



RADIO WORLD

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The News Source for Radio Managers and Engineers

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SHOW NEWS

A special conference preview “two-fer” in this issue!

Previews of NATE UNITE 2017, left, and NRB Proclaim 17.

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Fully Tested, Tom Mintner Takes His Leave

Industry stalwart retires from NTI Americas and reflects on his experiences of 50 years

BY TOM VERNON

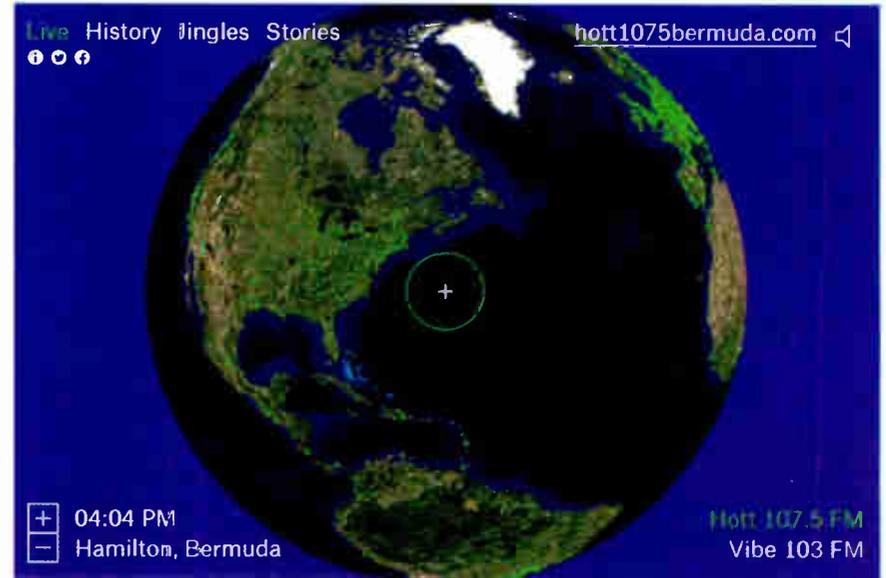
After a career spanning almost 50 years of music-making, music recording/mixing and audio test and measurement, Tom Mintner has retired from full-time work life.

At the end of 2016, he sold his company NTI Americas to his business

partners, although he plans to keep some of his connections with the audio world.

Over the years, he also worked for the University of Iowa, Credence Systems, Studer/Revox, Rupert Neve and Audio Precision.

Mintner looked back over the past
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Radio Garden Turns Earth Into Radio Tuner

Publicly-funded art installation makes dialing around the planet a visceral experience

STREAMING

BY JAMES CARELESS

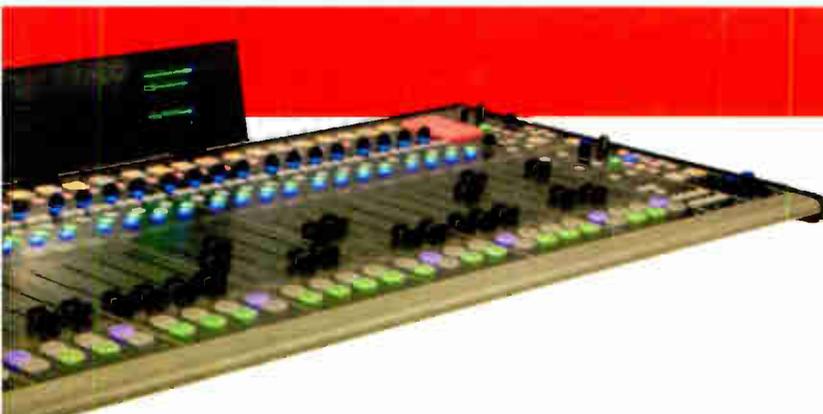
Imagine being able to spin an image of the earth on your computer screen, tuning into radio feeds that pop up as you move across the planet’s surface. You can, using the Radio Garden website (<http://radio.garden/>).

Using real-life satellite imagery running on the open source Cesium platform, Holland’s Studio Puckey has cre-

ated an online installation that makes finding and listening to about 8,000 audio streams as easy as moving your mouse. It allows you to spin the earth such that a tuning circle (with embedded cross inside) in the middle of the screen turns from white to green whenever you encounter a location with one or more live radio streams. Each broadcast location is marked with a bright green dot, which you can click on to go directly to that station’s audio stream. (You can

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MINTNER

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half-century with Radio World and shared recollections.

His interest in music and electronics began at a young age. "Early on, we moved to pre-Disney Orlando, Fla., and there was always a technical vibe in the family. My father was an engineer involved in the rocketry and aerospace business, both the military aspects and tangentially with Cape Canaveral.

"Occasionally, I ran into guys at live performances who showed up with 300 pounds of Ampex tape decks and a pair of [Neumann] U 67s, hauling them around in their station wagons. Right away, I became interested in this technology, and then in other aspects, including broadcasting and cinema sound."

Occasionally, I ran into guys at live performances who showed up with 300 pounds of Ampex tape decks and a pair of [Neumann] U 67s, hauling them around in their station wagons.

– Tom Mirtner



Mintner's formal education in electronics began in high school. "Public schools at the time had never heard of a technology curriculum, but with some prodding from parents, they established an independent studies course held in a closet. In that closet were a Dumont oscilloscope, Heathkit oscillator and HP 410 VTVM," a Hewlett-Packard vacuum-tube volt meter.

"That was all it took, I was officially hooked on electronics."

MUSIC TECH

Mintner continued his education at Northwestern University in Evanston, Ill., where he majored in music and started taking technical courses. He noted, though, there was a pronounced divide between the two disciplines.

"Unlike university curricula today, there was nothing like a music technology program. In fact, there was actually hostility from the music faculty concerning technology. This was true in most music schools at the time. Many musicians and musical academics thought that technology, and in particular electronic music, was threatening to put musicians completely out of work."

Mintner recalls that this attitude slowly began to change.

"About halfway through my stay at Northwestern, the administration grud-

ingly put up a tiny budget and assigned a new theory and composition professor to electronic music, and so a friend and I helped him to build what was the first electronic music studio facility at Northwestern. That motivated me to take some independent studies in physics, which were focused on musical acoustics. Then, inspired by reading about people like Bob Moog and Don Buchla, I started building ring modulators and the occasional mixer for local jazz musicians, as well as trying to build synthesizer circuits."

Mintner recalls working for Thomas Willis as an assistant in his classes at Northwestern. Willis was the senior arts and music critic for the Chicago Tribune.

"His NU gig was just to teach a class or two. But he always took the time and had the heart to be a creative and powerful mentor for myself and many other students over the years."

His first job after graduation was at the University of Iowa as a Performer/Fellow at the Center for New Performing Arts and recording studio there.

"In addition to supporting new music technology and one of the world's first laser image projection systems, we recorded and edited for various record labels," he said. "There were some ambitious broadcast projects as well, including a TV and FM simulcast broadcast

and recording of Mahler's 'Symphony of a Thousand,' produced together with the Iowa Public Broadcasting Network (now IPTV)."

A few years later, he packed up for New York and a job at Rupert Neve. This turned out to be an education of a different sort. Working as the tech support point man for the new NECAM console automation system involved a lot of travel, as well as interfacing with engineers and their often grumpy producers.

"The upside was I got to see and work with the very top studios in the U.S. and elsewhere. And ultimately, I learned a lot from those grumpy but supremely gifted producers and top engineers," he said.

"At Studer, I got a practical education about great audio manufacturing technology, and perhaps just as important, about the global nature of the audio and video industry, then and now. Also working in Manhattan and up and down the Northeast corridor, I had the opportunity to serve some of the great network owned and operated AM-FM-TV operations at what might have been their peak in the late '70s through '80s. Since Studer was based in Zurich, I also discovered how a multi-national company worked."

Moving to Audio Precision in Oregon and becoming part of the ownership there, he became part of what he calls "a truly great American high-tech engineering company."

Engineering at AP, he said, was driven primarily by several of the founders, but overall product planning and development was by consensus from a kind of development council, consisting of key employees. Mintner also guided the company's U.S. sales and marketing, as well as producing advertising and other materials.

"During my 13th year at Audio

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MINTNER

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Precision, we sold AP to a venture capital company, and by 2001 I had moved on to Credence Systems, an automated test equipment IC test company," where he managed low-frequency test products.

Around this time, so-called convergence trends in IC and product technology meant that system-on-chip IC testing had to test not only digital logic but audio, video, IF, RF and other functional blocks. "Since I had already taken AP sales into areas such as multimedia PC audio testing, the jump over to learning full IC testers in a short amount of time was possible, if a bit challenging," Mintner recalled.

TECHNICAL LIFESTYLE

He soon moved to NTi Audio.

"I knew my future European partners at NTi from my time back at AP. By 2003 they had already completed a spin-off of NTi from Neutrik and were exploring the problem of support and distribution for North and South America."

They joined forces to form NTi Americas Inc. in Oregon as an independent partner to the main company in Liechtenstein. (The North American

company writes NTi with a capital "i" while the international entity does not.)

"From the beginning, we offered complete service, technical, calibration and of course sales support." Technical services in test and measurement must meet strict performance standards; and in an addition to his general manage-

"All the larger test systems are individually selected or engineered for each customer's application, for example to test a mobile device, cellphone or perhaps a communications channel on an airplane or an automated evacuation system protecting a nuclear plant or defense facility," he said.

In handheld instruments, big changes of past years include greatly increased measurement quality and a proliferation of feature-rich small devices.

ment role at NTi Americas, Mintner was responsible for maintaining some of the higher-level service and adjustment/calibration work.

NTi makes handheld instruments as used by acousticians, system installers, broadcast and studio engineers, development engineers and educators. It also makes larger analyzers and software systems used for engineering design and factory production of audio and acoustic devices; and it is known for "defect detection" systems for transducers, such as loudspeakers and microphones.

Mintner has witnessed a split in the electronics industry between the design function and that of production engineering test. Much of the factory production for consumer and pro gear is done in Asia, while engineering development test can be almost anywhere. "So with the large testers, NTi's organization must often be coordinating among three continents to get the jobs done, usually working both with client company staff in multiple locations as well as outside consultants."

On the handheld instrument side,

the biggest changes in recent years, he said, have been greatly increased measurement quality and a proliferation of feature-rich small devices, along with a post-9/11 emphasis on intelligibility testing for emergency systems and security applications.

In broadcast, the change in engineers' instruments and their use of them have been driven as much by shifts in broadcast ownership and employment patterns of engineers and technicians themselves as anything, Mintner said.

"Years ago, at a larger station we might stop by and have a leisurely demo and chat with multiple separate transmitter, studio engineering and other technical staff at each station. Today, with IT expertise added and even dominating the work, many fewer staff are usually spread around several locations in order to support their specialty for a group cluster of stations — or in many cases even now as independent contractors rather than direct station employees."

This type of technical lifestyle, he said, demands even more lightweight and task-efficient portable gear.

"The traditional generator-analyzer test sets weighing 20 to 30 pounds are a thing of the past, and of course analog and various forms of digital testing must all be accommodated. The measurement

Upgrade Your ARC-16 Fast!

From: Joshua Smith
To: Matt Leland <matt@burk.com>
Subject: My Burk ARC-16 to ARC Plus Touch transition experience

Matt,

I found my transition from the ARC-16 to the ARC Plus Touch remarkably simple, helped along greatly by the Plus-X Dual IP8 Adaptors which allowed me to re-utilize all my existing wiring. Configuring the equipment took very little time, a marked improvement from struggling with serial ports.

The fact that all the equipment communicates over an IP network is so convenient and easy to deal with. That also really helps with management as I can hop on AutoPilot using my laptop on the office network rather than having to plug in directly.

I like that macros and calendars can be stored directly on the ARC Plus Touch. This is very helpful for procedures such as AM power change, as macros function without a computer. A computer failure won't leave my AM blasting all night!

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data must also be easily available to the PC if desired, for reports and other analysis, but without necessarily lugging round a connected laptop during the actual measurement work."

TECHNICAL WIZARDS

As he departs NTi Audio, is there anything that Mintner will miss?

"Everything," he told Radio World. "All the great customers, partners, engineers and technical wizards from many disciplines with whom I have had the privilege to learn from and work with.

