



RADIO WORLD

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DRM Digital Radio Comes of Age

Thanks to its adoption in India, the DRM broadcasting standard continues to advance

BY JAMES CARELESS

Public broadcaster All India Radio is operating 35 medium-wave (AM) and two shortwave radio transmitters using the Digital Radio Mondiale broadcasting standard, in an ambitious bid to roll out pristine digital radio service to the nation.

“Both of AIR’s shortwave transmitters are broadcasting in pure DRM mode,” said Yogendra Pal, former additional director general of AIR and head of the Indian chapter of the DRM Consortium, the global organization promoting the DRM standard.

“Out of 35 medium-wave transmitters, two are working in pure DRM carrying two audio services each in digital, and all the other 33 transmitters are working in simulcast mode. As of March 7, AIR has issued orders to operate 25 of the medium-wave DRM transmitters in pure DRM for one hour daily.”

AIR’s ultimate goal is to convert all of its medium-wave transmitters to DRM-only service. This will occur once the penetration of DRM receivers in India is sufficient to justify shutting down analog medium-wave transmissions. The original DRM30 data-based transmission standard works in the bands below 30 MHz. The newer DRM+ standard goes above 30 MHz and covers Bands I, II and III up to 240 MHz.

For the DRM Consortium — the members of which include many of the world’s major radio broadcasters and equipment manufacturers — India’s adoption of DRM justifies the group’s years of hard slogging. Although shortwave broadcasters such as the BBC, Radio France International and Vatican Radio are making limited DRM broadcasts to their audiences, AIR is the first major broadcaster to embrace DRM as an operational

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Ohio Digital Alerting System Is Active

OEAS Public AlertNet system upgrades the state’s “last-mile” EAS infrastructure

ALERTING

BY TOM VERNON

Ohio’s 12 public television stations recently collaborated to provide a major upgrade to the state’s EAS system. The project seeks to provide IP-based redundancy for the existing alerting architecture that distributes messages to radio stations, TV sta-

tions and government alerting sites — but without involving the “last-mile” internet.

The service became operational at the end of last year; it debuted by delivering non-broadcast, Common Alerting Protocol-based state and federal alerting messages — via data embedded in public TV broadcasts — to existing EAS decoders at 26

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Workbench: Helpful Instruments for More Efficient Troubleshooting

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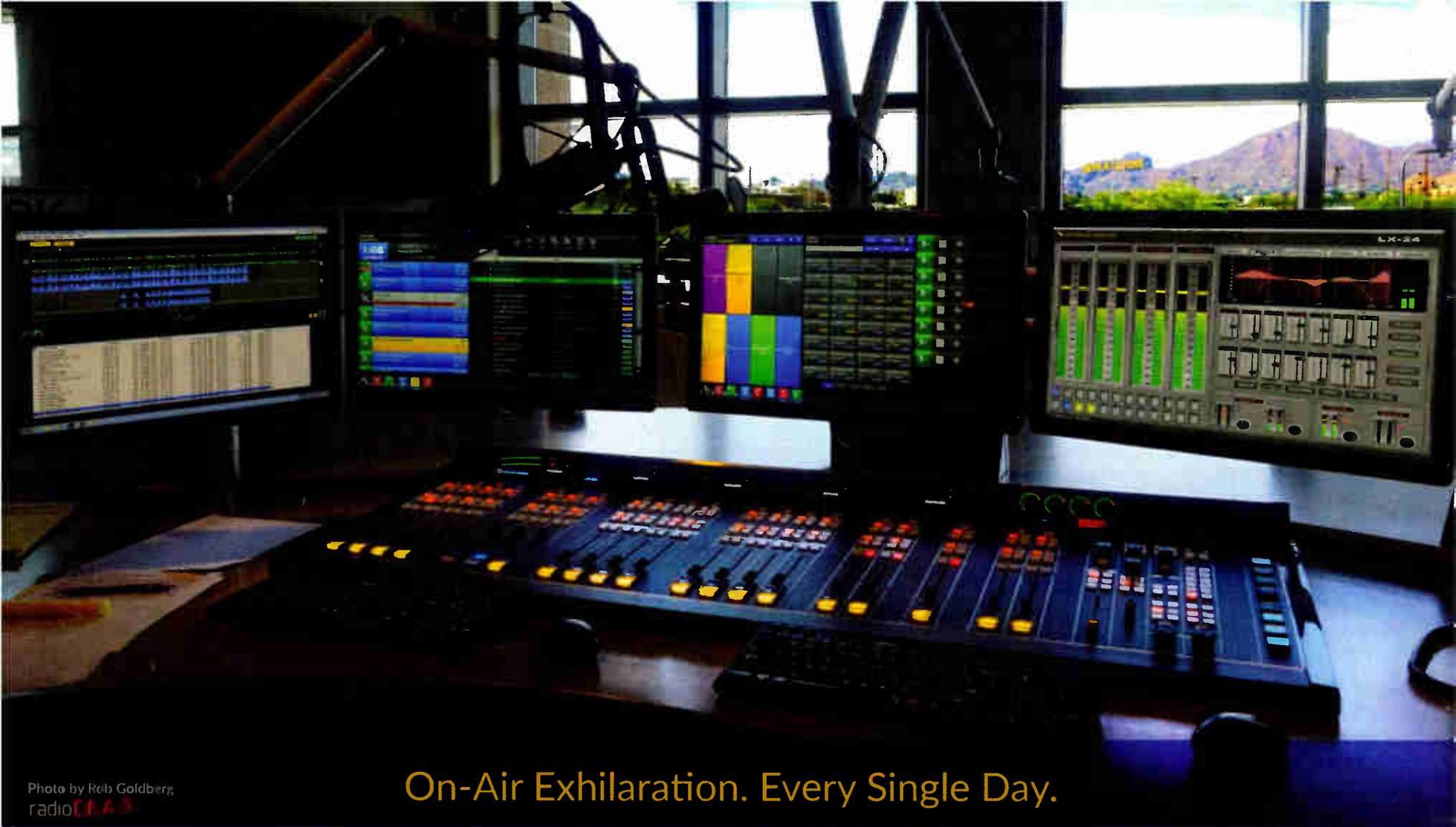


Photo by Rob Goldberg
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NAB Embarks on Cybersecurity Evangelism

Kelly Williams talks about available resources including the association's education program

RADIO IT MANAGEMENT



Kelly Williams is senior director, engineering and technology policy in the Technology Department of the National Association of Broadcasters; he served on the FCC's CSRIC working group mentioned below. This interview is part of the Radio World eBook "The Internet of Broadcast Things."

Radio World: What sorts of resources on cybersecurity are available from organizations like the Department of Homeland Security, NIST, FCC and NAB?

Kelly Williams: There are a number of resources and documents on the Department of Homeland Security's website, although they tend to be more global in scope. The top level for the federal government is the National Institute of Standards and Technology. They are charged with creating the standards for cyber security that all government agencies must adhere to, including the FCC. NIST has a number of reports and papers on its website under the Computer Security Resource Center.

The FCC responded to the NIST mandate by creating CSRIC, the Communications Security Reliability and Interoperability Council. Its mission is to provide recommendations to the FCC to ensure, among other things, optimal security and reliability of communications systems, including telecommunications, media and public safety. Its most recent recommendations are on the FCC's CSRIC IV website [see PDF at www.tinyurl.com/rw-csric4].

It is important to remember that the federal government considers broadcasters to be part of the critical infrastructure, owing to their ability to keep the public informed in event of emergencies.

For our part, the NAB has embarked on a cybersecurity evangelism and education program. There are two publications on our website, "The Essential Guide to Broadcasting Cybersecurity" and "35 Critical Cyber Security Activities All Broadcasters Should Know." The NAB has also created two webinars and two educational courses

about cybersecurity. [See www.nab.org/cybersecurity/broadcasterResources.asp.] Looking ahead, we are considering creation of a cybersecurity certification program.

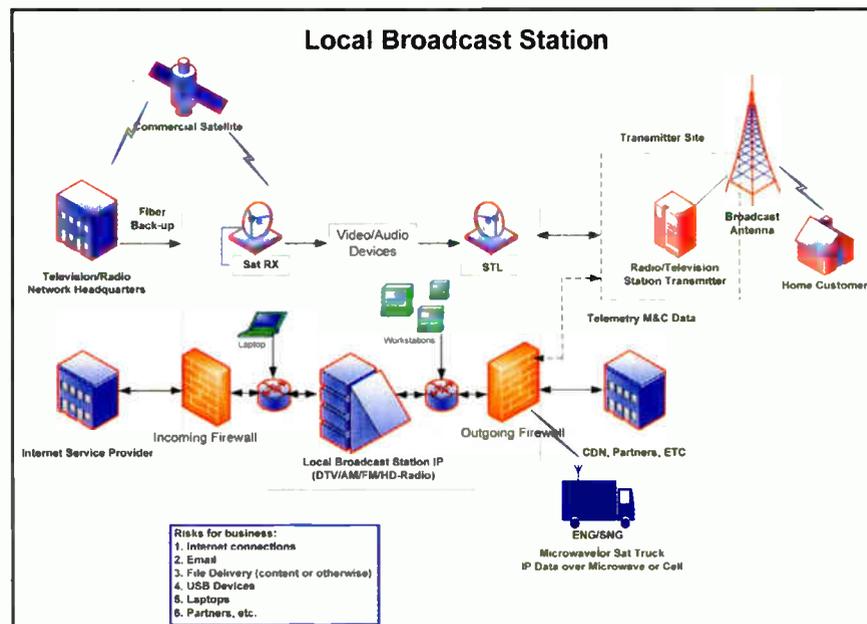
RW: How have strategies to protect organizations from cyber attacks

changed over the years?

Williams: It used to be done largely with checklists. When you completed everything on the list, your system could be considered secure. The problem with that was that hackers could use the very same checklists to figure out your soft spots.

NIST has developed a strategy called the Framework, where you determine your risk in five different categories.

(continued on page 10)



Shown is one of several broadcast ecosystem architectures depicted in the report "Cybersecurity Risk Management and Best Practices," produced by a working group of the Communications Security Reliability and Interoperability Council.

CHECK OUT THESE RESOURCES

The NIST publication "Framework for Improving Critical Infrastructure Cybersecurity" provided a broad approach to thinking about cybersecurity as well as practical guidance:

In turn, the FCC's Communications Security, Reliability and Interoperability Council took that framework and offered communications providers, including broadcasters, recommendations based on it.

Seeking to make that information more digestible for stations, the National Association of Broadcasters then published "The Essential Guide to Broadcasting Cybersecurity," picking out the most important broadcast-related recommendations and making them more accessible. And authors DCT Associates even boiled that down further to "35 Critical Cybersecurity Activities All Broadcasters Should Know." You can download those two files at www.nab.org/cybersecurity/broadcasterResources.asp.

Why go to all this trouble? As the authors put it, "Among many broadcasters the chief desire is for a simple checklist to ensure that newsroom, transmission, remote units and video production operations are sufficiently protected from cyber intrusion and disruption. Because cyber miscreants and threats are constantly evolving, static checklists no longer protect against such things as mutating malware, ransomware, viruses or sophisticated attack campaigns. The NIST Framework and CSRIC recommendations represent a new way of thinking about cybersecurity, offering holistic approaches under which broadcasters can begin to behave differently to ensure continuous, reliable operations."

For more helpful resources, see the NAB's Cybersecurity Resources page, www.nab.org/cybersecurity/default.asp.

Abdnour: Proponent of the Power of Radio

"I still get a rush when picking a distant signal out of thin air"

Longtime radio broadcast equipment sales executive John Abdnour has retired. The 67-year-old's career has extended from the days of mammoth multi-rack automation systems and analog cart machines to high-power solid-state transmitters and IP connectivity.

He has been working in radio broadcasting for five decades, most recently as a regional sales manager in the Asia/Pacific region for Nautel. A one-time employee of automation company SMC and tape cartridge maker International Tapetronics, he went on to work as Midwest regional sales manager for Collins/Continental for 22 years and national accounts manager for Broadcast Electronics for eight more.

