudioHub+ plug-and-play wiring solution. Each console comes complete with a no-charge full StudioHub+ wiring kit so you can install it fast and have more time for your summer vacation.

MILLENIUM ANALOG
Mic thru line level on any input

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Analog or digital on any input

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All Consoles Available in 6, 12 & 18 Channel Sizes.
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World Radio History

APT Codecs Deliver on the Internet

SureStream Technology Helps Minnesota Public Broadcaster Link Facilities Affordably

USERREPORT

BY DAN HOUG
Chief Engineer
Northern Community Radio

GRAND RAPIDS, MINN. — We at Northern Community Radio operate two public broadcast FM stations in northern Minnesota, KAXE(FM) and KBXE(FM), each with full-power stations and a couple of translator sites. KBXE has just been constructed this year and I was seeking an STL for the station and interconnectivity to its sister station, KAXE.

When it came time for linking two studios and implementing a new STL I was faced with a number of choices on the market. Due to the fact that the two studios were some 70 miles apart a microwave link was not practical, so we needed an alternative economical way to have a 24/7 bidirectional stereo link with CD-quality audio. A dedicated MPLS (multi protocol label switching) metro Ethernet link between KAXE and KBXE was available but cost-prohibitive, so our only other option was sending the audio via IP over the open Internet.

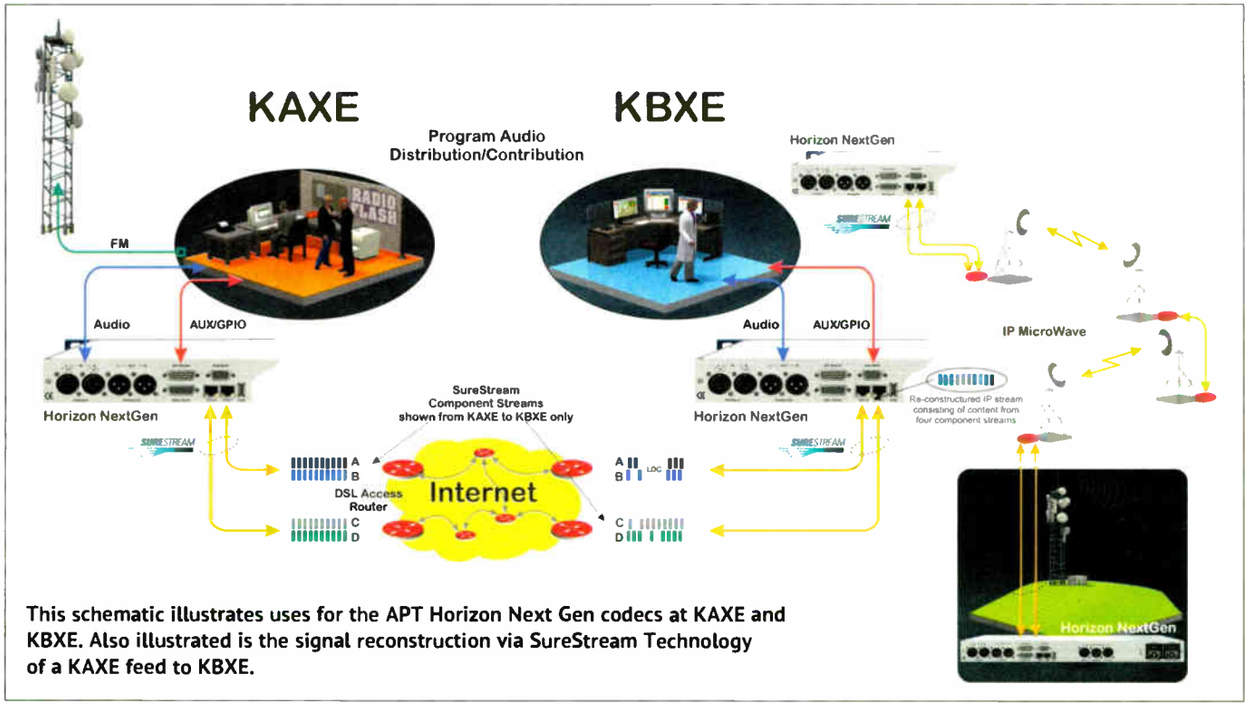
LINKAGE

I also needed an audio codec that was solid and reliable but also a solution that could match the economical operational expenditure costs associated with microwave links. But we also needed an STL solution from the KBXE studio to the KBXE transmitter site, which did not have high-speed Internet available at all.

After evaluating available solutions from a number of vendors I decided to go with the Horizon NextGen from APT WorldCast Systems.

The SureStream technology using two Ethernet NICs and gateways creating redundant streams was unique. The feature set with the HNG including the relay closures and RS-232 data, which I needed to send control information, was strong. The front-panel audio level indicators were invaluable for quick status indication. APT WorldCast has a sound reputation for audio quality and IP transport. Lastly, the product was shipping. My need was immediate.

For the STL I had a single Internet provider, who provided me with bandwidth at each site. We installed two links per site to utilize the two Ethernet NICs on the Horizon NextGen. These links' average speed is 4 Mbps upload and 7 Mbps download. Over each of the two links I send four tributary streams which are then recombined to create the broadcast-quality audio output, thanks to the APT SureStream technology running on the Horizon Next Gen.

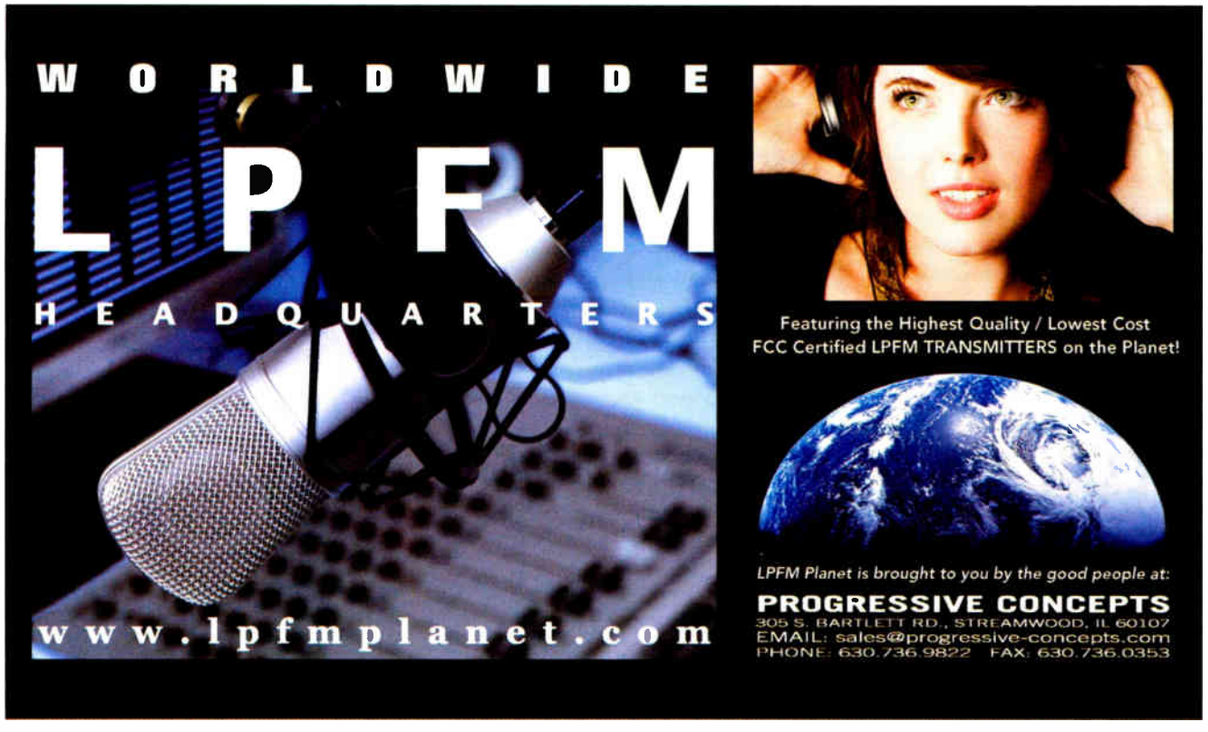


This schematic illustrates uses for the APT Horizon Next Gen codecs at KAXE and KBXE. Also illustrated is the signal reconstruction via SureStream Technology of a KAXE feed to KBXE.

