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WHAT'S NEXT?

From blockchain and 5G to the next steps for AoIP, car dashboards and all-digital FM ... technologists ponder the future, and how radio fits into it.

NAB Show Preview Page 18

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Thinstock / Greens87

Will Class C4 Idea Move to Front Burner?

A plan to help some FMs raise power becomes more complicated in today's crowded band

BY RANDY J. STINE

WASHINGTON — The FCC's expected exploration of establishing a new class of FM stations is gaining attention from many corners, including the National Association of Broadcasters — which, to the surprise of some observers, is resisting the move.

A notice of proposed rulemaking to create a Class C4 service circulated this winter at the Media Bureau. Chairman Ajit Pai in February indicated that the commission was moving ahead with it. An NPRM would receive a docket number and be opened up for public input, moving the idea to a regulatory front burner.

There's no doubt many Class A FM owners would love a chance to double their power level from 6 kW to 12, experts say. But NAB and others worry that the move would create further interference challenges in an increasingly crowded band.

TO DATE

In 2014, Matthew Wesolowski and David Honig co-wrote a petition for rulemaking, RM-11727, seeking a new Class C4.

Wesolowski is CEO of SSR Communications

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Gravley Sees Radio's Best Days Ahead

Opportunities include boosting in-home radio listening with smart-home speakers

NEWSMAKER

BY PAUL McLANE

Randy Gravley chairs the Radio Board of the National Association of Broadcasters and is president/CEO of Tri State Communications; Radio World checked in with him in advance of the NAB Show.

Radio World: What's the most pressing "big picture" business challenge for the U.S. radio industry as it heads into the 2018 spring show?

Randy Gravley: Radio faces a number of challenges that will shape our industry in the coming years. Increased competition for listeners, keeping and attracting advertisers, the changing auto dashboard, a convoluted music licensing system, sustaining live and local content, the role of digital and equipping Smartphones with radio capability are all issues that radio stations need to address.

That being said, I believe radio's best days are still ahead. Every week, more than 260 million Americans tune to their hometown stations. We're the

number-one source for the discovery of new music. We remain a trusted news source, particularly for local news, at a time when "fake news" is prevalent online and on social media. And, as we saw countless times last year during times of emergency, we are a lifeline that provides timely information that can keep Americans safe.

RW: We see the stories about debt burdens at several large U.S. commercial broadcasters. Presumably this is not good for the industry; how do you think this will play out?

Gravley: My guess is the picture for all of radio will brighten considerably once the debt situation improves. Once these companies resolve their debt situation, they will have greater flexibility to operate and better serve listeners. These are great companies and radio's a great business; we have margins that other businesses would love to have, and we have a connection to the community that none of our competitors can match.



Randy Gravley

RW: What technology trend are you most interested in learning more about or that we should be watching closely for impact on radio?

Gravley: I will be paying close attention to the future of the auto dashboard. We have many competitors who would love to replicate and replace the close relationship radio enjoys with the automobile. With most of radio listening happening in the car, we need to be proactive in maintaining our place at the forefront of in-

car entertainment. That's why NAB has been meeting so much with the automotive community. We must also set our eyes on the future and figure out what role radio will play in the self-driving car.

RW: What other business trends, consumer developments or stories should radiol/audio people be watching closely? Anything else we should know?

Gravley: There is a huge opportunity to boost in-home radio listening with smart-home speakers like Google Home and Amazon Echo. The growth of smart speakers can provide radio with a new platform in Americans' homes. We need to take advantage of how easy and convenient it is to tell your speaker to play your favorite radio station.

Some radio stations have also launched podcasts that go hand-in-hand with their traditional broadcasts. Podcasting fits right into broadcast radio's strengths. Radio has been the dominant audio service for decades — we should be the experts at creating engaging, compelling content. It's just online, rather than over the air.

Achieving streaming rates that allow for a viable business is also top-of-mind for broadcasters. The current royalty rate discourages radio stations from investing in streaming services because there's no money to be had. Reasonable rates would benefit the record industry as well as radio since more stations would offer streaming.

IN CASE YOU MISSED IT

A sampling of recent headlines delivered to Radio World readers in their free daily NewsBytes e-newsletter. (Click the Subscribe tab at radioworld.com, then Newsletters.)

► GatesAir Suspends Sale of AM Transmitters

The company cited limited availability of critical components and described the move as a responsible step. It said it was in the "advanced technology assessment phase for development of an updated line of AM transmitters."

► Eric Small Dies in Florida Accident

The audio processing innovator founded Modulation Sciences and made a mark in both radio and TV.

► iHeartMedia Pushes Ahead

The company proceeded with Chapter 11 bankruptcy to resolve its heavy and longstanding debt situation. Company leaders say they don't plan to liquidate stations nor lay off staff during the reorganization process. And music will keep streaming through the iHeartRadio app.

► Engineer Challenges FCC's Rubber-stamp of a Licensee's Applications

Chicago broadcast engineer Larry Langford looked into radio license filings he found suspicious.

► Congress May Consider More Stringent Pirate Radio Fines

Authored by Reps. Leonard Lance (R-N.J.) and Paul Tonko (D-N.Y.), the PIRATE Act proposes to increase fines for illegal pirate operations, possibly up to \$100,000 a day with a maximum fine of \$2 million.



NEWS

Media Study Measures Shifting Habits

“Infinite Dial” touches on smart speakers, podcasts & radio’s at-home hardware challenges

It’s time to get holistic!

Edison Research Senior VP Tom Webster recently said: “With the surge in smart speaker ownership and the continued growth of podcasting and streaming audio, it is more important than ever for brands to have a holistic

audio strategy.”

What led him to that conclusion? It’s the data from the 2018 “Infinite Dial,” released this month. The study of Americans’ use of digital platforms and new media is performed annually by Edison Research and Triton Digital.

Background: Edison is a firm that does surveys and provides research information to clients including radio ownership groups. Triton Digital is a technology and services provider to the digital audio and podcast industry.

Once again this year, 2,000 people were interviewed in January and February by phone, both landline and mobile users. Respondents were 12 and older, selected via random digit dial sampling.

FROM THE EDITOR

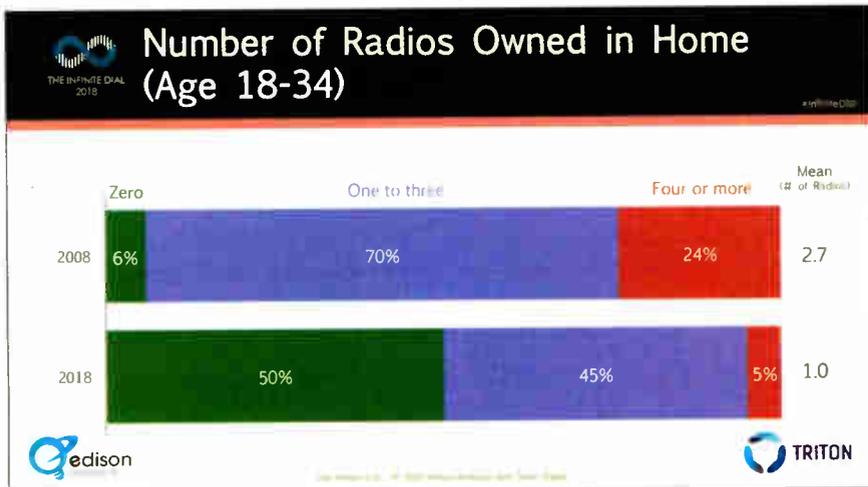


Paul McLane

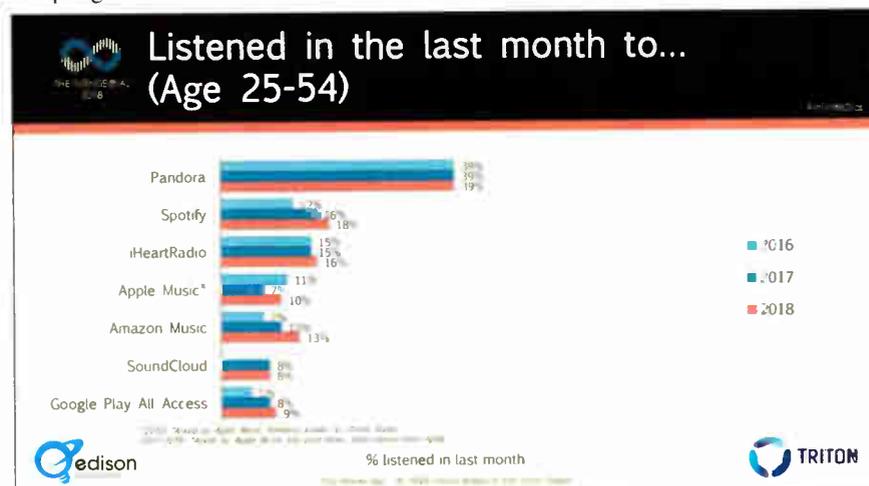
What follows are highlights.

GET “SMART”

Radio World readers already know that podcasting has had a remarkable second life. In 2018, the researchers found, the pod continues to grow steadily: 44 percent of Americans now say they have listened



This slide gives you a good idea why so many radio execs are hopeful about their content being available to consumers via smart speakers.



A nice breakdown of audio brand habits.

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to one, up from 40 percent last year. Among the places where more people listen to podcasts more is the car, where of course radio has a particular interest.

What about smart speakers, those voice-controlled devices like Amazon Echo and Google Home? You could be forgiven for thinking these are ubiquitous, given news coverage in RW and elsewhere. They're actually not, but watch out; smart speaker ownership did more than double from a year ago; 18 percent of Americans — 51 million of us — now live in households with at least one of these gizmos. In fact, the authors report that smart speakers are being adopted today at a faster rate than smartphones were in their own early days.

At the same time, you can probably guess that fewer Americans have actual AM/FM radios in the home these days. The study shows continued decline in standalone radio ownership. Twenty-nine percent of us do not own an AM/FM radio at our chateaux. More dramatically, fully half of the 18–34 demo don't have a single radio in the house. (The researchers thus deem that radio "has a home hardware challenge." Yes, I'd say so.) However, lest we lose sight of a bigger picture, they also confirmed that radio remains "by far" the dominant medium in the car.

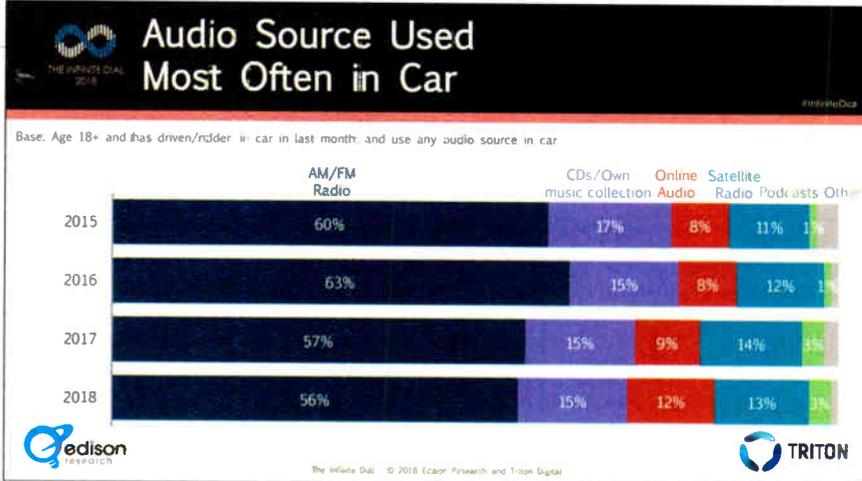
NOT FEELING SOCIAL?

Meanwhile, it comes as no surprise that smartphone ownership has exploded since 2010, and is now at an estimated 233 million people. But tablet ownership may have peaked last year, or at any rate it fell back slightly, to about 50 percent ownership.

What I didn't see coming was an ebbing in overall social media use, though social is of course still massively popular. Notably, Facebook dropped off, especially among younger users. FB remains the social media brand used most often, while Snapchat and Instagram are growing their share; but you can be sure FB won't be happy to learn that the percentage of 18- to 35-year-olds using it fell sharply, from 48 to 35 percent in just a year. (While I think we should be careful when drawing conclusions from dramatic individual data points like that, the trend seems clear.)

On the other hand, online listening is still on an upward track. Online audio's monthly audience is now 180 million Americans, or 64 percent of Americans 12+, thanks to growth in Spotify, Apple Music and Alexa-driven Amazon Music listening. (I find it interesting to compare this finding to separate results from Nielsen Audio, which estimates that broadcast radio reaches 228.5 million every week while streaming audio reaches 67.6 million weekly).

And despite the rise of other services, Pandora continues to lead the online radio space; 31 percent of Americans have listened in the past month.



AM/FM radio is still the audio source used most in the car, though losing share. An interesting finding not shown here, but relevant, is that only 15 percent of respondents to date even have an in-dash infotainment and entertainment system. Presumably that number will only grow and have bigger impact on the dynamics above.

POD LESSONS

Edison and Triton used a subsequent Facebook Live broadcast to extract lessons for podcasters; you can read more about it by searching "Infinite Dial" at radioworld.com, but Webster laid out takeaways for podcasters seeking a bigger slice of the speech audience.

Among them: Explain the content of podcasts, not the technology. He said that when respondents were questioned regarding what they liked the most about podcasts, their answers centered around four topics — content, connec-

tion, community and learning something new. Despite that, current promotional practice tends to just list podcasts and discuss technical topics such as RSS feeds, mobile apps and devices. He offered advice that, come to think of it, applies well to anyone in radio: If podcasters would align promotional strategies with the reasons that people listen, the technology side should take care of itself.

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CLASS C4

(continued from page 1)

Inc., licensee of WYAB(FM) in Flora, Miss. Honig is now president emeritus and senior advisor of the Multicultural Media, Telecom and Internet Council.

Wesolowski predicted that the change would allow for 12,000 watts of effective radiated power for about a third of the Class A FM stations now operating in Class C regions of the country. He pegs the number of stations that could upgrade in place at about 217. If tower moves within 20 km and/or community

of license changes are thrown into the mix, Wesolowski said more than 700 could be eligible. Most Class A stations in the Northeast and urban centers of the Midwest would be excluded from upgrading, Wesolowski said, along with most in California.

Class A stations are limited to 6 kW ERP at 100 meters antenna height above average terrain, according to the FCC. A Class C4 station would be authorized with a power of up to 12 kW ERP, according to the proposal.

Wesolowski said he met in early March with FCC Audio Division staff to

discuss his C4 proposal and concerns by some about how it could affect LPFMs and FM translators. Wesolowski said any impact on secondary services will be negligible.

"Our research found that a total of 22 LPFM and FM translator facilities could be impacted by the FM Class C4 upgrades, but in each situation, an engineering remedy existed to clear the conflict. The Audio Division has been working on their own study, which I believe will confirm our findings," Wesolowski said.

It's important to note that RM-11727 also calls for revising Section 73.215 of the FCC's rules. The revision proposed by the Class C4 petition for rulemaking is to give co-channel or adjacent channel FM stations — operating in proximity to a below-maximum-facility FM station that has operated as such for at least ten years — the ability to force that below-maximum-facility FM station to accept and be locked into a Section 73.215 contour protection status unless the below-maximum-facility FM immediately upgrades to maximum facilities for its class.



as well as AM revitalization.

The association went so far as to seek a meeting of radio leaders with Chairman Ajit Pai about the proposal in early March. Rich Kaplan, general counsel and executive VP of legal and regulatory affairs for NAB, joined NAB Joint Board Chair Caroline Beasley, who is CEO of Beasley Media Group, and Radio Board Chair Randy Gravely, president/CEO of Tri-State

NAB wrote that the Class C4 proposal "likely will only add to the interference challenges in the marketplace."

One observer familiar with the request said the proposal would give co-channel and adjacent-channel FM stations the right to effectively downgrade and lock in the coverage of a below-maximum-facility FM in the same way that the FCC allowed such downgrades to Class C stations a number of years ago.

OPPOSITION

Proponents of a new C4 service believe the change would help many established FM broadcasters better serve their communities.

However, the NAB thinks the FCC would be better off addressing more pressing issues first, like finding better ways to expedite settlement of interference complaints against FM translators. Its hesitation is tied to its own petition for rulemaking filed in April 2017 seeking policy and procedural changes to increase certainty for translators and facilitate handling of interference complaints between translators and full-power FMs. That has been an issue of rising concern given the huge growth in translators as a tool of business strategy

Communications. They asked Pai and the commission to not move forward with the Class C4 proposal. According to an ex parte filing, the broadcasters expressed the opinion that "this is not the time, if ever, to introduce another category of FM service."

Instead, NAB would like the FCC to turn its petition into a notice of proposed rulemaking, "to help ensure the certainty of translators" to benefit millions of listeners who rely on the content they provide. NAB said in separate written comments that this idea "should certainly take priority over consideration of the Class C4 proposal, which likely will only add to the interference challenges in the marketplace."

WHAT NEXT?

The translator landscape has changed dramatically in recent years. The NAB projects that approximately half of all AM stations will utilize FM translators once all pending applications for cross-service translators are processed. Translators also are a component in a strategy in which FM stations can gain

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Radio Sawa to Scale Back Regional Broadcasts

In cost-saving move, BBG network plans to focus its OTA transmissions just on Iraq

BY JAMES CARELESS

To save \$9.5 million in 2019, the U.S. government's Arabic language broadcaster Radio Sawa plans to restrict its FM and AM transmissions to Iraq. This will mean the end of Radio Sawa's radio service, AM and FM, to the rest of the Middle East.

In addition, Radio Sawa's country-centric feeds for Egypt, the Gulf, Jordan, Lebanon, Mauritania, Morocco and Sudan will be terminated, both on air and online at www.radiosawa.com. The remaining Radio Sawa Iraq feed will be streamed.

Cuts to Radio Sawa are part of a bigger reduction for the Broadcasting Board of Governors in proposed federal budgets for FY 2018 and 2019. Billing itself as "America's civilian international media agency," the BBG oversees the Voice of America (VOA), Radio Free Europe/Radio Liberty (RFE/RL), Radio Free Asia (RFA), Alhurra TV and Radio Sawa (under Middle East Broadcasting Networks — MBN), and Radio and TV Martí. The BBG budget was proposed at \$661.1 million for FY 2019, down from \$685.2 million in 2018 and \$786.6 million in 2017.

A BBG information page says, "Radio Sawa attracts young audiences by playing contemporary Arabic and Western music with news and information programs. It is one of the most popular radio stations in the countries where it can be heard on FM." So why is the BBG reducing Radio Sawa from a Middle Eastern regional broadcaster to an Iraq-only station?

"Tough trade-offs are always necessary in austere budget climates," replied Nasserie Carew, BBG's director of global communications and public affairs. "But BBG and MBN leadership are committed to and will continue reaching people in media-restrained countries."

With money being tight, Radio

Sawa's non-Iraq radio broadcasts were a natural target, according to interested observers.

"Eliminating the Radio Sawa network of transmitters in all countries except Iraq will save almost \$5 million," said Kim Andrew Elliott. He's

Sawa's largest broadcasting stream is to Iraq, where it reaches 4.7 million listeners, 40 percent of the audience, who will continue to be served by both radio broadcasts and digital initiatives."

It is these digital initiatives that the BBG is hoping will fill the gap created by Radio Sawa's transmission cuts. Overall, "MBN's digital outlets have grown to a weekly reach of nearly 6 million," said Carew. "Additionally, Radio Sawa's Facebook page has 7.5 million followers."

Nevertheless, starting in 2019, some 7 million Radio Sawa listeners outside of Iraq will no longer be able to tune in via radio. That is 60 percent of the

under way for some years now," said Greenway.

The BBG isn't alone in choosing lower-cost digital over broadcasting. The BBC, too, has radically scaled down its global shortwave service in favor of web streaming, and many other international broadcasters have followed suit. Some, like Radio Canada International, have stopped broadcasting entirely, choosing instead to only stream content over the internet.

This said, a big question remains: Will Radio Sawa's young listeners outside of Iraq tune into its content via the web? The BBG hopes the answer is yes.

After all, "Radio Sawa was estab-



U.S. Ambassador to the United Nations Nikka Haley is shown in a screen grab from Radio Sawa's home page.

a retired VOA audience research analyst and broadcaster who now produces Shortwave Radiogram (swradiogram.net) a weekly program of text and images via analog shortwave radio.

"Radio Sawa uses leased FM transmitters in Arab countries, plus medium-wave (AM) relays," he said, "and these are expensive."

HEARTS AND MINDS

Launched 16 years ago, Radio Sawa is a 24/7 Arabic-language broadcaster meant to attract and influence young Middle Eastern listeners. It replaced the VOA's Arabic language service, which was viewed by many in Washington as ineffective in wooing regional hearts and minds.

To win over this populace, "Radio Sawa reaches audiences in Arabic with a mix of Western and Arab popular music," said Elliott. "This format is designed to attract a young audience to the news and current features content audience also broadcast by Radio Sawa."