"I have been privileged to have worked for and known some of the best in both music and technology. On the tech side that includes Willy Studer, Eugene Spoerri, Rudy Van Gelder and Phil Ramone. In music, my original teachers Jerry Stowell of the Chicago Symphony Orchestra and Robert Willaman. Also, composers like David Tudor, William Hibbard and Peter Todd Lewis, not to mention the hundreds of other conductors, composers and fellow musicians and engineers over the years on both sides of the studio glass and proscenium."

For Mintner, retiring does not mean relocating. "I've been in Oregon since 1989, so now I am a completely converted Oregonian and westerner. My family loves Oregon and the Pacific Northwest, so we'll stay right here. We've got beaches with mountain streams right on them cascading out to the ocean, mountain ranges, famous wineries as well as Portland, with one of the best 'foodie' scenes in the country, along with the best classical music station left in the U.S., KQAC. Where would I go?"

The future does not mean the end of work for Mintner. "While I'm retiring from NTi and full-time work, I'm not quite retiring overall. Another small company of mine is called Audio Support Northwest, and it is where I can do system test design and audio consulting work that might come up."

Comment on this or any story. Email radioworld@nbmedia.com with "Letter to the Editor" in the subject field.

NEWSROUNDUP

FCC: Senior Republican Commissioner Ajit Pai was named chairman of the FCC by President Donald Trump. In remarks to the commission staff on his first day, he spoke of his parents, "who came to this country 45 years ago with literally no assets other than \$10, a transistor radio, and a desire to achieve the American Dream."



His first public meeting as chairman — with a 2-1 majority — was Jan. 31, when the commission unanimously eliminated the requirement that commercial broadcast stations retain copies of letters and emails from the public in their public inspection files. Observers expect Pai to start revisiting recent actions under Chairman Tom Wheeler, including the FCC's signal to carriers of net neutrality issues with zero-rating plans it saw as anticompetitive and the denial of a request by noncommercial stations to review new reporting requirements, as well as longer-arc policies like the Open Internet order and broadband privacy framework. Pai joined the FCC in 2012. He is a former FCC and Hill staffer and was associate general counsel at Verizon.

DIAL REPORT:



The makers of the NextRadio "hybrid radio" app have been vocal about its analytic benefits for stations and advertisers. Now they've launched a tool to help measure radio campaigns. TagStation — which makes NextRadio and is part of Emmis Communications — calls this tool the Dial Report, a digital measurement report about analog radio usage. "It provides location-based data, demographics and radio listening data within 48 hours of airing spots," according to an announcement. "Dial Report users can drill down into MSAs and/or device activity to uncover campaign listens, views, interactions, listener proximity and in-store traffic."

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BBC to Expand Audio Content Globally

The broadcaster hopes to use its vast radio archives to attract more listeners

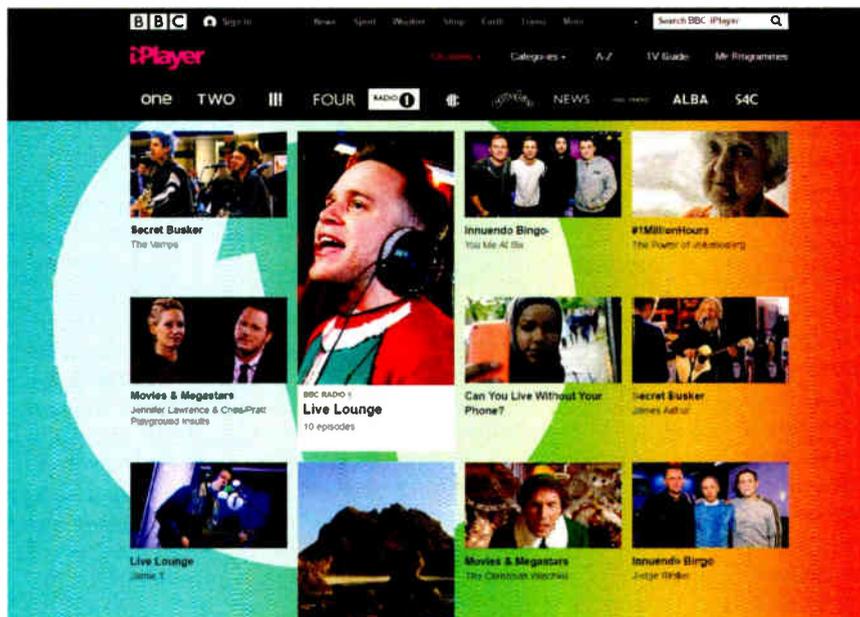
BY JAMES CARELESS

Nothing less than “a Netflix of the spoken word.” That is what BBC Director-General Lord Tony Hall promised in November when he announced BBC plans to offer its full archive of audio content to online listeners around the globe.

“The BBC makes the best radio in the world ... and we have an extraordinary wealth of audio riches at our disposal,” said Lord Hall during his keynote address to the Voice of the Listener and Viewer Autumn Conference in London.

“With our world-class content, we could use our current output and the richness of our archive to create a Netflix of the spoken word. It’s one of the things that will help the BBC carry the full weight of Britain’s culture and values, knowledge and know-how to the world in the years ahead — and say something really important about modern Britain.”

At the same time, after years of retreat and retrenchment, the BBC World Service has announced plans to broadcast daily news programs to North Korea via shortwave and medium-wave (AM) radio. Using UK£289 million in funding provided by the United Kingdom government (about \$363 million), the BBC World Service also will expand its TV news and online content for Russia, plus add 10 more languages to the BBC World Service’s roster of multilingual content.



BBC already serves a lot of free content on its iPlayer web page.

“As we move toward our centenary (in 2022), my vision is of a confident, outward-looking BBC, which brings the best of our independent, impartial journalism and world-class entertainment to half a billion people around the world,” said Lord Hall. The BBC World Service does not reach this many people at present: 500 million is a corporate goal.

PAID ACCESS

Lord Hall’s invocation of Netflix as a model for global distribution of BBC’s

famed radio archive immediately caught the attention of online and radio industry players.

To them, invoking Netflix suggests that the BBC wants online users to pay to access this content; just as Netflix subscribers pay to access this provider’s TV shows and movies. If not, Lord Hall’s comment doesn’t make much sense, given that the BBC is already providing free access to much of its audio content online today.

One clue to the BBC’s intentions:

tions into that of OMT. “We bring North America to the party, and they bring new products to our party,” OMT President/CEO Bill Baines said. Both offer media products that include automation/payout and logging. WinMedia is owned by a small group of shareholders; Stéphane Tésorière is president. Francois Beaumier heads WinMedia Canada. OMT’s automation roots go back to the 1980s and the earliest days of PC-based automation; OMT Technologies itself was founded in the 1990s by Ron Paley and later was publicly traded in Canada. OMT more recently was owned by Emprise Capital, its sole shareholder since 2011.

SBE: The Society of Broadcast Engineers added an education director. Catherine “Cathy” Orosz joined the national staff in January. She worked previously for association management and government affairs firm McGuffey and Associates, also located in Indianapolis. There she was director of client services and association manager for the Indiana State Chiropractic Association; she held that position for five years. She also served as Indiana executive director and director of operations for the Printing Industry of Indiana/Illinois Association for 10 years.



Kerri Hoffman is CEO of PRX.

In partnership with ITV, the BBC is launching a pay-for-access, Netflix-style online TV service called BritBox. It will go live for paying customers this year.

If the BBC is serious about copying Netflix in setting up a pay-for-access service, they will need deep pockets to do so. To establish itself on multiple distribution platforms globally, “Netflix has raised approximately \$200 million in financing,” said CEO Kerri Hoffman of Public Radio Exchange (PRX), a public media company that distributes and creates radio shows and podcasts. And this is far from Netflix’s only source of cash to fund programming, distribution and management.

“They have a mature revenue stream that brings in over \$5 billion each year,” said Hoffman. To succeed using the Netflix model, “Can the BBC make the significant technical investment to maintain, adapt and grow platforms?” she asks.

Another observer, WRMI General Manager Jeff White, is similarly skeptical. (WRMI is a privately owned international shortwave radio broadcaster located in Okeechobee, Fla.) “As far as the BBC’s ‘audio Netflix’ plan, my question is whether international listeners would have to pay a fee to access it, like with Netflix,” said White. “If so, I really wonder whether it would be very successful. If it’s free, more power to them.”

At this point, the BBC’s own intentions are unclear. “Work is at the early stages, and the BBC expects to say more in the spring,” the BBC Press Office said in response to a query from Radio World.

BUCKING THE TREND

The BBC World Service’s plans to broadcast radio news into North Korea, expand its multiplatform Russian service and add 10 more languages is a

(continued on page 8)

NEWSROUNDUP

DOT-RADIO:

The European Broadcasting Union is launching the new top-level domain name “.radio” for



the radio community. EBU has described its approach as a community TLD run for the benefit of the whole radio industry and amateur enthusiasts, reserved for people and companies with active interest in the radio sector. EBU’s .radio TLD Manager Alain Artero said, “The TLD will be focused on content and matters specific to radio and we want to prevent speculators and cybersquatting in this TLD; this extension will therefore rapidly become a high-value internet space for websites, mail systems and other internet applications,” he said. A pre-launch phase, reserved for radio stations, will run from May 3 to July 5. Other categories of applications will follow.

ACQUISITION: France-based software provider WinMedia Group acquired OMT Technologies in Canada, and will merge its own small North American opera-

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RADIO GARDEN

(continued from page 1)

zoom in and out of the earth's image using the mouse's scrolling wheel.)

As you home in on a radio station using Radio Garden, broadcast-band static coming through your speakers morphs into the station's audio — just as it would if you were tuning an analog-type radio with a tuning needle and dial. In the upper right corner of the screen, you'll see the actual link to the stream, which you can click on to get to the station's streaming page. If there is more than one station in the location, their clickable names will be listed in the lower right corner for easy access.

Because the green dots representing available streams are all shown on the Radio Garden Earth, it is easy to see where broadcasts are coming from, whether dense urban areas like London and New York or remote places such as Ushiaia, Argentina, near the southern tip of South America; Reykjavik, Iceland; or Bairiki on the Pacific island nation of Kiribati. More important, because tuning around the world is easy and precise, Radio Garden gives its users unparalleled access to radio stations around the globe on their PC or smartphone, all for free.

"Our goal was to recreate the experience you get on an old-fashioned radio, where the names of world cities are marked on the glass dial, inviting you to roam the world with the turn of the dial," said Jonathan Puckey, an interactive designer at Studio Puckey.

"The use of satellite imagery, rather than maps, gives the sense that there are no borders to radio at all."