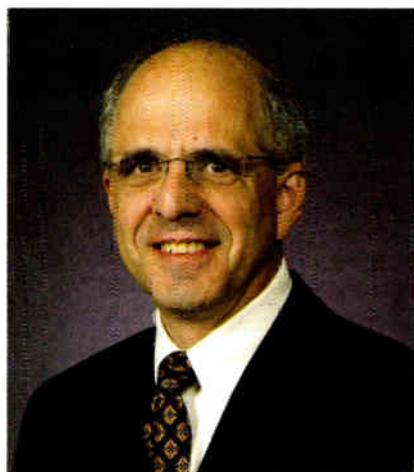
"Even with exciting emerging technologies, the most efficient and reliable method of reaching the masses is with a well-engineered FM, MW-AM or SW radio station," Abdnour told me in an email informing Radio World of his retirement.

I followed up to ask him for more about his career.

McLane: You started in radio as a part-timer ... Where was it and in what kind of position?

Abdnour: In the 1950s and '60s, many local radio stations sponsored a broadcasting club at their local high schools to mentor young people for possible careers in the industry. Station WIZZ (a 500-watt daytimer with a Class A FM) in Streator, Ill., began the practice when they signed on in 1953 and launched the careers of a number of people. They would also hire one of the students to work part time, doing everything: announcing, "riding gain" during remotes, doing the evening programs, writing news, learning engineering, filling the Coke machine! Etc.

That was me in 1966, doing just about everything to learn the business. The glow from inside the Gates BC500GY was mesmerizing, the bug was caught and radio was in my blood. The influence, reach and responsibility of a radio station was, and still is, magical. Eventually, this led to a full-time job in programming and engineer-



John Abdnour: above and right (circa 1969).

Below: Key broadcast elements of the era are visible in a studio photo from about 1970.



ing before moving into manufacturers' engineering and sales in 1973.

McLane: Where did you grow up and where do you live now?

Abdnour: I grew up and currently live in Streator, Ill., about a hundred miles southwest of Chicago and, of course, we were listening to "The Big 89" WLS or "Super CFL," WCFL during the 1960s. There were hundreds of us around the country who had visions of being the next Clark Weber, Ron Riley, Larry Lujack or Wolfman Jack. It didn't happen.

McLane: What do you think folks who designed those SMC and ITC systems back in the day would say about today's

automation systems?

Abdnour: Those of us who worked in the automation and tape cartridge business knew we were "state of the art" at the time; but, in 1975, we'd probably look in disbelief if someone had told us the day was coming when the capability of a 10-rack automation system would be dwarfed by that of a desktop PC or that you could put the content of thousands of tape carts in your pocket!

It does make you think about what will come in the next 50 years.

FROM THE
EDITOR

Paul McLane



infrastructure as the first stage in promoting, developing and growing HD Radio. We provided gear to put hundreds of IBOC (HD) signals on the air.

At Nautel, providing India with thirty-three 100, 200 and 300 kW MW-AM transmitters as All India Radio transitions to DRM30 is the single largest DRM effort in the world [see page 1].



John Abdnour, Direct Sales Manager

"This is John Abdnour. May I help you?"

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Abdnour was featured in a mid-1970s ITC brochure.



With the late Harry Priester of WLS Chicago, who purchased a Continental 317C-3.

Those transmitters will serve 1.5 billion people, many in remote regions.

McLane: Favorite memories?

Abdnour: In the '80s, there was a CE at a station who left disgruntled or was fired. His last act before turning in his keys was to program the dial-up transmitter remote control to call Continental's technical service number every 30 minutes, most likely to run up the long-distance bill. Caller ID was almost nonexistent then so we didn't know the location from where the calls

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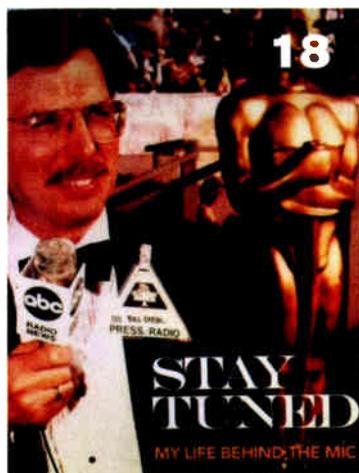
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came. It took most of the weekend to get into the back door to break the calls.

Then there was the manager of a station who wanted to move his new, four-rack automation system several inches forward. Apparently, he didn't pay attention in science class when he was pushing at the top of the racks instead the bottom. I can only imagine the shock when it fell on its face — broken plastic and bent metal everywhere.

I made a trip to a small station in the west to find out why an automation system seemed to go into business for itself, advancing and dumping out of programming but only on every other night of the week. I was sitting in front of it, staring at the system on one of those nights when the cleaning person came in and plugged the vacuum cleaner into one of the outlet strips inside the automation racks. Sure enough, as soon as the vacuum started, so did the chaos.

Following the commissioning of an automation system in the mid-'70s, I was puzzled why we couldn't hear the music on a mono FM radio (stereo radios were rare back then). The station had recorded their own reels of music — dozens of 10-inch reels with hundreds of hours of music — for the system. Tracing backwards, we found that the station had the *input* of the reel-to-reel recorder wired out of phase! *Sigh.*

McLane: And about that big India job.

Abdnour: Clearly, the largest project with which I have been involved is that of All India Radio. It began in 2010, when the AIR engineer in charge at the time showed me a map on his wall in Delhi of some 70 transmitter sites and said they "were going to convert all of them to digital." Some of the sites were upgrades while about half required new transmitters, ATUs, loads, etc.

Working with a team which included the Nautel project manager and engineers, Comcon (Nautel's representative in India), Altronic Research, Kintronic Labs, Digidia and AIR engineers, Nautel was successful in the tender for 27 high-power (100, 200 and 300 kW) MW-AM transmitters followed by a recent order for six more 100 and 200 kW transmitters (almost 6 MW of total RF power!).

The transmitters are located across India and serve one and a half billion people. Nautel supplied the entire systems: transmitters, electrical, feeder systems, antenna tuning units, loads, etc. As well, we hosted a number of AIR engineers at the factory for weeks of factory acceptance testing and training. Nautel and Comcon engineers assisted with on-site commissioning.

The task was daunting but competently handled with excellent planning and deployment. It showed the world our capabilities, but most gratifying is knowing that people who need it (espe-

cially in remote areas) will continue to be provided with news, information and other programming vital to their everyday living.

McLane: What do you think will be the biggest technical challenge for radio broadcasters and manufacturers in the next few years?

Abdnour: Probably the biggest challenge for both will be competing with other delivery technologies. However, radio broadcasters are heavily involved in providing content for these services and are embracing them to add to their over-the-air delivery channels. Manufacturers will continue to build on improving already good operating efficiency and on diagnostics to help engineers in maintaining their plants. As the engineering landscape changes, there will need to be expanded efforts to keep sites operating properly. Both broadcasters and manufacturers will continue to work toward the transition to digital whether it is HD Radio, DRM or a combination of both. As digital continues to evolve, we'll see much more information, programming and

data being pushed through the pipe.

McLane: What plans for retirement?

Abdnour: My wife of 40 years, Toni, and I love to travel, to anywhere and at any time, and will continue to do so, but probably largely from the trunk of the car to see parts of this great country and not chasing so many airplanes. We're also planning to move to the Sunshine State! And I am available to Nautel for contract work for special efforts and show participation.

McLane: What else should we share with readers?

Abdnour: 2016 was my 42nd NAB Show. Witnessing its expansion over the years is part of the excitement of our industry.

Radio is a fascinating, dependable medium. It can reach more people more reliably than any other communication form. I still get a rush when picking a distant signal out of thin air.

John Abdnour welcomes emails; his address consists of his first and last name, no spaces, followed by @gmail.com.



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DIGITAL RADIO

(continued from page 1)

standard. In doing so, backers feel, India has validated DRM as a digital radio format, one to be taken as seriously as Europe's DAB/DAB+ and North America's HD Radio.

"The DRM rollouts in India is quite spectacular," said DRM Chair Ruxandra Obreja. "The first phase of the project was the installation of DRM-capable transmitters. Now we are entering a second phase where better sound, value-added nonaudio services, and receiver manufacturing are being seriously pushed and promoted."

DRM's success in gaining a foothold in India seems likely to be repeated in nations such as Pakistan and Brazil, at least if the digital radio plans of broadcasters in these two countries come to fruition.

Here's a closer look at India's DRM progress to date, plus a glance at Pakistan and Brazil's DRM ambitions.

INDIA

With an estimated 1.2 billion citizens being served by AIR's radio broadcasts, the decision to adopt DRM as the country's digital radio standard was made after the broadcaster's deliberation and testing of DRM and DAB transmission systems.

"AIR selected DRM based on this technology's ability to deliver clear, full-range digital audio on medium wave, FM and the interference-ridden short-wave bands," said Pal, the retired AIR executive who helped spearhead India's DRM rollout.

Given the popularity of AIR's global SW services — "available in more than 108 countries in 27 languages in analog," Pal said — plus AIR's "vast network of over 140 analog medium-wave transmitters giving service to over 98 percent population of the country," selecting the DRM digital radio standard made good sense for India's public broadcaster.

The fact that DRM-enabled medium-wave transmitters can also simulcast in analog medium wave cinched the deal. "Until DRM digital receivers are available to a sizable population, analog medium-wave services can continue along with digital service from the same transmitter," Pal said. "No additional frequency spectrum was required, existing infrastructure such as transmission lines and antennas masts did not have to be replaced — and even the existing transmitters could be converted to digital at a nominal cost."

This said, AIR did buy a number of new DRM-capable transmitters from Nautel, which was big news for the Canada-based transmitter manufacturer.

"Nautel is proud to have supplied 11 100 kW NX100, 10 200 kW NX200, and six 300 kW NX300 DRM-enabled medium-wave AM transmitters to AIR, comprising the world's largest digital radio deployment to date," said Chuck Kelly, Nautel's Asia/Pacific Regional sales manager. "Nautel has [since] received a follow-on order from AIR for another four NX100s, and two NX200s."

Of course, deploying a specific digital radio broadcast technology requires the existence of compatible digital radio receivers. The widespread availability of DAB/DAB+ receivers in Europe has been central to the medium's success in this region.

Conversely, a lack of DAB receivers doomed Canada's DAB rollout in the late 1990s. This lack of receivers resulted in the DAB transmitters that were simulcasting the country's AM/FM services in Canada's major cities to eventually go dark. Currently, some Canadian private broadcasters are rolling out

U.S.-designed HD Radio transmitters into service on a trial basis.

In India, the push is on to get affordable, domestically made DRM receivers into the marketplace, and the hands of Indian radio listeners. "One Indian domestic manufacturer has already developed a standalone DRM receiver," said Pal.

"Some automobile manufacturers have also incorporated DRM reception facility in their built-in audio systems. Our domestic receiver industry sees a very good opportunity in meeting domestic demand as well as making DRM radios for export."

The price of India's domestically made first DRM/MW(AM)/FM receiver, the Avion Electronics AV-DR-1401, is about \$189. Compared to the cost of conventional MW/FM radios, this is expensive in a country where, according to the CIA World Factbook, almost 30 percent of the population is below the poverty line.



From left, Ruxandra Obreja, DRM chair; George Ross, TWR, Guam; and Alexander Zink, Fraunhofer IIS/vice chair DRM, show DRM reception on mobile devices and the Titus II software-defined radio receiver.

"The price of standalone DRM digital receivers is certainly a concern at present," Pal said, "but I am sure that prices will go down very fast with demand; as we have seen in the deployment of any new technologies in many other fields. The eventual availability of a DRM reception facility in cellular phones will further boost the popularity of DRM digital services."

PAKISTAN

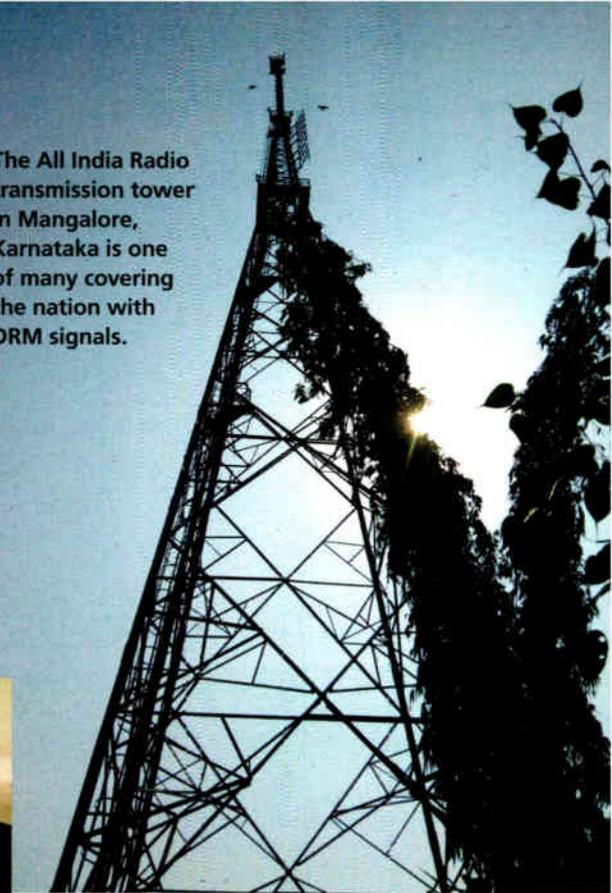
Unlike India, Pakistan's public-operated Pakistan Broadcasting Corp. (Radio Pakistan) is interested in possibly deploying DRM+ first on FM, then eventually medium wave. In fact, the country has already begun DRM+ field tests in the FM band, at its Islamabad facilities.