The cost of these four consumer DSL accounts, two at KAXE and two at KBXE, with static IP address, is approx $60/month each. These accounts also serve as the office LAN Internet access, for uploading and downloading audio to Public Radio Exchange, and providing a gateway for our remote equipment. Since we operate KAXE and KBXE as a network where the same signal is carried on both transmitters, either studio can originate programming for the other's broadcast chain. In addition, the paired HNG carry a satellite audio feed of our choosing along with contact closure data to synchronize profanity delays located at each studio. Separate profanity delays are used as the link between the studios is pre-delay, mix-minus audio to enable both studios to have hosts that can engage in bidirectional interviews and conversation between each studio with only 300 ms delay and all over public Internet.

The 17-mile STL microwave link using the other pair of Horizon NextGens we purchased has an upload download speed of 10 Mbps via a combination of license-exempt Ubiquity Nanobridge

(continued on page 34)



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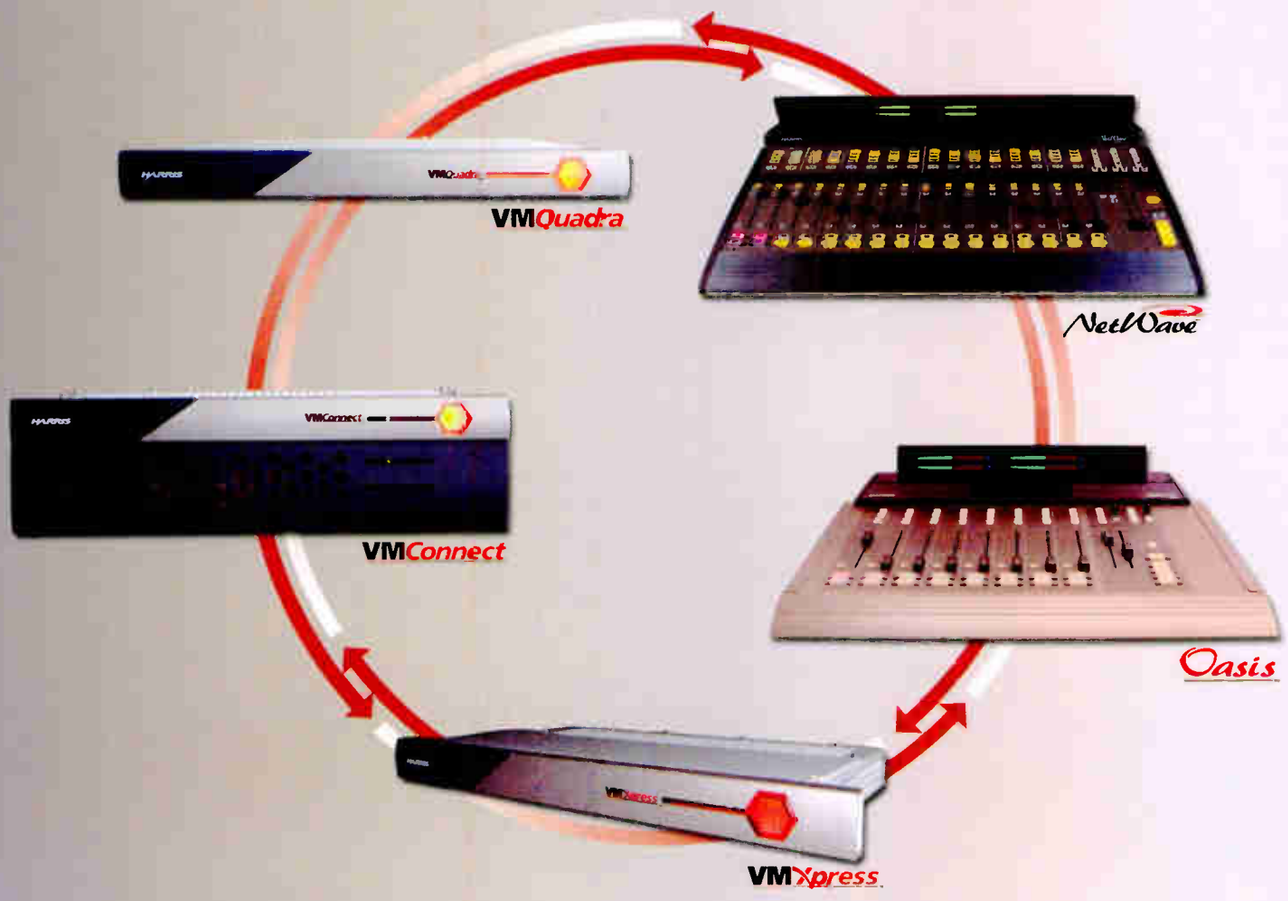

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Lily Massari	760-650-1427	Latin America
Art Reed / Bob Eburg	800-732-7665	Bradley Div.
Jim Thomason	866-573-5935	Southwest

World Radio History

Barix IP Audio Offers Big Rewards

Florida Satellite Teleport Operator Makes Clients Happy With Savings

USERREPORT

BY ED SHIFLETT
Operations Manager

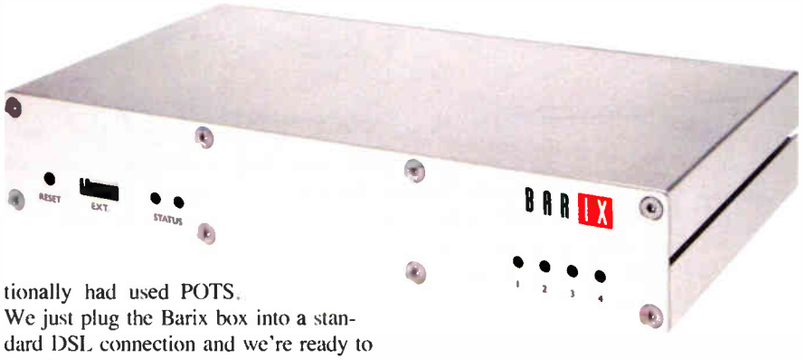
ORLANDO, FLA. — Broadcast audio delivery over the public Internet can be a tough sell. A growing number of radio stations are opening up to this concept thanks to ongoing technology improvements.

Barix is one such company that does IP audio delivery particularly well. I operate two satellite teleports that support a number of broadcasters, including a leading U.S. Hispanic broadcaster Stardome Radio Networks. We use Barix exclusively for IP audio delivery across Stardome and the other broadcast networks we support.

INTERNET AUDIO

Barix has to date replaced a series of satellite, ISDN and POTS equipment for our broadcast audio delivery. ISDN availability is shrinking. Satellite is expensive and the technology is clunky — not to mention old. Satellite introduces a new technology platform every 8–10 years, and translates to an upgrade investment of between $35–50K per headend.

We have added Barix to our master control center and affiliates as way of reducing costs and simplifying infrastructure. We can easily push audio to a new Barix device at a remote location and be on the air quickly. This includes live remote broadcasts, where we traditionally had used POTS.



We just plug the Barix box into a standard DSL connection and we're ready to broadcast.

Our Barix device of choice is the Exstreamer 500, which offers the option to encode or decode audio. At less than $600 each, the cost is far less expensive than satellite and we have the option to configure the devices anyway we want. And the ongoing investment in the public Internet means that the reliability of connection is comparable to that of satellite and ISDN.

Speaking of evolution, the Exstreamer 500 is a major advancement from the Exstreamer 100 for the broadcast environment. The biggest design benefits include the addition of balanced audio connections and contact closures.