AN AUDIO JOURNEY

How did this come about? Amsterdam-based Studio Puckey was invited by the Netherlands Institute for Sound and Vision to create an interactive installation incorporating content from an international research project called Transnational Radio Encounters. Instead of only using archival material, they felt it was important to offer radio in its present-day form and came up with the idea of projecting thousands of radio stations

BBC

(continued from page 6)

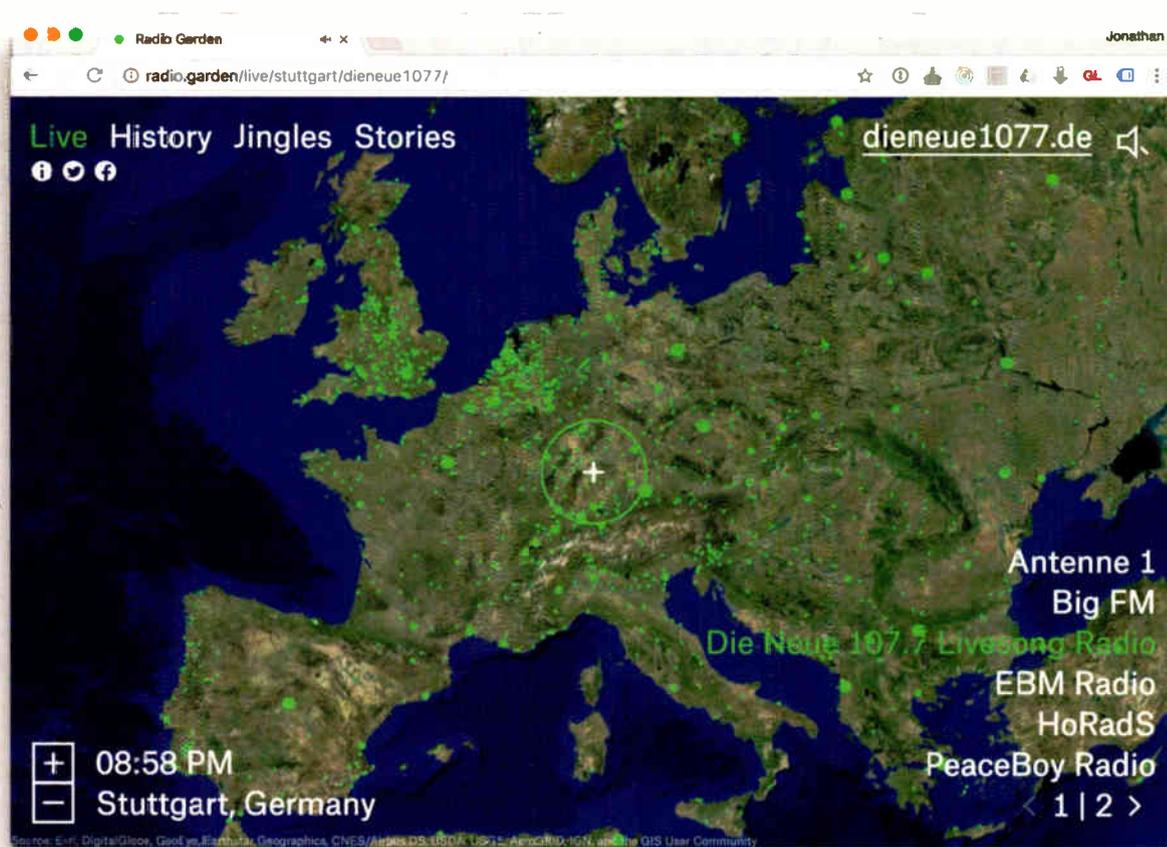
startling contrast to the decades of service contraction and outright cancellation suffered by cash-poor international broadcasters worldwide.

Perhaps the most surprising aspect of the BBC World Service's plans is its use of shortwave and medium-wave radio to reach North Korean audiences, as well as shortwave to reach new listeners in Ethiopian and Eritrea, among others.

According to Adrian Van Klaveren, the BBC's head of strategic change and portfolio management, the choice of transition medium is based on what stands the best chance of serving the target audience.

"In North Korea, some SW and MW receivers are available to the people that we are trying to reach," he said. (These are usually black-market radios; receivers sold by state-approved stores are fixed-band and only able to hear North Korean stations.) "In Ethiopia and Eritrea, low-cost SW receivers are widely used, while TV and the internet are not."

Will the BBC World Service get through to the media-deprived populace in North Korea? Not likely, said retired Radio Netherlands Worldwide strategic



Source stations show up as green dots and on a multi-page menu at lower right.

on a virtual globe.

"You hear all kinds of music and voices from all kinds of places," said Puckey. "Sometimes the most surprising and eye-opening experience is to hear music from distant places and people that you nothing about. I myself have found a new favorite station far from home, namely Marina FM (www.marinafm.com) in Kuwait."

To populate Radio Garden, Studio Puckey's staff uses custom content management software that helps

them connect new streaming sites to the site's earth-based graphical interface. "As long as the streams are functioning, we allow all stations on our site," said Puckey. "Just like the air knows no barriers to radio signals, we feel that our website should be open for everyone who is broadcasting."

Whenever a user launches the Radio Garden site, a title comes onscreen indicating that Radio Garden is "sprouting live radio streams" as its Earth view

(continued on page 10)

adviser Andy Sennitt. But numbers don't matter. "It's really only the 'elite' in Pyongyang who the BBC needs to reach, because that's where all the decisions are made," Sennitt said. In a bid to influence this elite, "there are already several independent stations in South Korea broadcasting on shortwave to the North," he noted.

Given how deliberately isolated North Korea is from the outside world, is it worth the BBC's money to broadcast to this group? Voice of America audience research analyst Kim Andrew Elliott believes that it is.

"North Korean elites have better access to the shortwave radios, and perhaps even to the internet, to facilitate their access to the BBC Korean Service," said Elliott, stressing that he was speaking for himself and not the VOA.

"Even if small in number, this elite audience is important given the possibility of crises on the Korean peninsula. This elite audience is probably aware of the BBC's reputation for objectivity and may turn to the BBC as a means to verify information, or the lack thereof, from North Korean domestic media."

At a time when most state-run broadcasters are reducing their coverage and content, the BBC's plans for its own audio Netflix and expanded World Service



Andy Sennitt is a retired Radio Netherlands Worldwide strategic advisor.

are a welcome exception to this industry trend.

Put together with its current multiplatform distribution, plus the Beeb's content sharing with third-party radio/TV stations, and the BBC is "the only truly global broadcaster," said Sennitt.

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RADIO GARDEN

(continued from page 8)

is populated by green dots. The association between living things and radio stations is no accident: It reflects Studio Puckey's belief that radio content is "a vibrant living thing," said Puckey. "People are intensely interested in what they hear on radio, whether over the air, on their computers or their smartphones. So radio is very much a living medium, even in the internet age."

AN UNEXPECTED SUCCESS

As a publicly-funded art installation, Radio Garden was never intended to become a mass-market phenomenon. But since it launched in December, the Amsterdam-based website has captured attention, and people have been logging on in droves.

"We had 12 million unique visitors in our first month, and 20 million unique hits," said Jonathan Puckey. "This is far more than we ever expected. We've had to scramble to scale our servers and resources to keep the site properly provisioned."

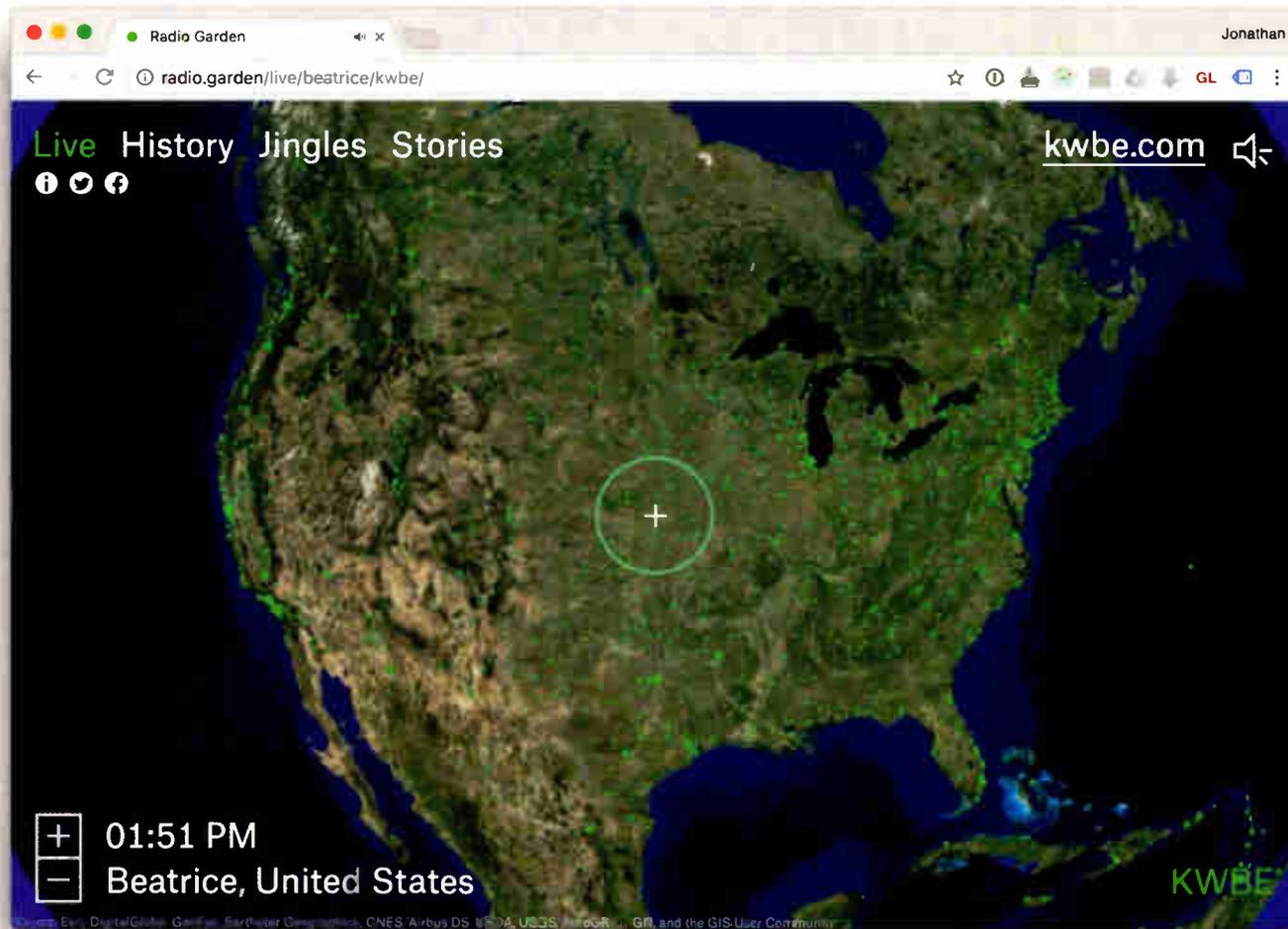
Also unexpected is where people are tuning in from. "I thought the majority of our users would come from North America and Europe, but in fact the number one country logging onto Radio Garden, in term of listeners, is India," Puckey said. "Next is Brazil, the United States, Saudi Arabia and the UAE. What a surprise."

Of course, serving all these listeners costs money. At this point, the parties behind Radio Garden are trying to figure out where to find the funds to keep Radio Garden online indefinitely.

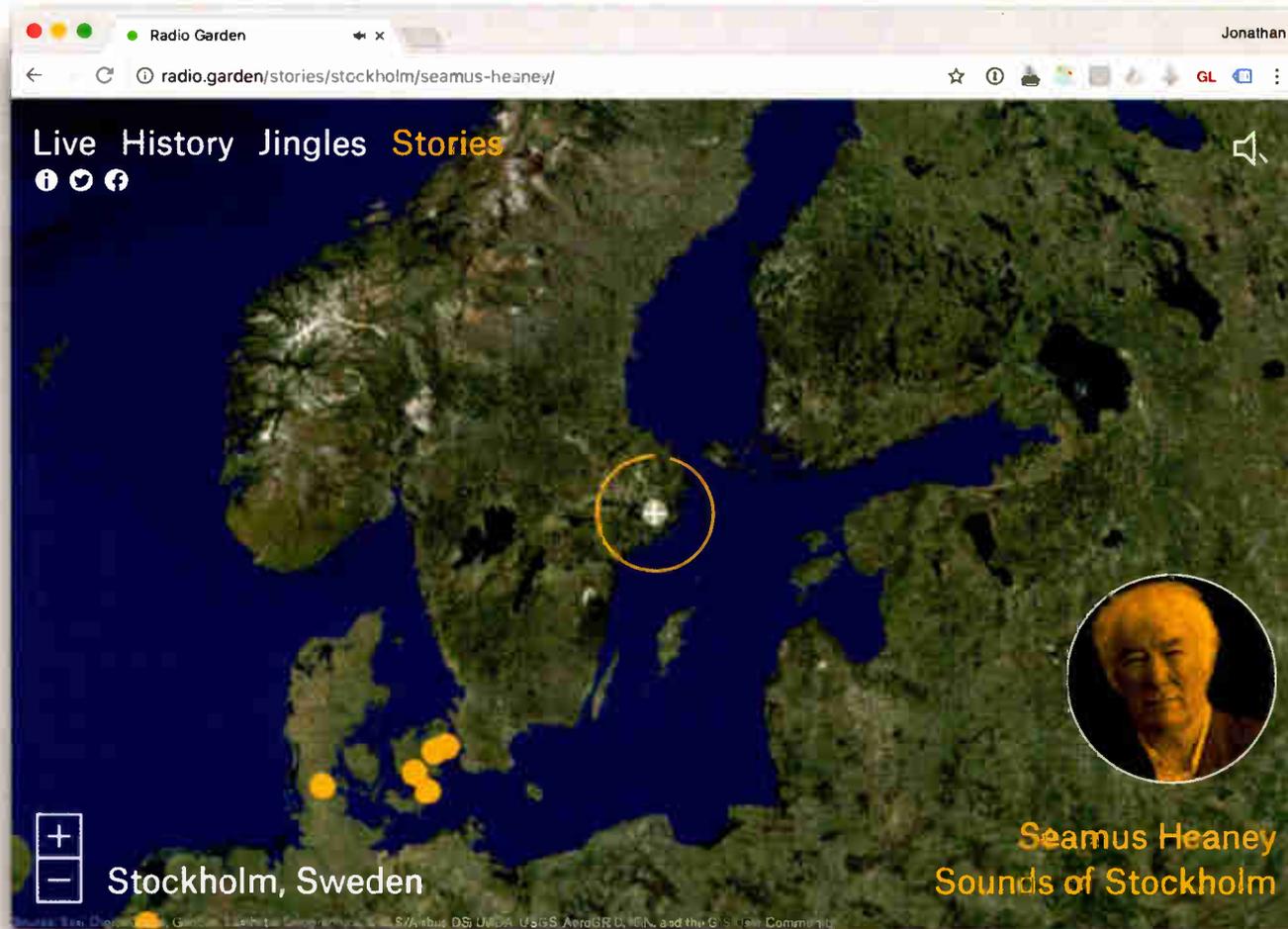
"The project is currently being financed by the Netherlands Institute for Sound and Vision and HERA (Humanities in the European Research Area), but there was no plan in place for this amount of success," said Puckey. "Our challenge now is to find a way to keep Radio Garden going without having to resort to things like advertising."

