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How to Get the Most Out of Your Remote Control

We invited these manufacturers to share tips and to look ahead at future designs

BY PAUL McLANE

If they are to manage effectively, radio broadcast engineers need good, reliable data about all of their stations, including distant transmission sites.

As Matt Leland of Burk Technology puts it, "A modern remote control system enables engineers to focus their efforts on the most critical tasks, reducing off-air time and eliminating unnecessary travel to remote sites."

How can you get the most out of this broadcast infrastructure tool, and how are remote controls evolving?

We asked several manufacturers.

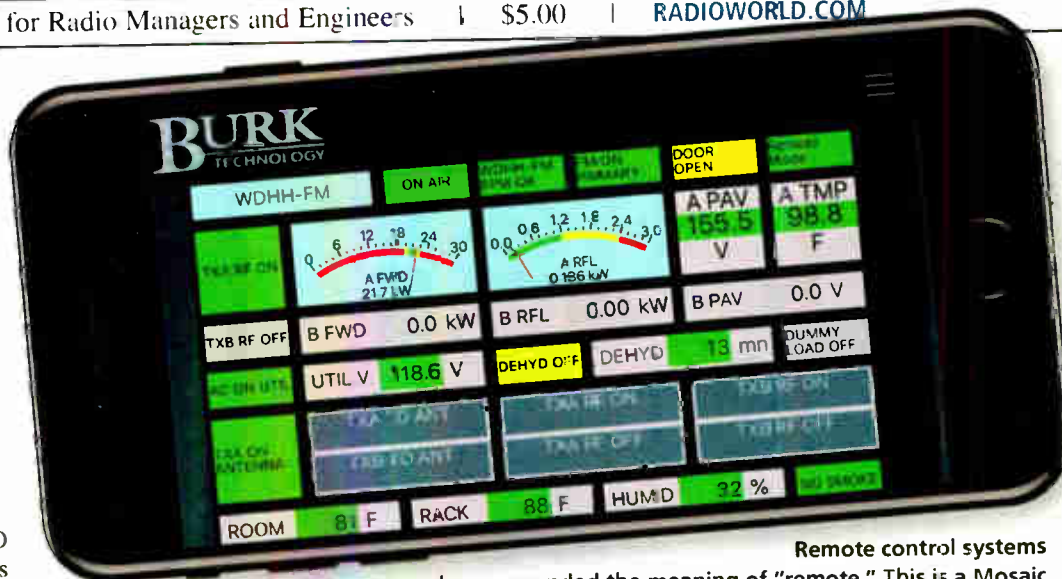
GETTING STARTED

Nicolas Boulay, co-CEO of WorldCast Group, notes how far the technology has come.

"Twenty years ago it was wonderful to receive a simple SMS over GSM, alerting me which relay was OFF, even if that information was received five minutes after the event," he said.

"Now technology offers much more, but the goal remains the same: to control and manage remotely."

He thinks the most important point is to define the purpose of your remote control, to decide what kind of information is useful for each action, rather than



Remote control systems have expanded the meaning of "remote." This is a Mosaic from Burk's Arcadia remote access system displayed on a smartphone.

just aggregating a lot of data.

"In the past, it was the opposite: it was the technology capacity that defined what the user could do. Today, it's the user who defines what he or

she wants, and can ask more or less for everything."

CircuitWerkes President Kyle Magrill said many factors go into selecting a

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Radio Leaders Look Beyond Pandemic

Three CEOs see some bright linings despite revenue drops and business uncertainty

BY RANDY J. STINE

CEOs from three of the largest U.S. commercial radio groups say their industry is well positioned to move past the COVID-19 pandemic when the time comes.

Mary Berner, president and CEO of Cumulus Media; David Field, chairman, president and CEO of Entercom Communications; and Bob Pittman, chairman and CEO of iHeartMedia participated in a group conversation

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BUSINESS OUTLOOK

(continued from page 1)

for the 2020 Radio Show, which was produced online by the Radio Advertising Bureau and the National Association of Broadcasters.