PBC's decision to focus on FM digital radio first is due to the country's large and growing urban population, and the fact that this technologically progressive audience is also more affluent than its rural counterpart.

"The literacy rate is much higher in the metro cities, as well as its buying power of new digital DRM receivers compared to rural areas," said Ghulam Mujaddid. He is PBC's senior broadcast engineer, a member of PBC's DRM Steering Committee, and an observer member of the DRM Consortium's International DRM Steering Board.

"It is also worth mentioning that the upfront equipment cost required for the transition in DRM+ for FM transmitters is much lower as compared to DRM-30 for AM transmitters."

The All India Radio transmission tower in Mangalore, Karnataka is one of many covering the nation with DRM signals.



Gopala Krishna A via Wiki Commons



The AV-DR-1401 DRM/AM/FM radio receiver from Avion Electronics is the first Indian-built DRM radio.

Pakistan's broadcast spectrum allocation explains why the country chose DRM over DAB.

"DAB uses Band III (174 MHz to 240 MHz), which is already occupied by the Pakistan Television terrestrial network and some other departments," Mujaddid said. "DRM+ works in Band II (88 MHz to 108 MHz), which is already the established band for FM broadcast. So it is quite easy and smooth for us to use the same FM band while transitioning to the DRM+ standard."

The fact that India is rolling out DRM also influenced Pakistan's choice of DRM over DAB. Broadcast compatibility with your next-door neighbor counts.

At present, PBC has 20 FM transmitters that are fully capable of DRM+ standard broadcasting across the country, and plans to buy 20 more DRM+-capable transmitters in the 2017–2018 financial year. PBC already has 10 kW, 100 kW and 400 kW MW/AM transmitters that are fully capable of supporting DRM-30 standard broadcasts.

The fact that PBC can operate its existing and new transmitters in dual DRM/analog mode was a point in DRM's favor. "In contrast, DAB transmitters do not support analog and only work in the digital mode," said Mujaddid. "So we can't run both modes from a single DAB transmitter." Cost also gave DRM the edge over DAB: "FM transmitters, which normally transmit analog signals, can easily be converted to DRM+ by just

(continued on page 8)

ENGAGING COMMUNITY

ACCESS 2USB

Ultra-portable IP audio codec designed for usability

Sun Prairie Media Center's mission is to create relevant community programming and empower Sun Prairie, WI locals to create their own content. ACCESS 2USB makes their remote broadcasts easy - not just for their professional engineers, but for their community producers too.

"When we were in the process of raising money to build the station, we learned it was a lot more fun to actually be outside and engaged with our listeners. It makes the station feel like a real thing, rather than a vague idea that people don't really understand."

Jeff Robbins, Sun Prairie Media Center



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COMREX

OEAS

(continued from page 1)

Local Primary radio stations.

Ohio already had a working EAS system, so why the addition? David Carwile, OEAS project manager, explains the forces behind these recent changes:

“Our concerns with the existing EAS service began about 10 years ago, when FEMA decided to create a new emergency system that would rely almost solely on the internet to send critical information to the people who then distribute it to the public. It seemed like putting all your eggs in one basket. Those fears were borne out by subsequent events.”

Carwile mentioned a bridge collapse in Minneapolis, a private plane crash into an apartment building in New York City and Hurricane Sandy as instances when internet congestion or loss of physical infra-



Ohio Emergency Management Agency headquarters is equipped with a Digital Alert Systems Emergency Operations Center capable of originating CAP messages as well as capturing and managing such messages coming in to the state. It can also translate to other languages.

structure made communication virtually impossible. “As Hurricane Sandy demonstrated, when every other system went down, it was broadcasters that were still able to provide information to the public to ensure their safety.”

REDUNDANT BACKBONE

Ohio’s new OEAS Public AlertNet System is an “overlay” that can provide redundant, data-based delivery of EAS, CAP/IPAWS, weather and other emergency communications to any Ohio radio and TV station that participates in EAS. It does not replace existing EAS gear or create new alerting programs; rather it

DIGITAL RADIO

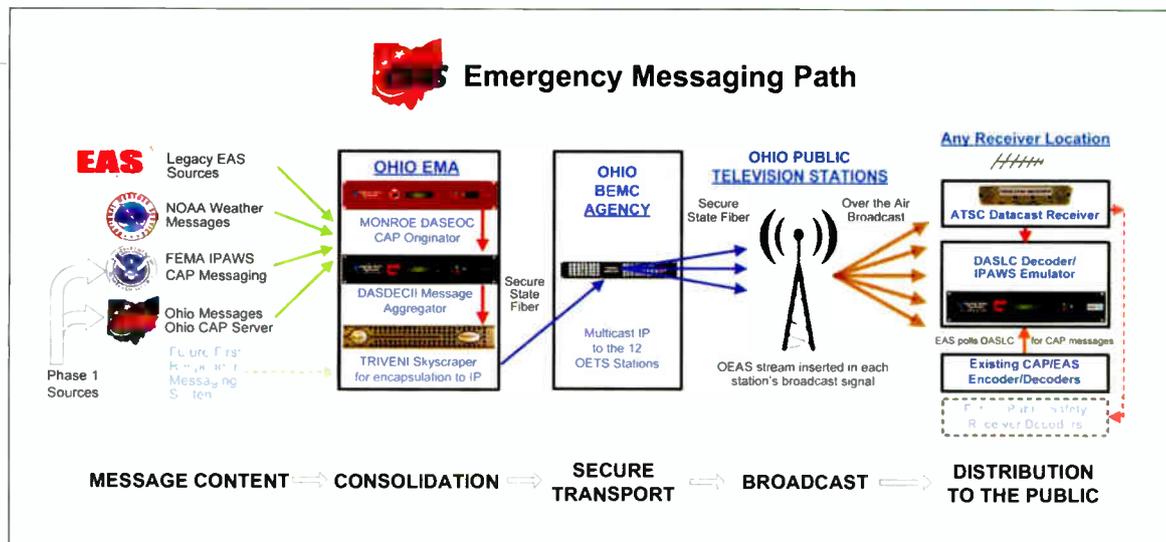
(continued from page 6)

adding a small piece of hardware to it,” he explained.

Although PBC is eager to start rolling out DRM+ and eventually DRM30 as well, it is no rush to shut down FM and medium wave. “There is no specific date for the rollout to be completed; it all depends on the factors and challenges we have already discussed,” said Mujaddid. This said, “PBC is determined to rollout digital radio standard in the country to provide efficient and better programs to the people of Pakistan.”

BRAZIL

Since 2012, Brazil has had two reasons for wanting to deploy DRM. First, the country is forward-minded when it comes to digital broadcasting. Second, when the national government “made a public call for digital radio standards to present themselves to be tested in Brazil, DAB did not attend,” said Marcelo Goedert, owner of the Brazilian audio equipment firm Audio Fidelity Produções Ltda, and the DRM Consortium’s Brazilian representative. “So it was never officially considered for Brazil.”



Ohio Digital EAS provides a simultaneous, redundant delivery path for current and proposed messaging systems. It’s capable of delivering any digital signal format, as well as multiple formats.

ous EAS operational areas (though any broadcaster that distributes EAS can purchase a receiver system).

“The project, by its very nature, had to be a partnership, so we built it on the relationships we had been developing over the previous 10 years of discussions,” he said.

The Broadcast Educational Media Commission, a state agency, provides Ohio public TV stations with access to its existing secure state fiber interconnection, at no direct cost to them. It also allows OEAS to focus what goes into the system and define distribution to a set geographical area, in this case the state, which in turn allows them to include more “local content” in the available bandwidth.

Another key player is the Ohio Emergency Management Agency. EMA’s desire for an alternative delivery path for EAS and IPAWS was what the new system was intended to fulfill. But EMA also guaranteed sustainability by agreeing to host it as part of the overall state EAS system. TV stations assist but do not manage the system; final decisions are made by professionals in emergency management. The proponents at Ohio EMA were Dave Ford and Mike Swaney.

Carwile cited a number of other supporters. “The Ohio Association of Broadcasters, the State Emergency

(continued on page 10)

is an alternative way of delivering existing messages, aggregating them into a single data stream for ATSC broadcast.

To make this possible, the dozen stations in Ohio Educational Television Stations Inc. agreed to dedicate a portion of their broadcast bandwidth; but for many years, this was still a solution waiting to be funded. The financial dam broke in 2014, when the Corporation for Public Broadcasting created the Emergency Alerting and Communications grant program. Carwile submitted a proposal that eventually brought in \$336,000. Among other things, those funds covered the cost of receivers for LP-1, -2 and -3 stations that serve the vari-

Add the fact that Brazil is a very large country — “any digital radio solutions have to consider long distance transmissions via medium wave and shortwave” — and DRM was the right choice. Goedert said.

Unfortunately, ongoing economic and political unrest is delaying Brazil’s adoption of DRM as the country’s digital radio standard. In the interim, DRM field tests are underway. Specifically, DRM30 signals have been test-broadcast by Empresa Brasil de Comunicação, Brazil’s public broadcaster, on 9.740 kHz shortwave, since the end of October, 2016.

“We are using a low-power 150 W DRM transmitter installed at the Rodeador Site in Brasília, the capital in the center of the country,” Goedert said. “The aim of this test is to assess the behavior of the equipment, signal quality and system stability. Because of the low power, there were not any high expectations of large coverage but, despite all this, the signal has been detected all around Brazil — and there were some intermittent signals received in New Zealand.” A new trial will start in April 2017 with a 1 kW transmitter, from the same site.

As for equipment, Brazil has a domestic transmitter manufacturer, BT-Broadcast Transmitters that makes DRM transmitters to sell locally and to other countries.

“Receivers for the test are coming from India,” said Goedert. “Since we don’t have digital radio yet, no company has started manufacturing in the country yet.”

“The main challenge for Brazil is the governmental delay in establishing parameters for digital radio,” Goedert concluded. “The other challenge is the diversity of Brazilian radio. We have around 10,000 radio stations divided into private, public, educational and communitarian; all with different interests and priorities. So it is very hard to find an agreement on radio policies and technical standards.”

These three countries and their interest in DRM suggest that this digital radio technology has found its place on the world stage. No longer is DRM an engineer’s pet project, it is now a credible broadcast standard.

Having achieved this result, the DRM Consortium’s task is to capitalize on DRM’s momentum and use it to attract other nations to the standard.

“Wider take-up and use of DRM remains the goal,” said Obreja. “This goes in parallel with increasing the volumes of sold or integrated receivers that should establish digital radio as the norm and bring radio where it belongs: as the ultimate integrator and ubiquitous glue for all new and old digital platforms.”