As a result, it is not clear at this writing how long Radio Garden will be fully functional, despite its inventive interface and definite popularity. So radio lovers would be well-advised to get to the site and start tuning into the world's radio stations while this magical site is operational.

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The tuner has found the stream of KWBE(AM) in Beatrice, Neb.



The menu at upper left also offers audio jingles or stories (shown) associated with a given station.

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This Support System Is Not Just Strong, It's Rigid

Here's how the folks at Mountain Country secured their monitors cost-effectively

WORKBENCH

by John Bisset

Read more Workbench articles online at radioworld.com

Rigid line in a studio may be unusual, as shown in Fig. 1, but you've probably never seen a monitor mount like the one in Fig. 2.

Dave West, general manager of

Mountain Country in Colorado Springs, Colo., and engineer Bryan Waters needed to mount monitors in the station's new control room. They also had some pieces of 1-5/8-inch rigid line left over from the transmitter installation.

Marry the two and you get a unique, solid support system for your monitors.

Support clamps (Fig. 3) anchor the

monitors to the pipe. Typical end flanges, screwed into the console table top and wall, secure the pipe, creating an engineering work of art.

Randall Davidson is director of radio services with the University of Wisconsin and WRST(FM) in Oshkosh. He writes that the engineers at WRST have come up with an economical and elegant application to serve as a tower light outage alarm.

WRST is a "half-time" affiliate of Wisconsin Public Radio and provides local student-produced programming at other times. The station operates with a 1973-vintage Gates FM1H3 1 kW transmitter (see Reader's Forum in our April 20, 2011, issue). It broadcasts from an 85-foot tower on the roof of a five-story building. Even though the station's license doesn't require it, the tower is equipped with two steady-state red beacons on top, activated by a photocell.

The station uses a Burk VRC 2500 unit to take transmitter/tower light readings automatically, and the student operators manually take readings when they're on the air. The problem comes when the station is running unattended during overnight hours. Specifically, how could workers be alerted in the unlikely event that *both* tower light beacons fail?

Chief Engineer Bill Kerkhof realized the infrastructure used for meter

(continued on page 15)



Fig. 1: 1-5/8-inch rigid line in the control room.



Fig. 2: The rigid line actually supports the control room monitors.

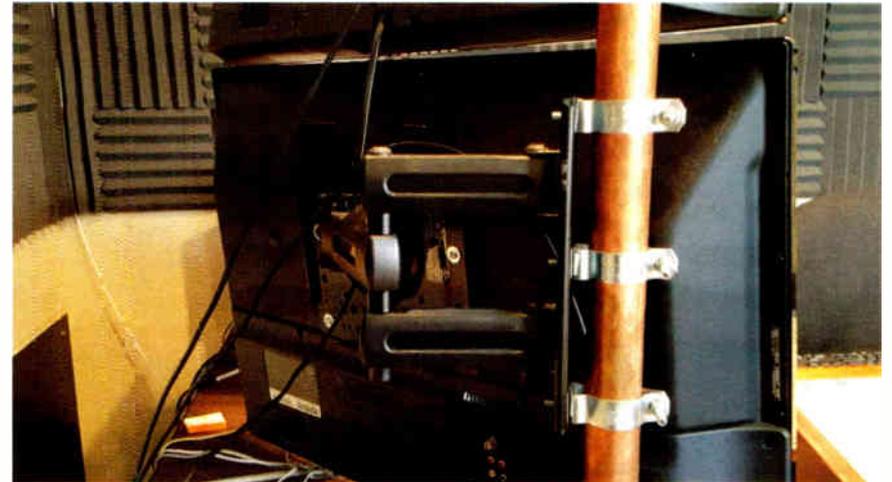


Fig. 3: Support clamps secure the monitor brackets.



Fig. 4: A small solar panel is used to warn of tower light failure.

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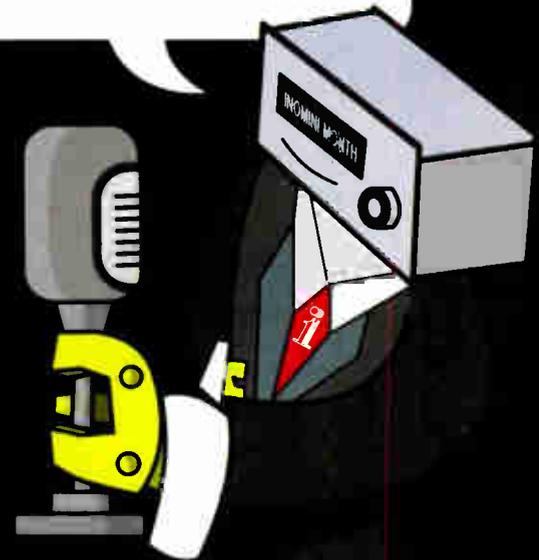
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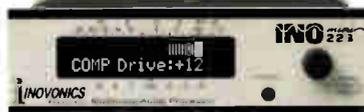
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Radio Raises Spirits and Relief Funds

♥ RADIO DOING GOOD

BY MARK LAPIDUS

The positive power of local radio can be amazing. These four diverse stories showcase radio's incredible impact in raising much needed funds, food and providing a voice for positive political action in the community. I'm hopeful that by sharing such stories with our readers on a regular basis, we encourage more stations to be proactive and plan to make a difference in 2017.

• You gotta admit that "Musicians on Call" is a cool name for a nonprofit. Since 1999, they've been delivering music bedside to patients at hospitals and hospices. Recently, Cumulus Nashville country music stations WKDF(FM) and WSM(FM) teamed up with Jason Aldean and

Michael Tyler to raise \$16,000 for the organization. On-air talent Ty, Kelly and Chuck hosted the show, which included a live auction featuring an autographed Jason Aldean guitar.

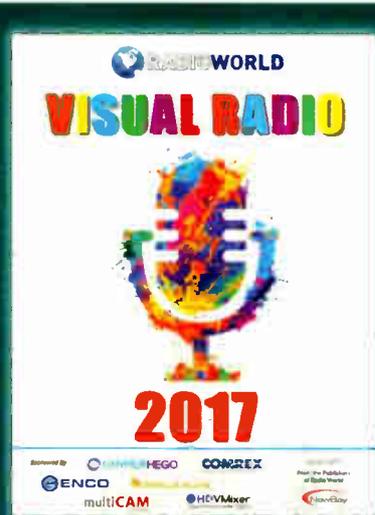
• Here's proof that even student-run non-commercial stations can make a big difference to the local community. Seton Hall University's WSOU(FM) collected 640 pounds of food for the Community Food Bank of New Jersey through the Students Change Hunger program. "More than 1.3 million people in New Jersey require food assistance," said WSOU News Director Katie Fatzler. "Factor in New York City, and there are many people in our listening area impacted by not having enough to eat."

• And listeners always express significant appreciation for disaster relief efforts. Knoxville, Tenn.-based Cumulus station WIVK(FM) raised \$815,000 during an 18-hour radiothon to benefit victims of the winter's Gatlinburg wildfires.

• Last but not least, consider asking your local congressman to participate in this upcoming public service effort. The NAB is now inviting members of Congress and their families to record PSAs about various important issues for stations across the United States. The actual recording for radio and TV stations will happen in May and early June. Those with questions can reach NAB Senior Manager of Public Service Suzie Raven at sraven@nab.org or 202 429-5448.



Country musician Jason Aldean, third from left, teamed with NASH FM's Ty Benti, Kelly Ford and Chuck Wicks to raise money for Musicians on Call.



Strong visual content makes a powerful impact not only on the viewer but on the listener. Is your radio operation delivering?

Video is no longer a novelty for a growing number of radio broadcast operations. These professionals use streaming and social media video tools to diversify their platforms and create new touch points with consumers.

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In **Radio World's latest eBook**, we talk to a range of experts and video users at the Cumulus NASH campus, CBS station WJFK(FM), Video Dads, Radio America, Townsquare Media's "Free Beer & Hot Wings Morning Show," public broadcasters KEXP(FM) and KCRW(FM), Jacobs Media, low-power FM station WDPE and Poland's Radio Wroclaw.

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WORKBENCH

(continued from page 12)

readings had unused inputs and thought perhaps one of these could be used to develop a tower light outage alarm. For less than \$20, he purchased a small solar panel, shown in Fig. 4, typically used for charging wildlife cameras. This was installed in the station's transmitter room and pointed out a west-facing window.

Testing indicated that it generated a positive voltage when the sun was up, but generated no voltage when it was dark enough to activate the tower light photocell. The solar panel voltage figure became another variable in the transmitter telemetry configuration.

Kerkhof wrote a short macro that would check both the tower light voltage and the solar panel voltage every 15 minutes. The possible outcomes are shown in the chart (above right).

This final condition triggers an automatic phone call to the cellphone carried by the engineer on duty. By checking every 15 minutes, it gives engineers ample opportunity to contact the FAA should both tower light beacons fail.

The system is economical and reliable in that there are no batteries to renew and no moving parts. Should the solar panel itself fail during the day, the engineering cellphone would still be contacted, since both its voltage and that of the tower light photocell would be zero, a condition similar to the tower lights failing overnight.

Remember the "handle" we told you about, described by consulting firm Hatfield and Dawson? It permitted inverting an AM field intensity meter, so the antenna could be held close to the ground and used to "sense" AM ground radials.

Consultant Lewis Dye Collins writes that there is a finite probability that the bolt used to secure the meter in the Hatfield-Dawson grip could come loose, in which case the FIM could go crashing to the ground.

Some years ago, Lew had an FIM come loose from its "mooring," so to speak, and the damage was not pretty.

A much safer approach is to make a

Solar Panel Voltage	Tower Light Voltage	Condition	Outcome
Positive	Zero	Daylight/tower lights off	No action
Zero	Positive	Post-sundown/both tower lights on	No action
Zero	Zero	Post-sundown/both tower lights out	Call to engineering cellphone

small shielded loop antenna out of coax and affix the antenna to a broom handle or similar non-conductive rod. The loop is then connected to the auxiliary input jack on the FIM with a short length of coax cable.

This method permits you to carry

the FIM right-side up, by its handle, and hold the test probe broomstick in the other hand.

Interested in this? Google "shielded loop antenna construction" for a variety of potential construction methods.

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.

Author John Bisset has spent 46 years in the broadcasting industry and is still learning.