The balanced inputs and outputs remove the need for a Henry Engineering Matchbox or similar component to connect the device in a studio or transmitter environment. It saves a lot of time and eliminates any associated audio loss. The devices become truly plug-and-play with this improvement.

The contact closures provide the most important enhancement for the Stardome operation. The closures essentially allow us to operate as a network headend, delivering data triggers to automation systems for local breaks and returns. This enables each affiliate to air local commercials and understand when to come back to network programming. The Barix devices also send ID closures so affiliates can play legal station identification messages and remain in compliance.

Ultimately, Barix removes a lot of the guesswork that stations experience when relying on tone decoders, which are difficult to calibrate and use uninterrupted. The Exstreamer 500 acts as a remote control to run a radio station in automated fashion, taking away much of the complexity.

Stardome Radio Networks uses the Exstreamer 500 to both encode and decode audio. One example is for Mex-Mix, a regional Mexican music format that includes two popular daily shows. The live host feeds are brought into our master control center in Orlando using bidirectional Exstreamer 500s.

SAVINGS

The 500s encode and decode audio in both directions using Barix STL firmware, streaming high-quality WAV audio between two static IP addresses. The clarity of the audio, delivered in the WAV format, is incredible. It is hard to believe on first listen that this kind of quality is being delivered over the public Internet.

Outgoing affiliate feeds are monodirectional, point-to-multipoint. The Orlando Exstreamer 500s are configured as encoding devices, with the affiliate devices configured to decoder settings. The devices are configured in Orlando and shipped to the affiliates, where engineers plug the closures into their automation systems of choice. Barix STL firmware again supports audio delivery. All feeds are streamed as high-quality MP3, since not every location has the bandwidth to support WAV delivery.

Another impressive Barix benefit is low latency. It might be slightly longer than satellite, but not so much that it is noticeable. We have tested latency between central Florida and the furthest corner of the Pacific Northwest, experiencing about three or fourth-tenths of a second in program delay. Barix has addressed the elastic latency of Internet delivery, compensating with a stable and predictable streaming solution.

Barix significantly reduces our monthly operational costs. Terrestrial bandwidth is far less expensive than satellite, where a single stream costs about $1,500 a month in space-segment expenses alone. Add another $1,500 a month for uplink costs, and toss in equipment depreciation, electricity and other expenses tied to owning a satellite teleport.

In comparison, our total bandwidth costs with Barix hover near $1,000 a month for multiple streams to multiple stations. It is a remarkable reduction in expenses. The equipment is also easier to maintain as there is no need to retune the satellite dish following each storm.

Everything will be delivered over IP in the future. The fact that we can deliver this much audio at the quality and cost we are at this stage is exciting. Satellite will never go away, and in fact Barix technology is often complementary to our satellite operation. But we believe that IP audio delivery and companies like Barix are helping radio get back to what it's about: Local service to local communities, and at a very reasonable price.

For information, contact Andy Stadheim at Barix in Minnesota at (866) 815-0866 or visit www.barix.com.

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World Radio History

Joy FM Enjoys the Sound of the Z/IP

Telos IP Codec Sits at the Center of a Redundant IP Network

USERREPORT

BY DAVE ANDERSON
Chief Engineer
The Joy FM

SARASOTA, FLA. — The Joy FM, a network of stations in Florida, has been using C band delivery for many years.

Satellite-based C band worked well for single-stream audio delivery, but it had its limitations. The first drawback that started causing problems was that some tower site locations would not accommodate a 3.7-meter dish due to space limitations.

The second was that it required us to have an automation system with IP connectivity at each individual site. This was required to handle issuing individual station legal IDs and local stop sets, which were triggered by contact closures over the satellite codec. While this system worked, it required that two PCs be installed and maintained at each of the remote tower sites in the state to handle the automation hardware and software. Many of these sites simply were not hospitable locations for such hardware.

SOUND QUALITY

As the network continued to grow, the technology solution we had in place became more difficult to maintain and keep up to date. This prompted our search for a more centralized model of audio distribution over IP.

The search started with a goal of bringing all automation systems back to our main studio in Sarasota. From a programming perspective, this model would allow us to do targeted breaks, thus localizing news and traffic — a win-win for engineering and programming departments.

As we built our sites, I made sure that we had a resilient self-healing IP path at each transmitter location. At the studio, we enjoy dual diverse fiber-optic Internet connections. At the transmitter sites, however, fiber typically was not an option. In light of this, I put in dual connections at each transmitter using local options available — cable, DSL, 3G/4G or fixed wireless broadband so long as each connection was on a different Internet carrier.

To send the actual audio, IP codecs would be needed. We needed a unit that could deal with the occasional packet loss and speed restrictions present in the public Internet, without dropping audio or causing problems. And of course, we needed units that not only produced audio as clear as possible to discerning listeners, but that were affordable as well.

The combination of features required quickly narrowed down the list. The Telos Z/IP One appeared to be the solution we were looking for. At just 1 RU of rack space the Z/IP One can quickly change your mind about audio IP delivery as an STL replacement.

With its support of AAC bitrates up to 320 kbps, the Z/IP simply sounds incredible. In blind tests with our staff, not a single person could tell the difference between AAC at 320 kbps and audio directly off of a CD.

The Z/IP One has a feature called Agile Connection Technology (ACT), which is what gives this hardware the ability to work over the public Internet with no issues. If packet loss or congestion is detected between the two sites, the Z/IP automatically will drop the bitrate of the audio to accommodate the network until the congestion passes, then restore the higher bitrate automatically when the congestion passes. Add in the Z/IP One's support of Axia Livewire AoIP networking, and you have a great piece of hardware that will work for both legacy analog plants and for sites that have embraced IP end-to-end.

We installed the first path to feed our northernmost station in Gainesville, Fla. Before putting it on the air, we decided to test how quickly switching to a backup Internet connection would happen with the routing system I designed. After several tests we were pleased that it only took two to four seconds to completely recover from any hiccup. This gave us the redundancy and speed of switching to backup that we needed.

Shortly after going on the air at the site, we had a cable modem outage. Thanks to the new Z/IP One and our routing configuration allowing automatic failover of our Internet connections, no one knew it happened outside of the engineering staff.

This "test path" ran for three months with zero problems. We even had listeners telling us that they felt that the station sounded better on air than it had before. After this, we decided that the Z/IP One would be our standard for audio delivery to our remote sites.

Several months later, we are running 22 Telos Z/IP Ones located all over the state of Florida as C band STL satellite replacements with seven different localized feeds leaving the studio.

We have been pleased with the level of Telos' support regarding the hardware. Since our first path was installed, there have been many software enhancements to the Z/IP One. Those have made it even more useful for our needs.

I am hoping that in the next software development cycle Telos adds the ability to change the MTU (maximum transmission unit), for those of us sending audio over tunnels, to prevent packet fragmentation. We did have one unit that failed shortly after installation, but a replacement was sent by overnight courier.

We've now gone back through and added off-air tuners feeding each of the remote site's Z/IP One inputs. This grants us a confidence backhaul at the studio of what we sound like on-air at all of the remote sites.

The Z/IP One has given us the features we needed as a C band STL replacement with incredible audio quality at a competitive price point. It's given our programming staff more flexibility, and allows us to have all of our automation systems at the studio, cutting down manpower to keep those systems running. We could not be more pleased.

For information, contact Clark Novak at Telos in Ohio at (216) 241-7225 or visit www.telos-systems.com.

APT

(continued from page 30)

2.4 GHz and licensed 11 GHz Motorola PTP800 radios. This is more bandwidth than we need. SureStream, in fact, only requires a 700 kbps up/down link on each Ethernet NIC. We own this link and have zero monthly costs other than the power to run it.

Over the time we've been using the Horizon NextGens and SureStream technology we've been able to use economical consumer-level DSL and had a reliable signal with no dropouts. The Enhanced apt-X codec used is crisp and clean. There is a useful smart auto-reconnect feature and the ability to transmit contact closures and RS-232 data is very helpful.