If one goes by Radio Sawa's numbers, the service is doing pretty well. "Radio Sawa currently has a weekly reach of 11.7 million," said BBG's Carew. "Radio

BBG and MBN leadership are committed to and will continue reaching people in media-restrained countries.

— Nasserie Carew, BBG

station's current audience.

As a result, the cuts to Radio Sawa's terrestrial service will "almost certainly" lead to audience losses, said Chris Greenway, assistant editor with BBC Monitoring. "Clearly not everyone in the Arab world is willing or able to receive radio broadcasts via non-traditional means. In-car listening is an obvious example."

WILL DIGITAL BE ENOUGH?

Even without budget cuts, the fact that Radio Sawa is putting more emphasis on the web comes as no big surprise. "The BBG proposal is in line with its policy of moving out of both shortwave and AM broadcasting, which has been

lished in 2002 to appeal to younger, non-traditional news seekers," said Carew. "Audiences change and now, more than ever, the younger generation is moving towards digital outlets for their news and information. MBN will continue to expand on that content to give digital audiences news and information in a way that will appeal to them."

Mindful that such a migration isn't a slam-dunk, "Three million dollars will be added back to the Radio Sawa budget to 'reposition' it as 'digital,'" said Elliott. "Presumably this will mean delivering the content to mobile devices, which are increasingly used everywhere.

"It's an interesting question how

(continued on page 10)



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CLASS C4*(continued from page 6)*

analog footprint by feeding a translator with content from one of their HD Radio digital multicast channels.

But John Garziglia, a communications attorney at Womble Bond Dickinson who opposes the proposal, believes the broadcast industry should not trade "nominal power increases for some" while creating loss of FM translator service for others.

One legal observer speculated that Chairman Pai may use the spring NAB Show to advance the issue; but Garziglia said he's not convinced the FCC will issue an NPRM at this point. "It could even be in the form of a notice of inquiry (NOI) rather than a NPRM — therefore asking a lot of questions but having few tentative conclusions."

LPFM stations, which broadcast at a maximum of 100 watts, are watching too. Michi Bradley, founder of REC Networks and active in the low-power arena, said her constituency is concerned but cautiously supportive of the C4 proposal.

"The concept of a 12 kW/100 m FM broadcast service class can work for those rural areas where they can fit. I do feel that while some C4 stations may find their way near suburban areas, the spacing rules towards other stations will naturally keep them away from many of the more highly populated areas," said Bradley. "I am still not seeing a huge gloom and doom towards LPFM stations, especially with the overprotection of full-power stations through the use of the existing LPFM buffer zone but it does have the tendencies of further increasing noise floors."

Bradley estimates from current sites and heights that approximately 202 Class A stations would be able to upgrade under the minimum separation guidelines proposed by SSR Communications. There are probably more potential upgrades using other methods as the C4 proposal suggests, she said. Some stations may be able to upgrade from an alternate site.

"Since Class A is a catch-all service class for full-service FM stations with a service contour of 28.3 kilometers or less, there are many Class A stations in this category for several reasons including short-spacing and international protections," Bradley said.

"This seriously brings up the question of how many of these sub old-A stations will actually upgrade and how many Class A stations that would have to relocate or install more expensive directional antennas would actually make the jump."

Mark Lipp, a communications attorney with Fletcher, Heald & Hildreth, acknowledges some trepidation among

stations owners over consequences of C4.

"Although the increase in coverage is beneficial in varying degrees, many station owners worry about interference from other stations that take advantage of the increase and thereby lose a portion of their existing coverage," he said.

Lipp, whose firm represents several clients who could benefit from

believe the commissioners are now aware of this conundrum and will be proposing some type of solution for the affected translator permittees and applicants," Lipp said.

EFFICIENT USE

Another expert doesn't envy the FCC's balancing act of spectrum interests, but sees a new C4 service as an efficient use of FM spectrum.

I believe the winners will be stations in a large market or any market where building penetration is a major problem for the Class As.

— Jack Sellmeyer

the power increase, expects to see the proposal on the FCC agenda in the next "couple of months" and thinks the delay is due to the need to offer translators, which may be impacted by the power increase, something in return such as non-adjacent channel changes if displaced by the power increase.

"The Class C4 petition has been on file for almost five years. If the FCC is favorably considering the power increase, it should have occurred before the translator applications were filed. I

AMs have had an opportunity for spectrum via FM translators, said Charles Anderson, president of Anderson Associates, a broadcast engineering firm. "The primary concern now is whether a new C4 upgrade will displace some of those FM translators. In some markets there may be an equivalent frequency to which the translator can move; however, the spectrum is very tight in and near many large and medium markets. The key consideration now is whether FM fill-in translators deserve

some protection from any future C4 upgrades."

Anderson said LPFMs do have some protection. LPFMs "cannot be displaced unless they are interfering within an FM's 70 dBu or its city of license. It seems reasonable for some accommodation for FM fill-ins to be included with the new C4 class similar to that afforded LPFMs, although maybe not as stringent," he said.

Jack Sellmeyer, retired president of Sellmeyer Engineering, anticipates Class A stations will be eager to explore the possibilities of higher power levels. However, he reminds station owners that twice the power doesn't mean twice the coverage distance.

"It's only an increase in the area covered. Terrain will play a large role in the gains. I believe the winners will be stations in a large market or any market where building penetration is a major problem for the Class As," Sellmeyer said.

And there will likely be costs associated with a signal upgrade, Sellmeyer said.

"I suspect more than half will require new transmitters along with new transmission lines unless the antenna and line are very conservatively rated for the 6 kW level. However, if the existing facilities are adequate for the power increase and no antenna change is made in terms of height of the radiation center, the costs should be minimal; probably two to four thousand dollars for the engineering forms plus legal fees."

BBG*(continued from page 8)*

owners of mobile devices prefer to be entertained and informed," he continued. "Will they listen to something that sounds like a radio station through those devices? Or do they prefer to access individual segments of content on demand? Do they want to read the content, view it as video, listen to it as audio, or some combination? This is best determined by studying the actual consumption behavior of mobile device owners in the region."

The BBC's Greenway also has concerns about Radio Sawa's fate. "Some listeners may take the trouble to switch to listening online, via a phone app, or via satellite," he said. "But others won't want to or be able to."

He said, "It's worth noting that the Paris-based Arabic-language Radio Monte Carlo Doualiya and the BBC Arabic service will continue to be broadcast to the Middle East on powerful AM transmitters, and so could provide a ready-made alternative for listeners who will miss the presence of Radio Sawa on the AM band."

"The BBC has cut back its Arabic broadcasts on AM to just the evening and early morning, but Radio Monte Carlo Doualiya is still on the air for 17 hours a day. And, like Radio

Sawa, it airs a high component of music."

Radio Sawa will answer the questions above by cutting its non-Iraq AM/FM broadcasts and then seeing how many of Radio Sawa's dispossessed radio listeners follow it to the web. As well, relying exclusively on the web appears to put Radio Sawa's content at the mercy of the non-Iraq Middle Eastern countries it hopes to influence, because their governments can block Radio Sawa's website whenever they see fit.

The result: "As more and more countries use more and more sophisticated means to block internet content, this budget cut could reduce Radio Sawa's ability to circumvent the interdiction of information delivered via the internet," said Elliott.



INSIDER

NAB SPECIAL EDITION

March / April 2018

What's Inside?

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Pg 3. Tieline's New Cloud Codec Controller at NAB2018, Tieline Unveils new 'Chatter Box' IFB/Talkback Solution

Pg 4. Win a FREE Merlin Codec at NAB2018

Stream, Record & Play with ViA

Introducing New Record and Playback Features in the ViA Codec for FREE.

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(Continued on Page 2)

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SEE PAGE 4 FOR DETAILS

www.tieline.com

World Radio History

(Continued from Page 1)

"It's like taking an entire studio with you on the road..."

With the inclusion of record and playback functionality, using Tieline's ViA is like taking an entire radio studio with you on the road. No longer do you need outboard gear like mixers, compressors, recorders and playback machines – with ViA it is all on-board and ready to go!

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Before you decide to purchase your next remote codec or sound recording equipment, you must see the impressive range of built-in features in ViA for yourself. Tieline invites you to see the new ViA firmware with record and playback functionality at booth N6506 at NAB 2018... we're sure you will be impressed.

Crocmedia Broadcasts the Big Game with ViA

Minnesota, USA to Melbourne, Australia - 9,395 miles flawlessly over IP!

Crocmedia's Off The Bench radio show in Australia has traveled to radio row to cover the Super Bowl since 2012 and they went to Minnesota to broadcast in the lead-up to the game in 2018.

"This is regular gig for us and in the past we used Tieline i-Mix G3 codecs to broadcast live audio back to Australia over ISDN, but for the last two years we have used Tieline's ViA over IP," said George Biagioni, Crocmedia's IT Broadcast Engineering Director.

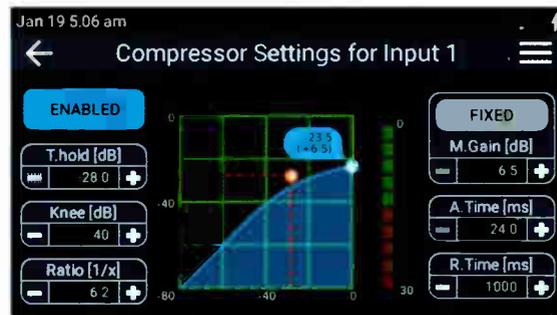
"We have purchased 5 Tieline ViA remote codecs and a Genie Distribution codec for our AFL nation show, which is syndicated nationally across Australia. We used one of these ViA codecs to go live from radio row in Minnesota and we also used it to call the game itself," said George.

"Craig Hutchison and Gerard Whateley were on the ground in Minnesota, and announcer Liam "Pickers" Pickering and Dr. Turf were at our Melbourne studio each day for the show in the lead up to the big game," said George. "Audio from the guys in Minnesota was mixed with Pickers' audio in Melbourne, so we needed very low latency audio communications between Melbourne and Minnesota to make it work."

"The ViA codec connected flawlessly to our Genie Distribution codec in Melbourne and delivered very low latency audio between 60 and 100ms, for several hours of broadcasting each day over IP. It never missed a beat which was impressive," said George.

New Updates to Input Processing...

Recent firmware innovations added input EQ, input compression and a touch screen routing matrix to an already impressive list of features in the ViA remote codec. Now compression settings have been upgraded to display a simple, easy to adjust graphical display.



Craig Hutchison and Gerard Whateley broadcast with ViA from Radio Row

"Gerard also called the big game live back to Australia using the ViA," said George. "We had been supplied an ISDN codec for play-by-play coverage, but we just couldn't get it to reliably connect to our ISDN codec back in Australia. Luckily we had our Tieline ViA with us and it saved the day. We connected for four hours live over IP at 128kbps using Music PLUS encoding and it worked a treat."

"We are constantly doing live remote broadcasts and ViA offers the flexibility we require to stream from dozens of locations across Australia," said George. "The Australian Football League season starts again in March and ViA will be at the front line of our national coverage. ViA's internal battery means we can broadcast from virtually anywhere for hours and we can stream using USB modems, Wi-Fi or Ethernet connections, so every option is covered."

Tieline's New Cloud Codec Controller at NAB2018

Connect, configure and monitor your remote codec from the studio!

Remote control is a powerful tool for broadcasters and Tieline's Cloud Codec Controller will take your remotes to a new level of simplicity. The Cloud Codec Controller integrates Tieserver and the latest cloud computing technologies to deliver secure real-time monitoring and remote control of all your G5 IP codecs, Commander G3 rack mount codecs, and smartphones using Report-IT Enterprise.

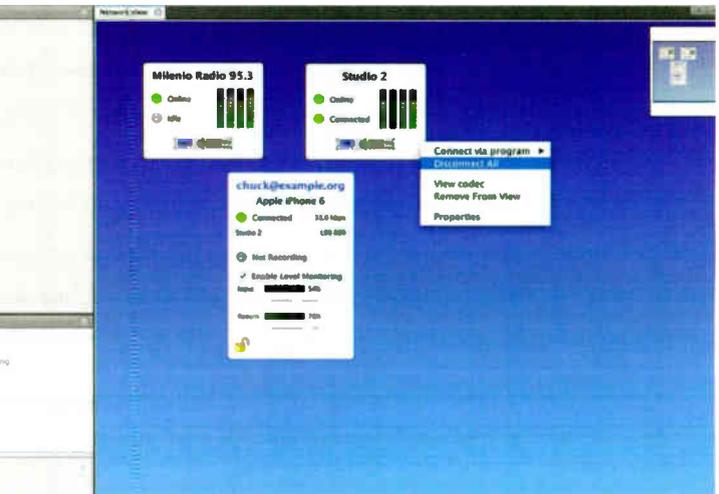
The Cloud Codec Controller immediately detects the presence of a Tieline codec or device running the Report-IT Enterprise app when it connects to the internet. This allows engineers to remotely control live connections from the comfort of the studio, at home, or anywhere they have internet connectivity. Connect a device to the internet and the Cloud Codec Controller will deliver:

- Real time online/offline status of supported codecs, as well as users logged into Report-IT Enterprise.
- Monitoring of connection status, link quality and audio levels.
- Remote adjustment of audio levels.
- Dial and hang-up remote codec connections from the studio.

Monitor and control your entire network of IP codecs and select and load programs, view and manage alarms, plus you can launch the HTML Toolbox web-GUI to access all codec controls including mixer and router settings, program editing/creation and much more.

Unparalleled Control of Report-IT

Using Tieline's award-winning Report-IT Enterprise app anybody using an iPhone or Android smartphone can go live in two simple steps:



The Cloud Codec Controller

1. Install the Report-IT Enterprise app from the iTunes App Store or Google Play.
2. Log in with credentials provided by the studio.

At the studio use the Cloud Codec Controller to remotely connect and disconnect Report-IT, start and stop recordings, monitor and adjust input and record levels, lock and unlock controls and observe link quality. Use VIP-Connect to send a secure Report-IT Enterprise URL to a reporter or contributor and use the Cloud Codec Controller to go live with full remote control in a single click!

See the Cloud Codec Controller for the first time at NAB 2018 on Tieline booth N6506.

Tieline Unveils New 'Chatter Box' IFB/Talkback Solution

Chatter Box Delivers Live Broadcast IFB Solutions with Push-to-Talk (PTT) Communications over IP

Why put up with poor quality mobile phone connections or outdated telephone hybrids for remote broadcast communications? Now Tieline's Chatter Box studio rack unit interfaces with a simple Chatter Box smartphone



app to deliver up to six dedicated IFB and push-to-talk communications circuits over cellular networks and Wi-Fi for remote broadcasts. This means you can provide discrete program and IFB feeds with integrated full duplex push-to-talk communications back to the studio from any remote location.

(Continued on Page 4)

(Continued from Page 3)

How does Chatter Box work?

Remotely located reporters, guests and other on-air talent, as well as directors, producers, camera operators and other technical staff simply download the Chatter Box app onto their iOS or Android smartphone or tablet. Open the app, connect, and then tap the device screen to activate PTT talkback paths directly to the Chatter Box rack unit at the studio with analog or AES XLR in/outs. Then route audio directly into studio communications panels for control room directors, producers, program directors, master control operators and other technical staff as required. Interface with your favorite earphones and microphones – you can even use a remote control smart button to activate the PTT function remotely!



Win a FREE Merlin Codec at NAB2018

Chris Leonard was the lucky winner of a Genie STL codec worth thousands of dollars at NAB2017. Here's what he had to say about the codec:

"The Genie is an integral part of our live broadcasts for our stations at New West Broadcasting. We know that we can count on rock-solid Tieline reliability when connected to our Genie with our ViA, Bridge-ITs and mobile users with the Report-IT app."

Will you be this year's lucky winner of a Merlin codec? Must be in it to win it, visit Tieline booth N6506 before the draw and you could win a FREE codec worth thousands!



Chris Leonard, President & General Manager at New West Broadcasting Corp with Tieline's ViA & the Genie STL codec he won at NAB2017

How to Enter:

1. Visit our Booth N6506 at NAB2018 & drop your business card into the draw
2. Drawing will take place on April 11th at 12pm. Winner will be notified by SMS or Phone.

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Replace Electrolytic Capacitors — *Before* They Explode!

And here's a handy way to know when it's time to swap 'em out



Fig. 1: Capacitors with a crease in the top will tend to explode upward, instead of down into the PC board.

WORKBENCH

by John Bisset

Email Workbench tips to johnpbisset@gmail.com

Workbench contributor and engineer Duke Evans writes that he has repaired many a circuit board trace with bare wire. In his years of circuit board repairs, Duke has also noted that some older electrolytic capacitors do not have the top creases in the aluminum, and when they explode, they do so downward through the rubber base. This then blows a hole in the circuit board.

The repair is not fun.

On one seriously damaged board, Duke was able to fill the hole with E-6000 epoxy from Tap Plastics, and had to do mucho wiring where the traces were blown apart. Fig. 1 shows two capacitors — one with the crease and one without it.

A good rule of thumb is to replace electrolytics every five to seven years. Older electrolytics may not explode but still cause squirrely operation or poor audio response.

Shotgun replacement of the electrolytics ensures that everything is fresh. Observe the polarity of the electrolytic capacitors as you replace them.

Now, if you don't have an electrolytic capacitor checker, WETA(TV)'s Bill Seabrook recommends the EDS-88A CapAnalyzer (www.eds-inc.com/cap.html). This instrument has saved Bill hours of time in identifying defective capacitors, without having to remove them from the circuit board.

In just a few minutes, this model permits checking a board with dozens of capacitors mounted on it. EDS no longer manufactures the CapAnalyzer but has licensed its manufacture to Merced Electronics (www.mercedelectronics.com). The analyzer runs less than \$250.

Again, when a capacitor ages, it can cause problems with the circuit's operation. In video circuits, it can cause a fully scrambled picture. High-end audio, video and computer products use tantalum capacitors that can also become leaky by as much as 500 ohms. Computer motherboards are another user of electrolytics that must have super-low ESR (equivalent series resistance), or strange problems and freezing can occur.

The trick to locating bad capacitors in-circuit is not just to measure capacity, but instead, to measure equivalent series resistance and DC resistance in relation to capacitance. A perfect capacitor will measure as an open circuit at DC, and will display less AC resistance as the frequency across it increases. The CapAnalyzer 88 was the

(continued on page 16)

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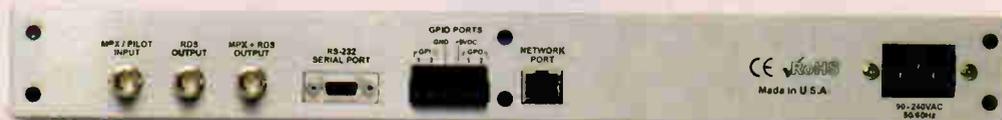
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Who says small can't be mighty? ruby's mixing engine, Power Core, is equipped with redundant IP networking, dual-redundant power capability, and tons of built-in I/O — 384 stereo channels, standard — with room to add even more. There are dozens of DSP channels, and a built-in routing switcher, too. It's like 12 rack units of power, packed into only 1RU.

WORKBENCH

(continued from page 12)

first device that would measure both DCR and ESR automatically.

If you don't have a CapAnalyzer, add it to your test equipment wish list.

Thanks, Bill, for sharing this find with Workbench readers!

Believe it or not, some stations still use cart machines. A snag in using this decades-old technology, however, is replacing the pressure pads used on the old carts. Project engineer Dan Slentz



Fig. 2 (left): A roll of foam weather-seal works for pressure pad replacement.



Fig. 3 (below): Cutting off a strip of the weather-seal and gluing it onto the pressure pad bracket effectively replaces worn pads.

found a working substitute for repairing the pressure pads on old carts.

Dan has seen a number of people asking for foam pads for the old Fidelipac-branded carts on Facebook, and was digging around and found that the right thickness "weather-seal foam" (not the dense "mushy foam," but the stuff that is a lighter foam such as the roll pictured in Fig. 2) will work.

If you can find the roll in a 1/4-inch width, it's a direct fit (when you cut the length to match). So all you have to do is remove the pad support (the metal bracket) and lightly sand off the old glue and clean with alcohol. Then cut this self-adhesive weather stripping foam to the right size and stick it on.

When searching for the weather-seal foam, make sure it is the "foam style" and not the "rubber type." The rubber will stick to the back of the magnetic tape and not allow the cart tape to "flow" over the pad. The cheaper foam is smooth, like the original pad material. It's got an adhesive on the one side, which makes it easy to apply to the metal piece that holds it in the cart (remember to scrape off and sand any remnant of the old pad before affixing the new), then maybe clean it with a little alcohol to make sure it's perfectly clean. A close-up of a strip of the foam is seen in Fig. 3.

Since nearly everyone reading this has a smartphone that takes pictures, why not adopt a process used by Alpha Media's Dale Lamm, DOE for WHBC in Canton, Ohio?

Dale combines pictures taken on his cell phone with maintenance tips and procedures, documenting problems he's solved in both word and picture. It doesn't take long to do, and the benefit to you or your assistant can be invaluable.