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WORKBENCH

by John Bisset

EVERY ISSUE
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NATE: Tower Industry Continues to Evolve

Drones, FirstNet and TV repack are on the show agenda — and, as always, safety first

TOWERS

BY RANDY J. STINE

The National Association of Tower Erectors considers itself in a good place as it prepares for its annual conference. The nonprofit trade association, based in Watertown, S.D., serves tower erection, maintenance and service companies; it has a staff of eight who administer the day-to-day operations, and its membership is currently 770 companies. NATE believes it is poised for further growth in the wireless structure industry.

NATE UNITE 2017, its annual conference, is scheduled for Feb. 27–March 2 in Fort Worth, Texas, with approximately 146 exhibitors and numerous safety and educational sessions.

Keynoters at the conference include FirstNet President TJ Kennedy on Feb. 28 and Marcus Luttrell, retired Navy SEAL and recipient of the Navy Cross for combat heroism, on March 1.

Radio World asked NATE Executive Director Todd Schlekeway for a conference preview and inquired about the major issues facing the tower industry. Schlekeway, former South Dakota state legislator, was named the group's executive director in 2012.

Radio World: What major themes are developing in the tower industry?

Todd Schlekeway: The utilization of unmanned aerial systems or drones is certainly near the top of the list. They are going to have a major impact.

Certainly the broadcast repacking work that will commence following the FCC's 600 MHz post-incentive auction is a hot topic. That will be a heavy lift for the industry but also a great business opportunity. We have educational sessions at our conference devoted to the consequences of the auction.

The broadcast work in our industry has diminished following the analog-

to-digital TV conversion, but the TV repack could begin in earnest in late 2017. It is anticipated that repack work will last 3–5 years post-incentive auction to complete.



Attendees show off stylish tower wear at last year's conference in a photo from NATE's Flickr page.

We also expect our industry to commence work in the near future on FirstNet, this country's first high-speed broadband network devoted exclusively to public safety. That will become a major vertical market for our members to tap into once they begin building up that network and it is certainly something we are watching closely.

And of course the deployment of 5G will be a major initiative. We are talking to our members about ways to prepare to do some of that work, which have a lot more densification associated with that and which likely will include a combination of macro towers and micro small cell-type action.

RW: NATE's Wireless Industry Network (or WIN) program was launched in 2016. What is its function and what can be expected in 2017?

Schlekeway: That's one of the most significant programs that NATE has launched in our 22 years of existence. We felt for quite some time that NATE needed a more extensive grassroots network. Our industry needs "boots on the ground" at the conferences, events and meetings that are held in every region of our country. The WIN program includes a network of eight regional ambassadors

and 50 state liaisons. We also have a presence in Canada and the Bahamas.

The goal of WIN is to increase our visibility and influence within the industry. This really extends the reach beyond our small staff here and our board of directors. The goal for 2017 is to host regional meetings and events that will supplement our annual conference. We

have very high hopes for WIN and are excited to see continued growth in our membership as a result of the program.

RW: What are a few issues NATE is tracking on Capitol Hill?

Schlekeway: Right now the U.S. Department of Labor and OSHA are in the middle of a regulatory rule-making process on communication towers. That process is continuing. The next step is for OSHA, the U.S. Small Business Administration and Office of Management and Budget to convene a small business advocacy review panel as required by the Small Business Regulatory Enforcement Act, or SBREFA. We are nominating some of our small business members to serve on the panel so they can provide some feedback on what would be the ramifications of a new regulatory environment on small businesses. The change in administration in Washington could impact where that all goes.

We also are working with the U.S. Department of Transportation specifically on some issues regarding hours of service provisions. We recently had a favorable interpretation from the Federal Motor Carriers Safety Administration confirming that since the work that

NATE UNITE 2017
FORT WORTH, TEXAS

IF YOU GO

Who: "Decision-makers in the broadcast and telecommunications tower erection, service and maintenance industry"

When: Feb. 27–March 2

Where: Fort Worth Convention Center, Fort Worth, Texas

How: <https://natehome.com/annual-conference>

How Much: Members \$169, others \$469 (higher after Feb. 24 and on-site). One-day and exhibits-only passes available.

our members do is providing broadband and wireless services, the commercial vehicles they drive are deemed "utility service vehicles." This is significant, as utility service vehicles are exempt from certain hours of service restrictions and logbook requirements. We are still monitoring the implementation, but this interpretation was a major victory for our member companies.

RW: What has been the impact of commercial drones on the wireless industry and where do you hope to see it go next?

Schlekeway: Our industry is tailor-made for the utilization of unmanned aerial systems technology. NATE has really embraced unmanned aerial systems. We view them as a means to contribute to a safer work environment at tower sites. They can mitigate the number times a tech has to ascend and descend a tower in any given day. There is a lot of efficiency in using drones, including applications like aerial inspection photographs.

NATE has an unmanned aerial systems committee that is working with the FAA and FCC on many issues. We expect many of our members will have some of their people get their remote pilots license and be licensed by the FAA to pilot drones for commercial purposes. We will also have a session dedicated to drones at our conference.

(continued on page 22)

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Proclaim 17 Heads for Warmer Weather in Orlando

National Religious Broadcasters' annual convention and exhibition switches location

NRB CONVENTION

BY EMILY M. REIGART

Proclaim 17, the National Religious Broadcasters' annual convention and exhibition, will be held Feb. 27–March 2 at the Orlando World Center Marriott in Orlando, Fla. The exposition will open Feb. 28 at 10 a.m.

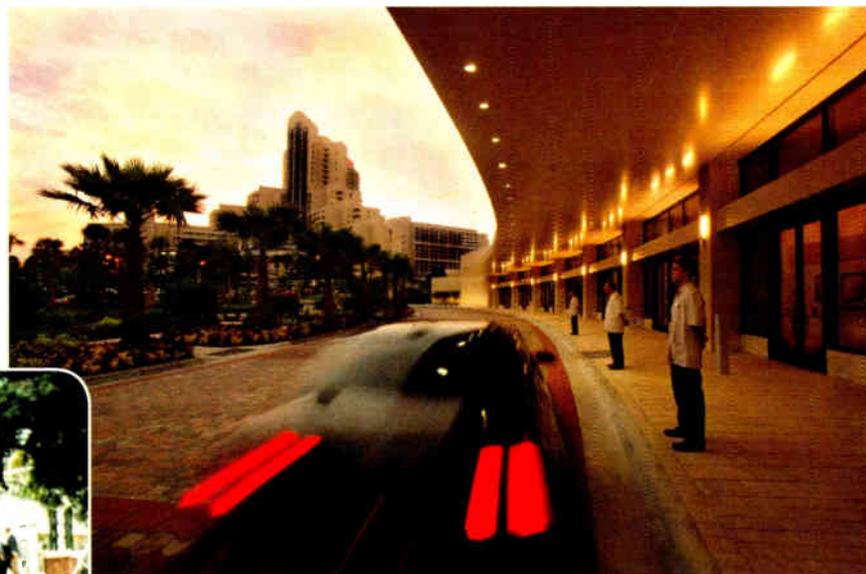
"We thought attendees would enjoy the change of venue, accessibility of theme parks and the feel of something new," NRB President/CEO Dr. Jerry A. Johnson wrote in an email explaining the decision hold the show in Orlando.

will impact the listening habits, how to engage audiences through social media and more.

Session titles include "Why Listen?" presented by Finney Media President

Sound Is Your Difference Maker" presented by social researcher, author and speaker Shaunti Feldhahn.

Another session is "Radio Regulatory Framework in the Trump Administration," featuring Hardy, Carey, Chautin & Balkin Managing Partner Joseph C. Chautin, III; Wilkinson, Barker & Knauer Partner David Oxenford; and



Courtesy Marriott International, Inc.

Above: Proclaim 17 will be held the Orlando World Center Marriott. **Left:** A Proclaim 2016 attendee poses with a robot in Nashville.

Chuck Finney; "The Taylor Swift Effect: How to Make Super Fans for Life" presented by Z88.3 Promotions Director Carol Baker Ellingson; the "A Movement, Not Just a Moment" panel featuring WDCX(FM) General Manager Brett Larson and Salem Media Group Senior Vice President of National Ministries Ron Walters; "You're Not (Just) in the Radio Business Anymore" presented by Jacobs Media President Fred Jacobs; and "Christian Radio's On-Air Tone: How A Kinder

moderator Advocace Senior Consultant for Research Paul Virts.

Chautin and Oxenford will tell attendees what they expect from the Ajig Pai-era FCC, covering issues ranging from implications of the administration change and a Republican majority, EEO online recruiting petition for rule-making, radio online public file transition, FM translators, AM revitalization, noncommercial fundraising petition, removal of public comments from public file rule and SoundExchange station recordkeeping for noncom educational stations.

Also relevant to radio broadcasters



IF YOU GO

Who: The National Religious Broadcasters organization sponsors an annual international Christian media convention and exposition.

When: Feb. 27–March 2

Where: Orlando World Center Marriott, Orlando, Fla.

How: <http://nrbconvention.org>

How Much: NRB members \$600, non-members \$700, first-times \$400, day passes \$300, expo-only pass \$25; rates increase by \$100 after Feb. 22

may be sessions in the Digital Media Summit, which Johnson said "will be committed entirely to social media, Facebook, YouTube, blogging, podcasting, and other new forms of media."

Its sessions include "Building Your Facebook Community: Tips, Tools, & Best Practices," "The Marketer's Blind Spot," "How Digital Media Drove the Largest, One Day, Live Event," "Podcasting and Effective Content Marketing," "Getting Real About Digital Marketing" and "The Sure Way to Fail in a Digital World."

Plus, "The Pastors Track will equip pastors with tools to get into radio, TV, web streaming, blogging and podcasting. It will also inspire them with a celebration of Martin Luther, the Reformation and the biblical truths that were distinctive to the movement, which was

(continued on page 22)



The convention had been held in Nashville, Tenn., from 2008–2016, and NRB says the convention will return to Music City for Proclaim 18.

TRACKS

Johnson highlighted the events that bookend Proclaim 17: "We begin early Monday morning with Sean Hannity and finish on Thursday night hearing from the pastor of the fastest-growing church in the world."

The Proclaim 17 conference tracks are divided into seven categories: the Digital Media Summit, Radio Summit, TV Summit, Church Media Summit, Great Commission Summit, and Film & Entertainment Summit and Pastors Track.

Radio Summit sessions will be held Feb. 28 and March 2, exploring how to build bridges between stations and local churches, how the connected car

EXHIBITOR SAMPLING

A sampling of companies that will be represented on the show floor. The full list can be found at nrbconvention.org/expo.

A-ware Software	1200	Kingdom	801
Aberdeen Broadcast Services	611	Liftable Media	1310
Barbizon Lighting Co.	539	Myers	1032
Blubrry	400	OMB America	405
Bott Radio Network.com	527	Podfly Productions	1311
Broadcast Electronics	502	Pro Podcast Solutions	638
Broadcast Software International	1024	RCS	407
Broadcasters General Store	306	RF Specialties Group	1018
Christian FM Radio Networks	200	SCMS Inc.	819
Comrex Corp.	1101	Shively Labs	1319
ENCO Systems Inc.	1202	Spreaker Inc.	101
Galcom International	910	StreamStation, Inc.	1224
		Vizrt	530



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NATE*(continued from page 18)*

RW: *Safety remains a primary goal of NATE. What steps does NATE have planned for tower safety and education for men and women climbers?*

Schlekeaway: A new 501c-6 national assessment and certification organization called the National Wireless Safety Alliance recently launched their first safety certification programs. That is going to be a major positive for the industry and should help professionalize the industry and make for a safer work environment. Our industry has never had an ANSI accredited, third-party certification entity that is standardized, so that someone trained in Minnesota or Florida has to go through the same assessment and validation process in order to get certified. In order to obtain NWSA certification, candidates must pass a computer-based exam and a practical, field-based skills test.

RW: *Is the number of tower climbing deaths in this country going up or down?*

Schlekeaway: There were seven tower climbing deaths in 2016. The total number of fatalities in 2014 was four. There were 10 in 2014 and 14 in 2013.

NATE's goal is for the industry to have zero climbing fatalities, and every safety resource and standard that we produce is designed to keep the elevated workforce safe so they can return home each and every night.

RW: *Will the increased use of drones help make keep tower workers safer?*

Schlekeaway: Yes they will. However, drones are not a substitute for the workforce. UAS technology will never be able to replace the technical skills of rigging a tower, modifying a structure and doing antenna and line work.