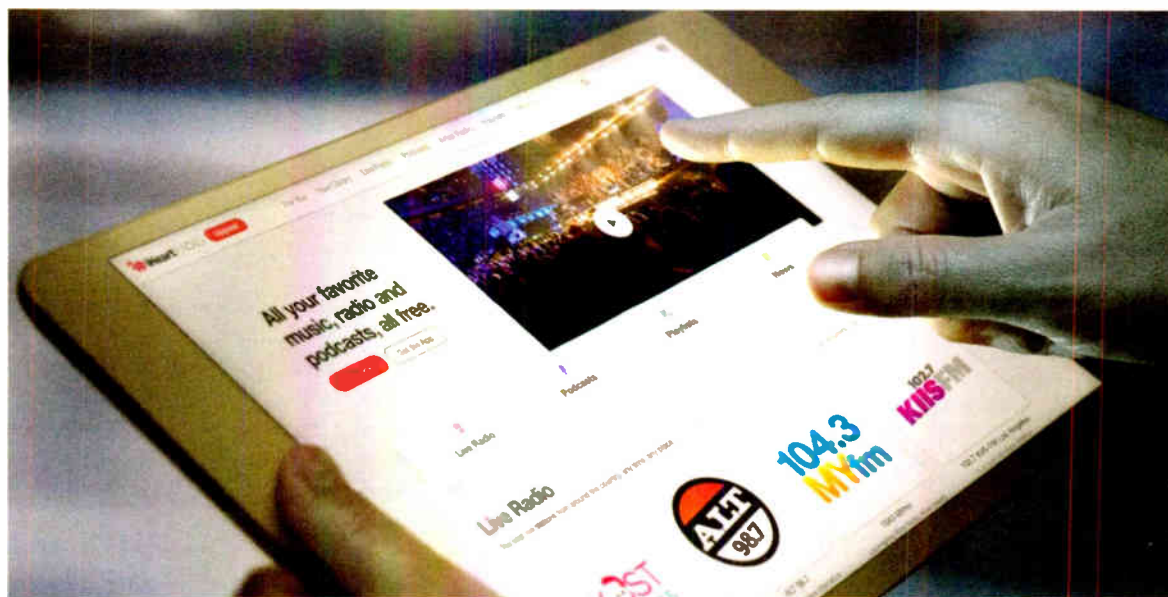
The business leaders gave their views about the massive business disruption and the challenges and opportunities it has presented.

They described a phenomenon that many Radio World readers have experienced directly: The pandemic has accelerated some aspects of the industry's technological evolution through forced adoption of work practices that increase efficiency and flexibility.

And their conversation touched on further possible changes as more of the radio air chain moves into the cloud.

"RELIABLE COMPANION"

The conversation never steered far from the economic environment caused by COVID-19, but the CEOs sought to project a positive attitude.



An iHeartRadio promotional image highlights the multiplatform nature of its audio offerings.

"Radio has persevered as it always does during times of crisis. This has provided us an opportunity to be stronger and better. The audio industry is in great position to thrive and move ahead faster than when we went into it," Field said.

In some ways, said Bob Pittman, "We've actually strengthened our relationship with the consumer. We have seen this before. Following a disaster or tornado, radio come out of it with a stronger relationship with the consumer because we are a reliable companion."

Cumulus describes itself as "an audio-first media and entertainment company," and Berner's choice of words in the conversation echoed that theme.

She says the industry's ability to serve listeners from "anywhere and everywhere" has made the medium stronger during the crisis. "The audio platform has been extraordinarily resilient. Consumer behavior radically changed during the shutdown but yet audio has remained a vibrant part of the day-to-day lives of our listeners," she said.

"People weren't in cars as much, for broadcast radio listening dipped a bit, but that was more than set off by increases in streaming, listening on at-home devices and podcasting. Listening just shifted as opposed to

going away."