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

Author John Bisset has spent 48 years in the broadcasting industry and is still learning. He handles Western U.S. radio sales for the Telos Alliance. He is SBE certified and is a past recipient of the SBE's Educator of the Year Award.

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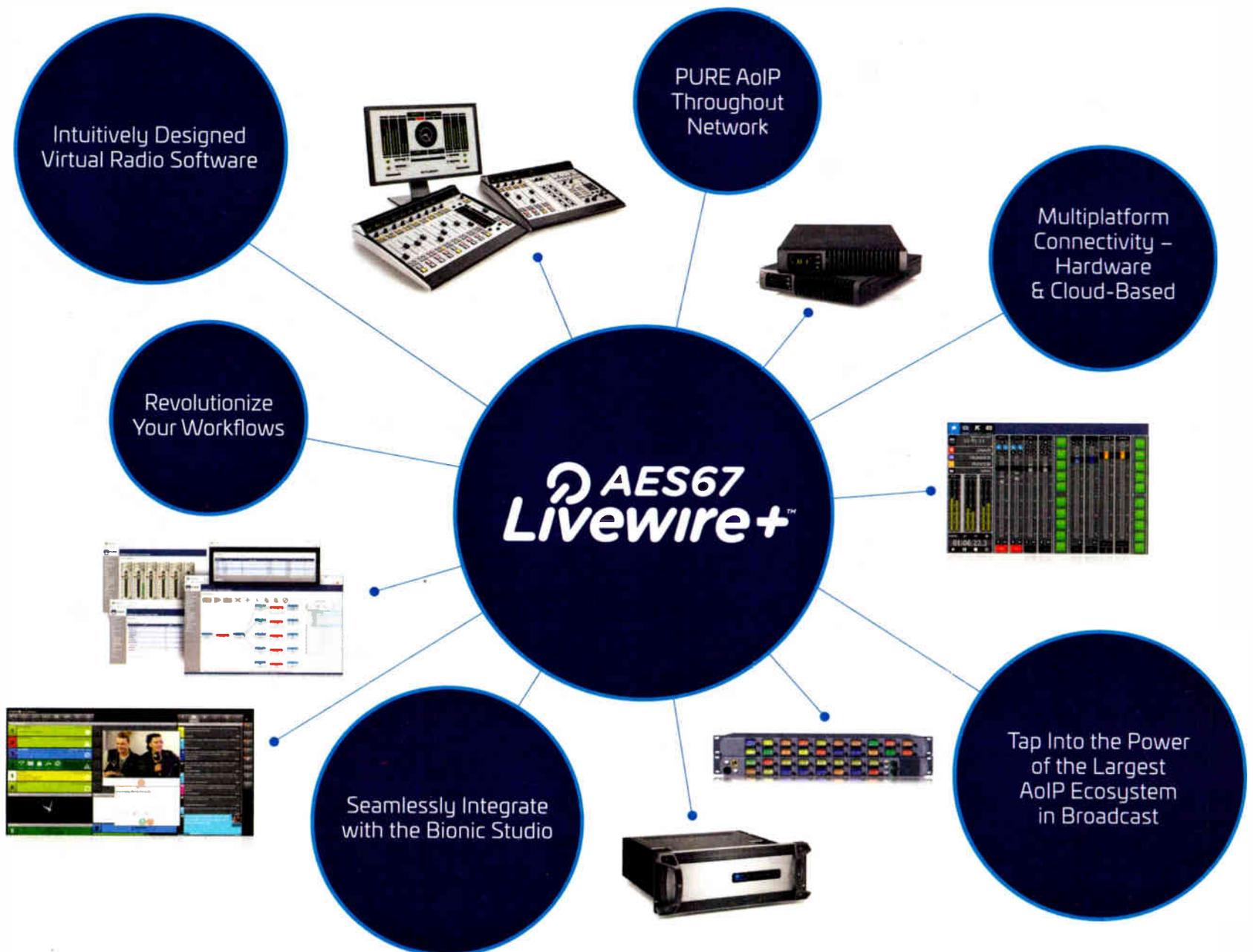
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NAB to Detail All-Digital FM Field Test Data

Trial involved multiple test vehicles; also, spring show will feature live demo on KKLZ

DIGITALRADIO

BY RANDY J. STINE

If all-digital FM HD Radio in its full glory is ever rolled out in the United States, perhaps test data revealed in Las Vegas during April's NAB Show will be a crucial first step.

A highlight of the Broadcast Engineering and Information Technology Conference will be NAB Pilot's "All-Digital FM Field Test Project" on Sunday April 8, from 1:50 to 2:10 p.m. in Room N255 of the North Hall of the LVCC.

The presentation may be only 20 minutes long but it promises a deep dive of results from the first extensive field testing of such service. Until now only limited field testing of all-digital HD Radio has been conducted, with low transmit power (100 watts) and reception equipment in non-real world test conditions.

Pilot, a technology and innovation initiative of NAB, conducted field tests in early 2018 with Beasley's KKLZ(FM) in Las Vegas serving as the test station. A live demo of all-digital FM signals from KKLZ will be broadcast during the show.

Virtually all HD Radio receivers in the marketplace will work not only with the familiar "hybrid" HD Radio signals but also with a more advanced, all-digital HD Radio signal. Crucially, however, an all-digital HD signal is not

receivable on analog-only radios.

Xperi, parent company of HD Radio, recently reported that 50 percent of new cars sold in the U.S. are equipped with HD Radio receivers. But a much higher penetration would be required if radio station leaders are ever seriously to consider utilizing all-digital HD FM.

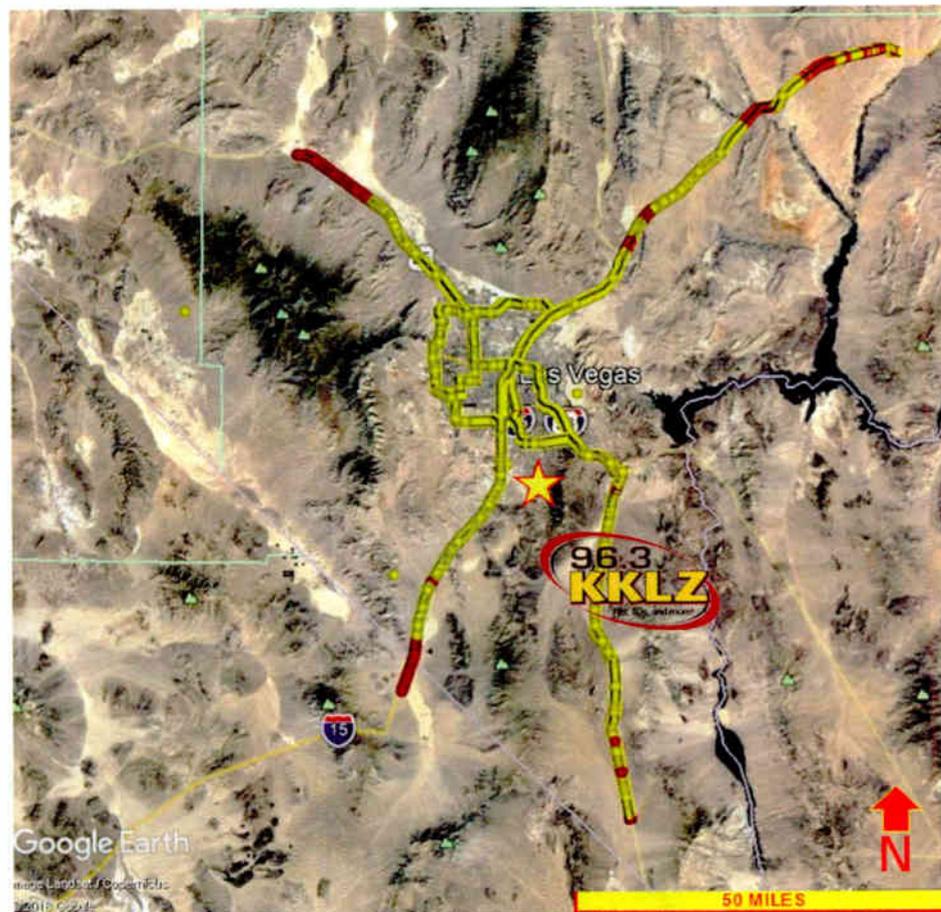
Martin Stabbert, VP of engineering for Townsquare Media, will moderate this session, which features David Layer, NAB VP of advanced engineering; Russ Mundschenk, senior field test & implementation manager for DTS/HD Radio; and Milford Smith, partner in Smith, Khanna and Guill.

Radio World previewed the session with Layer; while he said the test results were still being analyzed, he provided valuable insight into the testing process.

Radio World: There have been previous tests of all-digital FM in the field. What makes this testing different?

David Layer: Tests have been conducted previously by Xperi and others in the U.S., Korea and Norway. Ours is the first test, however, to use commercially-available consumer receivers and a high-power Class C 100 kW radio station. This was also the first test project to test both the standard MP5 all-digital configuration, which is specified in the NRSC-5 digital radio standard, and the HD Multiplex all-digital configuration developed by Nautel.

RW: Can you summarize results from any earlier tests of all-digital FM?



An image from David Layer's planned presentation. Yellow means all-digital signal was received; red means it was lost.

Layer: Two earlier studies come to mind, which were primarily field tests, not lab tests. I would refer you to the 2011 NAB Broadcast Engineering Conference Proceedings for an article titled "Field Trials of Digital Radio Technologies: DAB, DAB+, T-DMB Audio, HD Radio and DRM+," published by a group of authors from ETRI, which is a non-profit government-funded research institute in Korea. This article is a good summary of some work done back in 2010, which involved testing of a number of digital radio technologies. There was also a U.S. contribution

to the International Telecommunication Union, Radiocommunication Sector (ITU-R) in 2014 on tests conducted in Norway using a 100-watt transmitter. In that test, the digital signal at 100 watts provided good coverage of the metropolitan area and met or exceeded analog coverage.

RW: What groups were involved with the recent fields tests in Las Vegas and when were they conducted?

Layer: Tests were conducted during the weeks of Jan. 22 and Feb. 12. Our

(continued on page 20)



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DIGITAL FM

(continued from page 18)

partners in the project included Beasley Broadcast Group, Xperi, Nautel, Townsquare Media and Avis Budget Group, which provided the test vehicles. Also working with NAB Pilot was consulting engineer Milford Smith from the engineering firm of Smith, Khanna and Guill. [Smith also has long been active on the National Radio Systems Committee.]

RW: What signal strength and contours were measured? How were the all-digital field tests conducted?

Layer: We operated the test station at a variety of power levels and in a variety of configurations, which I will be describing in more detail during my presentation at the conference. One of our main considerations was to maintain comparable power levels across tests so that valid comparisons of the results could be made.

RW: What types of consumer radios were tested?

Layer: Our primary radio used for coverage tests was the HD Radio receiver included in the 2018 Ford Explorer. Through our rental car partner Avis Budget Group, we were able to lease

four identical Explorers and the radios in these vehicles were connected to our coverage test platform with software provided by Xperi. For some of the coverage tests, we also used an additional HD Radio test receiver built by Xperi. In addition, we did reception tests using a Sparc tabletop radio as well as a Sparc SHD-TX2 portable.

the benefit of all-digital FM radio is not just additional audio channels. The additional data capacity that can support more audio will also support advanced data services, and in the long run those data services may be of the greatest interest. During the field test, we focused on additional audio channels since our test software is designed to measure cover-

currently in use.

RW: What power level for all-digital needs to be established so that the existing FM allocations scheme for station coverage capabilities is maintained and new interference is mostly precluded? In other words, what amount of power is necessary in the all-digital mode to "equal" the coverage of the analog FM signal?

Layer: My first comment here is that any possible move by broadcasters to go all-digital is a long way off.

Regarding power levels, one of the areas where work is needed is that of allocation rules for all-digital and there will be plenty of time to study that.

RW: Do you think any existing stations would be willing to go all-digital FM before in-vehicle digital radio penetration reaches 80 or 90 percent?

Layer: I think it depends on the business opportunities available. One of the reasons we are starting to explore all-digital FM operation is that broadcasters may have an opportunity to provide data services to so-called connected cities and to the autonomous vehicle infrastructures that are now being contemplated. All-digital FM broadcast signals offer an extremely robust and redundant data channel, sure to be attractive to users and competitive with the alternatives.

It's important to remember that the benefit of all-digital FM radio is not just additional audio channels.

— David Layer

RW: Was there a separate testing program for inside home listening or only outdoor mobile?

Layer: This was principally a mobile test program to assess all-digital coverage and compare it to hybrid digital coverage. Some stationary, inside listening was done but the results are more anecdotal.

RW: How many channels of HD Radio were tested?

Layer: It's important to remember that

age based on audio channel reception, and broadcast up to five audio channels on a single HD Radio signal, more than FM broadcasters are currently supporting with hybrid digital services

RW: Was interference between HD and analog made better or worse by using the full digital version?

Layer: The MP5 all-digital mode of operation that we were testing did not create any additional interference compared to hybrid digital services



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Just a Little Big Apple Plumbing Project

Nicholas Paulin on designing a 19-channel RF system with mixed analog and digital operation

TRANSMISSION

BY JEREMY RUCK

Repacking the television spectrum following the commission's incentive auction is arguably the most complex and engineering-intensive undertaking ever performed within our broadcast industry. While its focus is on what amounts to the reconstruction of a large fraction of the television transmission plants, its effects are more far-reaching. Due to myriad other requirements, leasing issues and structural concerns, many FM stations will be directly affected; to a lesser degree so too will be AM stations on whose radiators FM auxiliary facilities have been, or will be, constructed.

Probably nowhere is the impact to FM operators more acute than at the large multi-tenant sites — buildings and mountaintops such as Willis Tower, Mount Wilson and the subject of this article, the Empire State Building.

There, in order to minimize interruption to FM operations during repack activities, Electronics Research Inc. designed and installed a 19-channel FM combiner and antenna system. Not only did ERI accommodate all of the respective analog carriers, it also designed the system to run IBOC for each of the stations at -10 dBc.

Nicholas Paulin, product engineering manager at ERI, will present an overview of the project on Sunday April 8 at 2:30 p.m. during the Broadcast Engineering and Information Technology Conference.

I had the opportunity of chatting with Nick about the project and discussing the challenges he and his team faced in bringing the system to fruition.

TWISTS AND TURNS

There is an old adage about location, location, location; it was no exception here. Being at one of America's tallest buildings provides certain advantages. But as seasoned readers of my own musings know, I have a certain conceptual fondness for the lack of a free lunch. That certainly is the case with this system.

A relatively short transmission line run from the combiner to the antenna is all that is necessary due to its building location. However, transmission line runs in buildings typically are tortuous, requiring many elbows. In this system, more than 20 elbows are spread over the two 6-inch rigid runs. Additionally, due to corridor widths and corners, standard transmission line lengths would not fit into the building for installation. Thus, shortened section lengths were used, which required consideration of flange reflection pileup issues. Here ERI used sticks 8 feet in length, which gave good performance, and addressed installation concerns.



Photo by Peggy Miles

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Normally complicated line runs can be a challenge to phase properly. In this project, ERI used two separate combiners. One provides right-hand circular, while the other provides left-hand circular. Because of this arrangement, phasing the two lines was not necessary.

In the construction of the two combiners, standard cavities were utilized. Due to the high voltages associated with the IBOC operation combined with physical dimension limitations, a new hybrid design was used in this installation. This design has a more compact footprint while at the same time increasing the voltage rating.



A peek inside the new system.

Courtesy ERI

comprises three layers, four around, utilizes a comb filter. This type of filter is created by the deliberate introduction of a delayed version of a signal to itself. This causes interference patterns to be created, which have the appearance of a comb, and are in this instance used to help smooth out the antenna radiation pattern. Given the central location of the site relative to the market, less scalloping in the pattern would be desirable.

This is a really cool system and one where necessity bred substantial advancement to our art. I know where I will be Sunday afternoon at the show.

In the system, more than 20 elbows are spread over two 6-inch rigid runs.

The compact footprint for the hybrids was crucial due to the room size. The dimensions of the combiner room are 15 by 25 feet, which required the cavities being laid horizontally in a two-tier type of configuration. Additionally, the system was height-limited due to existing ductwork in the ceiling. After installation, the vertical clearance was only a few inches.

TWO-WEEK INSTALL

Since the combiner location is within the building, it was possible to perform most of the installation tasks on that portion of the system during daytime hours. The installation time for the combiner spanned approximately two weeks.

On the antenna side of the system, work was performed mostly during nighttime hours due to RFR considerations. There, due to the shorter work window and weather considerations, the installation took around a month to complete. Before the installation of the antenna was performed, structural reinforcement was required.

The antenna is the first of its kind and utilizes a solid ground plane, rather than a screen or grating type. The system design specifications called for the ability to be able to climb through and work behind the array while it was active. Although a mesh ground plane would have limited the RF level behind the elements, the solid ground plane will prevent the protrusion of hands and feet into areas where they would experience high RF levels. In addition to the concerns behind the antenna, the potential for high RF levels at publicly accessible areas of the building was considered.

Additionally, the antenna, which

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Photo by Jim Peck



Entertainment Industry, will provide a business and technical overview of variety of blockchain use cases that may shape different segments of the M&E industry.

“Where’s My Console? New Tools Lead to New Workflows for On-Air Radio Talent”

Kirk Harnack of the Telos Alliance explores workflow improvements through equipment virtualization.

Pilot Welcome & NAB Technology Opening Address

On Sunday morning, NAB CTO Sam Matheny will kick off the technology sessions and update attendees on NAB’s Pilot initiative. Also, more than a dozen former NAB Engineering Achievement Award winners will deliver “mini-keynotes” on their view of the single most important challenge for the future of broadcasting.

“HD Then & Now”

Nautel’s Jeff Welton will present a paper discussing the original methods of creating an HD signal and combining it with the existing analog signal, as well as presenting the changes that have occurred, then present various options, including pros and cons. He will attempt to dispel some myths.

“Drone-based Techniques to Rapidly Characterize Broadcast Antenna Systems and Coverage”

A Sunday afternoon presentation featuring Sixarms CEO Jason Schreiber shows real-life examples of airborne systems in use, the timing needed to verify complex antenna systems and the effects of installation errors and nearby infrastructure on the RF coverage.

“The Race to Successfully Build the Connected Car of the Future”

Monday morning, Lior Ben Gigi will explore how vehicles, virtual assistants and data are keeping drivers safe and connected, and what the industry is doing to improve the experience of connected, autonomous, shared and electric vehicles of tomorrow.

“Putting Your Station’s Best Face Forward in the Digital Dash”

A Monday panel promotes the use of RDS and HD Radio data.

“Voice Assistance and Local Media: Use-Cases, Practical Experience and a Look Forward”

Another Monday morning session will feature a paper exploring the experience of a local broadcast media company in implementing a daily news and weather update on the Alexa Echo and Echo Show. It will describe both the technical hurdles and options for overcoming them, as well as the workflows necessary to support daily updates for these platforms.

“Preparing for a Cyberattack: A Case Study”

This Tuesday morning session will explore the experiences and lessons learned in the aftermath of a June 2017 cyber-attack of a joint licensee radio and television broadcaster.

“Wireless Microphone Operation — Post FCC Incentive Auction”

Joe Ciaudelli is director of spectrum affairs at Sennheiser Research & Innovation. He’ll talk Tuesday about the dramatic changes affecting users of wireless mic systems, which also affect in-ear monitors, intercom systems and IFB systems.

▶ A SHOW SAMPLER FOR ENGINEERS

This issue of Radio World previews technology themes of the NAB Show; below is just a sampling of additional relevant sessions. Last issue we looked at business and management themes. For the full schedule visit NABShow.com.

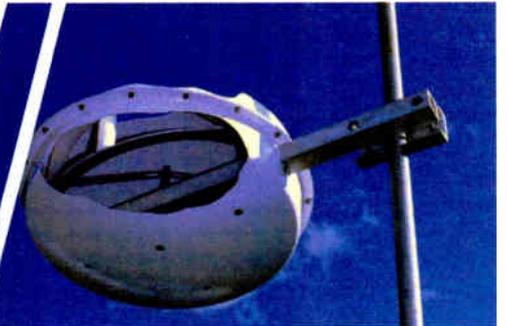
“SBE Ennes Workshop: Is IP Real?”

IABM CTO Stan Moote will moderate a Saturday morning panel about real-time IP from the supplier through system integrator to users. Attendees are welcome to ask questions from business through to technical matters about real-time IP in general including SMPTE ST-2110.