They can, however, reduce the number of times those tower techs have to go up and down a tower. That is risk mitigation in and of itself.

RW: *Standards-setting groups ANSI and EIA have recently tightened up standards for tower construction to provide better safety margins for extreme weather events. How are those affecting broadcast tower owners?*

Schlekeaway: It will affect those building new towers or modifying existing towers. The new ANSI/ASSE A10.48 Standard, "Criteria for Safety Practices with the Construction, Demolition, Modification and Maintenance of Communications Structures," touches on weather in the pre-planning and rigging plans sections of Chapter 4. Adverse weather is also addressed in Chapter 5 of the standard detailing jobsite conditions.

Extreme weather events can have multiple meanings. EIA, for example, provides specifications for extreme weather events for towers to make them more survivable. Think hurricanes, ice loading, etc. Another consideration addresses weather events during construction or service loads that can impact how towers are constructed and to provide greater stability should bad weather occur.

RW: *What do you make of the tower lighting changes via the FAA and the FCC that pertain to bird safety?*

Schlekeaway: I think that was important. Our industry has responded very well to what the FAA has recommended in terms of the lighting changes that reduce the impact of attracting migratory birds to the communications towers. The industry has done well in this area in recent years.

RW: *Equipment manufacturer GatesAir estimates that there are 1,200 tower sites in the country that accommodate*

shared TV and FM operations. What could be the consequences of the TV spectrum repack for radio broadcasters who don't own their own tower and share tower space with TV?

Schlekeaway: In the case of shared radio and TV towers, the tower loading could change, requiring structural modifications. It could mean larger and stronger components will need to be added to make the tower stronger. There may be some FM stations that will be forced to find other broadcast facilities, if the tower cannot meet the new loading requirements through modifications alone. I can assure you that tower owners would prefer any rental income to continue, but if the tower cannot pass a structural analysis without removal of equipment, concessions must be considered.

RW: *What technical trends might a visitor to this year's NATE UNITE conference notice?*

Schlekeaway: Since our show is held during the first quarter of the year, many vendors will debut their new product lineups. There will be the latest in training, safety equipment and structural components; and lots on drones of course.

RW: *Is tower technology fairly mature, or are there important changes coming still that radio broadcasters should know about?*

Schlekeaway: With all of the spectrum being acquired and the network densification efforts that are ongoing, radio broadcasters need to be aware of the work that is being done on structures such as light poles and utility poles as well as the Distributed Antenna Systems and other micro-deployments that are being conducted to enhance coverage and capacity. NATE members have worked on every generation of communication networks and are prepared to



Jason Erickson, instructor at Western Iowa Tech Community College, ascends a communication tower during a recent training course.

play an instrumental role in deploying the technologies of tomorrow.

RW: *Do you expect to continue to see the trend of radio broadcasters selling off tower assets for high cash-flow multiples?*

Schlekeaway: I do. The anecdotal evidence I get from our members leads me to think it will. Vertical real estate is extremely valuable. There has been consolidation within the tower industry, which I expect to continue. Right now you have three publicly traded tower owners that own a huge percentage of communication structures across the United States. Those are American Tower, Crown Castle and SBA Communications; and they have all been involved in buying broadcast towers. Vertical Bridge, a privately-held company, has been in major acquisition mode the last few years as well. I don't see those types of companies slowing down their efforts to accumulate assets.

PROCLAIM 17*(continued from page 20)*

launched 500 years ago this year," Johnson wrote.

POLICY AGENDA

Many broadcasters anticipate a shift in tone and practice at the Federal Communications Commission under a Republican administration.

Upon the announcement of Ajit Pai as the new FCC chairman, Johnson described Pai as "winsome, fair and an expert in the field." He said the new chairman "is also a tried and true friend of First Amendment freedom."

Pai has addressed the convention before but is not slated to speak this year. In fact, no politicians or policymakers are on the schedule as speakers, a change from the 2016 conference, which featured a debate between Sen. Ted Cruz and Dr. Ben Carson.

Johnson told Radio World that "FCC Chairman Ajit Pai understands broadcaster concerns and he is sensitive to issues that face many religious broadcasting ministries. I'm confident in his fairness and in his firm dedication to First Amendment freedom. We at NRB are looking forward to working with him on issues of liberty and electronic media in the months ahead."

The association's website nrb.org lists policy priorities as federal election communications protections, internet freedom, performance tax opposition and spectrum rights. Johnson indicated NRB's top broadcast policy concerns in 2017 are much the same as they were during the Obama administration.

"NRB is committed to defending principles of religious freedom and free speech on-air and online, and we're particularly mindful of any attempts to censor communications based on dangerously nebulous and biased 'hate speech' allegations," he said.

"Recognizing the importance of nonprofit minis-

tries that produce or project religious content, we are also watchful in defense of sensible donor privacy concerns and in hopes of advancing efforts that could allow such broadcasting ministries to better partner with other charitable groups to meet significant community needs. We will, of course, continue our efforts to stand against a new performance tax on radio and to stand for religious TV ministries in the wrap-up of the spectrum auction and any other relevant legislative or regulatory proceedings that arise."

Additionally, Johnson said that NRB, which recently moved its main office to Washington from northern Virginia, has "increased our footprint on Capitol Hill. Our headquarters' proximity to the Capitol, the White House and the FCC increases our visibility with decision-makers, as well as other influencers and media outlets in the city. When people seek to defend their freedoms of speech, religion and the press, I want them to know that NRB is here and ready to work with them."

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Rock, Chalk, Access!

Jayhawk Sports Network delivers the games with Comrex products

USERREPORT

BY BOB NEWTON
Producer and Engineer
Jayhawk Radio Network

LAWRENCE, KAN. — The Jayhawk Sports Network is an IMG Sports subsidiary that handles coverage of the University of Kansas athletics program. We've got a television network as well as a radio network, and — because our Division I sports teams are often candidates to perform well in any given season — we serve a large audience of devoted fans.

I've been the producer and engineer of the Jayhawk Radio Network for more than 30 years, and we've been using Comrex equipment from the start. From the SLX single-line frequency extender, we stuck with Comrex through the introduction of ISDN and the shift to IP technology. We still use Comrex POTS and ISDN codecs because the University of Kansas has its own switch and lines are available in some of our stadiums for us to take advantage of. But as soon as the Access was introduced, we purchased three systems, along with detachable mixers, to use for football and basketball coverage. At this point, we use IP as our primary method of broadcast when ISDN is ridiculously expensive or just unavailable.

Access has been totally reliable for us every time we've used it, and I trust the technology. While we have experienced dropouts from our internet service provider, Access has always delivered high-quality audio for us over lower bandwidth than ISDN. I'm amazed that Access sounds just as good as our ISDN lines, while running on only 40 kbps. It feels like magic.

We use Comrex's Switchboard support software with our Access units. That makes connecting to networks like ours that use firewalls without fixed



Bob Newton at a remote with his gear, including a Comrex Access codec and an older piece, a Comrex BlueBox codec.

IP addresses easy. Instead of having to enter the static IP every time we connect, we just pre-enter network information, and when the time comes to broadcast, select a connection destination from a dropdown menu. This makes things so much simpler, especially for

our nontechnical users.

I'm on-site as often as possible, and I help out announcers everywhere I go. Our women's basketball announcer, however, doesn't have an engineer — he's a one-man show. To keep his setup simple, he has the Access 2USB with the attachable Access five-channel Portable Mixer. That's his entire setup and he has no trouble with it. He keeps POTS connected to the Access as well to make sure we can switch over if there are any hiccups in our Ethernet connection.

With just this piece of equipment, he's able to announce from anywhere.

I know ISDN won't be around for much longer, and Access will soon become primary for us in every context. It's going that way — ISDN quickly is becoming impractical. But I feel confident, going into the shift, because I trust Access and I know what we can do with it. The future is bright.

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

TECHUPDATE

TELOS Z/IP ONE IP PACKS FEATURES



Telos says that broadband internet is available just about everywhere and ideal for live remotes. However, public internet can be erratic; users might be lucky enough to get a good connection, but it might deteriorate during the broadcast.

What to do? Cross fingers and hope for the best? Reduce your bitrate, sacrificing audio quality in hopes of making it through your show?

Telos says its Z/IP One IP Broadcast Codec won't require compromising audio quality for a solid connection. Z/IP One will help get the best possible quality from public IP networks and mobile data services — even from connections behind NATs and firewalls. Telos collaborated with Fraunhofer to develop a coding control algorithm — ACT (Agile Connection Technology) — that adapts dynamically to IP link condition while minimizing the effects of packet loss and jitter.

Z/IP One automatically lowers bitrate and increases buffer length to keep audio flowing at maximum quality when conditions deteriorate. AAC-ELD (Advanced Audio Coding-Enhanced Low Delay) produces excellent fidelity at low bitrates, with nearly inaudible loss concealment and very little delay.

Standard high-performance codecs are a part of the Z/IP One toolkit, which includes AAC-HE, AAC-LD, MPEG4 AAC-LC, MPEG2 AAC-LC, G.711, G.722, and linear PCM. And if apt-X is part of a user's codec cache, it can be added to the Z/IP One as a small extra-cost option.

Z/IP One is also wireless-capable and connects natively to IP networks via Wi-Fi. A parallel port is provided for end-to-end, time-aligned GPIO contact closures; Z/IP One can also transport RS-232 serial data, synchronized with audio delivery.

For information, contact The Telos Alliance in Ohio at (216) 241-7225 or visit www.telosalliance.com.



KROX Goes Live Via Tieline

Ease of use and reliability keep the signal on the air

USERREPORT

BY CHRIS FEE
President/General Manager
KROX(AM)

CROOKSTON, MINN. — I have always been passionate about sports; and radio has been in my blood since I graduated from Bemidji State University in 2000 after studying mass communications and coaching. I started my radio career at KROX(AM) with part-time announcing while in high school and college, and after graduating college, I came home to work full-time. I love doing play-by-play sports commentary for basketball, football, volleyball, hockey, wrestling, baseball and softball, which is my passion.

Four years ago, I bought the station from my father.

CONNECTIONS

At KROX, we have been using the Tieline i-Mix G3 mixer/codec hybrid for about five years, and while sports

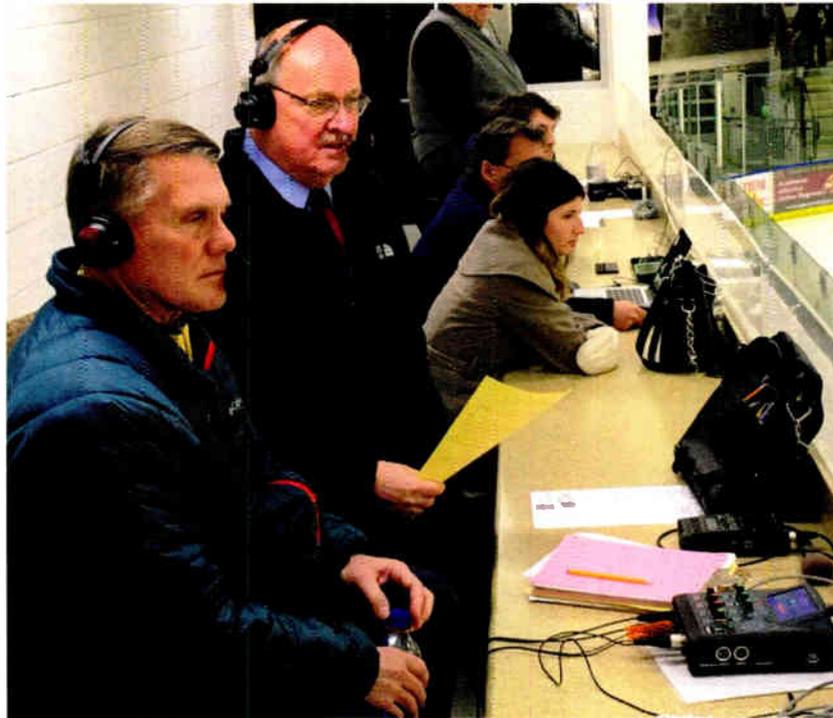
We connect in stereo over IP and send a mix-minus from the studio to our announcers at the remote site.

mixers are good pieces of equipment and sound good, the i-Mix and now the ViA codec are on another level when it comes to quality. They make it sound like you are calling the game from the studio.