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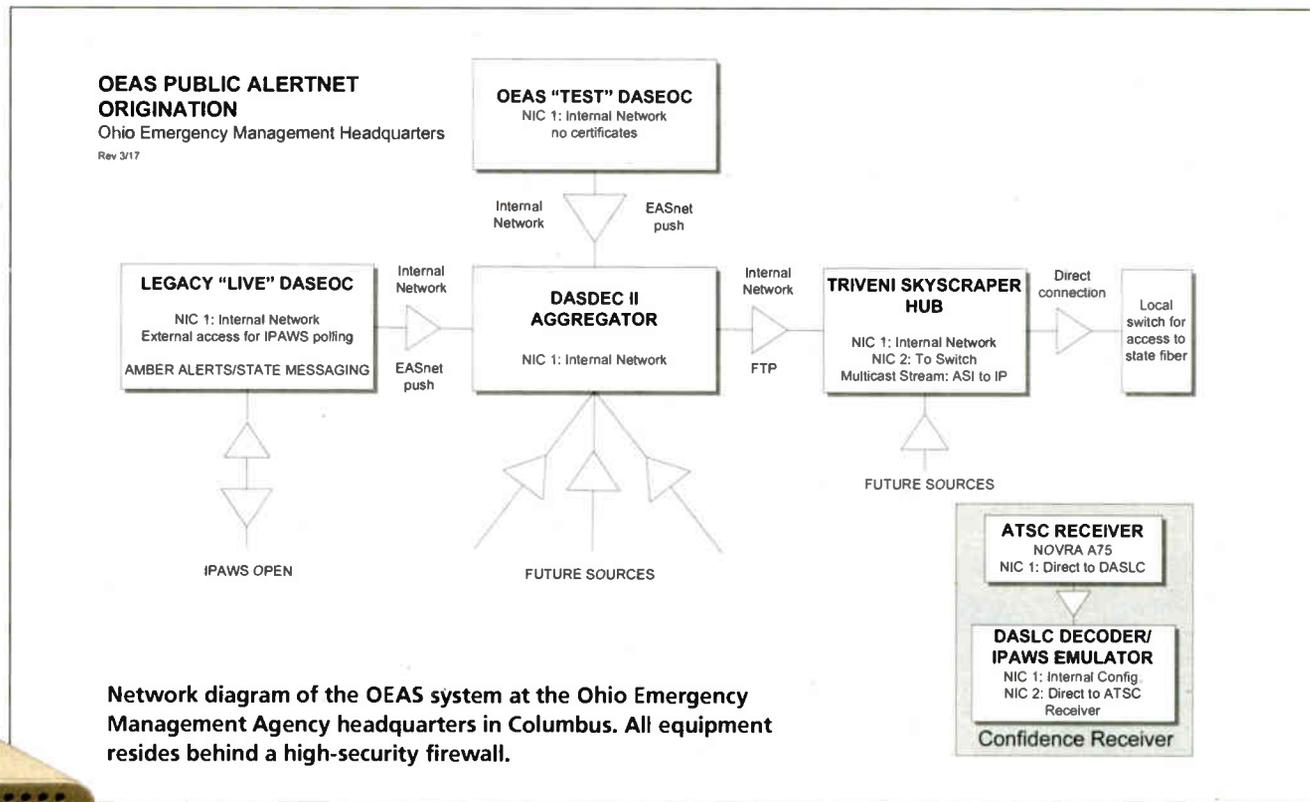
(continued from page 8)

Communications Committee, Amber Alerts, Silver Alerts and the association representing the state's 88 county EMAs have all endorsed the project. When the grant was awarded, we didn't have any convincing to do."

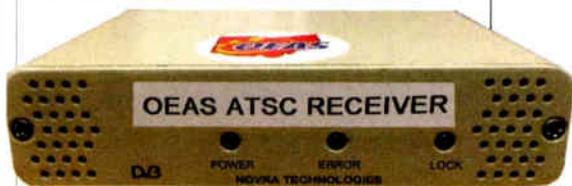
SCALABLE

The system uses technology from manufacturer Digital Alert Systems, part of Monroe Electronics. The core is a Digital Alert Systems emergency operations center, or DASEOC, that can originate and translate legacy EAS and relay CAP alerts, while a DASDEC-II EAS encoder/decoder functions as the message aggregator.

Next in the chain is a Triveni Digital SkyScrapper digital content distribution system. The origination equipment resides at the state EMA headquarters in



Network diagram of the OEAS system at the Ohio Emergency Management Agency headquarters in Columbus. All equipment resides behind a high-security firewall.



An ATSC digital TV data receiver is located at each EAS Local Primary site, including 26 radio stations. A companion emergency content management server makes the messaging content available to existing EAS gear in its native format.

Columbus. The Broadcast Educational Media Commission hub receives and feeds the messaging over secure fiber connecting to the 12 digital transmitters operated by the OEAS member stations.

The 50 Ohio LP station and EMA agency sites with OEAS equipment have conventional EAS boxes that can receive data in FEMA's Integrated Public Alert and Warning Format. To do this, the ATSC receivers at each site must be connected to emergency content servers equipped with IPAWS emulation software. The local EAS units poll the local server over their internal network, the same way they poll the IPAWS servers.

Everything starts at the Ohio EMA emergency operations center in Columbus. Here, IPAWS CAP messages are created or received and legacy EAS are translated. All messages are input to DASEOC, which authenticates, attaches a Spanish translation and relays them

to the aggregator, where they are assembled into a single data stream. DASEOC can also process federal, state and county messages that need to get to first responders, a function now being offered to state agencies with a look forward to the new FirstNet system.

Next, the Triveni Digital SkyScrapper encapsulates the data stream into a unique DTV transport stream. It is then delivered to the Broadcast Educational Media Commission Hub and on to the Ohio Educational Television Stations Master Control rooms over Ohio's secure fiber network. Once the data stream is received at each public broadcast location, it is multiplexed into each station's digital broadcast signal. The signal coverage of Ohio's PBS stations essentially blankets all broadcast and cable facilities in the state, as well as public safety agencies.

Once the signals have been broadcast over HDTV, they are picked up by receivers at the state's legacy EAS LP radio stations and at selected county EMA offices. The system can be expanded by equipping other agencies with the same digital TV data receivers, which have been integrated with Monroe Electronics' DASLC emergency content management servers and IPAWS emulation modules.

TEMPLATE?

The public TV stations and the OEMA feel they have created a cutting-edge EAS system for Ohio and that perhaps it will serve as a template for other states contemplating updates to enhance

last-mile redundancy in their systems.

The suppliers that helped build the system say that its "content-agnostic" architecture can transport any type of digital content securely, including non-public data and live video messaging. They say this will allow first responders and other emergency officials to use it as well, with information platforms of their choice.

Several inquiries have been received. "Broadcasters in other states can just as easily create a redundant EAS communications system or encrypted messaging to first responders," said Carwile. "North Carolina and California are already in the process of adapting the technology in their states, and we've also been visited by some of the commercial television groups here in Ohio. They're interested in purchasing the receiver packages so they can monitor the system directly. Those packages are available through Digital Alert Systems."

CYBERSECURITY

(continued from page 3)

Your assessment of risk determines the path to security, resulting in a more targeted and unique approach.

RW: What kind of questions should engineers and IT managers be asking when using IP audio and other IP accessible systems?

Williams: There are still a lot of systems out there that run on Windows XP, which hasn't had a security update in three years. Any system in use today needs virus protection, scans and a

More legacy messaging sources are being added to the multilingual overlay system, with audio translations in the works.

In fact, a system like OEAS is always a work in progress. Though it has just rolled out, Carwile already is planning the next round of upgrades.

"Specifically, we're looking at enhanced weather, with video and rich media for Amber Alerts. This should create more of a demand from the TV side. All of these things should also be possible when ATSC 3.0 and an advanced alerting system comes online. Right now, though, most of our attention is focused on how our existing system can support the LTE-based FirstNet first-responder system that AT&T is developing for national use."

Tom Vernon recently profiled John Kean, the 2017 recipient of the NAB Radio Engineering Achievement Award, for Radio World.

software firewall. The best systems incorporate Security by Design, meaning that the system has been designed from the ground up to be secure. Buyers should ask about the operating system of any equipment they are purchasing. Is it the latest version? Is it updated regularly? Can it do virus scans, and does it have a firewall? Has it been built using SbD standards?

IP connectivity is beneficial to broadcasters in so many ways, but "best practices" are still evolving; read much more on this topic in the eBook "The Internet of Broadcast Things" at radioworld.com/ebooks.

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Consider These Instruments for More Efficient Troubleshooting

ESR meters can be a time saver in the middle of the night

WORKBENCH

by John Bisset

Read more Workbench articles online at radioworld.com

Our recent discussion about checking capacitors for equivalent series resistance continues with tips from two engineers with plenty of field experience.

The first is from engineer Ed Treese. Ed writes about a capacitor checker used by several engineers in the Kansas City area. Made in Independence, Mo., by Midwest Devices LLC, the product is the Capacitor Wizard, “invented” in 1995 by Doug Jones, who also does a great SBE meeting.

The Capacitor Wizard measures ESR with the capacitor “in-circuit.” Its ESR meter’s low input impedance, simplicity of use and real-time measurements still make it the fastest and most reliable ESR analyzer around.

I checked it out on www.midwestdevices.com. One of the things I like is the information printed on the meter’s front cover. It explains what constitutes normal readings for a “good” capacitor — no digging around for the tech manual when you make a measurement!

Doug also shares 10 helpful “Tech Notes” about ESR on the website.

The Capacitor Wizard is available online for \$229.95.

Ed ended his tip by writing that he was pleased to see the comments from John Collinson in Workbench. (John was a chief engineer/contract engineer in Kansas City for many years before he moved south to warmer climates.)

Wolfram Engineering principal Greg Muir offers more thoughts about ESR, as well as a suggestion for general component diagnosis.

Our previous article tweaked Greg’s memory about something he meant to write a few years ago. He’s sure that there are engineers who have arrived at a remote transmitter site — probably in the middle of the night — armed only with basic test equipment but facing the challenge of trying to repair equipment. And sometimes it’s difficult to determine whether a component is defective or out of the manufacturer’s specification.

When you find the problematic part, the task then becomes finding a possible



Fig. 1: Greg’s Muir’s assortment of Peak analyzers.



Fig. 2: The meters fit in a compact travel case.

on-site replacement to get things working again. So the engineer starts to look through miscellaneous electronics parts amassed over the years for something that might serve the purpose.

It’s not uncommon that some of these parts do not necessarily carry an industry standard part number, making the task even harder and resulting in a hit-or-miss substitution situation.

After experiencing this over the years, Greg decided to find a solution to minimize head-scratching and wasted effort. He came upon the Atlas series of component analyzers made by Peak Electronic Design Ltd. in the United Kingdom.

Pondering what would be most handy in the field, Greg chose the following units:

- Atlas LCR45 passive component impedance meter
- Atlas ESR capacitance and equivalent series resistance meter
- Atlas DCA semiconductor component analyzer
- Atlas SCR triac and thyristor analyzer

Given their small size, you can put a nearly complete array of needed compo-

nent test equipment in a small carrying case.

Over the years, Greg has found these instruments to be real lifesavers. They are easy to operate (one button); do their own analysis of the device under test; and perform surprisingly well when compared to more expensive lab equipment.

The instruments won’t provide every
(continued on page 14)

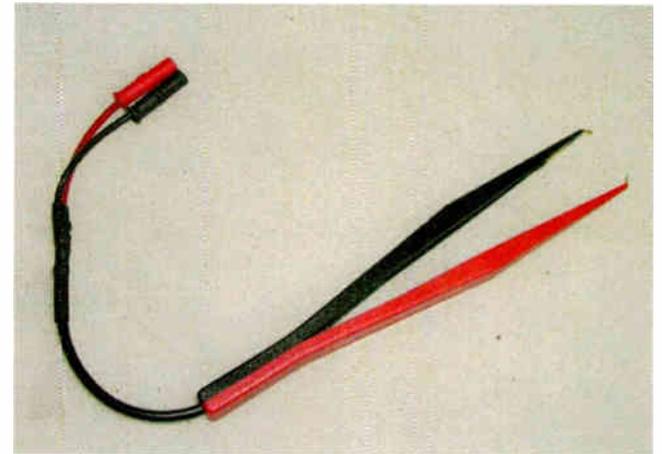


Fig. 3: A closeup of the component tweezers, ideal for checking surface-mount and high-density components.



Fig. 4: All packed up ...



Fig. 5: ... and ready to go!

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Here's a sampling of what NewsBytes readers learned about in recent weeks:

▶ **Don't Forget the AMC-18 Migration Deadline**

If you rely on network programming from the AMC-8 satellite, you must re-point to AMC-18 by the end of June.

▶ **Radio Preservation Task Force Announces Second Conference**

From Nov. 1-4, enthusiasts and professionals will convene at Washington's Wilson Center, The Library of Congress Madison Building and National Public Radio.

▶ **Translator Ordered Off the Air After Interference Complaints**

An FM translator received a letter no radio operator wants to get.

▶ **Berner Sees "Inflection Point" for Cumulus**

The CEO sounded an optimistic note despite the company's debt situation, stock price and a revenue decline in the first quarter. One company official also hinted at higher cap-ex spending this year, "to address the significant historical under-investment in infrastructure at the company."