“Blockchain Challenges and Opportunities in the Media & Entertainment Industry”

On Saturday, Peter Guglielmino, CTO for IBM’s Media &

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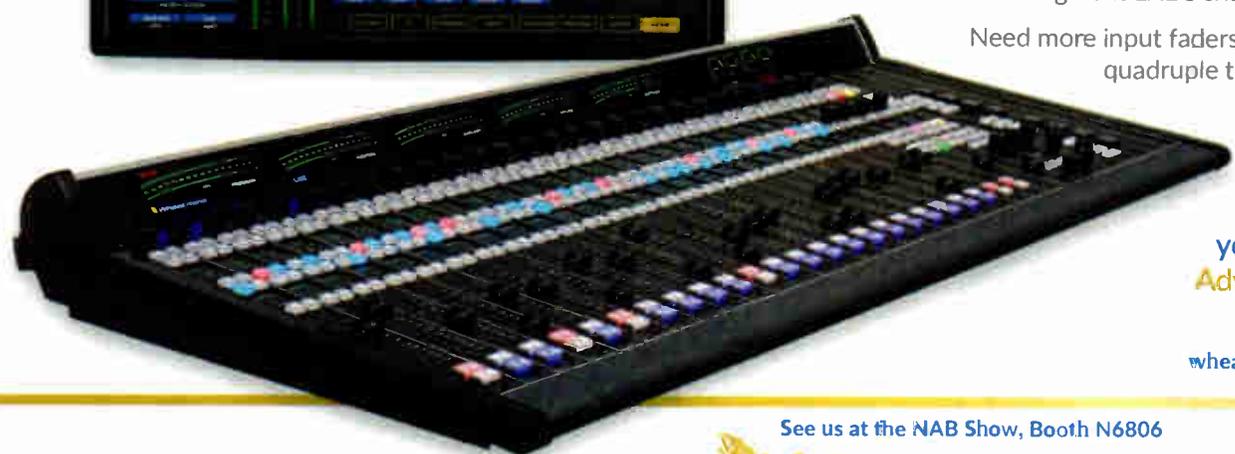
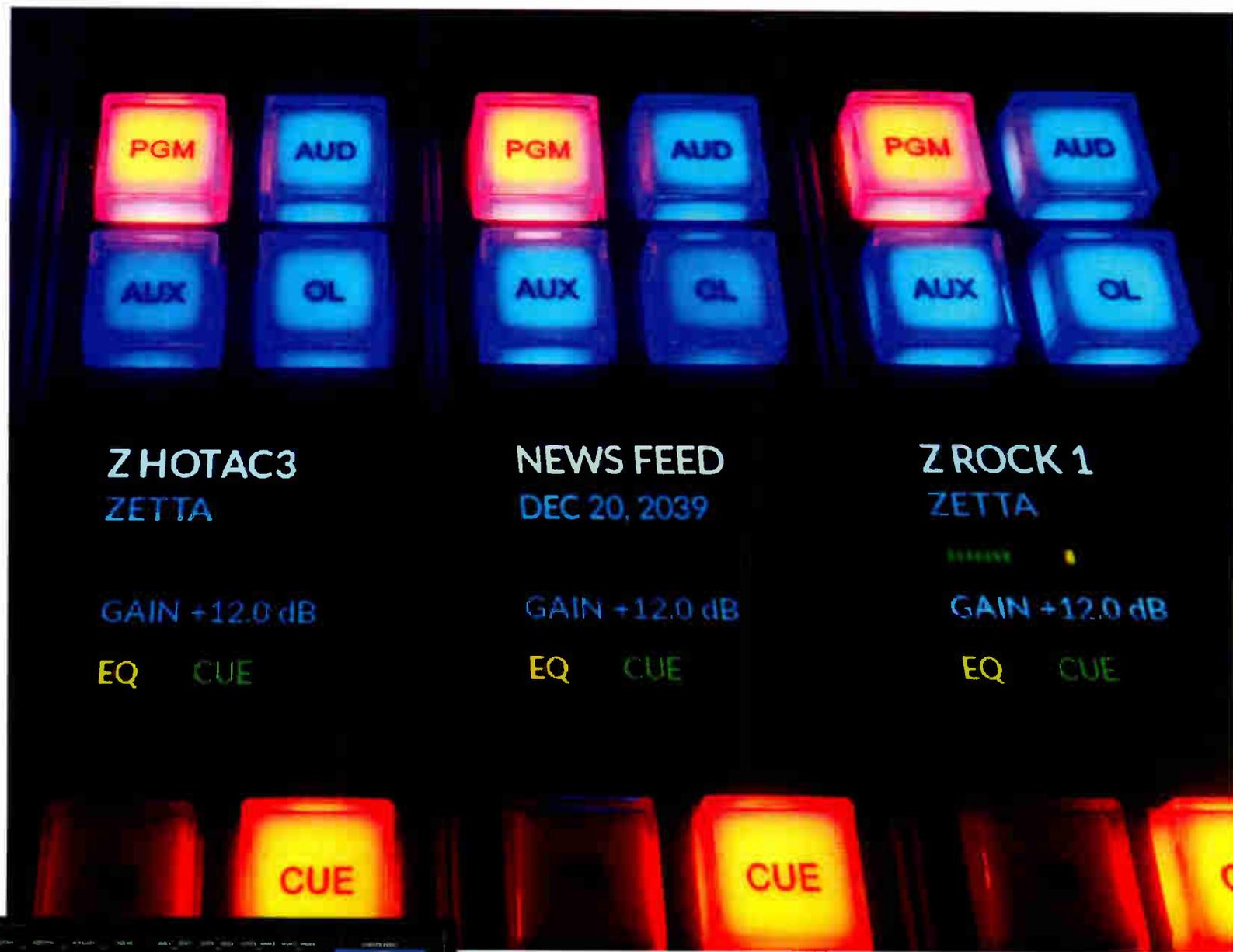
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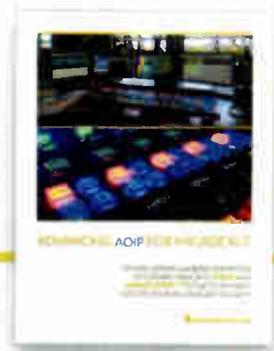
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“As Long as the Mood Is Right, No Static at All ...”

Despite that familiar rock lyric, FM radio is dealing with a growing noise problem

SPECTRUM NOISE

BY TOM VERNON

Mention noise interference to radio reception, and most people’s thoughts immediately jump to the AM band. But noise is also an issue for FM reception, the subject of Glynn Walden’s NAB Show presentation, “Noise Contributions to Recovered Analog FM Reception.”

Walden, now a consultant for Entercom, says FM noise is a different animal.

“When we listen to AM radio, it’s easy to distinguish between noise and a weak signal. With FM, the limiter in the receiver masks most of the noise, and what’s left might sound like just slightly more background hiss.” Although this noise is largely indistinguishable, it nevertheless becomes a limiting factor in FM reception.

NOT WELL DOCUMENTED

While noise in the AM band has been researched and discussed, much less is really known about how it works on FM.

“When I first became interested in this topic,” says Walden, “I worked for iBiquity, now Xperi. I did extensive research on existing noise levels in the

FM band, and discovered that neither the FCC nor the radio consulting community knew what the noise level was.

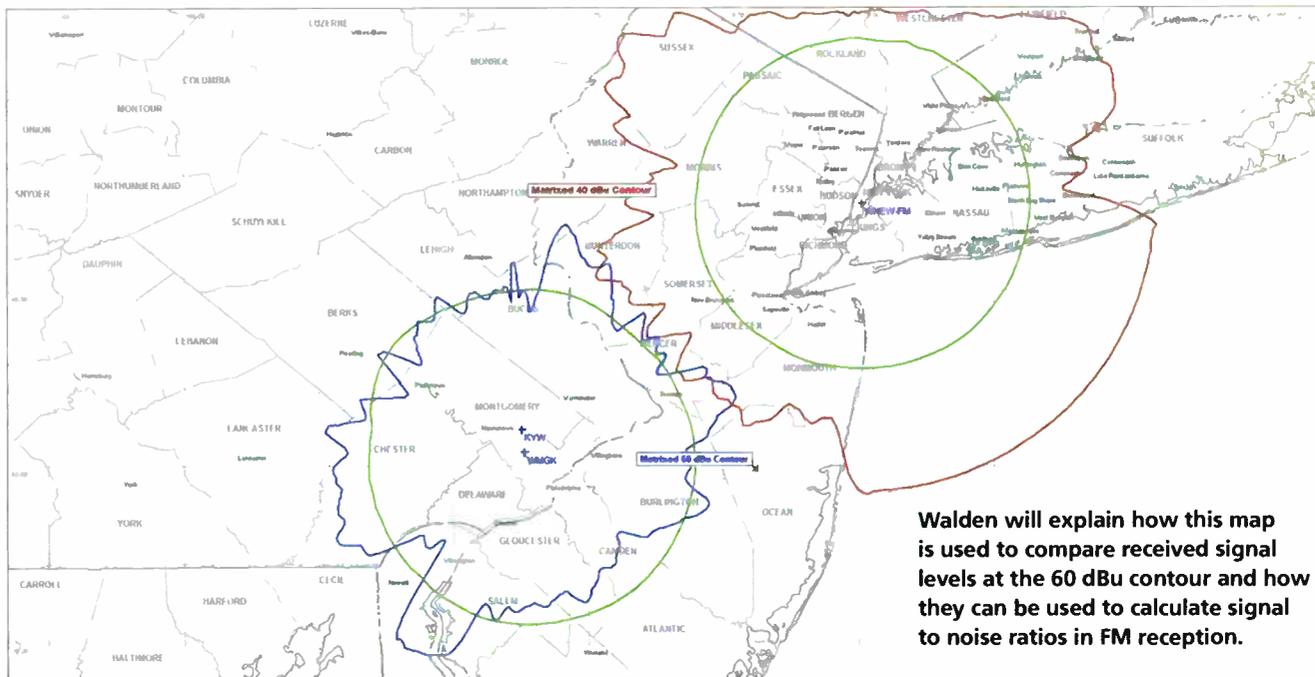
“What we do know is that the total noise is the sum of atmospheric noise,

floor of the receiver, as it is too low to be a contributing factor.

We also know that, comparatively speaking, the FM band is increasingly noisy. Walden notes that scientists at iBiquity’s predecessor USA Digital Radio observed that the noise floor in the FM band is about 10 dB higher than it is on the lower adjacent band or the upper

levels at -20, -14 and -10 dBc.

HD Radio has been a large part of Walden’s career for the past 25 years. As the senior VP of engineering for CBS Radio, he was responsible for numerous technology rollouts, including the CBS conversion to HD. He helped found USA Digital Radio in 1991; that consortium of broadcasters was respon-



Walden will explain how this map is used to compare received signal levels at the 60 dBu contour and how they can be used to calculate signal to noise ratios in FM reception.

the co-channel interference within some finite distance from the station and the noise figure of the FM receiver.”

Walden adds that, when evaluating received signal-to-noise ratios in car radios, he generally ignores the noise

What we do know is that the total noise is the sum of atmospheric noise, the co-channel interference within some finite distance from the station and the noise figure of the FM receiver.

– Glynn Walden

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adjacent aviation band. That observation led them to explore why this is so.

“A lot of the noise, particularly in urban areas, is manmade,” says Walden, “and there is an additional component that is simply a result of the number of FM co-channel signals adding asynchronously in a matter that resembles Gaussian noise.”

The session will focus on the effects of IBOC transmissions, at -10, -14 and -20 dBc on the received signal-to-noise ratio at the -60 dBu contour. Field measurements that Walden made were compared with FCC F 50:50 contours and Longley Rice matrix predicted contours. The actual measured signal levels, at the point identified as the FCC F 50:50 60 dBu contour, were used to calculate the signal-to-noise ratios with IBOC power

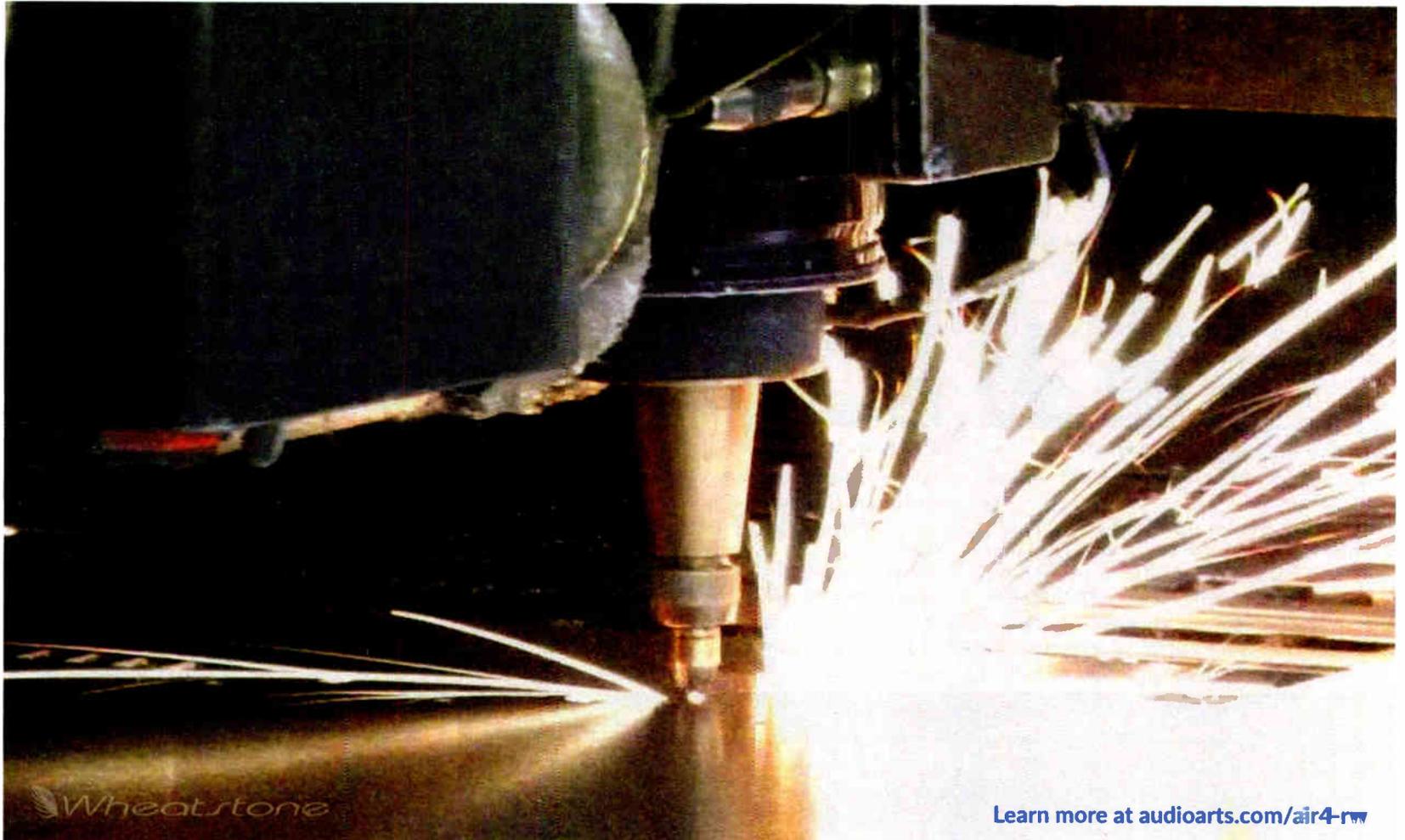
sible for developing in-band, on-channel technology. Before that, he was VP of engineering for Westinghouse Broadcasting’s Group W Radio, where he was involved with numerous improvements to AM and FM radio, including digital broadcasting.

Over the years, he continued to work on IBOC technology, and currently holds four patents involving digital radio. For those efforts, he received the Westinghouse Signature of Excellence. He was presented with a Lifetime Achievement Award at the 2004 NAB convention for his contributions to the industry and its transition to digital radio.

Walden’s session “Noise Contributions to Recovered Analog FM Reception” will be presented on Sunday April 8 at 2:10 p.m. in N255.

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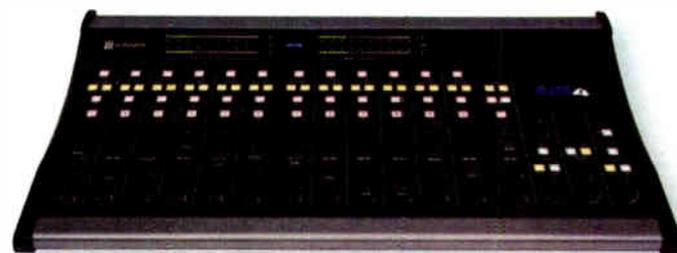
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World Radio History

Five Processing Considerations to Keep in Mind

Audio in and around media now takes many forms, so what are the main considerations in managing it?

BEST PRACTICES

BY MICHAEL LECLAIR

The technology of audio processing now encompasses a wide range of types developed to suit the various transmission platforms available to broadcasters. Mike Erickson, systems and support engineer and all-around hands-on processing guru at Wheatstone Corp., breaks these choices down into what are basically five categories: AM broadcasting, FM broadcasting, HD broadcasting, web streaming and podcasting.



Mike Erickson

For each of these systems there is a specific type of processing that will provide the best results. Over time, the industry has recognized these differences and developed processors aimed at each of these applications.

Erickson's NAB Show presentation "Processing the Many Forms of Audio Delivery" is part of the Saturday afternoon lineup of engineering sessions. I

spoke with him at length ahead of the show. The session will be co-presented with the company's Senior Sales Engineer Brad Harrison, who will discuss audio processing for video delivery.



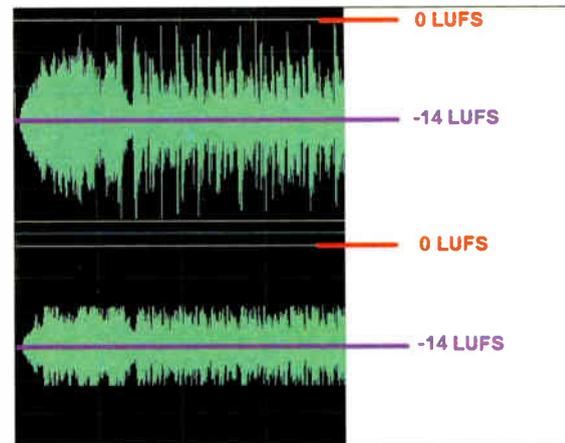
Brad Harrison

HORSES FOR COURSES

For radio and webcasters the audio "sound" is possibly the most important technical component for success. Audio processing for broadcasting at its core involves manipulation of signal dynamics to provide the best possible listening experience. Given this common goal, it would seem that the industry would have converged on a single-solution box that offers enough tools for any application. But this isn't the case.

"At Wheatstone, we used to offer a Jack-of-All-Trades kind of box, designed to handle any application," Erickson said. "But it turns out customers didn't want that — they wanted processors that were optimized for each kind of delivery system."

Each type requires a specific suite of tools to optimize the sound. Broadcasters should consider these



Loudness algorithms have changed how we should process audio content for sites like YouTube.

when choosing the appropriate processing for each of their audio delivery platforms. By selecting platform-specific processing, he says, it is less expensive and simpler to get the desired sound appropriate for each.

THE LIMITS OF TRADITION

To explore one example, Erickson examined the original forms of broadcasting in the electromagnetic spectrum, AM and FM, to demonstrate the unique limitations imposed by these formats. Broadcasting in the electromagnetic spectrum through the use of high-power transmitters is an efficient and effective method

(continued on page 32)

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World Radio History

PROCESSING

(continued from page 30)

of reaching audiences. However, due to the limits of the allocation system and available spectrum, both of these technologies are limited in extent by legally imposed modulation limits and receiver technology.

Looking at the first of these in more detail, amplitude modulation is sharply constrained by a narrow 10 kHz channel spacing and the consequent need to prevent interference to adjacent stations. At the same time, AM is the most susceptible of all delivery systems to impulse noise, both atmospheric and man-made, which is demodulated as audible noise in the receiver. This imposes a tight limitation on the dynamic range of the audio.

These two aspects of AM will drive the optimum methods for processing. To avoid interference the audio must be band-limited with a "brick wall" high-frequency filter. To stay above the noise, the audio must be high-frequency pre-emphasized and compressed substantially. Techniques to create apparent loudness come into play.

Audio processing for FM broadcast comes with its own limitations that make it different from AM. Once again, the legal limitations imposed by

limited spectrum and allocation systems bring with them the basic parameters of what is possible in FM. In Europe, add laws concerning loudness on commercial content that require additional considerations which must be addressed by the processing.

REVOLUTION OF DATA COMPRESSION

In recent years our increased understanding of the masking properties of audio have led to an explosion of new delivery methods that use data compression techniques to create data streams as a means of real-time (or downloaded and delayed) audio. The three main streaming techniques, HD Radio, webcasting and podcasting, share the common technical limits of digital transmission but each has its own specific requirements.

One common aspect of all streaming systems is the need to restore what is a digital audio file that has been broken into packets and transported to a destination without timing control over their reception. On the listener end, these packets must be reorganized into "streams" that restore the original timing of the audio. The requirement to build time-accurate streams by its nature introduces delays, most notably the delay associated with HD Radio which requires a full 7-8 seconds of

buffering to be decoded successfully.