In reviewing Tieline's ViA, I'll start by saying it's nice and compact and easy to use. The touchscreen and menus are a step up from the i-Mix and are simple to navigate and intuitive. The input and headphone controls are also easy to access and adjust.

I don't have a technical background but ViA is so simple to configure I can do it on my own. We had our engineer do the initial setup with the i-Mix G3 and when we got the Tieline ViA we just dialed and it worked.

The ease of using the ViA is second to none, and the ability to use its built-in Wi-Fi, an IP LAN or a phone line at a venue covers all our options. A couple of seconds is all it takes to connect the



KROX's Scott Kleven, left, and Frank Fee cover a high school hockey game using the Tieline ViA.

codec to a Wi-Fi access point, and we have successfully streamed live from various schools and colleges. In places without phone lines, a LAN or Wi-Fi, I have even used the hotspot on my phone to broadcast the game and it is crystal clear, studio-sound quality. It is amazing.

Although I wasn't familiar with the codec initially, I was able to make a connection to our Commander G3 studio codec quickly and easily. The touchscreen clearly displays send and return PPMs, and you can swipe to view connection info and IP statistics.

We connect in stereo over IP and send a mix-minus from the studio to our announcers at the remote site.

We stream using Tieline Music with a bitrate of at least 64 kbps when we connect over wired IP and when the wireless network supports that bitrate.

Tieline's automatic jitter buffer settings allow us to talk to the studio in real time. The auto jitter adjustment measures network capability to reduce latency to the lowest level the network can reliably support. Total latency is never more than 100 ms.

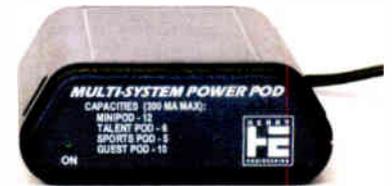
I love broadcasting over IP. It is pretty much foolproof, and we have never had a drop or anything while using IP. It makes life a lot easier and is one less thing to worry about in the age of disappearing phone lines. Not

(continued on page 26)

TECHUPDATE

HENRY'S POWER POD GIVES PODS POWER

Henry Engineering's Power Pod is a multisystem power supply and audio input unit for use with any of Henry's various "pod" products.



It will provide power to the popular Talent Pod and Sports Pod commentator units, as well as the Guest Pod and MiniPod headphone listening stations. Because these products use identical Cat-5 linking protocol, they can be "mixed and matched" to create a remote broadcasting or in-studio commentator system. One Power Pod can provide power and audio input facilities to the whole system via the Cat-5 link, eliminating the need for multiple power sources, DAs and complicated wiring.

Each Power Pod can provide power for up to 12 MiniPods, six Talent Pods, five Sports Pods or 10 Guest Pods. In addition, the Power Pod's audio input jacks can be used to feed audio to the entire system. With Power Pod, it is now possible to use Guest Pods for headphone monitoring without a MultiPhones Master unit. The Power Pod also facilitates use of the talkback feature on Sports Pods commentator units.

For information, contact Henry Engineering in California at (562) 493-3589 or visit www.henryeng.com.

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TECHUPDATES**NEW HANDHELD RECORDER FROM MARANTZ**

Building on its history of making portable audio capture devices, the PMD661 MKIII is a two-channel handheld solid-state audio recorder from Marantz Professional. The company highlights its performance features and rugged build.

The PMD661 MKIII is intended for news journalists, court/municipal reporters, public safety personnel, investigators and researchers.

It's suitable for situations where audio data capture is required but bulky equipment and separate microphones are not possible or appropriate. A file encryption function and password protection offer security for sensitive information.

The feature set includes an integrated stereo condenser microphone array for point-and-shoot operation, switchable balanced mic/XLR line inputs, as well as unbalanced line outputs on RCA connectors and a secondary unbalanced line input on 3.5 millimeter mini jack connector. The deck includes an external, omnidirectional boundary microphone, suitable for meeting capture at boardroom tables. The PMD661 MKIII includes a carrying case to protect the recorder.

Its "Retake" feature allows a button press to take you back though previously recorded audio and create a drop-in point to overdub. This enables easy rerecording partway through unwanted takes, helpful for dictation and electronic note-gathering applications.

MP3 files can be encrypted to MPS files and WAV files encrypted to WAS files. Both MPS and WAS files utilize a four-digit password protection feature so that only those with the four-digit key can open and play the files.

For information, contact Marantz Professional in Rhode Island at (401) 658-5766 or visit www.marantzpro.com.

**USING THE NAGRA SEVEN FOR BROADCAST**

The broadcast version of the Nagra Seven two-channel digital recorder offers stereo recording up to 192 kHz in 16 or 24 bits, but also has an assortment of optional accessories in software and hardware, adapting the machine to various reporting situations, the company says.

In hardware, these include an ISDN internal codec and a Wi-Fi/3G or Wi-Fi/4G board allowing communication via a Wi-Fi network but also over the GSM service.

In software, options for recording audio in MPEG compression and with an AAC codec as well as VoIP system allows transmission over the internet, either through the Ethernet port or through one of the TX modules (Wi-Fi/3G/4G). In addition an internal audio editor allows preparation of EDLs and audio files using the touchscreen. Transmission over IP is possible as FTP or live streaming using the SIP communication protocol.

Other broadcast-related features include programmable audio filters, and a user-adjustable audio limiter and automatic level control system. The Seven is able to import audio files from other devices from its removable SD card slot.

For information, contact Nagra/Audio Technology Switzerland at +41-21-643-2140 or visit www.nagraaudio.com.

**MAYAH'S GEMINI REPORT HAS A DIFFERENT LOOK**

Mayah says that the GeMINI Report is the newest chapter in portable audio codecs.

The company says that it was specifically designed for the needs of reporters and other users that

require portable audio transmission with in-depth control, with the hardware to match. The GeMINI Report sports four headphone and four mic connectors, supporting multiple participants.

Due to the design there are no knobs to fiddle with or be bumped. The customizable Mayah WebRemote 5.0 GUI on a 10-inch touchscreen offers more depth of control if needed. User profiles, onboard phone books and connection settings can be prepared ahead of time and stored, eliminating the need to prepare at a remote.

On the hardware side, GeMINI Report offers AES67, AAC-HE, Opus and FLAC but also supports classic algorithms as well. The case is built with an eye towards robustness and additional bumpers are also available for further enhanced shock and fall resistance.

For information, contact U.S. distributor Image Ops in California at (858) 613-1818 or visit www.imageops.com or www.mayah.com.

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Phone: 740-593-3150 jimg@gorman-redlich.comwww.gorman-redlich.com**TIELINE***(continued from page 25)*

having to deal with our telco as much has also been welcome. With IP, we are saving on telephone line costs and sound better on our remotes, which only helps sales.

The ViA codec is a tremendous upgrade to anything we have used. We added an FM translator over a year ago so people are really noticing the difference when we use the ViA and i-Mix compared to sport mixer games over a phone line or cellphone.

Since we started using the Tieline codecs many listeners have told us that our broadcasts have improved and now sound crystal-clear, and that's awesome. We also had an advertiser tell us our remotes sound great.

So far we have used ViA for play-by-play sports coverage, live remotes from stores, Christmas concerts and other live events throughout the year. It's trouble-free every time we take it out and we are talking about buying another one already.

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

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Wanted: real plate reverb. abgrun@gmail.com.

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MISCELLANEOUS

WANT TO SELL

I'm selling between 150 and 200 cassette tapes that consist of old-time radio shows, sports shows, some local New York radio talk shows, etc...

Must take entire collection and the price is negotiable. Please call me for details and, my phone number is 925-284-5428.

Radio broadcasts of Major League Baseball, NFL, and some college football games that are on cassette tapes, approx 100 to 125 games, time period of entire collection os from the 1950's - 1970's, 80. Must purchase entire collection. Contact Ron, 925-284-5428 or ronwtamm@yahoo.com

WYBG 1050, Messina, NY, now off the air is selling: 8-channel Harris/Gates console; 250' tower w/building on 4 acres; collection of very old 78s dating back to 1904; 12' satellite dish on concrete base; prices drastically slashed. 315-287-1753 or 315-528-6040

WANT TO BUY

Collector wants to buy: old vintage pro gears, compressor/limiter, microphone,

mixing consoles, amplifiers, mic preamps, speakers, turntables, EQ working or not, working transformers (UTC Western Electric), Fairchild, Western Electric, Langevin, RCA, Gates, Urei, Altec, Pultec, Collins. Cash - pick up 773-339-9035 or ilg821@aol.com.

2" plastic "spot" reels 6.5 or 8" diameter, as used for quad video. Wayne, Audio Village, 760-320-0728 or audiovlg@gte.net.

Equipment Wanted: obsolete, or out of service broadcast and recording gear, amplifiers, processing, radio or mixing consoles, microphones, etc. Large lots preferred. Pickup or shipping can be discussed. 443-854-0725 or ajkivi@gmail.com.

I'm looking for San Francisco radio recordings from the 1920's through the 1980's. For example newscast, talk shows, music shows, live band remotes, etc. Stations like KGO, KFRC, KSFO, XTAB, KDIA, KWBR, KSF, KOFY, KCBS, KQW, KRE, KTIM, KYA, etc. I will pay for copies... Feel free to call me at 925-284-5428 or you can email me at ronwtamm@yahoo.com.

Looking for a broadcast excerpt of a San Francisco 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 1:8:02, 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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Looking for KTIM FM radio shows from 1981-1984 if possible unscoped. R Tamm, 925-284-5428 or ronwtamm@yahoo.com.

RECEIVERS/TRANSCIVERS

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Johnson Electronic SCA880 module, 6792 Khz, 417-881-1846.

WANT TO BUY

AM Stereo radio. Call 417-881-1846.

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RECORDING & PLAYBACK HARDWARE

WANT TO BUY

1960s-vintage MacKenzie Repeater machines, magazines, spare parts and manuals, complete or "parts" machines considered, James, 870-777-4653.

Large or small collections of 16" transcriptions or 12" transcriptions, not commercial LPs. Bill Cook, 719-684-6010.

Schnader teletype series 16 mm musical films produced in the early 50 s. Bill Cook, 719-684-6010.

Standard Short-tune series. Bill Cook, 719-684-6010.

TAX DEDUCTIBLE EQUIPMENT

Donations Needed: All Volunteer, Non-profit Low Power community radios stations need Equipment. Will offer tax deduction letter, You determine donation value, We will pay shipping. Equipment shared between three

Wisconsin stations. Looking for Mics, Mixers, field equipment, etc. You name it. Email: Dan@WIECradio.org.

TRANSMITTERS/ EXCITERS/TRANSLATORS



WANT TO SELL

PRICE REDUCED! NAUTEL NX25 KW AM TRANSMITTER, WARRANTY, TWO YEARS OLD, FREQ. ON 810 AM, MOVING SITE & DOWNSIZING, 3 PHASE, \$59,000 OR BO. CARL, 386-566-4299, ORLANDO.

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EMPLOYMENT

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Are you a small market station needing a good nuts & bolts engineer in the Los Angeles area? I will make your station shine! CET, fully FCC Licensed. Available for Full/Part-time/Contract work. Available immediately. Mitchell Rakoff, 909-446-6820, mitchellrakoff@yahoo.com.

Experienced radio station manager seeks new management opportunity. More than 39 years experience in radio. Willing to relocate. Family-friendly format(s) preferred. Send details about your management opening to: radio gm@hotmail.com.

Extremely knowledgeable and articulate racing writer/talk show host Adam Amick is available for shows, correspondent, features, etc. Check out www.bleacherreport.com for samples. Call 214-384-5812 or email: adam@rubbinsracingshow.com.

Dependable, reliable, trustworthy person good at on-air, production, promotions. Very energetic, always in

a good mood, and ready for challenges. Mark, 585-307-9037 or mark4386m1@yahoo.com.

Every Great Radio Station needs a motivated and versatile team-player: On-air, production, VO, creative writing, promotions and social media talent. Contact Marvin Hopkins, 586-718-5066 or mtothehop@gmail.com.