As Americans started getting back on the road, Berner said broadcast listening had rebounded to over 90% of pre-pandemic levels.

"The economic uncertainty is probably the biggest challenge the industry is facing. Nobody has a crystal ball. We are not sure what is going to happen. We all have to be very focused on the generation and preservation of cash and building up liquidity and shore up our balance sheets," she said.

Shedding some insight into their power-player relationship, Berner disclosed that in the early phase of the pandemic, she spoke with Field and Pittman by phone "several times a week" as broadcasters began modeling what-if scenarios for operating in their new normal.

"We came together as an industry — for instance, in working together with Nielsen to determine a fair measurement of listening during this time of so many unknowns," she said.

"I think we need to keep working together. We are all making decisions very quickly that may have taken months and months to consider. Some of them might have been uncomfortable in the moment, but they will

be beneficial to the business in the long run."

She also noted that "broadcasters won't need the real estate footprint they thought" once they go back into their physical spaces.

TECHNOLOGICAL CHANGE COMING

David Field of Entercom said the company is focused on what it will be when it emerges from the economic malaise of the pandemic.

"There is technological change coming, and the competitive dynamic is evolving. Consumer trends are evolving. Our companies have enormously powerful audio platforms of local and national celebrities, podcasting and digital audio," he said. "We need to harvest that and become growing vibrant organizations on the other side" of the pandemic.

Accelerating the use of data analytics and attribution is crucial, Field said, to ensure that radio can become a more meaningful part of advertisement spending.

"Radio has often been the kids in the other room trying to get in. We were being held back by several things. One of those reasons has been scale. We didn't have the scale as organizations in a highly fragmented

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BUSINESS OUTLOOK

(continued from page 3)

industry," Field said.

"Now Bob and Mary and our company can go to advertisers and to play at a much different level. We all have deep podcasting lineups and strong digital audio platforms. Our offering is much more robust and impactful. Now we have the data to go in and demonstrate how radio advertising works."

REVENUE HIT

All three companies reported significant fall-off in revenue as a result of the novel coronavirus pandemic during the second quarter of 2020.

For example, for the three months ended June 30, Cumulus reported net revenue of \$146 million, a decrease of 48% from a year ago. iHeartMedia Q2 revenue also was down by nearly half.

All three broadcasters were forced to institute cuts that included layoffs, furloughs and pay cuts earlier in the year. In addition, Cumulus and iHeartMedia recently sold off a number of broadcast tower holdings to raise cash.

The roundtable, moderated by Stephanie Ruhle of NBC News, briefly touched on possible policy changes regarding ownership rules and further deregulation of the broadcast industry.

"We are always navigating policy," Pittman said. "It's hard for policy to catch up with technology. Today we are still regulated as if all the technology is in one radio station and all that we do is with a transmitter and tower. The idea that we have all of the equipment



On-screen during the virtual event, clockwise from upper left, are moderator Stephanie Ruhle of NBC News; Bob Pittman of iHeartMedia; David Field of Entercom Communications; and Mary Berner of Cumulus Media.

in one location ignores that fact that the cloud is where everything is going."

He continued: "If I have the studio in the cloud, then what do we have left in the building? And what regulations are related to that and which ones are not? It's the inertia of what it was, and we have to change it to what it will be."

Berner said broadcasters are still "really limited by policy to what we can do with consolidation and other moves we could make to strengthen the industry."

The Supreme Court recently announced it would hear an appeal by the FCC and NAB seeking to reinstate several updates to the broadcast ownership rules. In November 2018 the commission decided to abolish

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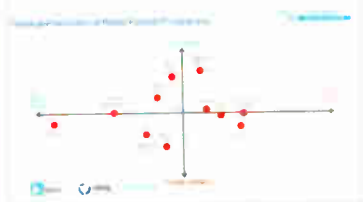
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the newspaper-broadcast and radio-TV cross-ownership rules and rework the radio AM-FM subcap regulations. However, those changes were blocked when the Third Circuit Court of Appeals concluded that the commission had not thoroughly analyzed the potential effect of the changes on female and minority ownership of stations.