▶ **Debt Burden Grows at iHeartMedia**

The earnings report for the first time included a series of statement risk disclosures and a warning as to the company's ability to continue as a going concern over the next 12 months.

**WORKBENCH**

(continued from page 12)

test parameter specified by the device manufacturer, but they do serve to provide a reasonably accurate indication of what is needed.

MCM Electronics carries Peak analyzers, and offers reduced prices on the instruments from time to time. In addition, its waterproof transit cases are an economical solution for keeping your analyzers together and protected.

Greg also purchased Peak surface-mount tweezers, which allow connection to the LCR45 and ESR analyzer test leads, so you can probe those tiny passive components quickly.

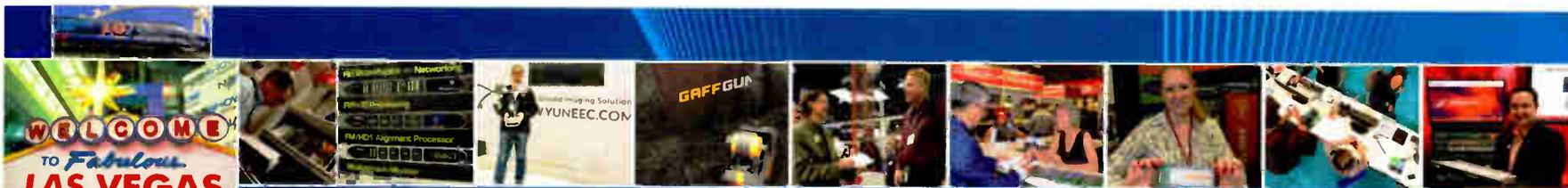
Peak has other models available and has come out with upgraded and some new units that provide a more detailed analysis of a component.

Greg has determined that one does not need to approach test lab conditions when trying to get back on the air and fielding phone calls from the studio.

Details about the Peak line are at www.peakelec.co.uk. Each meter sells from MCM Electronics (www.mcmelectronics.com) for around \$100 each; search for "Atlas Test Meters" for more information.

Got a test instrument you can't do without? Tell me about it and earn SBE recertification credit for published submissions. Email or fax your suggestions along with high-resolution photos to johnpbisset@gmail.com or (603) 472-4944.

Author John Bisset has spent 46 years in the broadcasting industry and is still learning. He handles West Coast 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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Entertainment Reporter Tells Story of His Life

Bill Diehl's memoir is full of broadcast history and celebrity anecdotes

Mel Brooks, right, hams it up during an interview with Diehl.

BOOKREVIEW

BY DONNA HALPER

Few current broadcasters have had as long and interesting a career as ABC Radio's Bill Diehl.

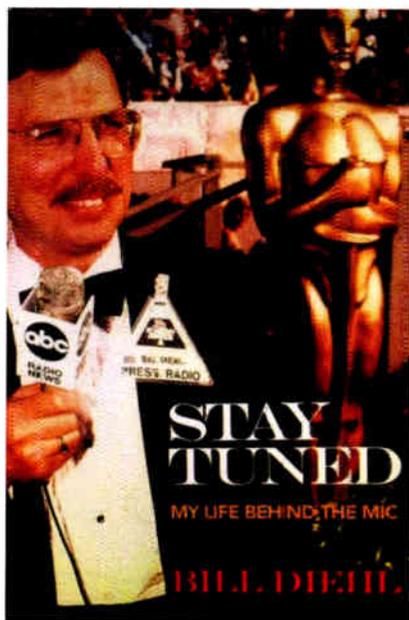
In his new memoir "Stay Tuned: My Life Behind the Mic," Diehl takes readers on a trip through his more than five decades in radio. His story is a mini-history of how the industry has changed; it's also the tale of someone who fell in love with radio as a boy and loves it just as much today.

In part one, Diehl recalls some career milestones, like when he set up a studio in his parents' basement at age 11 so that he could "play radio." He got his first radio job at 15, hosting "Youth Bureau Time" at WCLI(AM) in Corning, N.Y. He went on to work at the campus station at Ithaca College, where he got his degree in 1963. Diehl also worked part-time at Corning's newest commercial station, WTKO, playing the hits and doing some news.

After realizing he didn't want to be a DJ, Diehl concentrated on news reporting. Now married, he moved to Washington with his wife, who was completing a master's degree at Catholic University. He found work at WWDC(FM), and by late 1964, he had been hired at WTOP, where he did both radio and television news.

In his memoir, Diehl writes eloquently about the people he met at WTOP (including Sam Donaldson and Warner "Let's go to the videotape" Wolf); and he describes the process of learning to do TV news: "Back then, the anchor had to read the news while looking at camera — they had no teleprompter." He mastered that skill but much preferred radio.

Diehl's marriage did not work out, but his career was on the upswing. By early 1967, he was hired by WNEW Radio in New York, where he worked alongside big-name announcers like Gene Klavan and William B. Williams. Many enter-



tainers stopped by the station, including Steve Lawrence, Eydie Gormé and Tony Bennett. This was Diehl's first encounter with the world of show business, but it wouldn't be his last.

ABC RADIO NEWSMAN

Meanwhile, Diehl remarried (this time happily), and in the summer of 1971, he joined ABC Radio's Entertainment Network. Among his colleagues was Howard Cosell, about whom he shares priceless anecdotes.

In addition to reporting news, Diehl sometimes hosted interview programs, and his book shares memories of his conversations, including one with jazz great Benny Goodman.

He also recalls how different the technology was in that era — the reel-to-reel machines and audiotape. "We never did live interviews," he told me. "There was an engineer who edited the tape with a razor blade. I would tell the engineer what I wanted in, and what could be edited out."

ENTERTAINMENT

After more than a decade of anchoring news for ABC Radio, network executives asked him to become an entertainment reporter.

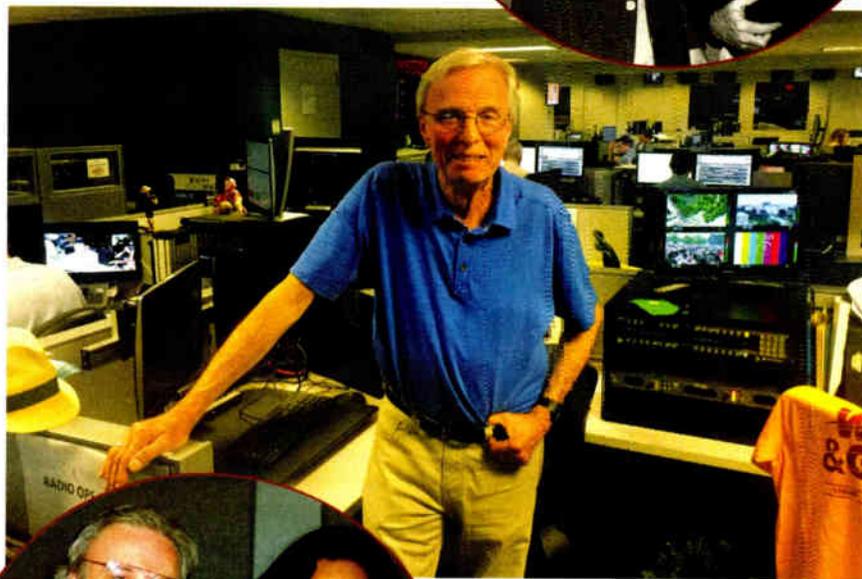
His first assignment was reporting from the Academy Awards. His bosses liked the results, and he was soon focusing entirely on movie reviews and celebrity interviews. By the end of 1982, Diehl was hosting an entertainment feature called "Bill Diehl's Spotlight."

In 1988, he was named ABC Radio's chief entertainment news correspon-

dent, a role he held until retiring in 2007. But it wasn't long before ABC asked him to come out of retirement. "They needed someone who knew show business," he said.

And few people know it better than Diehl.

These days, he maintains an obit file that can be used at a moment's notice; whenever a famous entertainer dies, Diehl writes, produces and voices



Above: Diehl is shown in the ABC Radio newsroom.



Left: Diehl interviewed Diana Ross in 1976.

Another unpredictable but fun interviewee was director Mel Brooks. I asked Diehl how he prepared for doing that task.

"With Mel, I had a list of questions about what he was doing, but they never got asked. They didn't need to be asked." Like Robin Williams, once Mel Brooks was on a roll, Diehl just let him be himself.

But this book is not just a series of puff pieces. Yes, Diehl clearly admires certain celebrities, like Bennett, Barbra Streisand and Lily Tomlin.

But he also acknowledges he had to be ready for the unexpected. For example, he was once asked to interview porn star Marilyn Chambers; when he arrived, she was naked (there is an amusing photo of the two of them).

He also interviewed Hugh Hefner, who wore his customary burgundy-colored robe and gave him a tour of the Playboy Mansion.

the obituary, as he did recently with Don Rickles, Chuck Berry and Mary Tyler Moore.

The second half of Diehl's memoir consists of anecdotes about the many celebrities he interviewed over the past three decades, along with rare photographs.

Actors Tom Hanks and Sean Connery win praise for being down-to-earth and not letting fame change them; comedian Billy Crystal is "one of my favorite people to interview," Diehl says.

He also tells of spending time with Robin Williams. In addition to answering questions, Williams treated Diehl to comic impressions of famous movie stars.

(continued on page 20)

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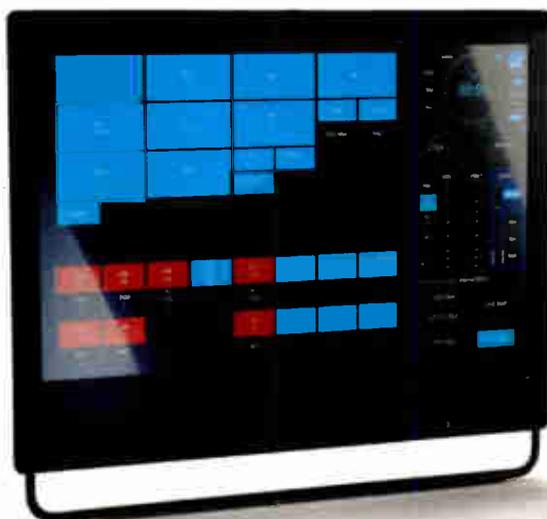
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Sometimes the best way to endear your station to listeners is to stay out of the political controversy

Early in my career, I heard a gem from a general manager. While heading out to lunch one particularly beautiful day, we discussed a significant drop in our station's ratings as released just that morning. I asked him why the station had plummeted in one ratings period.

"People listen to radio stations because they like them," he said. As kind of a joke, I asked him why people stopped listening. He responded, "They stop listening when they don't like them anymore."

I realized he was being serious and asked him, "Do you think it'll get worse?" He suddenly halted, put his hand on my shoulder and said to me, "Ratings can *always* go down."

I still smile when I recall the clarity of this conversation — then revel in this simple brilliance that is so often forgotten, even by programming veterans.

RADIO & POLITICS IN TRUMP'S AMERICA

Since we changed presidential administrations in November, program directors and on-air talent would do well to remember why listeners remain loyal to specific stations while ignoring others. Once again, simplicity rules, especially when it comes to politics. Why? For many, many stations in the USA, party politics just isn't relevant.

With the exception of talk radio, taking a partisan approach should be well researched, carefully debated and executed after careful consideration.

But why does this matter? Because of expectations. Your audience's expectation could very well be that your station should stay politically neutral, or even prefer that you ignore political goings-on altogether. This is especially true for music stations.

Just because you work at a country

music station, don't imagine that every single one of your listeners leans to the right. Sure, country music fans may respond well to patriotism, but that alone doesn't give a country station license to cross over into right-wing politics.



Do politics have a place on your station?

Here's another shocker: Rock radio fandom doesn't consist of 100-percent leftist liberals, although it seems that DJs in that format often project that tone as if it's fact.

Truth is, you can never tell what other people are thinking. Haven't you been shocked by co-workers or other people you thought you knew well when they've expressed a political opinion that is polar opposite to your own? When you presume that you can intuit what your listeners think about policy or candidates, you inject highly-charged tensions into a neutral situation and risk

alienating your audience.

TALK RADIO AND NON-NEUTRALITY

What about news stations taking a political stance?

Some do so because that's the angle they've chosen in a competitive situation. This can happen if a station has a hybrid news/talk format, where they've got both straight news and talk show hosts who dominate the day.