The APT SureStream technology has made possible something that was conventionally assumed to be impossible: having a high quality, real-time audio link over the open Internet. After some initial tweaks and fantastic customer service from APT WorldCast, our units have been stable, providing a 24/7 studio-to-studio link connecting KAXE and KBXE with a bidirectional program audio that has pleased our staff and enabled connecting two studios with economical consumer level DSL service.

For information, contact Tony Peterle at APT WorldCast Systems in Florida at (305) 249-3110 or visit www.aptcodecs.com or www.surestream.ws.

ABOUT BUYER'S GUIDE

Radio World publishes User Reports on products in various equipment classes throughout the year to help potential buyers understand why colleagues chose the equipment they did. A User Report is an unpaid testimonial by a user who has already purchased the gear. A Radio World Product Evaluation, by contrast, is a freelance article by a paid reviewer who typically receives a demo loaner. Do you have a story to tell? Write to bmoss@nbmedia.com.

World Radio History

TECHUPDATES

AVT EXTENDS MAGIC AC1 XIP FUNCTIONALITY

The Magic AC1 XIP system provides an X.21 interface, an ISDN BRI interface and a LAN interface. The units have analog and digital audio interfaces (switchable) and support the following coding algorithms: G.711 (3.1 kHz), G.722 (7 kHz), MPEG Layer II and III, AAC-LD, standard and Enhanced apt-X and PCM.

Magic AC1 XIP supports ISDN dial-up connections, IP leased line connections and IP dial-up connections according to the EBU standard audio over IP with SIP protocol. Furthermore, ISDN and X.21 leased line connections are supported.

The new release 3.x for the Magic AC1 XIP family will improve the ISDN and the IP/SIP dial-up mode. With the new "SIP+ISDN Feature" the system automatically decides on the basis of the type of the incoming call which network interface will be activated. In the case of outgoing calls users decide whether the call takes place over ISDN or IP/SIP by pressing a single key. Complicated reconfiguration using submenus will be history with the new release.

The new release also includes the optional AAC-LD algorithm, which will improve transmission quality choices offering the low-delay low data rate algorithm.

There are two sizes available: a half-rack (Magic AC1 XIP) with a plug-in power supply and standard 19-inch rack model (Magic AC1 XIP RM) with an integrated power supply. Neither requires a cooling fan.

For information, contact AVT Audio Video Technologies in Germany at 011-49-911-5271-0 or visit www.avt-nbg.de.

HARRIS CITES RELIABILITY OF INTRAPLEX IP LINK 100

According to Harris, its Intraplex IP Link 100 brings Intraplex reliability to IP audio while offering a range of audio coding options and other high-end features at an affordable price.

The compact IP Link 100 is suitable for STL along with audio contribution and distribution networks. Support for IP multicast and multiple unicast streams enables one encoder to feed multiple decoders.

The IP Link 100 incorporates dual WAN ports and a separate IP management port to increase reliability.

The codec's Dynamic Stream Splicing feature supports transport of multiple identical audio streams across the IP network (or two separate IP paths, if available) and switches between them at the decoder, providing the kind of reliability associated with T1/E1 networks, Harris says.

The multicoding feature permits simultaneous encoding of the same audio program using multiple different algorithms. Multicoding allows the user to send linear uncompressed audio on a main STL, and send the same program out with AAC coding on a lower-bandwidth backup link. At the same time, an MP3 can feed a streaming Web server such as Shoutcast.

Automatic back-up options enable switchover to a secondary feed from a lower-bandwidth link, with built-in silence sensors and alarms for notification. In the event of total IP connectivity loss, the system can switch to playout from a plug-in USB drive or from any local audio source connected to the audio inputs on the rear panel.

For information, contact Harris in Ohio at (513) 459-3714 or visit www.broadcast.harris.com.

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TECHUPDATES

YELLOWTEC'S B-LINE XT CONNECTS WITH POTS, ISDN AND VOIP

With the b-line XT, Yellowtec says it offers an adaptable hybrid architecture that is able to connect to multiple telco standards — POTS, ISDN or VoIP standards.

This hybrid should easily integrate into a studio, whether it's equipped with analog POTS, digital ISDN or VoIP. Each b-line XT is shipped with POTS and ISDN compatibility. For those working with VoIP lines now, or as a future possibility, the VoIP option is activated with a code key.

The half-rack b-line XT is also a functional talkshow system. It handles up to two lines for call-in/call-out.

The b-line XT delivers clear caller audio with a built-in AGC and expander meant to reduce ambient noise that caller signals can sometimes produce. Both hybrids incorporate special echo cancellation for tricky VoIP and cellular calls, as well, as an adaptive function to reduce the possibility of feedback in open speaker or conferencing application.

Talkmaster screener software is included. It is designed for use with touchscreens. Included within the Talkmaster software is a DTMF generator and integrated DTMF analyzer, a valuable feature for those managing call-to-win contests.

The XT b-line allows for viewing and access to all settings via a clear, backlit screen and adjacent touchpad on the front panel, which can also be accessed remotely. Connect handsets, headsets, telephones through AES3, a DB9 or RJ11 as needed.

The b-line talkshow line includes: the b-line XT, the b-line bold multiline rack-mounted talkshow system, Talkmaster software and an external keypad.

For information, contact Yellowtec in Germany at 011-49-2173-9673-0 or visit www.yellowtec.com.

COMREX STAC VIP IS PLUGGED INTO SKYPE

Comrex said its STAC VIP VoIP Call Management Systems has passed qualification by Skype to allow it to process Skype calls alongside other calls.

"Certification means the radio talk show system meets the guidelines to be called 'Plugged into Skype' and can carry the Skype logo," the company stated.

Technical Director Tom Hartnett said in the announcement that Skype support was an important factor in development of the product. "Skype, by its nature, carries very high fidelity audio when being used between Skype clients. Skype support means stations that use STAC-VIP for their call-ins can take wideband calls from anyone who has Skype installed on their PC or smartphone."

Also, Comrex said, STAC VIP allows Skype calls to be conferenced with other "normal" callers as well as those using the Comrex "VIP QC" app for smartphones.

The company added, "STAC VIP now contains a wide variety of tools to rid radio programs of thin, fatiguing telephone sound while seamlessly supporting legacy phone systems." These include the recently added VIP QC iPhone and Android apps.

Hartnett explained, "We realized one of the main pieces of the puzzle was a simple wideband voice app for smartphones. We determined early that configuration of telephone apps of this type was a nightmare for the user." So, he said, the company aimed for a universal app that would handle this complexity and be "plug and play" for guests to call the station with studio quality.

The QC stands for "Quick Connect." VIP QC app costs $20 and can be downloaded and installed on an iPhone and Android smartphone, then used to call a Comrex STAC VIP VoIP Call Management System using the phone's available data connection. A list of stations available for connection is presented to the user. Once a station is selected, the app locks to it, displaying logo information whenever the app is restarted. The app is available on the Apple App Store and Google's Play Store.

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

SONIFEX DHY-03 USES DSP

Sonifex offers two telephone hybrids, the analog-based HY-03 range, offering 30 dB typical rejection, and the DSP-based DHY-03 unit with a rejection ratio of 70 to 80 dB.

The DHY-03 has impedance matching between the central exchange and the hybrid. It can cope with impedances from many foreign exchanges and some digital exchanges and can detect and match to the line impedance that it is connected to.

Two echo cancellation routines run using internal memory allowing echo cancellation to 127 µsec and improved distortion of other mixed signals. This improves the hybrid's ability to take calls on mobile phones, or where there are other delays, such as satellite and conference calls.

The system is able to perform local acoustic echo cancellation.

The DHY-03 has a balanced mic/line input and a balanced line output from and to the mixer, with input and output gain adjustment from and to the telephone line, respectively, along with input and output metering of these signals. Users can switch from local to remote line hold either by using the front-panel pushbutton, by serial connection or by using a GPI remote input, usually connected to the on-air mixer.