Friendly and outgoing persona, dependable. Good on-air, voice, digital, and boards. Extremely creative copy/writing skills. Katie Marie Hayden-Summerton, 720-697-9792 or haydenkatiemarie@gmail.com.

Mission Driven and very tech savvy. Major stepper-upper and make-it-happen kind of guy! Strong Voice/ On-air, Production, Digital, copy/prep, and IT abilities. George (910) 703-9676; gmason1960@hotmail.com

Outgoing broadcaster. Enthusiastic, with positive attitude. Self-motivated, with

excellent people skills. Versatile, and fast learner. Tight boards, Cool Edit/Adobe literate. Eric, 601-966-9332 or horneric68@gmail.com.

Self-motivated, passionate, experienced Mobile DJ/Promotions. Technical background, Hip smooth voice, tight boards, and copywriting. Dependable, energetic, outgoing personality. Jayshawn, 804-475-7500 or pearsonjayshawn94@gmail.com.

Silver Tongued Devil! Entertainer, big personality, strong production skills/ copywriting. Dedicated Can Do Attitude, and most of all making people happy. Steven, 918-729-2175 or abssteven1006@yahoo.com.

Talented news/commercial writer, with production and on-air skills. Hard working and dedicated with great Board-op/Producer experience, accustomed to Dallas syndicated environment. Mecca, 214-517-3458 or meccacampbell@yahoo.com.



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READER'S FORUM

WHERE'S THE VOCAL?

Regarding "Calibrate Analog Audio Consoles" in the Nov. 9, 2016, issue:

Way back before many Radio World readers and broadcast equipment designers were born, Capitol Records' first stereo release was a record by one of their most popular artists, Nat "King" Cole. Promo copies had been sent to all broadcasters, most of which were AMers transmitting in glorious monophonic (please — not "monaural") sound.

According to Billboard, "Cap" quickly received a report from one broadcaster asking, "Where's the vocal?" With mud on its face, Capitol learned that when its stereo disc was played on mono equipment, the vocal, which was split equally to both stereo channels, was phased out and disappeared. (Now you know from whence that popular expression in business cometh.)

You see, Capitol, then with but a modicum of stereo experience, carelessly had wired the two channels of its disc recorder (a Westrex with cutter head designed by Charlie Davis) out of phase. The disc thus played perfectly when checked on Cap's cutting room stereo turntable, but they'd never bothered to play it on mono equipment.

Bill Putnam, who'd come from his Chicago success to Hollywood to take away Radio Recorders' dominance of the indie recording studio field, had told me that the recording studios' practice of splitting the soloist (most often, the vocalist) equally between both (properly in phase) stereo channels invariably would result in the soloist being too far "in front" of the band (i.e., too loud) when the recording was heard monophonically.

Superb sound mixer that he was, Bill developed a technique that eliminated this problem.

When feeding the soloist to both channels in the mix-down from multitrack, the soloist should be set 3 dB lower on one of the channels than on the other. Then balance your mix on the hottest soloist's channel and let the other channel fall where it may.

I explained this phenomenon to John Eargle, a highly acclaimed audio engineer; he told me that Bill's accomplishment was scientifically impossible.

But in practice Bill's technique worked beautifully. No listener ever detected that, per the vu meter, the soloist was slightly softer on one of the two channels,

and in mono playback format the balance between soloist and background was perfect. Ask Frank Sinatra and many other artists whose sessions Bill mixed with this simple, effective technique.

Mark Persons' authoritative piece "Calibrate Analog Audio Consoles" meticulously explains that mono mix positions ("channels," to you younger guys) such as for microphones, mix-minus phone calls and incoming mono remotes, being sent to two stereo channels, can lose their manufacturer-preset "equal" split due to component aging. But instead of rebalancing them per manufacturer's spec, why not use this, or any other, opportunity to set the level on one channel 3 dB lower than on the other? Take advantage of the Putnam effect.

(An aside: Contrary to what Persons implies, generally the vu meter will not be damaged when indicating an overmodulated voice source. But it can suffer if so subjected to a signal generator's continuous tone. Loudspeakers, being electromechanical too, are thusly accused; they overheat and distort.)

And if you have more than one source that's split to two channels — say, a guest interview — have Host's mic hotter on Channel A and the Guest's hotter on Channel B. This solves any problem where a mono source is used with a stereo source. Moreover, when two people are talking, this unequal split allows the audience to experience a stereo effect with mono sources; i.e., one talker seems more on the left, the other more on the right, yet each appears on both channels — just like in real life — thus enhancing the listening experience without the listener being aware of what's going on.

Try it. You'll like it.

I heard the plaintive wail in the same issue from Marvin Walther, who decries the "advance" involving resorting to USB instead of using the traditional phone plug and jack system. Sure, the latter is not advisable for use in permanent connections, except for properly maintained patch bays. But why complicate a simple matter, increase costs and diminish reliability with another piece of equipment subject to failure, such as an A/D or D/A converter?

TRANSMITTERS

Responding to "Trends in Transmitter Technology," RW Nov. 23, 2016 issue:

Robustness is important when a station is selecting a transmitter.

- 1) Hot-swappable power supplies.
- 2) Quiet fans/cooling (I'd rather see giant heat sinks).
- 3) Streaming port built into the transmitter — would it need different EQ than transmitted signal? Configure on an EEPROM so it can be updated with various codecs?
- 4) Built-in lightning protection.
- 5) Better components. How many times have we heard "It needs to be recapped"? (Can't capacitors be re-engineered for lower failure rates?)

John Morehouse, President/CEO
Long Valley Communications
Laytonville, Calif.

FEATURES
Calibrate Analog Audio Consoles

And educate your hosts so that they stay that way!

TECHTIPS

BY MARK PERSONS

You see, on the age of digital but in my experience the vast majority of radio audio mixing consoles still have analog audio paths through from end to end. Have you noticed that a monophonic signal such as a microphone often does not come out the same on left and right channels?



Fig. 1: Note the 3 dB difference in left and right channel levels shown by the variable VU meters in the photo of announcer Mike Valdehns in the studio of WPTX Radio in Baton Rouge.

Yes, we are on the age of digital but in my experience the vast majority of radio audio mixing consoles still have analog audio paths through from end to end. Have you noticed that a monophonic signal such as a microphone often does not come out the same on left and right channels?



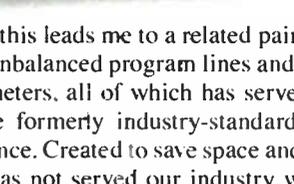
Fig. 2: An oscilloscope shows a difference between audio channels.

Fig. 2 shows the audio of a typical word processing board operator who double in the crowd while changing levels by adjusting the manual controls (channel). The good part is these problems are easy to fix.

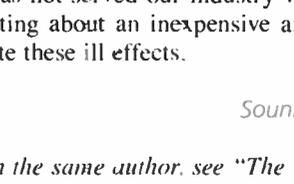


Fig. 3: Calibration controls in a Radio Systems RS-128 audio console.

Fig. 3 shows the audio of a typical word processing board operator who double in the crowd while changing levels by adjusting the manual controls (channel). The good part is these problems are easy to fix.



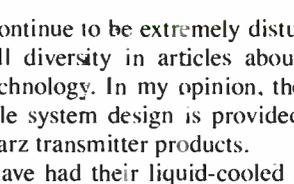
When balancing mono, adjust the gain on the left channel to match the right channel. This is a good time to look at the frequency response. A fading electronic amplifier might be causing the problem.



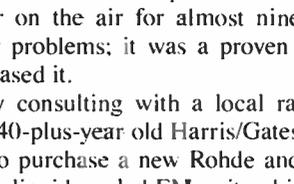
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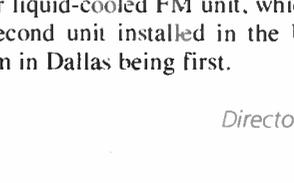
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HOW ABOUT RHODE & SCHWARZ?

I continue to be extremely disturbed to the lack of full diversity in articles about new transmitter technology. In my opinion, the best and most reliable system design is provided by Rohde and Schwarz transmitter products.

I have had their liquid-cooled television transmitter on the air for almost nine years with no major problems; it was a proven design before I purchased it.

My consulting with a local radio group after their 40-plus-year old Harris/Gates FM-20H3 died was to purchase a new Rohde and Schwarz high-power liquid-cooled FM unit, which I believe was the second unit installed in the United States, a system in Dallas being first.

Jim McKinnon
Director of Engineering
Gray Television
KOS(TV)DT
Odessa, Texas

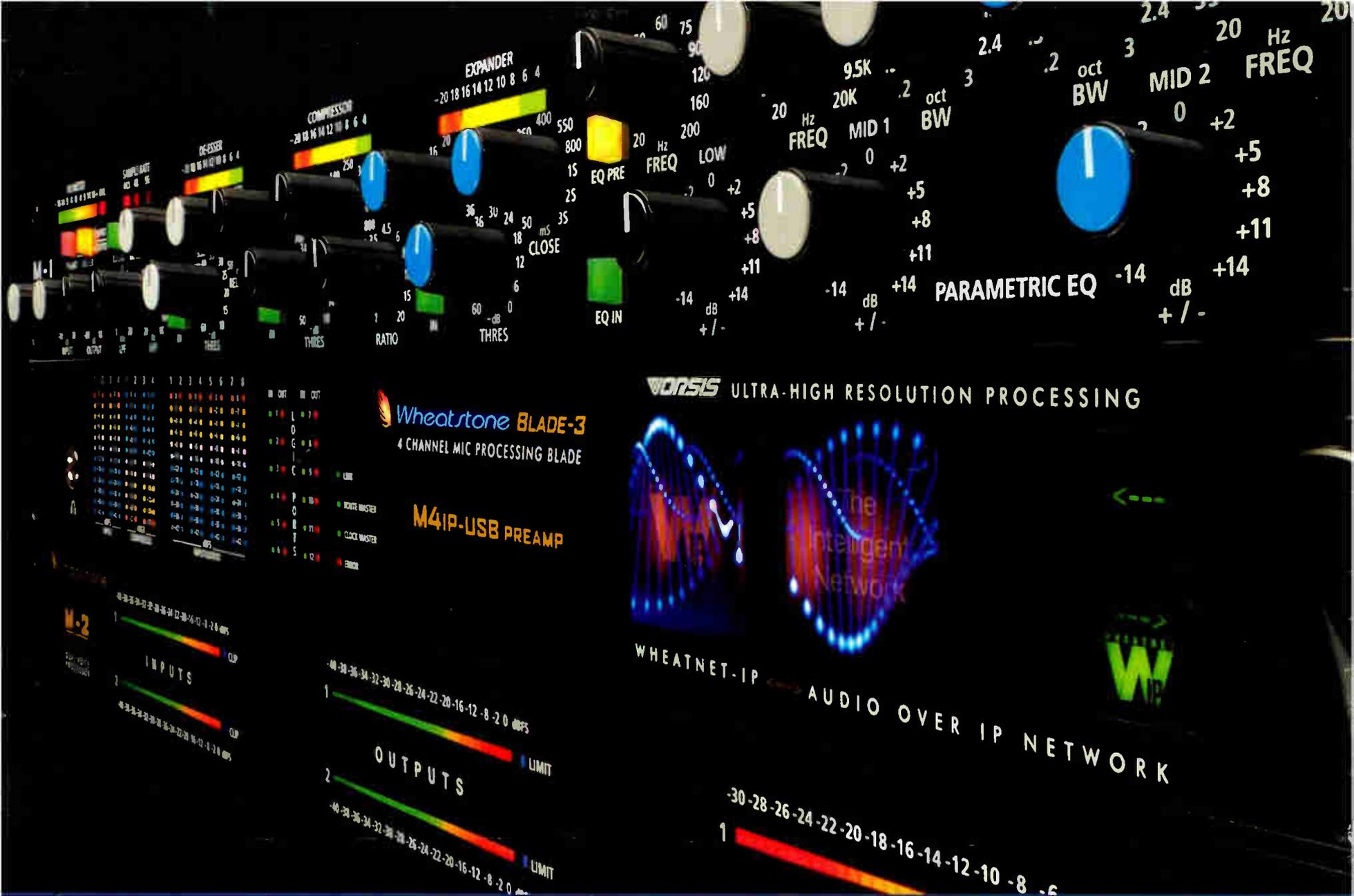
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