The additional requirement for HD Radio to "fall back" to its analog main channel audio defines its uniqueness relative to the other two digital platforms.

"With HD Radio, you have a highly data-compressed primary stream that has to reasonably match the analog FM loudness and spectral balance. At Wheatstone, we find that combining the early stages of FM processing with HD helps, although the processing on the output stages must be utterly different," said Erickson. At the same time, the very critical delay timing can be precisely adjusted in the same processor, eliminating the need for an external delay device, and allowing the use of composite processing on the analog channel.

One other aspect of audio processing for digital streams is the need to compensate for any effects of the digital audio codecs that are employed. These effects become more pronounced the more loudness is desired.

PUBLIC INTERNET AND NON-TRADITIONAL DELIVERY

Webcasting and podcasting raise unique considerations.

"There are still program directors who record the audio on their competitors' web streams in order to make loudness adjustments for a possible advan-

tage. There remains a feeling amongst some that loudness can help increase popularity. At the same time, if we tried to use the loudness techniques we employ on analog FM it would make web streaming hard to hold listeners for long periods of time."

The introduction of distribution methods like Alexa, with its support for higher data rate and more modern audio codecs (AAC+ vs. MP3), offers a vision of the future of webcasting with potentially greater flexibility in audio processing.

In contrast, a new perspective appears to be taking hold in the world of podcasting. "It's pretty hard for a listener to make loudness comparisons directly from podcast to podcast; there's no button on the dashboard to 'punch over' to a competitor during a commercial," said Erickson. Processing on podcasts tends to take a back seat to content, although it remains important.

Erickson will offer more ideas on how to process audio on these crucial new technologies during his presentation. In addition, he has tips and suggested tools that can assist in the setup of audio processing for all the delivery platforms, including the latest digital forms. It promises to be an informative session for audio engineers working in any delivery medium.

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EXHIBIT HOURS

Monday, April 9: 10 a.m.–6 p.m.
 Tuesday, April 10: 9 a.m.–6 p.m.
 Wednesday, April 11: 9 a.m.–6 p.m.
 Thursday, April 12: 9 a.m.–2 p.m.

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Adorama C4345

AEQ SA C3651
Intro: Systel IP 16 is a new multiline VoIP talk show phone-in system engine with SIP signaling protocol and Dante connectivity. The system can be controlled from the Systel IP app and the new SystelSet+ control terminal — a touchscreen IP phone running a new configurable control application. System capacity is 16 VoIP lines and four operator handsets. Netbox DSP/Netbox 32 AD MX are audio routers with Dante AoIP connectivity, controllable from the Netbox RTC app. Both units have mixing capabilities while Netbox DSP also has the capacity to process audio signals. Depending on the model, it can mix and route between 32 and 160 channels. CrossMapper Connectivity — There are new features and connectivity functions for Kroma by AEQ CrossNet and ConeXia intercom systems. They now include AEQ's Phoenix family of codecs as an integrated part of the intercom systems. It is possible to make any remote connection from the control panel to virtually any destination in the world. LM9055 Broadcast Monitor — The AEQ range of 4K resolution Series 9000 broadcast monitors in sizes of 24 inches and 31 inches has been expanded to include a 55-inch monitor. Kroma by AEQ signal measuring tools, HDR, color space adjustment, Closed Captions, etc. are standard features available for this top of the range broadcast monitor.

Aldena Telecomunicazioni Srl C1256
Intro: High Gain Log-Periodic Antennas — Aldena's ALP series have excellent electrical performance with high gain and low front-to-back ratio. Custom directional pattern can be performed to meet FCC requirements. Aldena solutions are used worldwide. FCC Proof-of-Performance Test — Custom directional antenna pattern and FCC Certification (proof-of-performance) are available at the Aldena full-scale test range. Aldena has introduced a headquarters with a 9,000-square-meter indoor

area and a 125-meter certified test plant area for antenna measurements. EMLAB software for antenna design is specialized software to design/manage complex array radiation patterns and calculate the coverage area pattern all the way up to a complete network.

AlertMe N3938SP-B

Altronic Research C1722
Featured: RF dummy loads

American Tower C3630

Anton/Bauer C6025

Armstrong Transmitter Corp. and Sine Systems N7124
Featured: AM and FM transmitters, FM exciters, STLs, remote controls

Arrakis Systems N6510
Intro: Apex Automation is the next generation in the Arrakis Systems automation family. With features like custom user interfaces, channel volume control, etc., it is powerful and a value for its price. Simple IP Control Software and Surface — AoIP consoles are both powerful and flexible. They are now also affordable, with the introduction of Arrakis' first AoIP software-driven console control surface. Harmony Sound Card is a rack-mount four-playout channel, one-record channel sound card that can be used for any application. Bluetooth Consoles, ARC-Talk-Blue — Arrakis' ARC consoles all now have Bluetooth compatibility. Connect cellphones or Bluetooth-enabled devices for direct to air input. The latest Bluetooth board has two Bluetooth channels, five mic channels, USB and a line input. Accent Furniture — Check out our latest designs for studio furniture. The Arrakis Accent collection uses premium components, such as aluminum sides, and PVC trim. This will give your studio a premium look, at a fraction of the cost.

Associated Press/AP ENPS SL7606

Audinate N4511
Intro: Dante AVIO Adapter lets users use their favorite legacy audio gear with any Dante-connected system, delivering the interoperability, performance and scal-

ability that only networking can bring. Cost-effective, compact and built for the road, Dante AVIO adapters bring the modern connectivity that every audio pro needs in their toolbox. Dante Domain Manager is network management software that enables user authentication, role-based security and audit capabilities for Dante networks, while allowing seamless expansion of Dante systems over any network. Dante Domain Manager brings IT best practices to AV, making audio networking more secure, more scalable and more controllable than ever.

Audio Accessories Inc. C1839

Audioarts N6806
 See *Wheatstone Corp.*

AudioScience N6520

Audio-Technica U.S. Inc. C6012

Axel Technology N6524
Intro: RDSE3 is a dynamic RDS encoder which supports all RDS services and features such as TMC, ODA, IH, TDC, EWS, Radio Text and Radio Text plus. Oxygen 3000 Digital is the new concept digital console characterized by an elegant design and compact size. Oxygen 3000 has been designed for both on-air and production studios.

Axia Audio N6531
 See *The Telos Alliance*

Azden Corp. C8438


Your Station Anywhere

Backbone Networks Corp. N5721
Intro: Backbone Hub — Produce and syndicate Alexa/GoogleHome briefings, and more, via iOS/Android — directly from the field. Cloud-based content production/management service. Automatically turns voiceovers into dynamic audio clips, adding music beds and prerolls. Schedules and distributes audio Flash Briefings to Echo and GoogleHome, plus audio FTP for AM/FM stations. Also publishes and streams podcasts.
Established Products: Backbone Radio Production Suite — Your Station Anywhere. Replaces hardware, bricks, and mortar with flexible, virtual cloud infrastructure. New 24/7 and existing stations can scrap their expensive gear and physical buildings. All you need is a laptop or phone and an internet connection; the cloud does the rest — including radio automation, live assist, collaborative remote co-hosts, streaming, live syndication to AM/FM/Sat, multiline phone systems, Opus studio quality remotes on iOS/Android.

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 Website: http://backbone.com

Barix C1139
Intro: Reflector Cloud Encoder Servicesaves broadcasters money by moving on-premises encoding and system management to the cloud. Uses a Barix Instreamer to stream uncompressed PCM (WAV) audio and metadata to the cloud, where any number of encodes and bitrates can be produced. Available through StreamGuys. Also: Now shipping, Redundix improves the quality of a received RTP stream by adding time and path redundancy to an RTP link. Redundix removes many of the annoying audio glitches in STL, contribution or studio-to-studio links. Redundix is a cost-effective solution for adding redundancy to an RTP link. IPAM 400 — The IPAM 400 is an openly-programmable module that enables OEM manufacturers and systems integrators to build audio-based solutions with less risk and faster time to market. Supporting many audio formats and I/O connections, the Linux-based module helps developers incorporate advanced audio processing, IP-based streaming and control functionality into product designs.

Barnfind Technologies SL9630

Belar N7127
Intro: FMHD-1 Artist Experience Software — a new application built into the FMHD-1 modulation monitor automatically manages bandwidth-heavy image data, and provides broadcasters with diagnostics to monitor the Artist Experience data stream. The software decodes images for display on a desktop or laptop workstation in alignment with PAD data including artist name and song title. SNMP Monitoring Software — New software application operating in the cloud on a server to communicate SNMP monitoring information to Belar modulation monitors. Enables engineers to remotely monitor more in-depth diagnostics associated with RF, audio and more, and enables alerts.

Belden Inc. SL106

BGS, Broadcasters General Store C2022
Intro: Comrex Opal — Opal enables guests to connect to the studio by simply clicking a link. Unlike Skype and other apps, the remote guest doesn't have to install a thing — just click a button, and go live. Axia IP-Tablet — The Axia IP-Tablet virtual radio software virtualizes monitoring and control of broadcast gear, putting the broadcaster's favorite functions on an app and lessening the need for physical equipment. IP-Tablet controls networked HTML5-enabled equipment, the Axia Fusion console, and other compatible Telos Alliance gear.

BIA/Kelsey Encore Salon M

Bittree SU3417
Intro: ProStudio 96DB25F and ProStudio 96DB25i 2x48 Audio Patchbays — Delivering quality and reliability at affordable pricing, ProStudio audio patchbays let users define their signal flow while providing the cleanest sound possible. The front-programmable PS96DB25F features 96 TT (bantam) connectors in a 2x48, 1.5RU rackmount form factor, while the internally-configurable PS96DB25i offers the same advantages in just 1RU. ProStudio 16DB25QX Audio Pass-Through Panel — The problem-solving ProStudio 16DB25QX audio pass-through panel gives users convenient audio I/O connectivity in permanent and mobile environments. Available with a flexible choice of male XLR, female XLR and

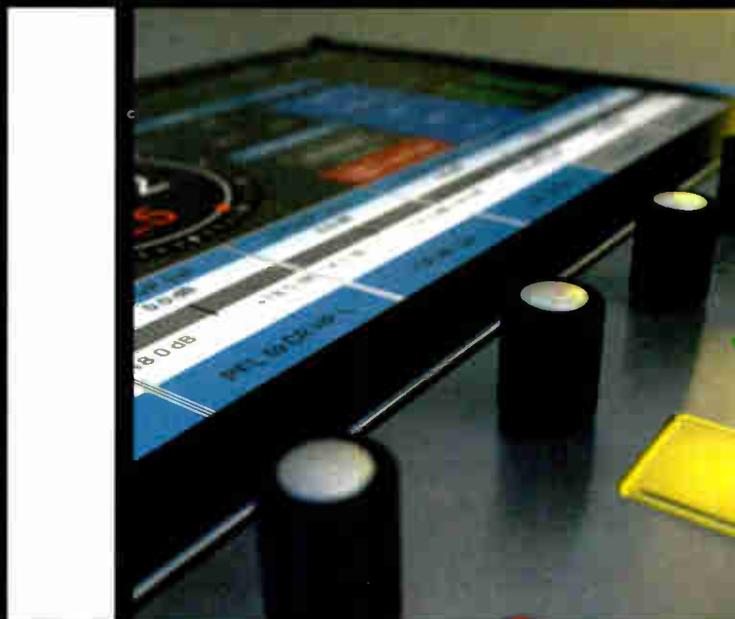
TYPE FOR RADIO

SCALABLE

Breaking
Radio
Silence



NATIVE AOIP



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CALREC

1/4-inch TRS connections, the 1x16 device passes audio signals through to two rear-panel DB25 interfaces for Avid ProTools and Tascam connectivity.

Broadcast Bionics **N7131**

Intro: Bionic Studio offers a glimpse at the future of broadcast tech. For the first time studio tools are listening, watching and reacting to content in real time. Delivering unprecedented information and control over every aspect of studio production, audience interactivity and social engagement. Bionic Portal — A tool for search and insight across all user content. Auto segmentation and topic detection allows unprecedented discovery, linking and recommendation capabilities. MOR> — The Multi Object Recorder is an unmixer for radio. It captures every element of live radio from media and mixing telemetry to transcription and face recognition. Smart Speaker Toolkit — It can receive messages directly from listeners as they shout at the radio. Understanding listeners as they speak messages, express opinions or ask questions. Virtual Director — Creating shareable radio the technology creates perfect video cuts every time.

Broadcast Concepts **N4306**
Broadcast Electronics **N6106**
Broadcast Pix **SL8320**

Established Products: VOX Visual Radio

Broadcast Software International **N7116**

Featured: Thousands of broadcasters around the world rely on BSI every day for their radio automation software, play out and multichannel logging/skimming solutions. Developed and supported in the United States by a dedicated team of broadcast professionals, our software has helped BSI become one of the leading suppliers of small, medium and multi-station markets with distributors on every continent.

Broadcasters General Store **C2022**

See BGS

BroadView Software Inc. **N4424**
BSW-Broadcast Supply Worldwide **C1330**
Burk Technology **N5131**

Intro: Arcturus protects multiplexed RF plants including antennas, transmission lines, and RF combiner systems from harmful or abnormal operating conditions. Fast response to VSWR faults removes RF energy, preventing equipment damage. Predictive trend analysis of power levels, line pressure, and temperature identifies abnormal trends before dangerous thresholds are reached.

Burli Software Inc. **N5024**

Intro: Burli Newsroom System; Burli NE — updated.



HD Radio Ahead
 Digital AM & FM

On the road to HD Radio broadcasting?
Nautel has you COVERED.

nautel.com/HDradio **nautel**

BW Broadcast Ltd. **N5927**

Intro: V3 FM Transmitters — Our latest V3 FM transmitters with direct to channel digital modulation, RDS, audio processing, AES over 192 kHz and 10 MHz and 1PPS sync inputs for SFN applications as standard. Available now in various power ranges and lightweight, highly efficient designs.

Calrec Audio Ltd. **C7408**

Featured: New Type-R to be unveiled. Also, RP1 remote production unit, a unique live-broadcast product that directly addresses an increasingly prevalent requirement for high-quality content from remote locations. Also: Brio 12 Compact Audio Mixer meets the demand for a broadcast mixer that can be used in very tight spaces like small vans and compact control rooms.

Clark Wire & Cable **C8012**
Clear-Com **C6908**
Coast to Coast Tower Service Inc. **C1107**
Coaxial Dynamics **C1131**

Featured: RF test and measurement equipment, loads and wattmeters

Comrex **C2330**

Intro: EarShot IFB is designed to help broadcast stations reduce costs and provide more flexibility for remote IFB feeds. It provides telephone-based live studio program and IFB audio to field-based remote broadcasts. Up to 30 users can listen to program or IFB feeds by calling into EarShot IFB with a mobile phone. EarShot IFB can handle up to four program feeds, or two IFB feeds. For higher fidelity, smartphone apps can be used to pull the audio in studio quality. EarShot IFB can be connected to low-cost cloud-based VoIP service, or tied to a station's VoIP PBX. It can pay for itself within a couple of months in phone service savings alone. Also: A new firmware version for Opal, the IP audio gateway. Opal firmware 1.1 includes native Safari support for macOS and iOS11. Prior, Opal was compatible with Chrome, Opera, Edge and Firefox browsers. Now, Opal users can connect using Safari, making it even easier to operate for Apple users.

Continental Electronics Corp. **N2513**
CPI/Eimac **N6210**
D&M Broadcast **N5324**
Dalet Digital Media Systems **SL8010**

Featured: Dalet Galaxy

Dan Dugan Sound Design Inc. **C6706**

Intro: Model E-2A Automixer automatic microphone mixing controller has both analog and ADAT I/O. The E-2A incorporates 28 channels of processing (12 balanced analog plus 16 ADAT) and supports all Dugan algorithms. Channels may be grouped into three independent automixers; a six-bus pre/post matrix mixer is also provided, with 56x6 capability. Updated Model N Automixer — The Dugan Model N, an automatic microphone mixing controller with Dante I/O, now includes AES67-compatibility, device locking and Dante Domain Manager-compatibility. It also offers six

internal mix busses that can be sent to any outputs or which can be used as Dugan Music System threshold inputs.


Davicom **N5711**

Intro: Davicom CORTEX 360 — Remote site management system with SNMP for up to 1024 GET, SET & TRAP commands; front-panel OLED display; eight fully differential, extended-range (up to 80V) metering inputs; 16 status inputs with independent-grounds; dual firmware memories; IPV6-ready; HDMI output for computerless onsite operation; includes dial-up modem, voice interface and IP communications.

Established Products: Davicom Micro, Mini, 208/216 remote site management systems. FMBM monitor receiver/frequency counter. DVLD Lightning Detector, DVLC Lightning Counter. Extensive choice of sensors.

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DAVID Systems GmbH **C7936**
DB Broadcast **N5327**

Intro: Mozart Next features high-quality modulation, easy maintenance, hot-swappable plug-in power supplies, up to 75 percent efficiency, excellent thermal characteristics, Automatic Current Sharing (ACS): automatic current balancing system, perfect load distribution, maximum redundancy.

DB Elettronica Telecomunicazioni S.P.A. **N5327**
Delta Meccanica Srl **C1837**
DEVA Broadcast / Sound4 **N5916**
Dialight Corp. **C1121**
Dielectric **C2613**

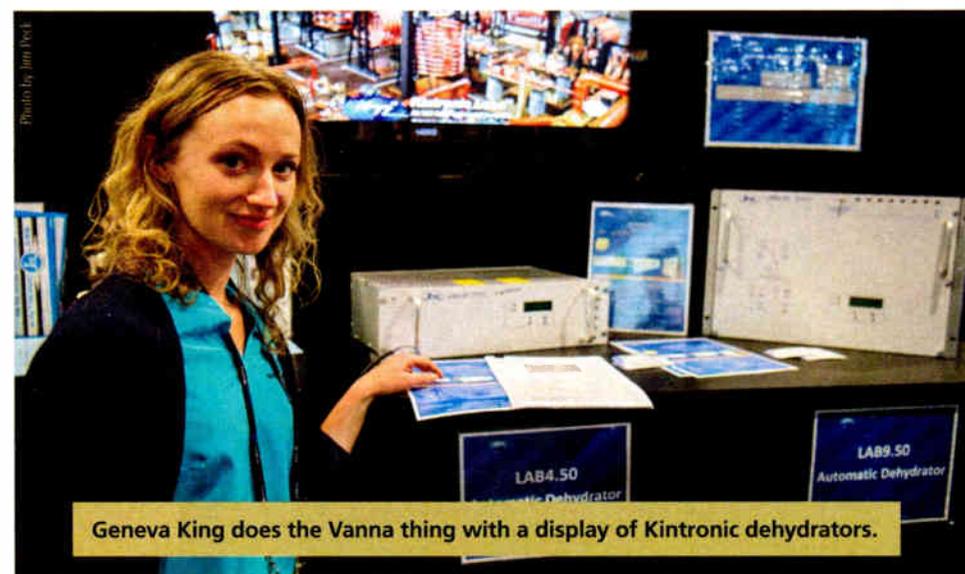
Intro: DCR-T-R Antenna — The DCR-T-R antenna brings the benefits of Dielectric's FM ring-style series to lower power FM broadcast applications. It is field-adjustable to optimal performance for Class A, B, and low-power stations. A parasitic element kit is available to meet full power and translator directional antenna requirements.

Digigram **N6615**
Digital Alert Systems **N5009**

Intro: HALO Homogenous ALERT Overseer is the guardian of a company's EAS infrastructure. This web-based, enterprise-wide tool forms a single aggregation point where multiple users can oversee health and status of each EAS device, alert key personnel of critical changes, centralize configuration settings, manage software updates and consolidate FCC-mandated test results.

DJB Software Inc. dba DJBRadio
(Digital JukeBox) **N6310**
DJI **C2207**
DPA Microphones **C3336**
Elber Srl **N1724**
Elenos Srl **N6517**
ENCD **N3824**

Intro: ClipBoard — A new control interface for ClipFire, DAD and MOM systems, ClipBoard displays live video or thumbnails within each OLED button over Ethernet, making it easier for operators to locate clips for on-demand playout. ClipBoard is a 56-button package with 48 arrays. WebDAD — The latest WebDAD gives native-level control with the flexibility of an HTML5 architecture, allowing broadcasters to take control of the radio station from any remote location with a network connection. With a direct line to DAD, broadcasters can control the complete on-air interface over IP via any web browser. HotShot3 — HotShot3 provides instant access to local and



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SOME WORDS SHOULD BE OBSCENE AND NOT HEARD



Eventide Broadcast Delays are designed to keep profanity off your air, and angry listeners, embarrassed advertisers, and the FCC off your back. We invented the obscenity delay and have a solution for stations large and small that provides up to 80 seconds of the highest quality revenue and license-protecting delay.

Our new HD compatible BD600, 24-bit delay, comes standard with AES/EBU, and provides up to 80 seconds of memory — twice as much as other delays. There are fully adjustable Delay and Dump functions, and a Sneeze function which “edits” audio entering the delay, allowing the host to sneeze, cough, or make a short comment without being heard on air.