It also has serial control of dialing and of the configuration parameters, so it can be configured specifically for your needs, with free-of-charge control software available on the Sonifex website.

For information, contact Sonifex/Independent Audio in Maine at (207) 773-2424 or visit www.independentaudio.com or www.sonifex.co.uk.

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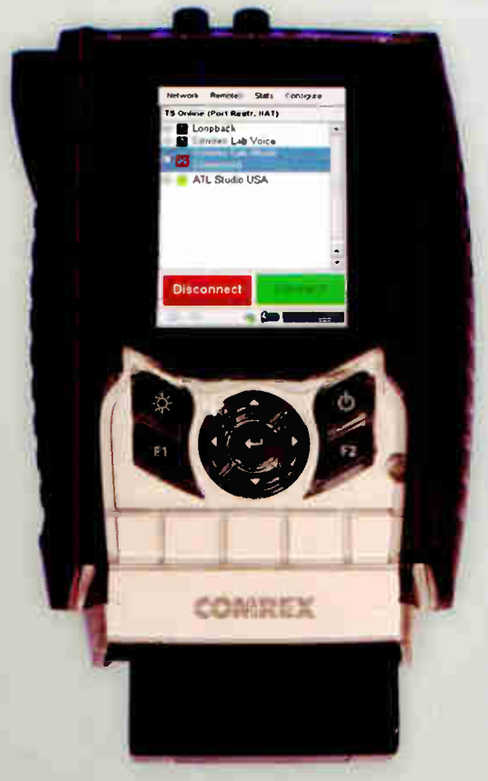
World Radio History

THIS CODEC HAS BEEN THROUGH TWO WARS, MULTIPLE ELECTIONS, FLOODS, FAMINE, EARTHQUAKES, HURRICANES, MARATHONS, CHAMPIONSHIP GAMES, REGATTAS, LOTS OF CONCERTS AND WAY TOO MANY CLUB EVENTS TO ADMIT.



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World Radio History

RemoteMix One Plays in Pittsburgh

JKAudio's Affordable and Multitalented System Is Used for Live Cut-Ins and Phone Interviews

USERREPORT

BY LARRY BERGER
Executive Director
SLB Radio Productions

PITTSBURGH — Based in Pittsburgh, SLB produces a regionally-distributed public radio program for children and families that often features live cut-ins from the field. We also conduct youth media workshops during which teens often record and edit phone interviews with community leaders.

Recently we've had the use of a JK Audio RemoteMix One phone interface/mixer. For both applications, this device proved to be a solid performer that was reliable, simple and a pleasure to use.

Before describing our tests, a quick product description is needed. The front panel contains a rotary pot, peak light and mute button to control a microphone connected via a rear-panel XLR jack. The front also contains a similar pot for use in mixing a line-level signal fed into a rear-panel stereo 3.5 mm jack. Trim pots are provided in recessed side holes to adjust levels to and from the phone. Rounding out the front is a headphone pot for volume control of the rear connected 1/4-inch headphones. The unit is powered by a 9 V battery and features a pushbutton on/off switch with light on the front panel.

MULTIFACETED

This is not just a phone interface but a small mixer that can blend mic and line-level signals for transfer via the telephone interface. We immediately thought of applications such as live field reports with prerecorded actualities fed via the line input or remote broadcasts using this simple mixer or an external mixer sending its line output to the RemoteMix One line input.

All of this happens within a rugged 4 x 4 x 1.5-inch box that fits on a table or can be clipped to a belt. As we've come to expect from JK Audio, mic preamps are exceptionally quiet, the pots have a solid feel, and buttons and jacks are built to last.

As for the telephone interface, the RemoteMix One uses wired connections. While this may at first seem like a step backwards from their Bluetooth version, our evaluation convinced us that use of a wired connection makes sense for multiple reasons.

First, most of today's phones — including iOS and Android devices — use a standard four-wire 3.5 mm minijack for headset I/O, eliminating age-old concerns about phone jack compatibility and ruggedness (JK Audio includes cables for this 3.5 mm jack as well as a one for a 2.5 mm jack designed for legacy three-wire devices).

Using the wired connection also is easier when setting up a phone interview — getting to the interface is as simple as inserting the headset plug (no more phone menu searches).

Second, and perhaps most important, with Bluetooth out of the picture audio need not be subject to its bandwidth limitations. This is important because virtually any iOS or Android codecs can be used (e.g., Skype) in lieu of a telephone call to move audio between source and destination. Such codecs also can be used via a computer in lieu of a smartphone.

We began our tests using the unit as a tool for teens to conduct and record oral history interviews with adults by telephone. Without reading the instruction manual, we grasped quickly that the RemoteMix-connected microphone and headphones were their means for interacting with the caller. They conducted their interviews comfortably; audio levels were reliable and clear. Recordings were made via the back-panel 3.5 mm stereo-out jack.

As with the company's BluePack unit, its attention to a detail makes a difference here. The line-out jack delivers microphone audio in one channel and telephone audio in the other channel with outstanding separation. This means that interviewee audio can be isolated to remove local microphone noise (or inadvertent interviewer interjections). It also means that the interviewer's portion can be captured in full fidelity for tape sync applications.

We continued tests by having an SLB field reporter call our studios via cellphone (to a landline connected to our studio board via a POTS hybrid) and a Skype-to-Skype connection (to a PC connected to our studio board by a Lynx AES16 card).

Both scenarios yielded remarkably clear speech. While Skype provided slightly better clarity, its increased latency made us favor use of the cellphone option. That said, it's nice to have the Skype option for situations in which reliable cell connections may be difficult to maintain. Moreover, we suspect that codecs from other broadcast companies will yield better results.

We also tried passing music to the studio via the line-level input. While it was easy and effective to use the mixer, both the phone and Skype tests delivered (not surprisingly) music that was bit hard to listen to on the receiving end. That said, using the line input for brief music or recorded news actualities would be fine. Moreover, we feel certain that stronger smartphone codecs would allow passage of music more clearly.

We found two notes of caution. The front-panel mute button exhibits slight bleed-through at very high mic levels. Second, as with nearly all cellphones, there is a possibility of RF noise if the phone gets too close to another piece of gear. Neither issue affected our use of the unit but are good things to take note of to ensure success.

As a telephone interview interface, we now have a device that is robust enough for broadcast-quality recordings yet simple enough for teens to use. As a device for live cut-ins, we have the flexibility of mixing line-level and mic content as well as leveraging third-party codecs such as Skype. For a belt-worn portable device that lists for $315, the unit is a sensible addition for anyone serious about newsgathering, public affairs, and community outreach.

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

TECHUPDATE

AETA PORTABLE AUDIO CODEC GETS LTE

The Scoopy+ portable audio hardware codec now supports LTE, according to Aeta Audio. The company says that LTE offers an alternative to congested 3G networks, enabling up to 100 Mbps download and 50 Mbps upload, with lower latency for better performance during live transmissions, and improved coverage in rural areas by using lower frequencies in the 800 MHz band. Scoopy+ now also includes IPv6 support for further ease of use.

Internal LTE modules are available in new Scoopy+ units, and the latest firmware for the Scoopy+ supports several LTE external USB sticks, allowing LTE to be used with the different standards in Japan, Europe and the U.S. With an external USB stick, LTE capability can be added to existing units and used in conjunction with an internal HD Voice module. Scoopy+ supports internal and external mobile network devices in parallel.

Introduced at the NAB Show in April were new Aeta codecs. The Scoop 4IP was designed for broadcasters (STL users) who wish to send high audio quality live transmissions over IP at a reasonable cost, Aeta says.

This rack-mount codec features X24/V11 and Ethernet interfaces, several coding algorithms, and 4SB ADPCM at a low latency in 15 kHz quality. The new Scoop 4IP is also equipped with audio analog I/O, simultaneous AES, additional I/O and the option to configure and manage the equipment via embedded Web page.