PROMO POWER



Mark Lapidus

an intentional stance (*à la* Fox News or MSNBC on cable TV), it's one thing. But if your station is perceived as having a political position solely due to the leanings of specific anchors, that's quite another.

OK, OK, calm down! I am not against discussing politics on the radio. I am also not suggesting that you can't make political jokes; you can, but they must be truly funny and not just snarky.

Politics has always been emotional, compelling and vital to our national and local discourse, especially on the radio. But before staking out a political position that will become one of your brand elements, PDs must recognize that politics don't mix well with all formats. Most importantly, have a plan. Don't allow your station to project a political image without a full understanding of what can be gained — and what can be lost.

And remember: Ratings can always go down!

DIEHL

(continued from page 18)

Sometimes, a star was challenging to interview — he spoke with Broadway legend Joel Grey, but no matter what he asked, Grey responded with one-word answers.

Most stars were eager to get some publicity, but a few were not. Baseball great Joe DiMaggio brushed him off, saying he didn't do interviews. And although he did meet Elvis Presley, he was never able to get an interview.

I asked Diehl if there were other celebrities he wished he had interviewed: he named Doris Day and Frank Sinatra.

Diehl credits his celebrity interview success to his style. "I'm not political or confrontational. I try to make celebrities feel good. And I don't ask mean-spirited questions."

Diehl's memoir covers a lot in only 162 pages; my one criticism is that I wish it had an index — since he mentions so many famous people, it's difficult to keep track of them all. But I thoroughly enjoyed "Stay Tuned: My Life Behind the Mic." It's published by Oliver Productions and available in paperback (\$16.95) and Kindle versions (\$4.99) online at Amazon.com or bdiehl.com.

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Dealing With Differing Audio Levels

Smoothing out the peaks for music played on a station is a professional approach

BROADCAST BASICS

BY DAN SLENTZ

This is part of a continuing series of occasional articles about basic broadcast concepts for new LPFM broadcasters and others who may be unfamiliar with industry terminology and practices.

It's not unusual for different songs from different sources to play at different audio volume levels. Even production within the same station can have very different levels when people aren't

phones when in program (as opposed to "air" or an off-air receiver or modulation monitor) lets you hear the preprocessed sound, so there will be differences.

In this case, we're talking about audio files where you notice the peaks may be in the lower 80 percent range or even lower versus songs where the peaks are hitting 100 percent. Remember that digital audio is quite unforgiving at anything over 100 percent in the digital realm, so audio exceeding 100 percent should be avoided or else very noticeable distortion will occur, thus the reason our board ops should be watching those levels!

When "ripping" or transferring or converting audio (same thing, different names) from CDs to automation-

to a normal high peak of 98 percent (as opposed to 100 percent peak). When you "normalize" your audio, you are saying that no matter whatever the high point is in the track, whether 85 percent or 100 percent, you want that peak to be 98 percent. This means all audio is adjusted one single time across the entire file so that "loud" is 98 percent.

In Fig. 1, there is a tune that looks to have peaks around 90 percent. In Fig. 2, I have chosen to normalize the file at 98 percent. Fig. 3 shows the resulting waveform.

It should be noted that when a file is normalized, everything else is adjusted up or down by the same amount. So if the peak had been 88 percent and the volume of the peak brought up by 10 percent, that means the lowest audio and middle audio was increased by the same 10 percent. The differences that existed in dynamics are still maintained. Doing this overall and equally to the song doesn't change the dynamics, it just makes sure that the loudness of the loudest part is consistent between all your audio files.

We as audio engineers really want to maintain the integrity of the artist's

(continued on page 24)

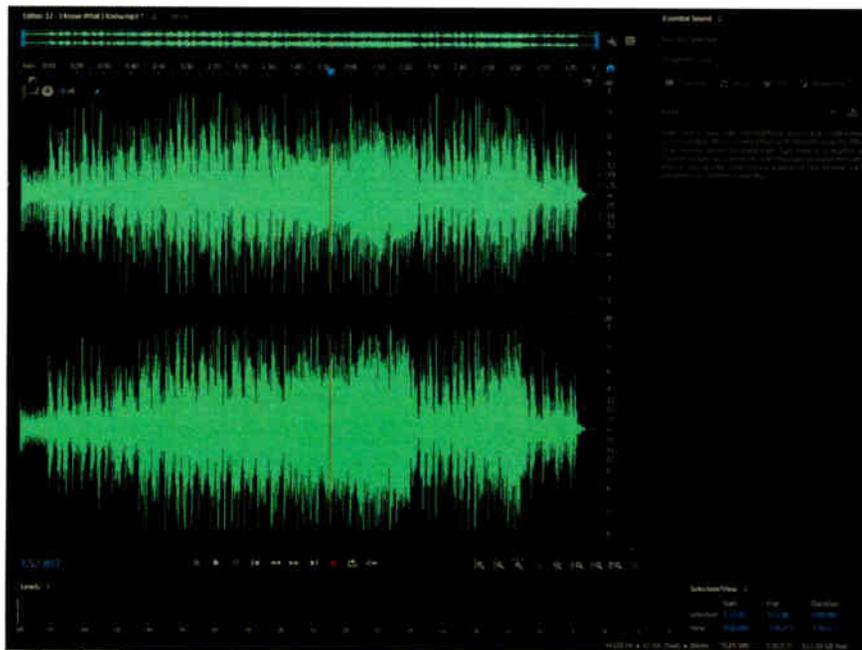


Fig. 1: Audio on the low side (peaks appear to be in the 90 percent range)

watching the levels closely when recording material.

I was asked the following question: "Seems like the volume levels of some songs are different. It's not drastic but it's noticeable to me. I mainly notice it on the headphones. Am I imagining this? If not, is there a simple solution?"

That question isn't about the loud parts versus quiet parts within one song, but rather from song to song. Often, subtle differences in source material are corrected by our audio processing. Differences between quiet passages and loud passages within songs are perfectly acceptable. That is referred to as the dynamics of a song.

However, hearing a difference in head-

friendly WAV files, many of the audio "ripping" software utilities allow for automatic "trimming" of both the beginning and end of the file. This is to trim embedded silence or dead air that a song might contain at the beginning and end of the track. This provides for a much "tighter cue", like in the days of "back-cueing" a vinyl record so it started instantly when needed.

The other common option in ripping software is to "normalize" the audio. To normalize is not the same as compress or expand, nor is it to apply an AGC (automatic gain control). "Normalize" is to take the file and give it a reference peak that is standard across all your audio files. I tend to rip the files

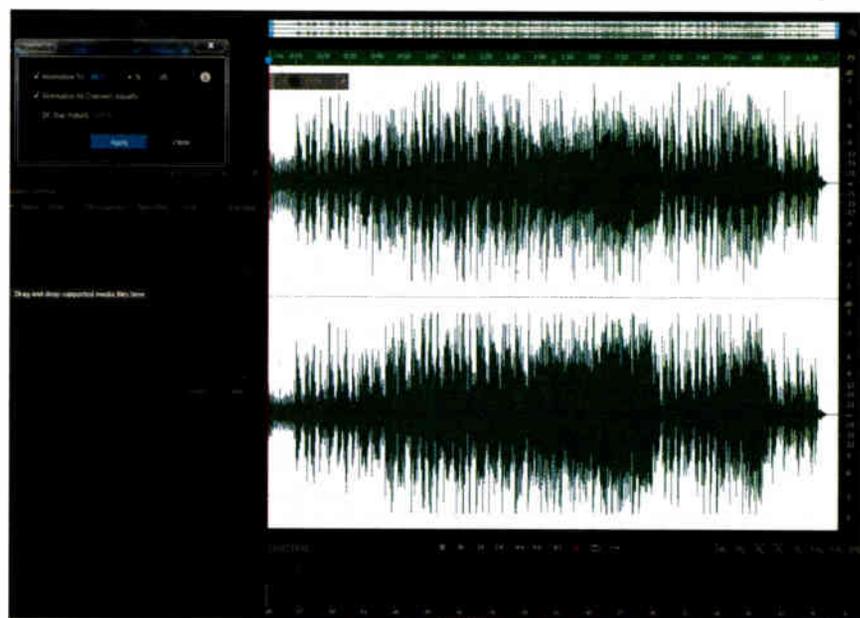


Fig. 2: Normalizing to 98 percent

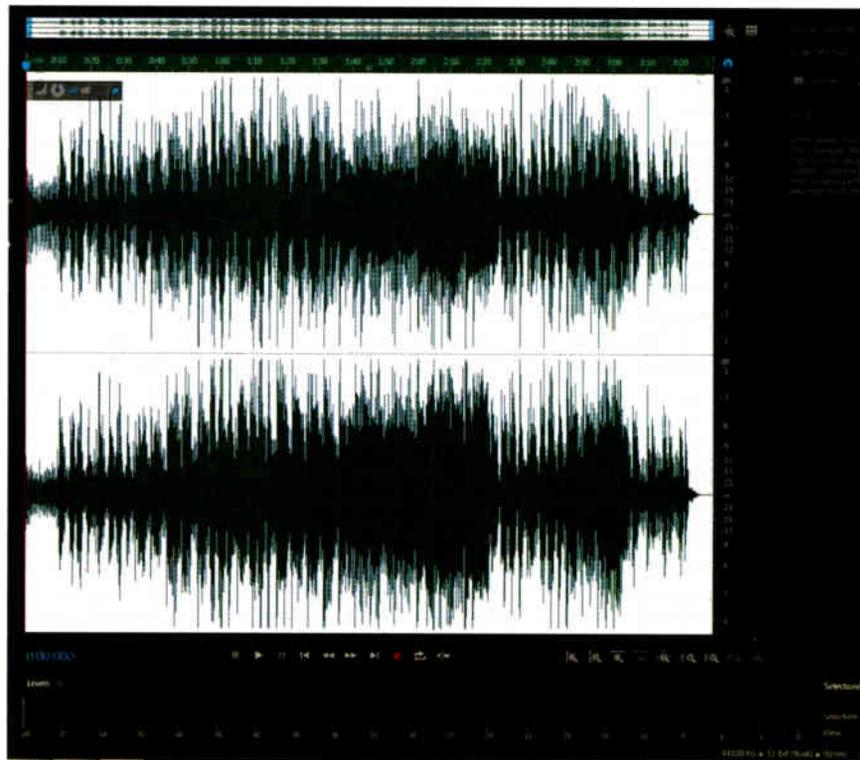


Fig. 3: Final product



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World Radio History

DAW in the Clouds

Can a free (or cheap subscription) cloud-based DAW perform well enough?

FREE SOFTWARE

BY CURT YENGST, CSRE

Amptek Technologies out of Stockholm, Sweden, released Amped Studio, which they bill as the world's first hybrid audio editor.

It allows registered users to access their projects and other content anywhere they have an internet connection. Signing up is free, as is the software; but a "premium" subscription (\$4.99 per month) provides access to additional libraries of audio files

and the ability to use native VST plugins.

By simply visiting www.ampedstudio.com, users can launch the app, register with an email, purchase a premium subscription and generally get an idea of how it works. The free app allows users to export finished projects to a standard WAV format, but email registration is necessary to save projects for further use, as well as to download a native version of the program.

Amped Studio is essentially a loop-based audio editor. If you've ever used Sony Acid or Ableton Live, you get the idea. The free version comes with a fair collection of loops, from drums to bass to piano, to get you started. It's handy for creating short music beds for spots or background music for longer projects. The timeline is beat-and-measure based, allowing for global adjustment of time signature and BPM. Adding loops and tracks is as simple as drag and drop. Audio clips can be time stretched or

compressed, copied, pasted and clipped with some simple mouse moves. Each audio track includes a "device chain," where various processors can be assembled, such as limiting, delay, EQ, etc. There's also a software drum machine and virtual analog synthesizer.

Two types of material can be added to tracks: straight-up audio or MIDI "piano roll" tracks. The piano roll provides a means of taking the imported sounds and editing the individual notes, so any melody or chord structure can be created. Recording raw audio is as simple as opening a new track and clicking the record button. It uses whatever default audio hardware is available on your system. For me, it didn't seem to like the Digigram audio card on my test rig for recording; but switching to a Focusrite Scarlett 2i2 USB interface worked very well.