The BD600 offers two different methods of delay buildup and

reduction: Eventide’s catch-up and catch-down system, and an exclusive fast-entry-and-exit feature which allows starting a broadcast with the delay already built up to a safe amount and erasing it with a rapid reduction of delay.

For HD, the BD600 offers MicroPrecision Delay™ mode which allows up to 10 seconds of delay to be adjusted in real time in 100 nanosecond increments. This is useful for synchronizing analog and digital signals while on-air, without audible artifacts, to maintain a seamless user experience.

Whatever your size, whatever your format, you can’t expect to protect the integrity of your air and the foundation of your business without an Eventide Broadcast Delay in your rack.

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Photo by Jim Peck
Manny Centeno, program manager at Department of Homeland Security/FEMA, is alert at NAB 2017.

network audio assets, with a user-friendly design ideal for control rooms, audio suites and mobile production trucks. HotShot3 interfaces with recording systems and strengthens logging and compliance, and supports stereo and surround sound.

ERI — Electronics Research Inc. C1322
Intro: DC Series Externally Terminated Adjustable Coaxial Directional Couplers — ERI is introducing a line of adjustable coaxial directional couplers that feature externally terminated sample ports and are available as 3-1/8-inch, 4-1/16-inch and 6-1/8-inch sizes with one to four sampling ports. It is simple to change the sample port orientation as it only requires removing and reinstalling the port termina-

tion load. CP385 3-1/8-inch Eight-Port Quick Patch Coaxial Patch Panel — The CP385 is a newly available eight-port configuration for ERI's Quick Patch coaxial patch panel product line. These patch panels are a unique design that provide quick and positive changeover of system inputs and outputs with a positive preremoval interlock system, provides ease of use with high reliability.

- ESE C2539**
- Eventide Inc. N6911**
- FEMA Integrated Public Alert and Warning Systems (IPAWS) C2635**
- Flash Technology C2457**
- Forecast Consoles C9912**
- Fraunhofer IIS SU4916**
Featuring: xHE-AAC
- G&D North America Inc. N3917**
Intro: KVM-over-IP matrix system; DP1.2-Vision KVM Extender System for 4K; ControlCenter-Compact Matrix Switch; DP1.2-VisionXG High-End KVM Extender System; Broadcast Feature for Tally Lights.
- GatesAir N3703**
Intro: Flexiva FMXi 100 — GatesAir's Gen 4 FMXi

100 combines the HD Radio Exporter and Importer into a single unit. The FMXi 100 is an embedded HD solution providing for both the Main HD audio and secondary multicast channels along with any program associated data. Maxiva VAXTE VHF Transmitter — To be shown for the first time in the U.S., the Maxiva VAXTE uniquely support repack across Bands I and III, and also supports all DAB Radio modulations. The VAXTE is built on GatesAir's latest high-efficiency power amplifiers, which increase peak power capacity for ATSC and OFDM waveforms. Also: Intraplex IP Link Connect — New standalone half-rack hardware solution for adding IPConnect data protection capability to a broadcaster's STL system. IPConnect software solves the problem of reliable data transport across complex networks that traditionally suffer data loss through dropped packets. Maxiva VAXTE. Also: Intraplex IP Link 200p — The latest codec of the growing Intraplex IP Link codec family offers dual, bidirectional stereo audio channels; and features integrated AES67 capability for intelligent networking applications.

- Gator Cases C2362**
- Genelec Inc. C4742**
- Glensound (UK) N5108**
- Globecast SU11406CM**
Intro: Limitless video Internet delivery as a service solution.

Gorman Redlich Mfg. Co. C1124
Intro: The CAPWATCH system provides alerting from NOAA weather service servers and sends fast accurate weather alerts for distribution through digital signage, email notifications, public address systems and more. The CAPWATCH accepts CAP V1.1 and CAP V1.2 messages and will supplement many over-the-air weather alert receivers already in use.

- Gracenote Inc. Wynn Salon D**
- IABM C2962**
- IBC C158**
- IEEE Broadcast Technology Society LN4**
- Independent Audio Inc. C2839**



Inovonics Inc. N5911
Intro: 732 Advanced Dynamic RDS Encoder — The new 732 takes RDS to a new level with all the tools necessary to ensure an engaging and dynamic RDS presence. It connects to virtually any automation playout system. Control via remote Web interface or front-panel OLED. Email alarms & SNMP. Also: AARON 655 FM/HD-Radio Rebroadcast Receiver — AARON 655 is an HD-Radio receiver in Inovonics' line of rebroadcast (translator) products. Sensitive FM/HD

SDR-based receiver accepts FM, HD1-8, Analog, AES, and Streaming sources for Rebroadcast. Includes RDS Encoder, and 3-band processor. IP connectivity via Web-browser permits total remote control from any mobile device and remote audio monitoring. Also: NOVA 272 FM Stereo Processor — NOVA 272 FM Stereo Processor is a half-rack digital audio processor with Stereo-Gen and RDS for FM radio broadcast. Accepts both program line, streaming inputs, and remote IP audio monitoring. An intuitive menu-driven setup via Web is compatible with any mobile device. Multiple factory processing presets streamline the setup process. Also: 662 DAB+ SiteStreamer - Remote Monitor — Web-enabled 662 DAB+ SiteStreamer™ provides remote audio monitoring via the Internet. Monitor up to 30 sources of DAB+ programming from a remote site over the Internet. Tune-in, switch modes, listen remotely via streamed audio, and receive email or text alarms & notifications. StationRotation feature for sequential scanning station presets.

Established Products: JUSTIN 808 FM/HD-Radio Time Alignment Processor, DAVID IV FM/HD-Radio Processor, INOmni 635 FM/RDS SiteStreamer, 531N FM Modulation Monitor, 525N AM Modulation Monitor, 610 Internet Radio Monitor
Mr. Gary Luhrman, Sales & Marketing Mgr
5805 Highway 9
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831-458-0552
Email: gary@inovonicsbroadcast.com
Website: www.inovonicsbroadcast.com

- Intelsat SU1510**
- International Datacasting Corp. SU2721**

Jampro Antennas Inc. C2213
Intro: Jampro Antennas Inc. — a world leader in the manufacture and design of antennas, combiners & filters and RF components for every application in radio and television broadcast including DTV, DVB-T2, FM and HD Radio solutions — will return to NAB with both TV and radio broadcasters' needs in mind. The manufacturer will show its full line of antennas, combiners, and filters. The family includes UHF Broadband Slot and Panel antenna, the UHF Broadband Super Turnstile for UHF Bands IV and V, and the competitively priced RCEC family of mask filters for TV, and a series of Broadband FM antennas for radio.

JK Audio C7306
Featured: RemoteMix Series Field Mixers, AutoHybrid IP2 VoIP Hybrid, BluePack, Broadcast Host, Innkeeper 1/2/4 Digital Hybrids, Innkeeper PBX, Universal Host, Concierge 2x6 Switch Core, Guest Modules, BlueDrivers, ComPack

- JLCooper Electronics SL2919**

Jünger Audio GmbH C3039
Intro: Netbridge MADI is an advanced interface for simple fast bridging between Audio-over-IP (AES67 and Dante) and MADI infrastructures. With two independent MADI and AoIP interfaces it handles up to 128 audio channels. Also: Easy Loudness — With dual stereo processing channels, integrated 3G SDI or Dante AoIP and optional logging features Easy

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Loudness SDI is the ideal entry solution for automatic and intelligent real-time loudness management. Jünger Audio's integrated Level Magic process ensures maximum audio quality and compliance with worldwide loudness standards.

Jutel Oy **N5719**
Intro: Jutel RadioMan Access — JUTEL RadioMan ACCESS, is a game-changing cloud-based radio automation platform that makes workflow management of radio broadcasting straightforward and cost-effective. RadioMan ACCESS helps broadcasters to take a leap in ROI and lower the total cost of ownership.

JVCKenwood USA Corp. **C4315**

Kathrein **C1919**

KenCast Inc. **SU6702**

Killer Tracks **SL7616**

Kintronic Laboratories Inc. **N5627**
Intro: FM Dummy Load, with 5 to 80 kW power rating; dry, forced-air cooled or dry, convection-cooled; all loads handle Peak Envelope Power (PEP) of up to twice the average power rating; Frequency: DC - 110 MHz, VSWR: Less than 1.15:1; 50 ohm input; 7/8, 1-5/8 or 3-1/8 EIA flange input dependent on power level.

Established Products: AM Weatherproof Multiplex Unit; FM Combiner; FM Translator Isocoupler; Isocoil; Weatherproof Rack; AM Dummy Load; PowerAIM 150; LAB4.50 and LAB9.50 Automatic Dehydrator

K-Tek **C7934**
Intro: K Airo is a line of audio tools for content creators who require quality, affordable audio sound for video. The Airo line includes a telescopic boom pole, shock mount, fuzzy windscreen, boom holder, cables, mixer and travel bags, etc. priced to suit entry-level users and students.

Lawo **N2813**
Intro: Ruby Radio Mixing Console — Intuitive, uncluttered and powerful, Ruby is designed for today's radio. Flawless AES67 networking with Ravenna. A sleek, refined control surface. A 1RU mixing engine with tons of I/O and DSP, standard. AutoMix smart mixing. And a customizable, context-sensitive touchscreen GUI. Ruby is the AoIP console you've been waiting for. Also: Power Core Audio Mixing Platform — Power Core: the incredibly powerful mixing and audio intake platform from Lawo. 384 channels of standard I/O, plus 8 expansion slots. AES67 and MAD1 built-in. Dual-redundant networking and power. Up to 1920 x 1920 routing crosspoints, with up to 96 DSP channels and 80 summing buses. All in just 1RU. Also: VisTool 5.0 — VisTool builds powerful custom GUIs for your studios and MCR. The drag-and-drop screen builder can create mixing console controls screens, status & meter displays, routing matrices and more — all with context-sensitive touchscreen controls. Even include HTML5 windows to control studio peripherals or display interactive Web content.

Lectrosonics Inc. **C5414**

Libsyn **SU6115PP**

Logitek Electronic Systems **C1633**
Intro: JetLink — This new line of remote audio products enables sending and receiving of broadcast quality audio from PC to PC. Using a high-bitrate Opus software codec, JetLink has been proven to keep a solid, low-latency connection on corporate LAN connections, DSL lines, WiFi and 4G LTE connections.

Established Products: Helix Radio audio console, Helix Studio virtual console, Pilot console, JetStream Plus high-density AoIP engine, JetStream Mini high-density AoIP engine

Magnum Towers Inc. **C1113**

Marantz Professional **C547**

Marketron Broadcast Solutions Inc.
Encore Salon C, Encore Salon D

Masterclock Inc. **N3413**

Microsoft Corp. **SL6716**

Moseley Associates **N7119**
Established Products: Moseley is the world's largest manufacturer of digital studio-transmitter links for radio and television program transport. Moseley audio contribution/distribution (STL/TSL) microwave links operate in all worldwide STL bands and

Moseley IP and T1/E1 links support terrestrial transmission. Moseley has more than 15,000 microwave systems in service in 120 countries.

multiCAM Systems **N6514**
Intro: multiCAM ARES Interactive Media Integration — multiCAM Systems adds two-way interactivity to its integrated video production systems for TV and visual radio with the ARES Interactive Media platform. The integration visualizes interactivity and participation with audiences from live on-air Q&A sessions to online contests, polls, news contributions and more. Also: IP Box is a flexible interface that can receive up eight IP or NDI video streams directly from the LAN. It supports a much greater

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number of cameras than enabled through SDI capture cards, with a PoE switch/injector supporting all power, video streams and PTZ camera control over the network. Also: mCam is a hybrid 1080p camera that allows customers planning a transition to IP to first take advantage of existing SDI infrastructure. To expedite delivery and integration times, mCam cameras are automatically flashed with the appropriate firmware before shipping.

Museum of Broadcast Technology LN2



MusicMaster N6521

Intro: MusicMaster Professional Edition — New Version 7 features include Scheduling Calendar showing all aspects of log preparation and delivery. Ready Check verifies that a log is ready for air based on criteria. Merge Songs tool allows song copies to be combined without losing history or other data. Live365 connector simplifies setup for Live365 broadcasters. Also: MusicMaster Client-Server — MusicMaster Client-Server is our top-tier offering for large broadcasters. Manage all data and processing in a centralized location. New permission system makes set up and management of user roles easier. Schedule sharing between stations now takes special programming into account. Added

additional compliance reporting for international licensing organizations. Also: MusicMaster Nexus Integration — MusicMaster's Nexus API allows real-time integration between MusicMaster and third-party software systems, including the worldwide leaders in Automation. New features can push song and schedule changes to external systems automatically. Demonstrations can be seen at the MusicMaster booth and at many of our partnering system locations.

Established Products: MusicMaster Client-Server, MusicMaster Pro, MusicMaster Nexus Interface with Automation Systems

Mr. Shane Finch, VP Business Relations
 8330 LBJ Freeway Suite B1050
 Dallas, Texas 75243 / United States
 469-717-0100

Email: shane@musicmaster.com

Website: www.MusicMaster.com

MYAT Inc. C1916

Intro: Coax Switches — Available in 7/16 DIN, 7/8, 1 5/8 and 3 1/8. motorized. Also: SpectralLine — Broadband rigid coax transmission line systems in sizes 4-50, 6-50, 6-75, 7-75 and 8-75.

Established Products: Rigid coax line and related components

Myers N3711

Intro: ProTrack is a comprehensive broadcast management system for broadcast networks, affiliates and independent media companies.

NAB Public Service LNU2

National Association of Tower Erectors C6448

Nautel N6031

Featured: Nautel offers the broadest portfolio of digital/analog solid-state radio transmitters including 1–2000 kW AM/MW and 300 W to 88 kW FM systems. More than 15,000 Nautel transmitters are deployed in 177 countries. Nautel transmitters offer comprehensive monitoring and control instrumentation via touch screen or web, outstanding reliability, compact footprints, high efficiency, easy maintenance and 24/7 support.

NETIA N6514

Neutrik USA Inc. C8721

NewBay C7046

Featured: Parent company of Radio World, TV Technology, Broadcasting & Cable and many other familiar brands.

NextRadio Wynn Salon L

NPR Satellite Services SU2821

NUGEN Audio SL8230

O.C. White N4206

Intro: Mic-Lite On Air Indicator Light — Available factory installed or as a retrofit to existing O.C.

White mic booms. Let everyone in the room know if you are mic-live or mic-standby. Dimming control (#13800) is also available to adjust LED intensity, to keep everyone between drive-time and overnight staff happy with the same solution.

Octopus Newsroom SL7627

OMB Sistemas Electronicos S.A. N5314

Featured: FM transmitters from the latest high efficiency technology.

Omnia Audio N6531

See The Telos Alliance

Omnirax Furniture Co. N5611

Featured: Innova custom and Phoenix production studio furniture, plus WeDesk office furniture

OMT Technologies Inc. N6819

Intro: iMediaLogger 6 — North America's #1 audio logger continues to get better. Now available with features such as delayed playback and the addition of a new module called Player. The Player has a 24-hour waveform display that you can scroll through and export audio cuts. Also: iMediaTraffic is an advanced and flexible solution for advertising, scheduling and management, suitable for small and large radio groups. Automatic insertion of spots in playlists and integrated with the iMediaTouch Enterprise radio automation. Also: iMediaSales is fully integrated with iMediaTraffic, to streamline Booking and Billing operations. This cloud-based



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 air gap or oil-filled (up to and >300kV; >10kVA)
- **Isolated Data Opto-coupler (DataPort)**



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solution offers real-time access and management, with a range of planning, management, billing and reporting options. CRM 360-degree view of your complete sales, cycle and campaign management. Also: WinMedia Visual Radio is a combination of automatic camera switching, video playlist following the radio playlist with graphic overlays in real time.

On Air Mic Flags **C2662**

Orban Labs Inc. **N2024**

Intro: Orban openGear 2.0/5.1 puts Orban processing for radio, TV & streaming into industry standard openGear format. It includes all Orban standalone processing technologies along with iMix Surround headphone and sixth generation upmixer, downmixer, mono2stereo and 1770 loudness. Supports 3G-HD-SDI, HD-SDI, Dolby E/AC-3/4, MPEG-H, Dante/AES67 AoIP and standard AES audio. Also: Opticloud is a cloud-based processing environment for TV, radio and streaming. Based on Orban processing technology, Opticloud offers an X86 based solution for virtually any audio processing needs. With up to 64 processing instances per server, it offers high-density, low-latency, Orban processing for cloud-based users. Also: Orban XPN-AM AM Processor is next generation of AM processor, to address the noise floor of the AM band. It generates 3 dB to 5 dB more apparent loudness with upwards of 8 dB lower distortion. It provides more density and has a user-defined bandwidth to maximize signal to noise. Also: DaySequerra TimeLock — The third time is a charm. After years of head banging, hair pulling and unhappy customers, we finally got all of the bugs nuked and it's 100 percent reliable. We know, we have told this story before, so we are offering a "no questions asked money back guarantee."

Orbital Media Networks **N6812**

OWC (Other World Computing) **C3647**

Intro: Envoy Pro EX Thunderbolt 3 — one of the first external storage solutions to integrate Thunderbolt 3 connectivity, making the aesthetically sleek enclosure faster and more powerful.

Padcaster **C7749**

Paravel Systems **N6811**

Featured: The WallTime NTP Clock and Notification System from Paravel Systems combines several essential services for your studio into one streamlined product. WallTime eliminates the need for an expensive synchronized studio clock system and for a dedicated studio notification device. WallTime has two display modes: A large

Analog Clock display with widgets and a full-screen notification status and alert monitor. GPI triggers can be received from Livewire, WheatNet and Modbus GPIO devices.

Pelican Products Inc. **C3627**

PILOT **N2037FP**

Plura Broadcast Inc. **N1516**

Prime Focus Technologies **SL9605**

Intro: CLEAR Inside NLE (Non-Linear Edit) — CLEAR now enables users to perform high-resolution Quality Control operations, like data entry and playback, on an Adobe Premiere Pro timeline. Users will be able to view all manual and auto-QC faults on one system, and perform fault reviews and content segmentation efficiently.

Propagation Systems Inc. (PSI) **C1731**

Quantum **SL8511**

Radio Active Designs **C1539**

Established Products: Radio Active Design's UV-1G wireless intercom system features body packs that operate in the VHF band, freeing up valuable space for wireless systems that require limited UHF bandwidth. Plus, the systems provide exceptional audio level at the headphone ensuring users are heard no matter how loud the venue. New scene change presets allow every pack to tune across multiple base stations for up to 20 wired intercom channels and 40 independent talk paths. Users can easily change belt pack parameters

Radio Design Labs **C5046**

Radio Frequency Systems **C1913**

Radio World **C7046**

Featured: Radio World is the news source for radio managers and engineers. For more than four decades, it has been your reliable and forward-looking friend as you build your technology-oriented radio and new media career path. Now featuring the best content from sister publication Radio magazine, including contributions from Doug Irwin, Jeremy Ruck, Chris Wygal and others.

RadioDNS **N6021**

RadioMax **N2633SUL-A**

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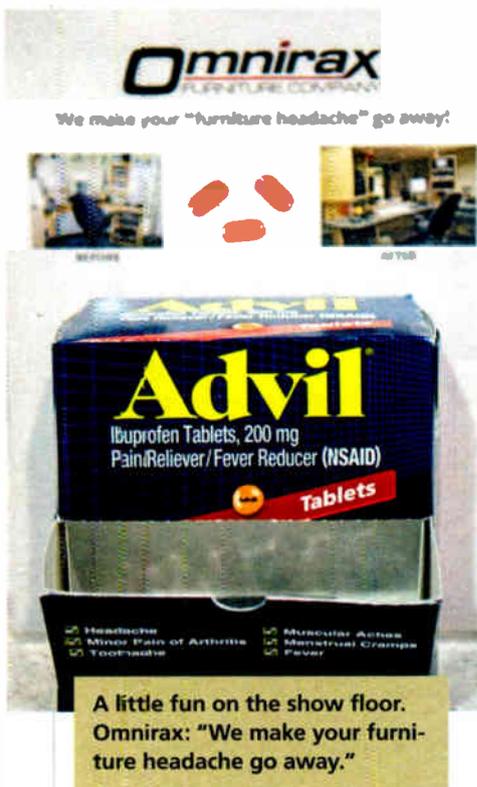
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Photo by Jim Peck

improved universal audio streams, MPEG-TS and HLS capture; simultaneous display and export of multiple DVB subtitle language; improved Metadata support; new Podcaster with full SML 5.5 support for audio and video; full DVB Teletext support.

StreamGuys **N3824 (with ENCO)**

Intro: SGrecast 2.0 cloud-based live stream repurposing system enables radio broadcasters to record their live streams and transform them into revenue-expanding side channels and podcasts. Enhancements in version 2.0 include AudioLoggers for on-the-fly repurposing during 24/7 recording, side channel workflow improvements, embeddable content players, and granular user roles and permissions.