Aeta has also introduced the Scoop 5 studio codec. Building on the feature set of the Scoop4+, the company says that the new Scoop 5 offers an enhanced software platform for faster, more intuitive operation, and profile management and supervision via an embedded Web page. It also comes with a new control panel with graphic displays and an elastomer keyboard for greater comfort.

For information, contact Aeta Audio in France at 011-33-1-41-36-12-62 or visit www.aeta-audio.com.

World Radio History

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TECHUPDATES

NEW TIELINE GENIE STL IP CODEC SHIPPING

Tieline's Genie STL is a DSP-based IP audio codec for critical point-to-point connections and studio-to-transmitter links.

The company says that by using IP the Genie STL delivers superior quality audio over LANs, WANs, the Internet, satellite IP, 3G, 4G, Wi-MAX and Wi-Fi. It is designed for operation over mission-critical audio paths throughout broadcast IP networks.

Genie STL IP codecs have multiple levels of power, audio and network redundancy. The codec features dual Gigabit Ethernet ports (10/100/1000), dual redundant power supplies, automatic audio silence detection and IP network backup solutions to make sure users remain on the air.

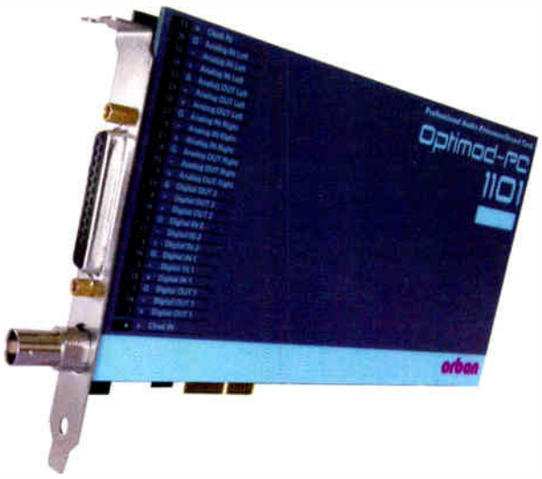
Automated network failure detection provides switching to a backup IP LAN connection and automatic silence detection can fail-over to backup audio files on a thumb drive connected to the codec's USB port.

Tieline says that some manufacturers charge for IP management software. Tieline disagrees with the practice and provides SmartStream IP management software for free in Genie STL. It says this aids in performance reliability over inexpensive unmanaged IP audio links like the public Internet, despite varying network conditions.

The Genie STL supports IPv4 and IPv6 (Dual Stack) protocols, so broadcasters can have a future-proof codec investment. Users can connect over IP with any SIP-enabled IP codec brand supporting the EBU N/ACIP Tech 3326 standard.

For information, contact Tieline in Indiana at (317) 845-8000 or visit www.tieline.com.

ORBAN INTRODUCES OPTIMOD PC 1211/1211E



The Orban Optimod PC 1211 is a package that includes the Optimod PC 1101/1101e codec and the latest version of the company's streaming encoder, the Opticodec 1010PE v3.8.

The latter is an enterprise-level MP4 (AAC/HE-AAC) encoder, the first enterprise encoder to address those formats 10 years ago, Orban says. Since then the company implemented v2, added Adobe Flash (RTMP) and now for legacy streams, MP3. Matched with server support for Adobe, Icecast, Shoutcast, Real, Quicktime and Wowza, the Opticodec 1010PE addresses many server and format needs with one codec. The Opticodec 1010PE is celebrating its decade with version 3.8, with Vista, 7 and 2008 support.

According to Orban the Optimod PC 1100 was the first audio processor designed for audio streaming use. The new Orban Optimod PC 1101 adds features designed for broadcast streaming. Because stations often sell terrestrial and IP platforms separately, the unit was designed to work as two sound devices, eliminating a need for two sound cards in ad insertion systems. It has an onboard DAB audio processor, the same processing power of the Optimod 8500 and 6300.

With the ability to distribute high-quality audio at low bitrates, HE-AACv2 @ 32 kbps is equivalent to a 128 kbps MP3, the Opticodec 1211 is available to capture the mobile IP market. Lower bitrates mean higher reliability and lower bandwidth costs. With HE-AACv2 that comes without a sacrifice in audio quality.

For information, contact Orban in Arizona at (940) 206-7702 or visit www.orban.com.

World Radio History

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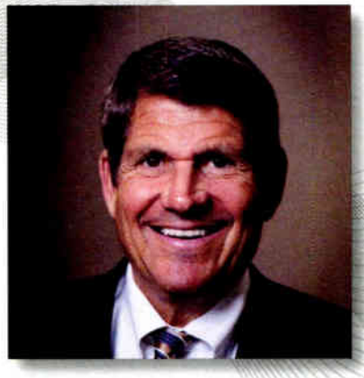

Jeff Smulyan
Chairman and CEO
Emmis Communications

José Valle
President
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Marci Ryvicker, a managing director with Wells Fargo Securities, LLC, will provide opening remarks. The panel will be moderated by Lew Paper, a partner at Pillsbury Winthrop Shaw Pittman LLP.

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World Radio History

TECHUPDATES

CLEAR CHANNEL SATELLITE DEBUTS SATELLITE AUDIO PLATFORM

Clear Channel Satellite says that its new XtremeSat Media Content Receivers are available in many versions. The MCR-100 Series carries a stereo analog output and an AES/EBU output on XLR connectors. The unit features eight audio-synchronized relays, two AAC formats, several MPEG choices and the ability to transition from SCPC to MCPC.

The MCR-200 Series includes onboard SD memory providing DVR-like functions for playback of recorded programming and/or automatic insertion of regionalized spots. File playback and Shoutcast streaming are stock features on the MCR-200 Series, protecting content if an outage occurs. The system is equipped for DVB-S/S2, Web management and a network management system. MCR receivers have no moving parts and due to energy efficiency, no fan is needed.

XtremeSat Media Content Receivers have an available network management system known as SIRC, Satellite In-Band Remote Control, which allows for remote management and equipment servicing without a physical network or Internet connection. This is useful managing equipment in remote locations with no or poor outside connectivity. Data can be delivered safer and faster than using telephone or Internet connections while providing major bandwidth savings.

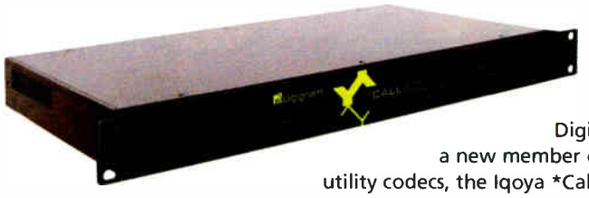
For example, using SIRC to distribute a new configuration to a large number of devices takes just a few minutes, depending on the available bandwidth. The Embedded Controller (EC01), in all the receivers, can be managed via a Web interface from any computer, without the SIRC.

Clear Channel Satellite partnered with Germany's 2wcom Systems GmbH to develop the advanced feature set for the new receivers, manufactured at the 2wcom facility in Flensburg, Germany.

XtremeSat MCR Series receivers have a two-year warranty. The U.S. Warranty Center is maintained by Clear Channel Satellite in Denver.

For information, contact Clear Channel Satellite in Colorado at (888) 879-1118 or visit www.clearchannelsatellite.com.

NEW IQOYA IP CODEC AVAILABLE



France-based codec and IP networking equipment maker Digigram has announced a new member of the Iqoya line of IP utility codecs, the Iqoya *Call/LE.

The *Call/LE promises 24-bit, full-duplex operation and an ability to navigate DSL lines and Wi-Fi and 3G wireless routes. It is compatible with other Iqoya models and uses Digigram's FluidIP technology for solidifying the connection and minimizing problems such as drift and latency.

According to a release, the *Call/LE "offers a symmetric RTP mode that allows for quick and easy setup of full-duplex connections over the Internet but without any challenging NAT issues and with no SIP infrastructure required."