Field said ownership rule changes would help ensure the long-term survival of the industry.

"The ownership rules around radio continue to be reflective from a different era from a competitive standpoint. We must preserve the sanctity of the AM/FM band."

The panel chafed a bit when asked if innovations have been derailed because of the pandemic.

"I don't think we stopped (innovating)," Berner said. "In fact, in some ways we have accelerated our adoption of new technologies and work scenarios. We want to be where the listeners are. We need to deliver great audio content wherever and whenever it's needed. We have doubled down on smart speakers and invested in our podcast platforms."

iHeartMedia is leveraging its stations to promote its iHeart-Podcast Network, typically one of the top podcast publishers in the United States each month. In fact, the network had the most downloads and streams in September as measured by Podtrac.

"Nothing has the growth rate of podcasting," Pittman said. "Our podcasting revenue grew 100% in the second quarter of this year (from 2019). Our usage is up 35% to 40% in that same quarter."

"It's no secret that radio is having success with podcasting because it is very much a radio experience. It's a host chatting about something," he said.

"And the silver lining right now to this terrible situation we are in is that we have an opportunity to get people to try our new products like podcasting."

The state of the economy is the ultimate challenge, Berner concluded.

"While better, it's certainly not to the level pre-pandemic. We have a long road ahead of us, but fundamentally I think we are well positioned."

And Field added a bright note, saying the pandemic disruption for now has lessened. "We have seen a substantial amount of pickup in demand for advertising into the fall. I'm optimistic we are climbing out of this."

MARKETPLACE

Shiny!: Audio-Technica has released new limited-edition AT2020 Series studio microphones — the AT2020V (standard) and the AT2020USB+V (USB model), each featuring a reflective silver finish.

The side-address condensers are equipped with low-mass diaphragms custom-engineered for extended frequency response and transient response. The mics' cardioid polar pattern reduces pickup of sounds from the sides



and rear, improving isolation of desired sound source. All models in the AT2020 mic line are aimed to provide a wide dynamic range and handle high SPLs. Both of the limited edition V models come with AT8458a shock-mounts to attenuate noise, shock, or vibration transmitted through a mic stand, boom or mount.

The AT2020V is intended for vocal pickup in home-studio applications and features an analog XLR output for connection to a digital converter or mixer. The AT2020USB+V, applicable for podcasting, streaming, home studio recording and voiceover use provides the convenience of plug-and-play USB operation. The AT2020USB+V features a built-in high-output headphone amplifier with volume control that allows direct monitoring of the microphone signal with no delay.

It also offers a mix control that blends microphone and prerecorded audio. The microphone's A/D converter has a 16-bit, 44.1/48 kHz sampling rate, and a 10-foot (3.1-meter) USB cable is included.

The microphones are currently available in the U.S. priced at \$149 (AT2020V) and \$199 (AT2020USB+V).

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REMOTE CONTROL

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remote control.

“First, make an ordered ‘wish list’ of features that you need and then add the features that you want,” he said.

“Second, make a list of features that you dislike and don’t want to have in your system.”

An example of desirable features might be multiple ways to connect to the product such as network, serial port and telco. An undesirable feature, Magrill said, might be the lack of an indication that the network connection to the user interface is lost, misleading you into thinking that you’re connected to the remote unit when you’re not.

“When deciding on the actual product, don’t waver on the ‘must have’ features, and try not to compromise on the more ‘desirable’ ones,” he continued.

“Remember that you will have to live with your choices, possibly for many years. For example, if your site is very remote, you may want to get a remote control that has both telco and internet capability, for redundancy. Don’t settle for one that has only one or the other. If you have multiple sites, it might be important to have a set of remote controls with the ability to be simultaneously monitored from your network operations computer.”