StreamS-Modulation Index Westgate Executive Suite A

Switchcraft Inc. C5343

SWR, LP C1126

TASCAM SL3016

TBC Consoles C9012

Tektronix Inc. SU5006

Telos Systems

See *The Telos Alliance*

The Telos Alliance **N6531**

New: A reimagining of broadcast communications technology, Telos Systems Infinity IP Intercom is more than talkback. It converges voice communication and contribution audio on a single IT backbone employing the latest standards-based VoIP and AoIP transport to provide dedicated features and functionality without compromise. Also: Axia Fusion Console modular system features capabilities refined from a decade of AoIP experience:

Four Program and four Auxiliary mixing buses, voice dynamics and EQ, automatic mix-minus, integrated IFB/Talkback. Virtual Mixer technology, with 16 five-channel VMixers, extends mixing capacity. Anodized metal surfaces feature rub-proof laser-etched markings and high-resolution OLED displays. Omnia.7 — Premium features, spectacular performance, surprisingly low price. Exclusive "Undo" Technology re-creates peaks lost in poorly mastered tracks. Psychoacoustic Controlled Distortion Masking Clipper removes virtually all distortion detectable by human ear. Also: Omnia Toolbox with built-in Oscilloscopes, RTAs, and FFTs. Available with HD, Streaming Processing/Encoding, RDS options. Also: Telos Systems VX and Prime VoIP Talkshow System; 25-Seven Voltair Watermark Monitor and Processor; Axia IP-Tablet Virtual Radio Software, Axia Pathfinder Pro Core Routing Control Appliance, Axia iQ Radio Console. Omnia.11 with G-Force Broadcast Audio Processor, Omnia VOLT Broadcast Audio Processor. Telos HX1 & HX2 Digital Phone Hybrids

The Telos Alliance TV Solutions Group SU2321

Thermo Bond Buildings LLC N6828

Thimeo Audio Technology B.V. **N5027**

Intro: Stereo Tool 8.60 gives you superb sound on FM, AM, digital radio and television. It makes you the loudest and cleanest, without causing listener fatigue. Its innovative features make your audio shine, even with poor quality source material. Also: Thimeo WatchCat 1.2.0 — Apply the full power of Stereo Tool on files. Thimeo WatchCat monitors multiple folders and processes and normalizes all the audio and video files that appear there. Scripting is available to perform custom actions, such as automatically uploading files.

Thinklogical, A Belden Brand SL6328

Tieline Technology **N6506**

Intro: Reimagine wireless remote broadcasts with the VIA Remote Audio Codec. Connect using dual Ethernet ports, dual USB modems or optional LTE module; or use built-in Wi-Fi and stream using a cell-phone Wi-Fi hotspot, or hotels and other Wi-Fi access points. Includes SmartStream PLUS and Fuse-IP. Optional POTS or ISDN modules available. Also: Genie Distribution delivers multipoint audio distribution solutions including six channels point-to-point, three x bidirectional stereo or six x bidirectional mono, multicasting and multi-unicasting. Supports six simultaneous SIP connections. Optional ISDN and POTS modules, dual Gigabit LAN ports, dual internal power supplies, IPv4/v6, 24-bit 96 kHz sampling, plus SmartStream PLUS and Fuse-IP. Also: Save on hardware costs with Merlin PLUS. Create two bidirectional mono or stereo remotes, each with separate bidirectional IFB channels, or create six independent bidirectional mono connections with IP codecs or smartphones using Report-IT. Supports six simultaneous SIP connections. Optional ISDN and POTS modules allow IP, ISDN and POTS remotes. Also: Bridge-IT XTRA Rack Mount IP Codec; Report-IT Enterprise.

TMO SL5329

Intro: Fidelity is a ready-to-rack 1RU server creating frame-accurate video for viewing in any web browser after the recording starts. Supported as standard is

the indexing of timed text for rapid searching across spoken words and 24/7 recordings, using the latest technology trends MPEG-DASH and HTML 5.

TWR Lighting Inc. C546

VocalBooth.com Inc. SL11109

VSN SL8006



V-Soft Communications **N6824**

Intro: NLCD Land Cover High-Resolution Database — Now, for the first time V-Soft Communications offers a 30 meter resolution land-cover database to be used with V-Soft programs for highly accurate propagation analysis. Also: Probe 4 Version 4.92 — Updated propagation prediction program for predicting coverage and interference for radio and television and communication transmissions. Probe 4 produces stunning, atlas-quality, maps for TV and FM. Integrates high resolution terrain and population databases with state-of-the-art polygon-mapping. Winner: Radio World "Cool Stuff" award. Also: FMCommander 6.3.168 upgrade provides essential allocations data and mapping to establish, move or upgrade an FM station, translator, booster or LPFM station and to expertly design directional antenna patterns. Incorporates, atlas-quality, mapping for coverage and interference analysis. Accesses the FCC FM, AM, census, terrain, towers, airports and other databases. Also: Microwave-Pro 2 is our top-of-the-line, NSMA, microwave allocations and radio path analysis program, for broadcast auxiliary services, Part 101, COALS and CARS projects. We have recently added bi-directional channel analysis and polygon mapping. Microwave Pro produces PCN mailing lists for notification to other microwave users.

Established Products: AM-Pro 2, Conductivity, XField, PlotPath, RF Hazard, Pattern Workshop, InterMod, V-Tower, WatchDog, FCC databases

Mr. John Gray, VP Research

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Fax: 319-432-7275

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Website: www.v-soft.com

Wheatstone Corp. N6806

Intro: Wheatstone will introduce the PR&E EMX-IP Audio Console, a networked control surface with augmented feature set, designed to complement its previously introduced DMX console. Available with 16, 24 and 32 faders, the EMX has full dynamics/EQ on all channels, with full color OLED displays next to each fader. Also: New digital audio signal processor, a whole new ballgame for broadcast audio, in one new top-of-the-line box. Combines phase linear FM+HD dual-path processing, FM peak limiting, HD

time alignment, off-air FMHD receiver, dedicated digital rating insert point, advanced RDS encoding — in short, everything we've learned through the years about digital signal processing. Also: A new Audioarts analog mixing console, a basic straight analog audio mixer aimed at smaller markets and studios, whose operators still require professional broadcast features, full-sized controls and a layout designed for live radio and content.

Established Products: Digital audio processing equipment, software for customized control and monitoring of extended network systems, and established product lines including Audioarts consoles, LX and LXE networked consoles, new AirAura signal processing and the latest VoxPro7 audio editing hardware and software.

Whirlwind C6049

WhisperRoom Inc. SL11113

WideOrbit N5531

Intro: Designed for station groups using WideOrbit for traffic management, WO Analytics Cloud delivers business intelligence insights from traffic data that can help any station improve revenue and eliminate costs, without selling a single additional ad.

Established Products: WO Traffic, WO Automation for Radio, WO Programmatic Radio, WO Streaming, WO Programmatic Digital Audio, WO On Demand, WO Analytics, WO Media Sales

Will-Burt Company, The C1205

Win-OMT Software N6819

Intro: iMediaLogger 6 — North America's #1 audio logger continues to get better. iMediaLogger 6 is available with new features such as delayed playback and the addition of a new module called Player. The Player has a 24-hour waveform display that you can scroll through and export audio cuts easily. Also: iMediaTraffic is an advanced and flexible solution for advertising scheduling and management, suitable for small and large radio groups. Automatic insertion of spots in playlists and fully integrated with the iMediaTouch Enterprise radio automation. Also: iMediaSales is integrated with iMediaTraffic to streamline booking and billing operations. This cloud based solution offers real-time access and management, with a range of planning, management, billing and reporting options. CRM 360-degree view of your complete sales, cycle and campaign management. Also: WinMedia Visual Radio is a combination of automatic camera switching, video playlist following the radio playlist with graphic overlays in real time. WinMedia pushes the limits of media convergence by enabling talents to control video playlists directly. This powerful module allows broadcasters to grow their audience on digital and video platforms,

WireCAO N3821

Wohler Technologies Inc. N3424

WorldCast Connect N7111

Intro: WorldCast Manager centralizes and unifies the monitoring and management of broadcast equipment across multiple sites. Its powerful auto-discovery engine ensures fast deployment while guaranteeing scalability. Notifications, assignments and visual reports are presented via a simple and

comprehensive user interface allowing proactive decision-making and action at all levels of the organization.

Worldcast Systems

N7111
Intro: New options on Solar FM include wind power and an energy pack with additional battery to optimize operation time. The wind turbine can be used in conjunction with or as replacement for its solar panels. This versatile system can be customized according to your energy, audio, operational needs. Also: WorldCast Manager centralizes and unifies monitoring and management of broadcast equipment across multiple sites. Its powerful auto-discovery engine ensures fast deployment while guaranteeing scalability. Notifications, assignments and visual reports are presented via a simple, comprehensive user interface. Also: Ecreso's compact transmitter range is more powerful with the launch of Ecreso FM 3 kW. This addition not only increases power, it includes built-in redundancy, hot-swappable power supplies, planar design, highest efficiency. The range features digital modulator, built-in five-band sound processor, built-in RDS encoder and more. Also: Mobile SureStreamer brings the benefits of redundant-streaming technology SureStream to remotes. It works in conjunction with hardware and software IP codecs to enable rock-solid remote broadcasts over 3G/4G networks. The system can be pre-configured for use by non-technical personnel in the field.

XPERI/HD Radio/DTS N5924, Wynn Salon C

Xytech Systems

SL4305
Intro: Dash is new cloud-based software derived from company's flagship MediaPulse. The subscription-based software takes just three days to install and enables small- to mid-sized video departments, and post-production operations the ability to leverage Xytech's world-class workflow capabilities. Dash offers no-compromise security in the Microsoft Azure Managed Cloud.

Yamaha Professional Audio

C1725
Yellowtec **N5015**
Intro: Now it is possible to use Yellowtec's Intellimix Desktop Mixer as a fully loaded 8-channel mixer. Use it to simultaneously mix not only four but up to eight channels with the use of one single Intellimix unit. The assigned eight sources will be displayed in two layers. Also: Intellimix Desktop Mixer & b-line Phone System — By combining Intellimix with Yellowtec's b-line Digital Hybrid and Phone System you are now able to control telco and control lines directly via the Intellimix' Desktop Unit's touchscreen. All incoming calls are indicated by the touchscreen buttons Drop, Pretalk, Hold and On-Air alternating in their active and passive colors. Also: The new major PUC2 Mic LEA firmware update refines the LEA Level Engine's real-time audio processing performance, especially at higher sample rates. The improved ControlApp makes adjustments of the volume knob immediately visible within the app now. The reinitialization after adjusting presets and sample rate takes place faster now.

Zoom North America

C549
Intro: H1n — Creators everywhere are using Zoom Handy Recorders to capture sound and sample audio like never before. The new H1n is the ultimate take-anywhere recorder for every creator's gear bag. Also: F1-LP — The Zoom F1 Field Recorder + Lavalier Mic is the perfect solution for videographers who need to capture the nuance of every word with professional quality audio. Also:

F1-SP — The Zoom F1 Field Recorder + Shotgun Mic is the ultimate solution for run-and-gun filmmakers who need to capture professional quality audio for video. Also: With the LiveTrak L12, you can finally mix, record, and monitor with a single piece of gear. It's the only digital console that lets you mix your live performance and record up to 12 discrete channels — all while providing five individual custom headphone mixes.

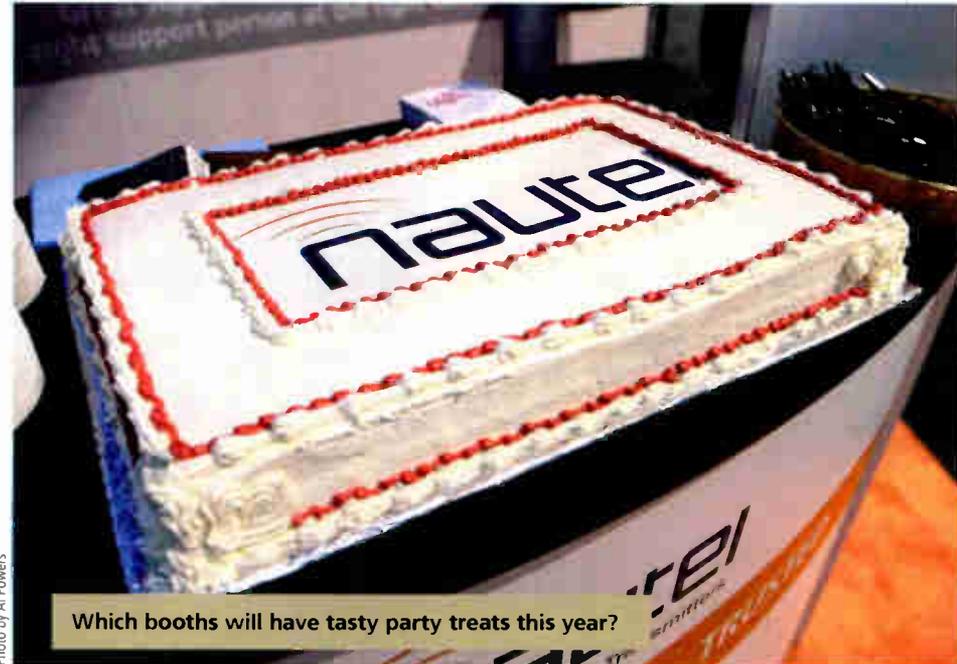


Photo by Al Powers

Which booths will have tasty party treats this year?

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Radio Brands Making Brands

Two case studies: Using your station to launch an online business

21ST CENTURY PD

by Dave Beasing

Pity the poor general managers. They have to increase revenue every year, usually with mature radio brands. Events and concerts can only do so much. After some good ratings, they may be able to drive spot rates higher. But what they really need is more inventory to sell.

In this edition of 21st Century PD, we examine two small-market radio clusters that are creating revenue with new online media sites. These aren't brand extensions, but totally new brands created, as they say, "out of whole cloth" — or in this case, out of the power of local radio.

CASE STUDY NO. 1: CLARKSVILLENOW.COM

Meet Katie Gambill, president/general manager of Saga Communications' radio cluster in Clarksville, Tenn., a market of 200,000 that's about an hour northwest of Nashville, Tenn.

That's just far enough and big enough to feel separate from Music City. "Local" TV is from Nashville, though, and Clarksville's local newspaper is part



Katie Gambill

of the centrally-operated "USA Today Network" — but (Katie is too nice to say this) sometimes it doesn't feel that local.

Seizing the opportunity to operate a local online news source, *ClarksvilleNow.com* was born on April 1, 2010. It's the third-highest billing property in what is now an eight-brand media cluster, delivering over 2 million pageviews per month.

If you tour the site, you might learn that some houses and cars were vandalized, that nearby Fort Campbell will text an emergency test alert tomorrow, and that a local high school is headed to the state basketball tournament. What you won't see — without close examination — is a website that's owned by a radio company.

"It's important for ClarksvilleNow to be its own brand in order to have news credibility. It's a partner to the stations, not a vehicle to promote them," says Gambill.

Instead, the stations and the site find more organic ways to refer to each other. Drivetime news originates from the "ClarksvilleNow newsroom," for example.

ClarksvilleNow has been known to run stories about its sister stations' events. But Gambill says, "We don't just post radio logos."

Gambill cites two things to keep in mind if you're considering an online startup:

1. It's a commitment. In their case, local news is "24/7. If a tornado happens on Saturday night at 9:30, you're working," she says.
2. There has to be a need. "You have to figure out what is missing in the community and fill that void."

CASE STUDY NO. 2: BACKYARBEND.COM

In beautiful central Oregon, along the eastern edge of the Cascades, Bend Radio Group Owner Jim Gross was



ClarksvilleNow.com



BackyardBend

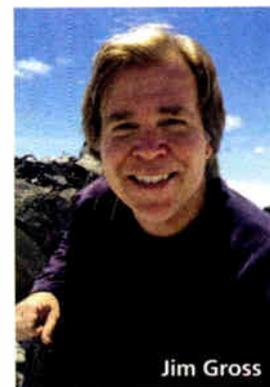
shown his own opportunity in September of 2014 by his son Charlie, 19 years old at the time.

Charlie sent his dad a video on his phone of some friends doing ski jumps on the nearby Three Sisters peaks. Jim asked, "When was this taken, last spring?" "No, Dad, they hiked up, shot this video, edited and sent it during their walk back down. Right now!"

If you've spent time at an outdoor sports area like Bend lately, you've probably noticed that younger skiers, snowboarders and surfers love to share their photos and videos with friends via text and social media.

Gross got to thinking — "What if we give them a larger stage?" After all, the locals may have to work to pay the bills, but they're always curious about what's happening outside at that very moment.

Working with Steven Wood, a developer friend in southern California, Gross built *BackyardBend.com*, where you'll find lots of "UGC" (user generated content), plus weather and lift con-



Jim Gross

ditions, and things to do indoors, too.

Turn on your phone's geo-tagging, take a picture or video and post it on Instagram or Twitter with the hashtag "#BackyardBend," and the site instantly places it on a map, showing where it was taken and when. So far, there've been over 25,000 posts from 15,000 users, and having invested the time and money to develop the technology, Gross is looking to partner with other radio groups in resort communities.

Bend Radio Group Operations Manager Mike Flanagan directs his DJs to refer to BackyardBend's content on-air, and BackyardBend helps promote their concerts and events. But Flanagan says the cross-promotion is subtle.

"BackyardBend is cool because it's so relevant to the lifestyle of our listeners. Our stations benefit more if they simply show that they're relevant, too, that they

deserve to be on BackyardBend."

Gross thinks digital content is a huge untapped opportunity for radio, "but it isn't about 'following' or 'liking'. Our DJs aren't Kardashians, so who cares? Who wants to be friends with people who only talk about themselves? Our motto is 'Community Inspired,' and we think that's what digital should

be — a place to share your own real life moments."

As for the constant need to grow revenue, if we're in the "radio" business, commercial inventory will always be limited. If, instead, we're in the business of providing compelling local content — on any medium — the possibilities are endless.

As a veteran radio programmer and consultant, Dave Beasing is known for pioneering new formats and marketing ideas. His latest venture, Fryman Canyon Studios in Los Angeles, specializes in audio that brands, podcasts for national advertisers.



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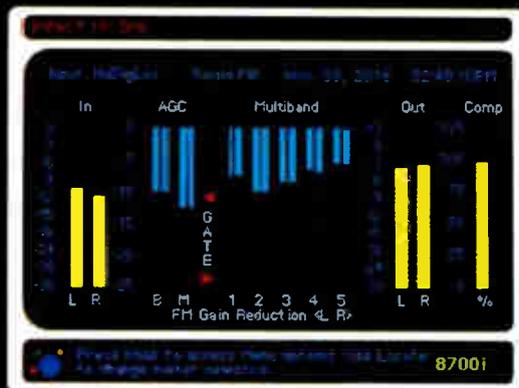
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GM JOURNAL



Coke, Pepsi or generic soda? If it's all the same to you, listeners and advertisers will notice.

noticed she was looking past me at my team in the living room. Then — holy cow! — we jumped out of our skins as she suddenly screamed in anger. In her line of sight on the kitchen table was, to my amazement, a bottle of Pepsi which had apparently been purchased during that little shopping trip earlier in the day.

While Coke had us finish the broadcast week, we were told that we'd be having a meeting back home to discuss the matter. In the end, we lost an upcoming \$50,000 ad buy and were not invited to the Olympics that summer.

In retrospect, I understand why Coke was so upset. They love and protect their brand and they trusted us. The best companies are extremely passionate about their brands. Deep down, we all know this because of how we feel about our own station brands.

THE SOURCE OF THE PROBLEM

Many people in radio simply do not invest enough energy in understanding our advertisers' brands, be they products or services. Instead of helping our clients grow their businesses, too often we air the spots, take the money and never ask one question about what we can do to enhance an advertiser's mission.

Be Passionate About Your Clients

They love their brands — they expect you to know and love them too

PROMO POWER

Mark Lapidus



You have no doubt heard stories about angry advertisers cancelling large ad buys due to radio staffers behaving inappropriately.

Perhaps you've wondered if they were really true. While I obviously can't testify to every tale, I can tell you that I have indeed witnessed insensitive and just plain stupid behavior by station

personnel that resulted in dire financial consequences.

I'd like to relate one story simply to set the tone. Then we'll explore establishing appropriate expectations with your staff, and to a lesser degree, with your clients, so that relationships remain profitable and happy.

CASE IN POINT

The setting: The incredibly beautiful French Alps, with perfect weather conditions for the Winter Olympics.

I was assisting with a broadcast back to the USA. Our station junket was exclusively sponsored and completely

paid for by Coca-Cola.

Coke had very generously covered the staff expenses and made all the arrangements, right down to securing tickets for us to see the best competitions.