The unit is small and fanless, consuming 11 watts, can be placed most anywhere.

For information, contact Digigram/Point Source Audio in California at (415) 226-1122 or visit www.digigram.com or www.point-sourceaudio.com.

MAYAH SIGNS UP FOR LIVEWIRE

Codec maker Mayah Communications has signed on to license Axia Audio's Livewire IP audio technology for use with its codec equipment.

Mayah has obtained a Livewire Limitless License, which, besides access to the technology, allows it to work with other Axia Partners to make sure products work together and to develop new products. Axia Partners include Broadcast Electronics, BSI, Burli Software, ENCO Systems, Fraunhofer, Netia, OMT, RCS, Rivendell Radio Automation and WideOrbit.

Mayah Communications President Detlef Wiese said, "We believe that the increase in IP connectivity in LANs and WANs needs to be supported with more compatibility, as demonstrated by Mayah and Axia supporting open standards."

For information, contact Mayah Communications in Washington state at (360) 618-1474 or visit www.mayah.com.

MOSELEY RINCON/STARLINK IS AN EIGHT-CHANNEL STL

Moseley Broadcast says if you connect the Moseley Rincon digital audio transporter to the IP port of a Moseley Starlink microwave STL, you get the first eight-channel digital STL in the licensed STL band.

Moseley notes that frequencies are becoming crowded in many markets but stations frequently need to add audio channels. It says expanding Starlink STLs with via the Rincon can be a creative and cost-effective solution to increasing the payload capacity of new or existing links.

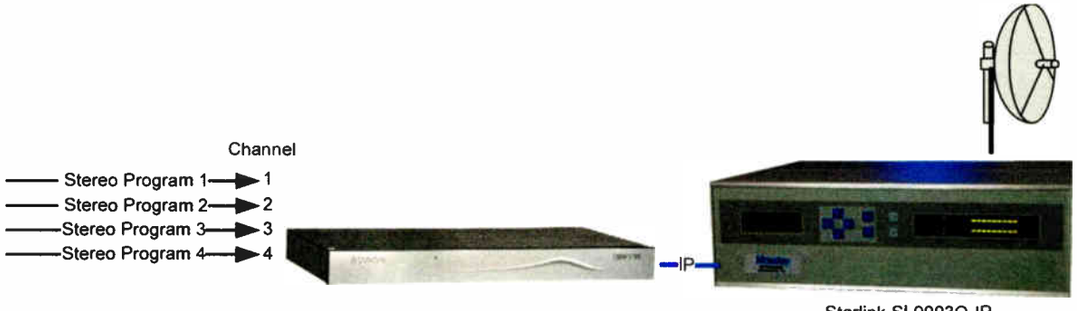
The Starlink SL9003Q-IP devotes its entire capacity to IP transport. By connecting the IP port on the Rincon to the IP port on the Starlink that capacity can be utilized.

As an example, at 32 QAM this combination will support eight channels (four stereo) AAC-LC at 448 kbps. Or, choose two linear uncompressed channels (one stereo) and scale the remaining bandwidth to accommodate two 256 kbps and one 128 kbps stereo pairs. These are examples; any combination is possible up to the maximum bandwidth of your STL channel allocation.

The Rincon is equipped to provide backup redundancy to your audio feeds. A second audio stream can be assigned to an alternate network path for backup. Moseley LanLink, DSL or broadband modem, or a T1/E1 line can transport the backup audio stream. At the receiving end the backup feed is switched on line automatically in case of a failure of the main link.

The Starlink is modular with configurable bandwidth and QAM rate. It is available in worldwide STL bands. Combine the Starlink's features with the Rincon's library of audio algorithms and high channel count to create a large number of custom audio transport combinations. The company says that these solutions are often lower in cost than installing multiple discrete STL links.

For information, contact Moseley Broadcast in California at (805) 968-9621 or visit www.moseleybroadcast.com.



Rincon 440

Starlink SL9003Q-IP or SL9003Q-2SLAN

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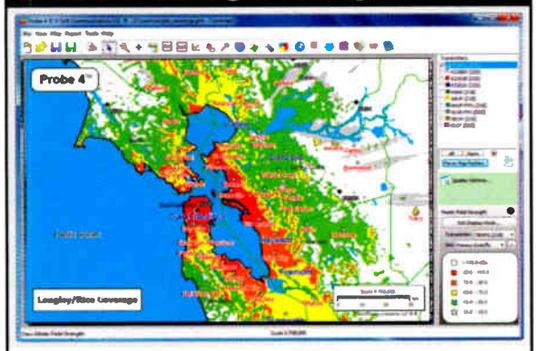
Broadcast Engineering Software



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Looking for a broadcast excerpt of a SanFrancisco Giant's taped off of KSFO radio from 1959, interviews with Willie Mays, Dusty Rhodes & some play by play excerpts, also features a homerun by Willie Mays and Felipe Alou stealing second base, running time is 18:02, also looking for SF Giants games and/or highlights from 1958-1978 also taped off KSFO Radio. Ron, 925-284-5428 or ronwtamm@yahoo.com.

Looking for KFRC signoff radio broadcast from 1930 Andy Potter, running time is 0:22 & also the KLX kitchen the program guest is Susanne Caygill, a discussion of women's affairs with a long promotion for Caygill's appearance at a local store. Anne Truax, Susanne Caygill, running time is 13:44. Ron, 925-284-5428 or email ronwtamm@yahoo.com.

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Humorous with good bits/entertainment news. Extremely creative writing/prep ability, and boards. High energy on-air sound, with relatable personality. Particularly polite. Julia, 972-415-5978 or juliafautner@yahoo.com.

Professional with a passion for the radio industry. Loyal, hardworking, natural ability to connect with people and audience. Strong technical skills. Carolyn, 706-798-6568 or cstory7@yahoo.com.

Very passionate bilingual radio broadcaster. Creative, well-spoken, adaptable, direct, knowledgeable and organized with copywriting, production, news, Mobile DJ and tech savvy. Crist, 214-991-8060 or cristguzman@me.com.

Hard-working team player, experienced in Sports, Copywriting, and setting up equipment. Looking to work in Sports, News or Music. Call Eric, 405-220-5444 or EricTheBlue17@gmail.com.

World Radio History

READER'SFORUM

LEONARD KAHN, REMEMBERED

I met Leonard Kahn ("Word of AM Stereo Patent-Holder Leonard Kahn's Death Spreads," Radio World Online) when I was an assistant attorney general at the New York State Department of Law in lower Manhattan. In June of 1990, the Hon. Robert Abrams, New York's attorney general, directed me to consult with Leonard as he explored several antitrust claims against firms with whom he had prior business dealings.

Shortly afterwards, my United States Marine Corps Reserve unit was activated and I spent the next year overseas on the front lines. Although I am now retired, I served as a communications and electronics officer in the Marines for more than 20 years.

A 2003 Radio World archive photo shows Leonard Kahn, who had been part of an audio processing panel at the AES Show in New York. Kahn is pictured back row, center, behind the panel moderator Glynn Walden.

During that combat tour, I encountered service-affecting problems caused by RF ducting, a problem common in hot climates. I called Leonard and asked for his help, and he not only explained to me the physics of RF ducting, he also gave me sage advice on how to work around it.

The results were improved communications range and reliability that ultimately assisted Marines in directing supporting arms and medical evacuations, leading to success in combat. Leonard's recommendations also helped medical regulating communications that improved medical services to the wounded and saved many U.S. and Iraqi lives.

The Leonard Kahn I knew and will always remember loved his country and the people in it. He is a hero and an American patriot. May he rest in peace with his beloved wife, Ruth.

David Ward
Senior Legal Advisor
FCC
Washington

AHEAD OF HIS TIME

I am certainly sorry to hear about the passing of Leonard Kahn. He was a man ahead of his time. While the AM world was all topsy-turvy over the AM Stereo debate, Leonard was not bashful about promoting his system, arguing the merits of his system over other contenders.