Bob Tarsio, president of Broadcast Devices, encourages customers to be well-informed both before and after purchase.

“The best way to have a good outcome is to read the technical manual thoroughly before planning the installation. This way you know what you need to do and in what order including information needed for setup, tools to have on hand and how to get the most out of customer support.”

Plan the installation for when you have time to do it right and have the resources you need when calling customer support.

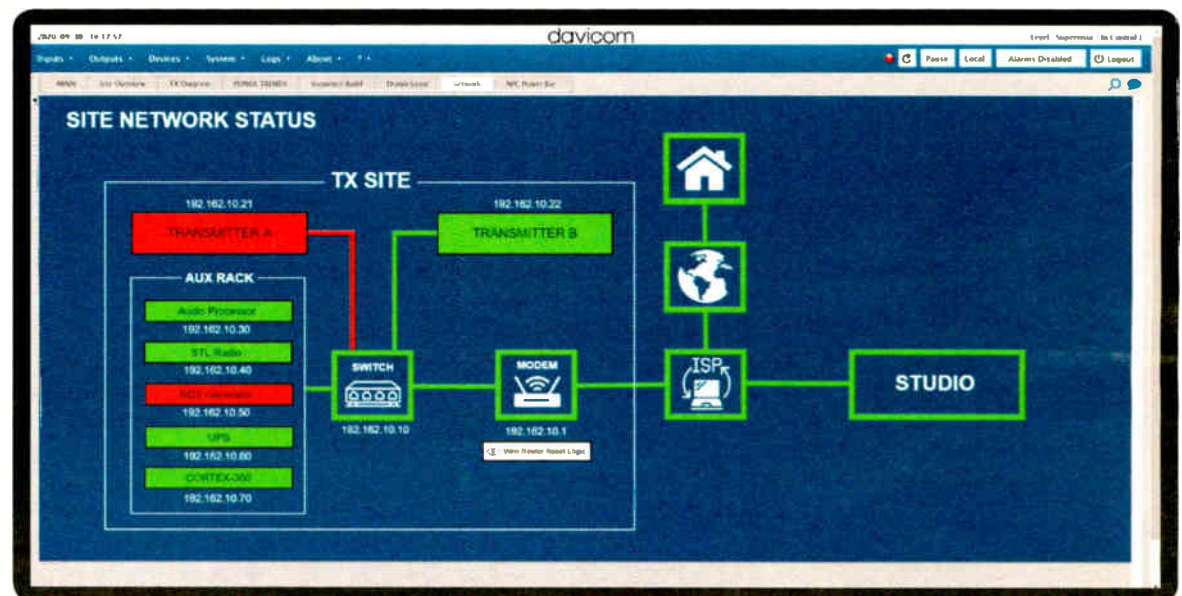
“Things like having your laptop ready to go, a good internet connection and a good telephone to call for support when you need it,” Tarsio said. “This may sound basic, but all of these things go into a good experience for fast installation and easy setup.”

Ask your vendor what’s included, such as software and SNMP capability. Tarsio reminds customers to consider options that BDI offers such as expansion panels, premade cables for motorized switch interfaces, transmitter interface cables and accessories such as prewired temperature and pressure sensors.

Connectivity is another factor to ask about and understand. “Since our SWP-300 series are SNMP agents, they can be connected via our provided GUI or even the competition’s system. Just load our MIB into brand X or Y SNMP-based remote control and you have complete control and monitor capability of every parameter on one system. This also allows NOCs to easily interface to a site with one MIB file.”



Remote control systems are tasked with managing increasingly complex site networks. Shown is a CircuitWerkes Sicon-8 system in multisite mode.



This Davicom network monitoring and management system can monitor the complete site LAN as well as the remote WAN, ISP, studio and internet connection all the way back to the engineer’s home.