After the third day, our station staff made what seemed to be an innocuous trip to a nearby convenience store to buy a few personal items. Around midnight, as we were lounging in our pajamas watching Olympics highlights, I heard a knock on the door and was surprised to see our Coke rep show up unannounced to discuss logistics and celebrity interviews for the next day.

While we were talking in the foyer, I

If you're not hearing about your top clients' goals at least once a year, how do you expect to maintain, let alone grow, their business?

A large part of this issue concerns relationships. When our sales people and their managers are tasked with an overwhelming number of clients, then everyone loses. Relationships take focus and time.

Relationships also require fairly sophisticated emotional intelligence, which is not easy to teach to inexperienced reps. You may wish to do some creative brainstorming with your most relationship-savvy sales reps on how best to get others to understand this mindset and take positive action.

Another common quandary in the client/station dynamic is not providing feedback about ads or promotions that we know will not perform well on radio.

How many times have you not said a word when a client broadcasts a bad offer? Ten or even 15 percent off anything rarely produces results. Customers do not hurry in "while supplies last." So

(continued on page 49)

<p>Studio Items Inc.</p> <p>Mic Booms On-Air Lights Speaker Mounts www.studioitems.com</p>	<p>TORPEY TIME <i>(The Good Time People)</i></p> <p>Clocks Up/Down Timers www.ram68.com</p>	<p>Dixon Systems</p> <p>News Mixers Line Matchers USB Audio Codecs www.ram68.com</p>	<p>RAM Systems</p> <p>Broadcast Furniture Systems Integration Sound Absorption Panels www.ram68.com</p>
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Where Will Radio's New Talent Come From?

True mentoring and apprenticeship programs can ensure the next generation of broadcasters

CONTINUING ED

BY DICK TAYLOR

I worked for 10 radio companies before becoming a college educator. My longest stretch at any one of those companies was 13 years.

I just retired as a broadcast professor after seven years at Western Kentucky University. It was on my "bucket list" to mentor the next generation of broadcasters in the area of radio sales, management and operations at a college. Mentoring others still remains my passion.

Lately, the thing that has most troubled me is the R.O.I. from a college degree in radio broadcasting. My degrees were not in broadcasting, but physics and education. I went to college to become a teacher. Radio broadcasting was what I did to earn money to go to college.

In 2018, can you afford to earn a college degree to be in radio?

Kiplinger recently published a story about the "Worst College Majors for Your Career 2016-2017" and told radio, TV and film production majors that "demand is low."

While tuitions for any degree at the same college are "created equal," the future salaries earned for different

degrees are not. The average salary for broadcasting in America is in mid \$30s, based on national averages. Starting salaries will most likely be half that.

Compare that to the national average for student loan debt in 2016, it's up 6 percent. The average college graduate enters the workforce today with over \$37,000 in student loan debt.

See the problem now?

THROWING IT BACK TO 1968

I started working in radio in 1968 shortly after taking and passing my FCC Third Class Radiotelephone Operator's License with Broadcast Endorsement while in the 10th grade in high school. I was paid the minimum wage.

In 1968, that minimum wage had the most buying power it has ever had in my lifetime. It has gone down every year since.

Over the past three decades, tuition at public four-year colleges has more than doubled, even after adjusting for inflation."

Anyone who says to me, "I paid for my own college education without going into debt when I was growing up — what's wrong with today's youth?" doesn't fully grasp the changes that have taken place since their youth.

Radio owners know you make your money when you buy a station — not when you sell it. In other words, you have to buy it right. That means you

can't start off "upside down." Student loan debt is upside down when it comes to having to earn a college degree to enter a career in radio broadcasting.

A RADIO APPRENTICESHIP PROGRAM

Radio has never been more important than it is in our internet-disrupted world.



Thinkstock/monkeybusinessimages

Listenship continues to be strong. Radio is the mass medium that delivers the largest weekly audience while also delivering affordable frequency for its advertisers. But where will new talent for our industry come from?

I believe the radio industry needs to take a leadership role and create an apprenticeship and certification program for high school students. Radio needs to take away the student loan debt

problem for entrance into our fabulous industry. I wrote more about this concept and why it's needed in a recent blog post called "Just in Time Learning" at: www.DickTaylorBlog.com.

I would like to lead just such an apprentice program.

If you are one of the future-thinking leaders in radio who believes the industry needs to begin earlier engaging future generations who want to be in

radio and who believes the radio industry would benefit from such an apprentice training and certification program for radio, please email me at Dick.Taylor@wku.edu.

Insanity is doing the same thing and expecting a different result. The time for change is now.

The time has come to change the way we attract, train and grow radio talent. Don't you agree?

(continued from page 48)

when we hear these or other non-starters, we need to state the obvious, otherwise subsequent advertisers will tell us that "radio doesn't work."

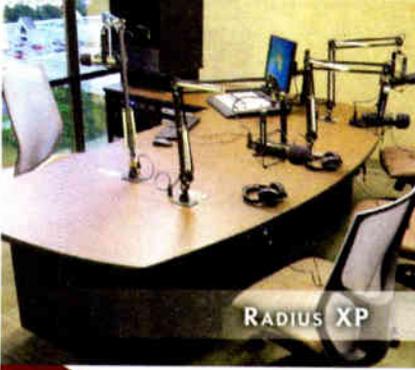
By extension, if remotes, games or contests are involved, you may wish to include your promotions person in the mix. He, too, will need to be in the mindset of what will truly work to serve clients' interests, not just those of your station.

When was the last time you did a customer needs analysis with your biggest advertisers? If you're not hearing about your top clients' goals at least once a year, how do you expect to maintain, let alone grow, their business? Take a moment to put yourself in your clients' shoes and consider the needs of those who truly pay our bills.

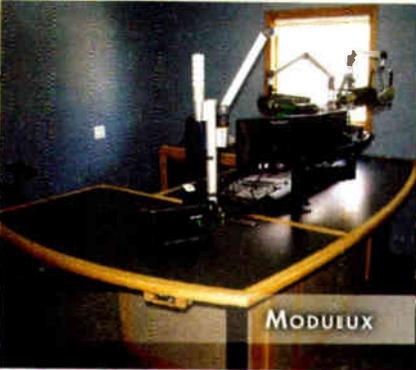
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Sennheiser's Handmic Digital Brings the Mic Back to iOS

Get quality sound into Apple's tablets and smartphones

PRODUCT EVALUATION

BY PAUL KAMINSKI

When Apple decided to delete the headphone/microphone jack from its popular iPhone, there was wailing and gnashing of teeth among professional users, because a professional microphone could no longer be connected to those devices to record audio. A separate microphone improves the quality of audio recordings made with any cellphone or tablet.

The end of using such devices in field acquisition? Maybe not.

Enter Sennheiser's Handmic Digital, based upon its Evolution series.

The company partnered with Apogee Digital to make the digital magic (16-/24-bit/44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz audio) by developing a mic and software

interface package. The cardioid pattern dynamic Handmic Digital offers an audio frequency response that company specifications describe as 40 Hz–16 kHz, with a noise level of -96 dBFS at minimum gain, and maximum sound pressure level of 124 dB at minimum gain.

CONNECTIONS

The Handmic Digital connects to iOS (iPhone and iPad) devices with a Lightning connector. It also connects to standard USB Type A connections. At an informal SBE Chapter 1 show and tell, I connected it directly to a dual-boot Windows 10 and Android tablet running the latest version of the Audacity audio editor through a USB port. The device immediately recognized the Handmic Digital and I was able to record a quick voice track.

Apogee Digital has two apps in its App Store or on the company's website (www.apogeedigital.com/apps) that work with the Handmic Digital. Apogee Maestro and Apogee MetaRecorder. However, any Core Audio-compatible app, video app or recording software

will work with the Handmic Digital. The device will work with any iOS device that runs Version 9 or later; any Mac OS running Version 10.7.5 or later; and any Windows device running Vista or higher.

The Handmic Digital has an advantage over other microphones in a news serum situation, where cellphone signals can wreak havoc with non-RF blocking XLR connected microphones. Since the signal is digitized, and passes through a Lightning, USB or USB/On-the-Go (OTG) cable connection, RF from a cellphone doesn't affect the signal.

SIZE

Sennheiser includes a USB 2.0 cable and Lightning cable (both about 2 meters/6.5 feet-long) with the Handmic Digital, along with a substantial table microphone stand and carrying case. The Handmic Digital weighs 340 grams/12 ounces, and is 180 mm/7 inches-long.

If you have an iOS device with a headphone jack, Sennheiser suggests you connect those phones before you connect the Handmic Digital to your device. Once it's connected and passing digitized audio to your device, you'll see a red tally light light up on the front of the microphone.

Of course, Android phone users (like

PRODUCT CAPSULE

SENNHEISER
Handmic Digital Microphone

Thumbs Up

- + No external power needed for dynamic mic
- + USB/Lightning connections resist RF from cellphones in close quarters interview situations
- + Quick recognition and connection with Windows OS

Thumbs Down

- Microphone weight may be a drawback for reporters who really want to reduce their gear
- Not for Android — yet

Price: \$259.95

Info: www.sennheiser.com



me) may ask, what about us? Nothing in the documentation mentioned connection to an Android device but I am told that Sennheiser is working on an Android version, possibly for summer delivery.

Paul Kaminski, CBT, is a longtime Radio World contributor and columnist and a semi-retired radio newsmen. Reach his Twitter page: [msrpk_com](https://twitter.com/msrpk_com), Facebook: [PKaminski2468](https://facebook.com/PKaminski2468)

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Simply Sound SS1 Gives Mics a Pick-Me-Up

SHORT TAKE

BY CURT YENGST, CSRE

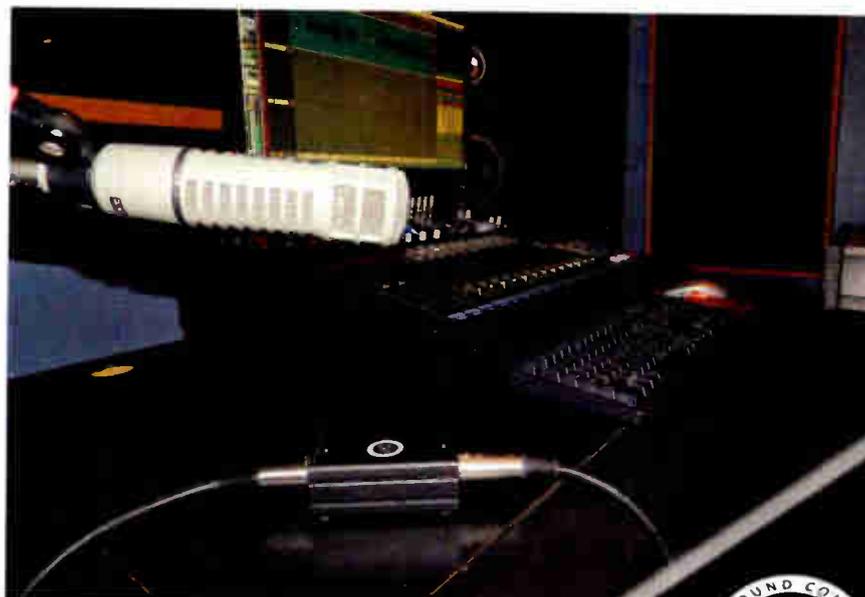
Jordan Jones, founder of The Simply Sound Co., describes his new venture as “a group of friends out of Salt Lake City who are avid musicians, recording and electrical engineers. Friends would always ask us how to get the same quality in their home studios without breaking the bank.”

Their inaugural offering, the SS1, is a compact mono microphone preamp with a fixed gain around +25–27 dB. It’s intended to give dynamic microphones, particularly ribbon mics, the added boost that preamps on some mixers or interfaces can’t deliver without losing headroom or increasing noise. The SS1 is phantom-powered, so there’s no need for an additional outlet or batteries. It does not pass phantom power to its mic input, so it’s safe for ribbon mics.

Jones told me, “The SS-1 is most commonly used on broadcast microphones like the Shure SM7B and Electro-Voice RE20 due to their low outputs.”

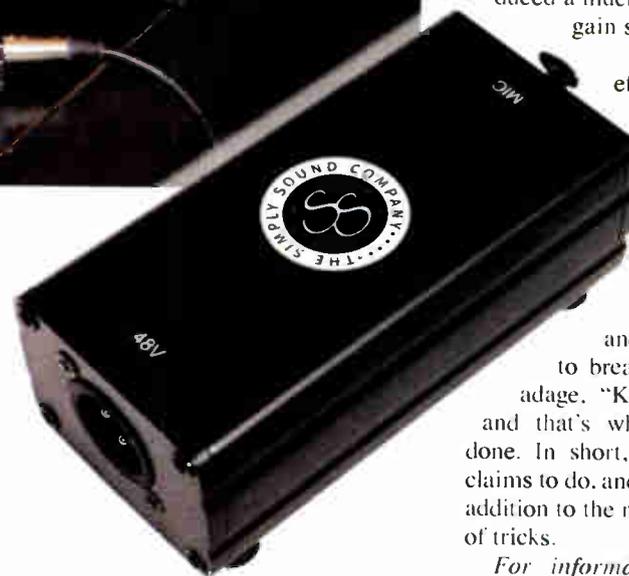
The controls couldn’t get any simpler. There aren’t any! Plug it into a phantom powered mic input, plug a mic into the other end, and you’re in business. As advertised, it delivers quite an increase in level, so make sure the input gain is down first.

I started with an MXL R40 ribbon



mic. Normally, when using this with the preamps on my digital console, I’m forced to almost max out the gain or compensate elsewhere for sufficient level. The SS1 was a big help here. I was able to get a good, hot level without overdriving, and still had ample headroom. It passed a very clean and clear signal. On the ubiquitous EV RE20, the results were impressive, partially owing to the RE20’s higher output.

Another advertised feature of the SS1 is that it brings out different tonal characteristics in some microphones. To my ears, the RE20 took on a sound more akin to a large diaphragm condenser,



without sounding overly bright. I didn’t feel the need to dial in more “air” in

the EQ. It was a nice complement to the mic’s proximity effect. There was one instance, plugging it into a Symetrix 528E, where the boost from the SS1 was almost too much. It didn’t take much to overdrive the input stage.

Next, I paired it with a Focusrite 2i2 USB buss-powered interface, fully expecting the 48V supply (which is generated from 5VDC, using some electronic sleight-of-hand) to buckle under the strain of actually having to power an amplifier circuit. The SS1 still did what it was supposed to do and produced a much cleaner signal at lower gain settings.

I thought it could benefit from a gain control of its own, perhaps a trim pot; or a quiet bypass switch, making A/B comparisons or removal from the signal chain easier. But, these would likely raise the cost and introduce more things to break. We’ve all heard the adage, “Keep it simple, stupid;” and that’s what Simply Sound has done. In short, the SS1 does what it claims to do, and at \$75, is an affordable addition to the recording engineer’s bag of tricks.

For information, contact Jordan Jones at The Simply Sound Co. in Utah at 1-801-448-7011 or visit www.simplysound.co.

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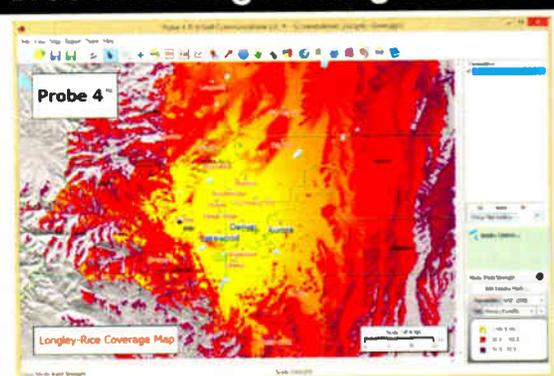


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WYBG 1050, Messina, NY, now off the air is selling: 250' tower w/building on 4 acres; collection of very old 78s dating back to 1904; 12' satellite dish on concrete base; prices drastically slashed or make offer. 315-287-1753 or 315-528-6040

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I'm looking for KFRC radio special of Elvis Presley which aired on January 8, 1978. I'd be willing to pay for a digital copy. Ron, 925-284-5428.

I'm looking for the Ed Brady radio show in which he did a tribute to Duke Ellington, the station was KNBR, I'd be willing to pay for a digital copy. Ron, 925-284-5428.

I'm looking for KTIM, AM, FM radio shows from 1971-1988. The stations were located in San Rafael, Ca. Ron, 925-284-5428.

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, KTAB, KDIA, KWBR, KSFX, KOBY, 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 18:02, also looking for SF Giants games and/or highlights from 1958-1978 also taped off KSFO Radio. Ron, 925-284-5428 or ronwtamm@yahoo.com.

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

Looking for KSFX radio shows, Disco 104 FM, 1975-1978. R Tamm, 925-284-5428.

Looking for KTIM FM radio shows from 1981-1984 if possible unscoped. R Tamm, 925-284-5428 or ronwtamm@yahoo.com.

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TRANSLATORS

Well-done piece ("AM Translators: What's Next?" ebook). Very open and without bias.

My concern is that moving AM aural service to FM — 2,035 translators assigned — seems a slimy kind of "AM revitalization." It's not a flat landscape for all AMers to obtain translators. While no one in the broadcast world appeared to like the views of Tom Wheeler, he brought up a point about not giving away free spectrum. Oddly, he seemed to be the only objector.

It's amusing when the FCC uses the phrase "serving the public." Commercial radio broadcasters are "for-profit" operations; with zero listeners and zero revenue, they have zero value and no way to continue. No subsidies, no handouts — just flat zero income; no one is going to fund them without ROI. So does addition of an FM translator to an AM band operator just continue the death by a thousand cuts?

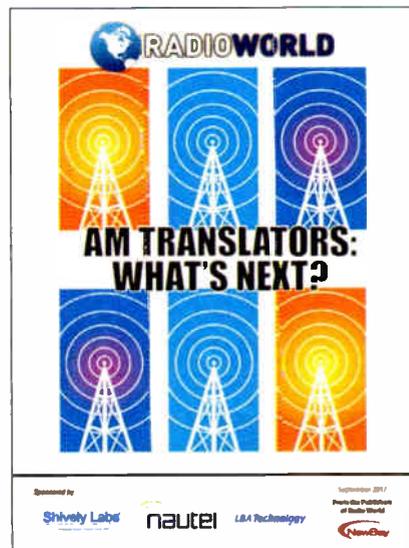
A translator is 250 watts today. I predict we'll hear complaints that their coverage is poor and they need more power. Once that door is opened, it won't be closed. Full-power operators need to watch for complaints and a possible power increase; 2,035 AM licensees can apply a lot of pressure to Congress.

One suggestion is to narrow deviation on the FM band, drop IBOC and repack the FM dial to make space; and clear off (shut down!) all signals under 10 kW from the AM band. Manmade noise is going to make AM reception increasingly difficult. I can't see expanded FM band or digital AM taking off; receiver migration would not happen.

Smartphones rule. Any change now is too late for consumers to adopt new receiver equipment. So the repack could be the only game in town.

Last I looked, more than 581 comments had been filed on the FCC website about AM revitalization. In my RV travels, I noted 115 AM channels; but sometimes at night you will be able to receive only four signals; in metro areas, that may rise to 12. AM night reception is a sea of noise with few listenable signals. A power increase is not the answer. It would become mutual annihilation. Comments printed out from the FCC AM Revitalization R&O would be the size of an urban telephone book!

James O'Neal has quoted Henry Bellow, one of the first Federal Radio Commission members, from 1927: "A broadcasting station is in many ways akin to a newspaper, but with this fundamental difference: There is no arbitrary limit to the number of different newspapers which may be



published, whereas there is a definite limit, and a very low one, to the number of broadcast station which can operate simultaneously within the entire length and breadth or our county. This limit has not only been reached; it has been far overpassed; the demand from every section of the country is to cut down the number of broadcasting stations in the interest of the listening public."

These words are from 90 years ago! All the FCC needs is a mirror for AM revitalization.

Warren Shulz
Retired broadcast engineer
Life member IEEE, SBE, AES

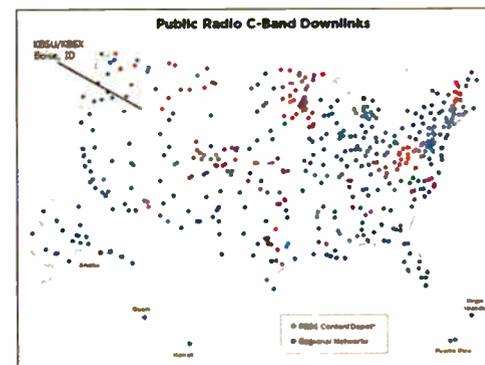
DOWNLINK MAP ERROR

I found your article ("Mid-band Spectrum Talk Worries Broadcasters," *RadioWorld.com*) a very interesting read.

But I note that our network, Boise State Public Radio in Boise, Idaho, is not indicated on the map. We have 18 stations, nine full-power and nine translators, a pretty big network. And most all of it is fed by our C-Band downlink in Boise, which isn't shown.

I have notified the PRSS folks about this error on their map.

Richard Strack, CSTE
Chief Engineer
Boise State Public Radio
Boise, Idaho



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