I am sure the others all had some merit, but all one had to do was to compare all the competition side by side to understand that the Kahn AM stereo was, hands down, the best-sounding system.

I installed two systems at KNBR in San Francisco, one on the main and one on the alternate transmitter. Leonard was very helpful and made a couple trips to San Francisco to assist in the setup. All three AM stereo receiver owners in the Bay Area were very complimentary about the big improvement to KNBR's signal.

I mention this with a bit of sarcasm as the lack of enthusiasm by the receiver manufacturers was what killed AM stereo. I should probably also give some credit to the FCC for helping to kill it.

Leonard was a visionary engineer whose shoes will not be easily filled. He will indeed be missed.

Bill Newbrough
President
RF Specialties of Washington Inc.
Las Vegas

AM DIGITAL DILEMMA

The $5 analog AM radio that will run for days on a 9-Volt battery has been the last ditch save-all for disaster survivors (aka Hurricane Katrina and WWL). Digital radios thus far have been too expensive and power-hungry and without user-replaceable batteries.

As tempting as an all-digital AM sounds, it is a bad idea removing the last inexpensive lifeline to live radio by taking it digital and rendering hundreds of millions of analog AM radios useless. I'm of the opposite view: I believe we should be moving AMs that want to move to FM to Channels 5 and 6 and the remaining AM stations all become wide-bandwidth AM superpower stations of 750 kW+ and run analog AM stereo without any digital components other than using the stereo pilot tone for low-speed data for ID and EAS text only.

John Frank
Engineer
Toledo, Ohio

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Email **radioworld@nbmedia.com** with "Letter to the Editor" in the subject field. Please include issue date.

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OPINION

How to Help AM Radio in Six Steps

Antenna Improvement, Power Increase Are Just Two of Many Ways to Revive an Ailing Band

COMMENTARY

BY DAVID WEBSTER

AM radio needs help right now. Broadcasters must find ways to keep themselves relevant and heard to finally regain, or at least stabilize, listenership at current levels.

In order to do this, we must improve the received quality of current stations, while transitioning to a new digital broadcast band. Here is a set of suggestions that I believe could add health and longevity to the service.

1. We should seriously reevaluate Richard Arsenault's proposal — which the FCC was quick to dismiss without even opening it up to comment — for an across-the-board power increase for all AMs. This would allow stations to punch through the current interference that renders stations unlistenable, and would not require the purchase of a single new radio to get the payoff.

It wouldn't have to be the "10 times increase" as proposed, but there may be a reasonable middle ground at which improved signals can be cost-effective and politically palatable.

2. It is imperative that we implement a plan to move stations to a new broadcast band, such as the Broadcast Maximization Committee's proposal for the Channels 5–6 spectrum, or the alternate proposal from the DRM consortium of establishment of local DRM digital in the 26 MHz space. In fact, the proposed use of DRM in the 26 MHz band has already been successfully field tested in Mexico, Germany and Brazil, with papers documenting its viability.

Broadcasters need a modern infrastructure that can be competitive and take AM into the future — one that is not prone to the unfortunate physics and haphazard allocation history of the current AM band.

3. We should allow mechanisms for "band congestion thinning," which would allow stations to propose "negotiated" interference between each other or allow for signals to be bought for the sole purpose of surrendering or adjusting licenses to allow for stronger or better-positioned stations to up power or open their directional patterns.

Troubled or non-competitive stations could sell "accepted interference" or go dark for payment by an interested party, which is certainly a more positive option for cash-strapped signals that may be headed for permanent darkness and insolvency.

A pay-for-play environment would accelerate deals of this nature. This activity could be simultaneous to current stations making the switch to translators or a new digital band. An extension of this concept would allow a station that had attained a translator to go dark on its AM and transfer the translator status to a new type of LPFM class license.

4. Let's look into synchronous AM transmission systems. A smaller number of synchronous "AM nodes" at lower power, scattered throughout a listening area, could keep power densities high near listeners, yet have a lower interference and skywave profile.

With GPS and today's ability to lock transmitters in time, self-interference could be kept quite low on the same frequency with this solution. The picture becomes more interesting with digital transmission, in that the idea of SFN (single-frequency networks) with HD Radio or DRM was considered and designed into their systems from the beginning. Examining this idea of a sort of "cellular AM" might help solve some of the current issues. Additionally, it could be implemented with low-profile, albeit less-efficient, transmitting antennas and at relatively low cost due to the much lower power levels involved. Perhaps some cells could be located at business concerns, and lease considerations could be bartered for advertising time.

5. Let's reopen the case for transmission antenna improvement. It's astonishing that with all the supercomputing power available — which allows us to simulate everything from protein folding to nuclear weapons detonations — that we would not be able to apply our technological savvy toward creating a viable "anti-skywave antenna" for AM.

The idea of stations "turning off" or greatly reducing coverage at sunset is unbelievable today, and it harks to a different time. You certainly don't have a fighting chance to compete with FM, SiriusXM, TV, games or Pandora … if you are effectively *off the air*.

6. Finally, the Web and streaming are here to stay and are quite good, if not the easiest to locate and tune into for non-techie listeners.

How about putting a data signal in AM and FM transmissions that will tell an IP-connected/enabled radio where to find it in cyberspace? When it gets a lock, it will transition to the stream, a kind of pilot tone or beacons for the Web. This could further be developed to allow for narrow/zone-casting of material or advertising based on demographic profile or the location of the receiver at a given moment.

These are just a few suggestions, and there are many more out there. But one thing is for certain: If things stay as they are now, the service will not survive, and that would be a terrible loss for current and future listeners.

I find it amazing that the conversation about opening up the airwaves to *new* local or niche broadcast entities via LPFM rages on, while we already have thousands of local AM broadcasters who could put up innovative and locally focused content if the revenues were there for them.

It's simple math: Less listeners equals less revenue. If they can't hear you, they can't listen. I hope the ideas keep coming and that we can all put our heads together to move this service into the future.

Comment about this or any story to radioworld@nbmedia.com.

Dave Webster is CEO of VSI/HD Media in Southington, Conn., which offers media-related production and technical services. He can be reached at dwebster@visualmedia.com. *Find information about the Broadcast Maximization Committee and the DRM papers at* http://radioworld.com/links.

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World Radio History

BOSTON, MASSACHUSETTS

left:
The "TIC" newsroom airs a Public Affairs Program
below:
A graduate of Talking Information's' Voice Training Program; Kati Crocker is now the Public Service Director
below left:
Janet LaBreck; commissioner for the blind and creator of the VOICE program with her guide dog, Osborne

A V.O.I.C.E. FOR THE VISUALLY IMPAIRED

Special software provided by Radio Systems allows the visually impaired to operate their broadcast consoles unassisted.

From high above Boylston Street, at their new custom studios at the Massachusetts Commission for the Blind in Boston, four blind or visually impaired students are the first class of VOICE, or Vocational Opportunities in Communication Education.

The program was created by Janet LaBreck, commissioner of the Massachusetts Commission for the blind as an intensive, interactive and hands-on learning experience with longtime collaborator Ron Bersani, executive director of the nearby Talking Information Center.

To build the new studios, Bersani contacted long-time supplier Radio Systems. Says Bersani; "their StudioHub+ wiring system made meeting our multiple deadlines easy and when we needed special software to aid our visually impaired operators in using the console, Radio Systems provided it at no charge."

VOICE program participant Kati Crocker, 24 says: "In a way I think this is life-changing. I didn't think I could do this before, but it has really broadened my scope for employment."

Commissioner LaBreck feels they've all worked closely to develop a curriculum that bolsters students' confidence in broadcasting but also "diminishes the isolation" felt by many blind people entering the job market.

below, from left to right:

Gerrett Conover
Vice President

Daniel Braverman
President

Michael Sirkis
Chief Engineer

Dennis Greben
Manufacturing Manager

Jo-Ann Dunn
Sales Manager

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