(Management Information Base, or MIB, is a text file that lists data objects used by a piece of SNMP equipment.)

THINGS TO REMEMBER

At Broadcast Tools, Don Winget is founder and president, and Ben Nason handles product development, tech support and engineering.

“Start with the basics, which means setting up email alarms,” they wrote by email. “For broadcasters who are not necessarily IT experts, configuring a remote control to send email (SMTP) can be a little daunting, but it’s easy once you know what server settings to use.”

For those who don’t already have that information, they recommend using an SMTP service from third-party provider SMTP2Go, which features multiple authentication options as well as email tracking for

more advanced users.

“Once you have alarms and email set up, you might want to delegate some local functions to the remote control,” they wrote.

“The easiest way to do this on our remote controls is with a feature we call the Event Action Sequencer, which uses a simple syntax for logic functions. All you need to do is fill in the blanks.”

For example, to trigger a relay output for one second when a high-temperature alarm occurs, the configuration would be: *When (Temperature) is (in High Alarm) delay (0) seconds then engage for (1) second.*

“The email inbox isn’t always the best mechanism to get people’s attention when the remote control detects a problem,” Winget and Nason noted.

“Luckily almost everyone has a cellphone, and the cellular carriers provide email-to-SMS text message gateways that make it easy to convert an email alarm

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9 MISTAKES TO AVOID WHEN BUYING A TRANSMITTER

message into a text message using a special email address with customer's phone number in it."

For more advanced users interested in getting started with SNMP, they recommend checking out MIB Browser from iReasoning, a cross-platform application for working with SNMP MIB files, SNMP traps and accessing data/controlling devices using SNMP GET and SET.

THINK BROADLY

Matt Leland, the director of sales for Burk, recommends that you think of this whole process as managing your facility and not just the transmitter.

"Monitor your critical systems: tower lights, transmission line pressure, room temperature, air chain equipment, silence sensor, PPM to name a few," Leland told Radio World. "Use timer channels to keep track of tube life or hours on the filter in your air handler."

Burk clients can use the company's Jet Active Flowcharts to automate site functions such as switching to the standby transmitter.

"Use remote data captures as an analytical tool, drilling down for additional detail related to alarms or equipment failures. Use virtual channels to calculate efficiency and to cross-check power metering by comparing measured power to calculated indirect power."

Leland also recommends that you not set alarm notification thresholds too tight.

"Set each threshold at the point where you should take action. Use alarm roll-ups to consolidate notifications from a cascading event such as loss of power at your transmitter site."

At Davicom, President John Ahern said a point of emphasis is the reduction of false or nuisance alarms.

"Having a remote control is supposed to reduce your workload," he said, "but if it sends too many alarms, users will begin to mistrust it and their workload may actually increase! So fine-tuning thresholds and applying different measures to mitigate false alarms can go a long way towards making users more productive."

CLOUD THINKING

We hear much these days about the cloud and the related subject of virtualization, so we asked the manufacturers how those conversations affect facility remote control planning or products.

Leland said Burk's Arcadia is built for the virtual environment: it runs on an AWS Virtual Private Cloud instance or on an on-premises customer owned server, giving engineers access to their remote sites over one secure web link. Its graphical mobile interface presents high-level summary information with drill-down capability to access moni-

Plan the installation for when you have time to do it right and have the resources you need when calling customer support.

tored equipment and functionality in the virtual and physical plant.

Davicom's Ahern says moving to the cloud is a nice concept. "But consider Wikipedia's definition: cloud computing operates on big data, while edge computing operates on instant data," he said.

"I think that at the transmitter site, we're talking more about edge computing and fast processing to react to issues like lightning strikes, equipment failure, network throughput reduction, to name just a few."

Cloud computing requires an always-

on link to the cloud, Ahern continued, but many transmitter sites may lose that link as soon as, for example, a UPS runs out at the cellular communications tower.