The interface is somewhat intuitive, although some mouse-over hints would be helpful. Their online documentation is pretty sparse. I found no way of automating fader moves or adjusting volume envelopes on individual tracks, or even the ability to fade or crossfade regions, so mixing an entire spot (VO with music bed) might be tricky at best.

Still, it's a decent tool for scratching out ideas or doing something on the fly while traveling, the upside being that you don't have to download anything to use it. Then again, with internet speeds being what they are these days, that's hardly an issue. But most other free downloads aren't going to come with a built-in library of audio. If they added automated mixing of some sort to this app, they'd have a real winner.

For past articles about studio gear by the author, visit radioworld.com, keyword Yengst.



AUDIO LEVELS

(continued from page 22)

work (including the producer and composer), so we generally minimize any changes to the audio content on a piece-by-piece basis. If we have old source material that needs to be cleaned up, we can do that (say, from an old tape recording with hiss or an LP with pops), but generally we don't change the dynamics on a song-by-song basis.

This is where we allow our audio processors to give the station that overall processed sound we're aiming for — which includes bringing up quieter passages when necessary. Of course radio processing, if done to extremes, can certainly change the "sound" of the song or piece from how the composer or artist intended.

Generally, classical music stations tend to preserve the dynamics much more than pop music stations. A great example of why that might be is the "1812 Overture." When the cannons "boom," it's at a significantly louder level than the orchestral build-up of the piece. With changes to the dynamics through processing, we could easily bring the level of the prelude up to the same level as the cannons, but it would destroy the psychological effect of the "boom" after listening to the rest of the work left at that lower level.

So when listening to your audio files of your station, keep in mind that the levels should always be consistent. Let the dynamics of each source be addressed by processing after the output of the mixing console.

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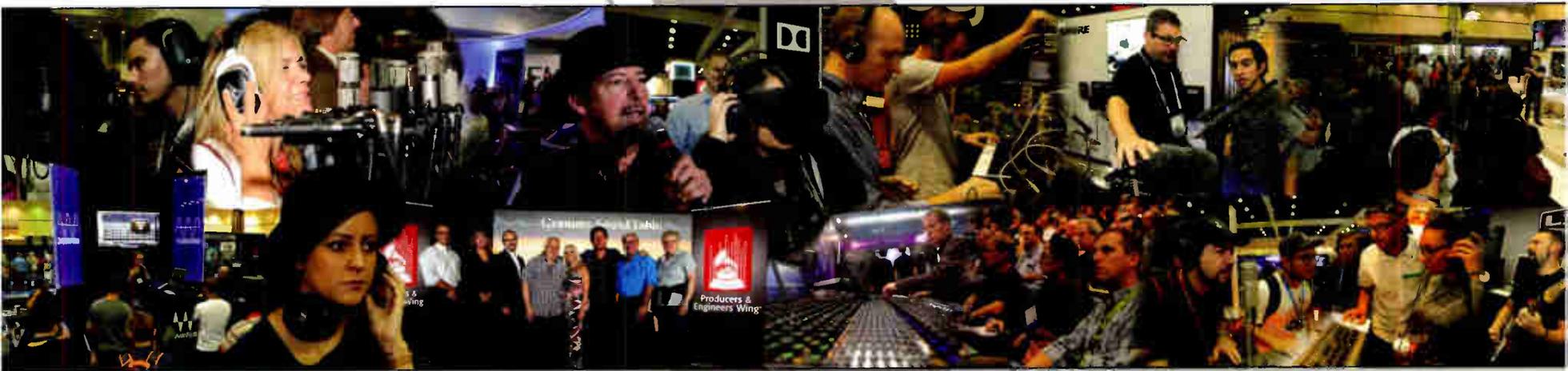
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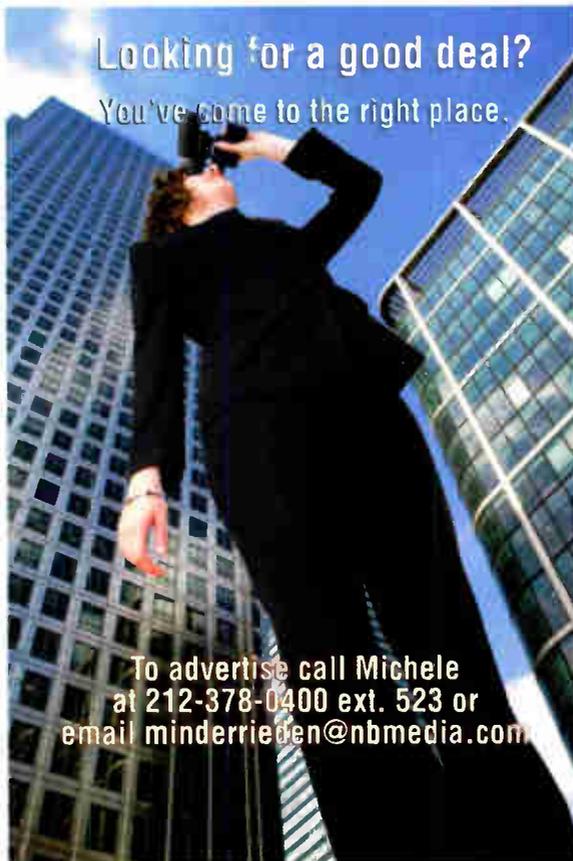
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Readers Value Their Right to Repair

Steve Johnston's commentary in the April 26 issue generated strong response

READER'S FORUM

"You bought it. You own it. You should be able to fix it yourself or have it fixed at a shop of your choice." That quote from the website of The Repair Association captures the sentiment of many RW readers.

Hello Steve — saw your article today and was delighted to see your interest in "our" movement.

The more people like yourself who fight against this ludicrous business model of monopolized repair, the more quickly we will be successful. There are 11 states now with bills filed, but only a couple of them have any serious support behind them. Every consumer in the U.S. is harmed by repair monopolies and has a personal reason to demand their right to repair.

After all, if you don't want to fix your own stuff, you should still have the right to hire someone you trust to help.

People can go to our website and contact their legislators in any state through our advocacy tools <https://repair.org/stand-up/>.

Please feel free to contact me for additional information.

*Gay Gordon-Byrne
Executive Director
The Repair Association
(Formerly The Digital
Right to Repair Coalition)
North Haledon, N.J.*

~ ~ ~

I have spent over 30 years in the broadcast engineering field, and I have also found that it is getting harder to get service information on the equipment we use.

There have been numerous times some piece of equipment would quit working just when it was needed for a

production, and I would have to repair it without any service information.

As I have been told many times, engineers are like firefighters: We are the unsung heroes who always seem to be able to pull a rabbit out of our hat at the right time to save the day. One way or the other, we either get the equipment to work, or we come up with a temporary workaround.

*Roger Newton, CSTE, CBNT
Chief Engineer
OETA(TV)
Tulsa, Okla*

~ ~ ~

A company that does not respect the "right to repair" will lose my support, and failure to provide service information is on its way out.

*Bill Croghan, CPBE WBØKSW
Lotus Broadcasting
Las Vegas*

~ ~ ~

File this under "Things You Paid For But You Can't Touch"? Really!

For years, there have been stickers on equipment with the message "No user serviceable parts inside." All the more reason to provide customer support, if the user can't fix it. But they can't have it both ways on user-serviceable parts. ("They denied there was a problem and would provide no technical details of

their product.")

Of course there are user-serviceable parts. I paid for it. I own it.

If they won't fix it, don't tell me I'm violating a warranty if I try to fix it and the company won't either.

Because if the product was not defective in the first place, maybe from poor design or component failure, this need may never have arisen.

Of course there are user-serviceable parts. I paid for it. I own it.

— Don Elliot

So I do own it. Except for the copyrights, of course. If this is a lease, then so disclose, change the terms and give me some money back!

As far as the phony excuse for competitors stealing the circuit, I am assuming the writer is talking about an American company operating under the protections of U.S. copyright law. They're doing business here. How could they be unaware of this? Finding this out *after* you buy a product is a violation

of sorts because it's "changing the deal."

Although a bit off-topic, there are other elements we have paid for that we as the owner/user cannot access, and for which some reimbursement should rightfully be in order. (Dare I mention the "FM chip"?)

There are a lot of similar frustrating experiences many of us share that are "second cousins" to this situation. Like spending \$6,000 or \$7,000 on a hearing aid that you're not allowed to adjust yourself. Excuse me? I bought it. Paid for it. Took it home. I adjusted the equalizer on my car stereo on my way home ... You get my drift.

*Don Elliot
Owner
Levine/Schwab Broadcasting
KWIF(AM)
Hollywood, Calif.*

As far as I'm concerned, until the manufacturers give their equipment away, we have the right to fix it!

There are virtually no service manuals available for anything anymore. Sure, a new major product is just a computer masquerading as a piece of broadcast equipment, but there is still a need to know — a need to know how it works, what's inside, how it interfaces ... If there is a fuse invisible to the naked eye, I still want to know.

And by the way, if they are going to give their equipment away, they should give us two. We need a spare to stay on the air while we wait for the factory to respond to a service request.

*Robert White
43 years in broadcasting*

~ ~ ~

I wholeheartedly agree with Steve Johnston's position.

This is exactly why every Henry Engineering product includes a schematic diagram and still uses "old school" through-hole components instead of surface-mount parts. SMT is cheaper to manufacturer but virtually impossible to repair.

Very few radio station engineering departments have the equipment or expertise necessary to remove and replace SMT components without destroying a product's PC board in the process. And needless to say, SMT ICs cannot be tested once removed, so it's a lost cause to even try.

We still use DIP ICs, mounted in sockets, for very quick and easy replacement. ICs seldom fail, but when they do, it's a simple repair to replace a 50-cent IC by simply plugging it in. You're "back in business" in minutes, rather

(continued on page 29)

than sending a product back to the manufacturer for repair or buying a new unit because it's not repairable by either the station engineer or the manufacturer.

Sometimes there's wisdom in keeping things "old school," especially if you're the "student" responsible for keeping a radio station on the air!

*Hank Landsberg
Henry Engineering/
Sine Control Technology Inc.
Seal Beach, Calif.*

~ ~ ~

I agree with Steve Johnston's commentary regarding the need for servicing documentation for a newly purchased product.

I, too, have been faced with having to discard an expensive UPS because the manufacturer refused to provide schematics, parts list and other critical information that would have allowed me to repair the unit. I shipped the unit to them for repair (at a cost of \$300 for express delivery) only to be told they do not repair these.

In another case, I was forced to replace a controller PC board in a generator at a cost of \$750 because the manufacturer would not provide service information. The part numbers of the chips on the board had been mutilated, which disallowed any reverse engineering efforts.

Older models are no longer supported by the manufacturer, and some manufacturers are no longer in business. This leaves customers to fend for themselves.

— Tom Osenkowsky

The pace of technology change is rapid. This means products are being improved, updated and replaced by new introductions: older models are no longer supported by the manufacturer, and some manufacturers are no longer in business. This leaves customers to fend for themselves when it comes to service, maintenance and repair.

Documentation is critical to that process. While I do understand a manufacturer's concern that a competitor may benefit from some information, it is also commonsense to realize they may do so without it being handed to them (i.e., reverse engineering).

In an extreme case, I am told that owners of a major brand of tractor are warned against performing certain repairs on equipment they have purchased due to possible violation of the Digital Millennium Copyright Act.

If I buy a product, I expect proper and accurate documentation.

In the case of surface-mounted components, it may not be possible to field repair or even diagnose a problem due to the small size of the component leads. Removing and replacing the failed component is another challenge, unless you have the proper equipment.

It is unfortunate that many times we are faced with needing components that have become "unobtainium"

because they are no longer manufactured. We should not however be encumbered by lack of documentation that would enable us to maintain and repair that for which we have paid.

A client compensates me to perform repairs, calibration and maintenance. If I simply told them to return the equipment to the manufacturer, why would they need me?

I consider myself qualified and educated to perform diagnoses and repairs, and I require the documentation to do so. A manufacturer who disagrees with that philosophy will not have the benefit of my business or recommendation.

*Tom Osenkowsky
Brookfield, Conn.*

~ ~ ~

Long overdue has been a public airing of such an astute opinion as that brought by Steve Johnston.

During my nearly 50 years of working in radio, I have become increasingly frustrated by the diminishing availability and quality of documentation about things that need to be repaired. I recall the days when it was common to have an accurate schematic diagram enclosed with the packaging of most professional and many consumer electronic items.

Fortunately, it seems that many manufacturers of broadcast-related equipment realize the need to provide well-detailed operation and maintenance documentation, including block and schematic diagrams. Over the years some of us have learned a good bit about electronics from the excellent functional descriptions and diagrams provided by manufacturers of broadcast equipment. Large-scale integration and microprocessors are sort of like the "black boxes" of earlier times but all of these yet require supportive circuitry, which is often the point of failure that can be repaired — a task that is much easier if we have the "road maps." Give me a diagram and I'll decide whether I need to spend money for a factory or other repair.

The implication that users do not own the right to do whatever they wish with their purchased property is a repulsive indication of how our society has a diminishing view of those who, without some sort of "certification" or "title" are somehow thought to be dullards who must be protected (read: manipulated) for their own good or, perhaps more correctly, for the profit of those who practice this kind of manipulation. Incomplete documentation may function to the detriment of those whose equipment we choose not to purchase for lack of it.

*Nels Wilson
KBGN(AM)
Caldwell, Idaho*

~ ~ ~

There's another good reason that manufacturers should provide schematic information: Device compatibility.

We engineers deploy devices from different manufacturers in systems, connecting them one to another. Sometimes "middleware" is needed, like a gain block or logic level shift. Knowing the internal architecture behind the external connections makes that a much less uncertain process. It probably avoids warranty repairs and support calls as well.

*Frank McCoy
Chief Engineer
Salem Chicago*

FM TRANSALATORS

Thank you for the article on FCC Chairman Ajit Pai ("Chairman Pai: The Radio World Interview," RW March 29 issue).

He is a bright star in the regulatory universe in whom much hope is invested for the future of radio, and AM radio in particular. I wrote my congratulations to him along with an urge to continue to implement the balance of outstanding items from the AM NPRM.

Unfortunately, much of the article and Mr. Pai's focus continue to stress FM translators as a cornerstone of AM radio's future, whereas nothing could be farther from the truth. FM translators spell the death knell for AM radio because FM translators seduce listeners away from the noisy AM band.

While AM station owners rejoice to obtain an FM translator to enhance their property value, if not necessarily their signal coverage (translators have become a prestige item), by so doing they drive a stake in the heart of their AM station's audience share when lost to the the FM dial.

Rather than switch over to FM at night for coverage continuity, the rules should be changed to greatly curtail the protected coverage contours of Class A and applicable Class B stations so that lower class stations could operate full-time at daytime power levels, rather than reduce carrier levels to some absurdly low figure such as 4 W.

Given the severe and apparently intractable spectral noise factor on the AM band, medium- and long-distance reception is neither popular nor possible for Class A stations anymore, therefore any interference received from lower class stations is irrelevant outside Class A COL borders. For Class A and certain Class B stations, contour protection for coverage outside COL borders is no longer justifiable, and severely impairs the business viability of lower class stations.

I urge Chairman Pai to perform a genuine improvement to the AM broadcasting service by changing the rules to permit full-time, full-power operation of Class C and D stations, so that station owners can improve their existing AM transmitter plants for consistent COL coverage, rather than resort to FM translators.

Concerns about nighttime skywave interference from lower Class stations operating at daytime power are overblown.

Furthermore, subsequent such a rules change, I recommend sunseting FM translator licenses to de-clutter the FM band once such are no longer needed. Let's keep listeners on the AM dial to the maximum extent practicable.

*James B. Potter
Cutting Edge Engineering of Missouri
Kimberling City, Mo.*

WRITE TO RW

SEND A LETTER TO THE EDITOR:

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

An Engineering Career Taking a Different Path

Ham radio enthusiast chooses the profession of radio electronics officer

COMMENTARY

BY KELLY ANDERSON

When I was a kid in junior high school in the mid-1970s, I happened across a fascinating book on the shelf of the school library. It had lots of black-and-white pictures of big transmitters and antennas and microphones. The book was all about building and operating one's own radio station. I was immediately hooked!

I checked it out and pored over its pages ... only to be disappointed. It turns out I was wrong. These were no home-built broadcast stations spinning stacks of wax and beaming their voices to their neighbors' AM radio sets. Instead, I'd accidentally stumbled across amateur radio (unfortunately, at least in my mind), not to be confused with "professional radio."

So I couldn't simply plop down a high power transmitter in my basement and start yakking? I had a lot to learn about radio, not the least of which is that there was a little government agency known as the FCC that might have a say in such things.

Eventually, I did pass the required exams and got my amateur radio license, and I took solace in the fact that at least I could put a signal on the air, even if the entire town couldn't hear my prepubescent voice, and I couldn't play my favorite records for them. As it turns



out, I ultimately did have a short career in the world of broadcast radio, but that's a story for another time.

What my accidental fall into amateur radio as a kid led to later is what I want to talk about here. Another library, another book. This time, I was in high school, and the book was an introduction to shipboard radio officers. That word — "radio" — again! And what do you know but my newfound hobby appeared to have a lot in common with that career?

Morse Code, check.

Transmitters, check.

Antennas, check.

And when I turned the page to see the picture of a sharp-dressed proud officer, standing on a mast pedestal and working on a radar scanner, I was sold

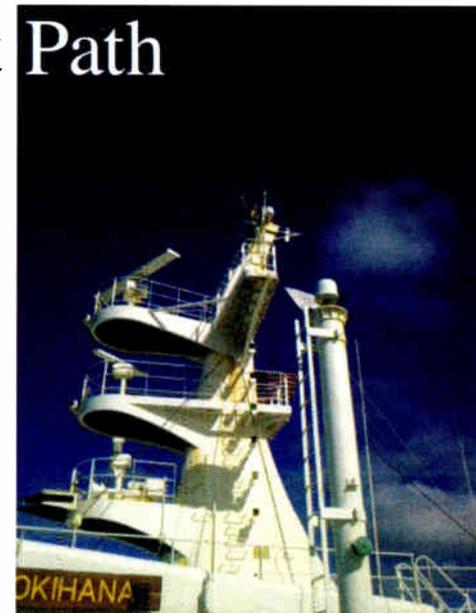
(again). So, if I understood correctly, I could be paid to do what I enjoyed, while sailing aboard a ship and visiting exotic ports around the world? Sign me up!

RADIO ELECTRONICS OFFICER

To make a long story slightly longer, 10 years after high school I did join a seagoing union, the American Radio Association, and started sailing aboard vessels of the U.S. Merchant Marine.

It's been a long and interesting voyage. I've tasted the sea salt of yesterday when Morse Code was king on a medium-frequency lifeline that was the only connection with the outside world, sometimes thousands of miles away. I feel fortunate to have seen the waning days of that chapter of nearly a century of maritime wireless history.

But I've also witnessed a great evolution in technology aboard the vessels



A view of the main mast of the MV Mokihana, showing navigational and communications antennas, including X Band and S Band RADAR, HF Radio, VHF radio, GPS and Standard-B, C, and Mini-M satellite domes. The author can be seen waving from its top.

I may be repairing a coaxial feed line to an antenna on the flying bridge in the morning and calibrating the throttle in the engine control room in the afternoon.

I've sailed on and great changes in my own experiences and daily routine at work to go along with it.

When I began this career, it was primarily a sedentary job, consisting of sitting in front of a large console of vacuum tubes, knobs and switches, ferreting out the subtle signals of far away ships through the static crashes of thunderstorms at sea. Nowadays, I find myself in all parts of the ship on any given day, working on everything from navigational computers to the automation that controls the main engine.

I love my job. From day to day, I never know what I may be working on, learning about and getting involved with. And I'm somewhat of a free agent on board. Depending on the need at the time, I may be working for the captain or for the chief engineer. I may be repairing a coaxial feed line to an antenna on the flying bridge in the morning and calibrating the throttle in the engine control room in the afternoon. The modern day radio electronics officer doesn't much resemble his or her counterpart from a quarter century ago.

What an incredible ride it has been.

I've sailed on container ships to Hawaii, surfing the beaches of Waikiki, and I've crewed military cargo ships supporting exercises in Thailand, where I've experienced the local culture and tasted the local cuisine. I may not have sailed the seven seas, but I have indeed sailed five of them. And every single day of that adventure has been filled with learning something new or seeing something for the first time.

I think my little stumble into radio as a 14-year-old kid has paid off OK.

I could have had a very satisfying career as a broadcast engineer. That's where I was headed. But it's funny how life sometimes deals you interesting twists and turns. I found myself instead using much of the same skill set with the added dimension of being a seafarer and traveling the world.

Now, where did I put that stack of wax?

Kelly Anderson is the president of the American Radio Association. He lives in southern Utah with his dog Radar. The ARA is currently seeking skilled electronics technicians and engineers. You can contact them at www.araunion.org or via email to araship@mail.com.

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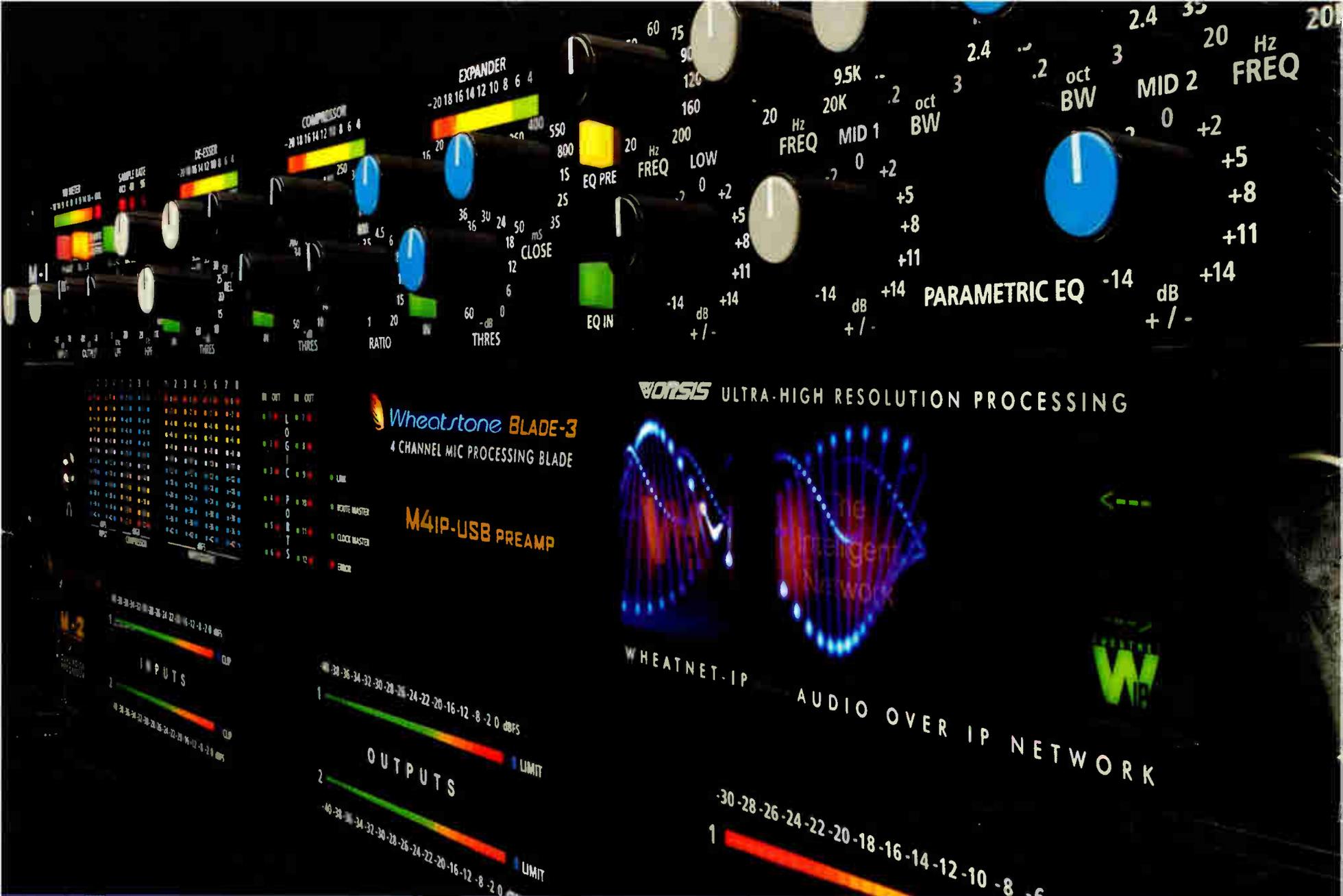
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