Although the cloud may be expanding slowly towards the transmission site, he said, a robust system should always have a smart edge computing device — the remote control — at the site to keep things running, or at least keep a log of what is going on, during bad situations.

"This edge computer should be capable of handling various tasks at the site.

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REMOTE CONTROL

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well beyond simply controlling the transmitter. The same device should be able to control and monitor subsystems like the HVAC, network, utility power and generator, antenna deicer, audio processors, backhaul links and of course, the transmitter.

“For example, it should be able to take control and

try to restore connectivity to the studio (or the cloud) working from the remote end, while the station engineer is trying to restore things from the studio end.”

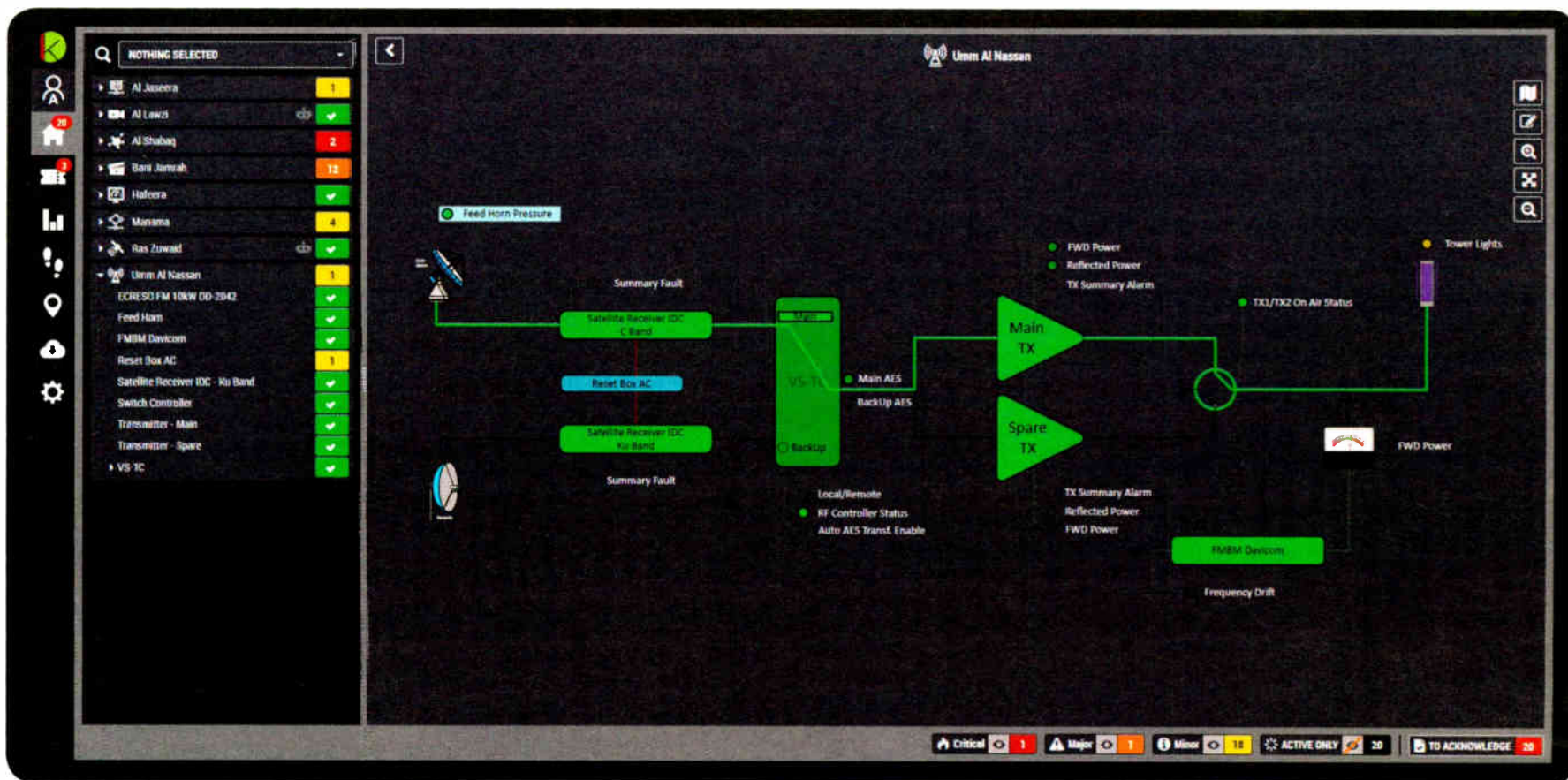
Asked about the cloud, Boulay at WorldCast Group noted that remote control designs naturally follow the evolution of infrastructure.

“At the beginning, remote control meant the management of physical I/O — analog, digital, relays. Then protocols like SNMP replaced I/O. And now, in the majority of cases, remote control means the manage-

ment of API, including the cloud.

“So of course, technically speaking, tools for performing remote control are completely different. But the end goal is the same: to make sure your radio station or web radio is on-air or its stream is accessible, and to manage all the redundant processing automatically.”

For Winget and Nason of Broadcast Tools, the concept of “virtual” in this context means less focus on a central piece of hardware and more on remote control hardware as peripherals distributed throughout



Control dashboards are more sophisticated. This image of a KYBIO system from WorldCast Systems shows dynamic and contextual dashboards based on SVG files.



The HTML-based monitor and control web page of a Broadcast Tools WVRC-8 Plus remote control.

the studio and transmitter sites, tied together over the network with an SNMP manager that can collect, store and display data from devices all over the network.

“As a remote control hardware manufacturer our goal is to provide products with features that strike a balance between the need for local/standalone operation as well as network-based ‘virtual’ operation via SNMP,” they wrote.

“This is why we provide built-in features like a smartphone-compatible HTML-based web interface, a relay event scheduler, support for notification via email/texting and POTS telephone (on our WVRC-4 Plus and WVRC-8 Plus remote controls) in addition to support for SNMP.”

IMPORTANT TRENDS

What about other notable trends?

Ahern says that because everything is becoming network-centric, there’s more need for network status and performance monitoring.

“Being able to ping different network branches and devices, and using that information to automatically reroute data or restart network elements, will help to proactively manage network infrastructure to keep it operating smoothly.”

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REMOTE CONTROL

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Winget and Nason wrote, "This may be a no-brainer for some folks, but as we rely more and more on virtual systems and IP networked devices in areas like remote control and audio, it's important to plan for what will happen when the network — be it your LAN, WAN or internet service — fails.

"This means being smart about implementing network failover and backup options like cellular modems or POTS lines so that you can maintain connectivity with your remote control when things go wrong."

manufacturers' equipment to a software or hardware platform easily with Cat-5 cables instead of a soldering iron and a crimping tool," he said.

"We pioneered SNMP technology over 10 years ago with the DPS-100D power meter and the SWP-200 series motorized switch controller, which was the industry's first SNMP RF switch controller."

Now the company's SWP-300 is SNMP-based and its software platforms all run with SNMP technology.

He said events and storage are a natural for cloud-based technology because the information can be obtained and stored off-site in case it is needed later. "Software platforms are undoubtedly going to be impacted by cloud technology as well. Software plat-

allows this to happen easily and provides flexibility in NOC location and capabilities."

The "internet of things" is coming into the conversation. Matt Leland, while agreeing on the usefulness of SNMP for bringing in additional data, said, "Additionally, Burk is releasing API for ARC Plus, enabling our customers to bring data from a growing range of IoT devices into the AutoPilot environment," he said.

"For example, the API could be used to integrate weather information from the internet as remote control channels with associated alarming and logging. This expands the scope of the remote control system beyond the limits of parallel wiring and SNMP."

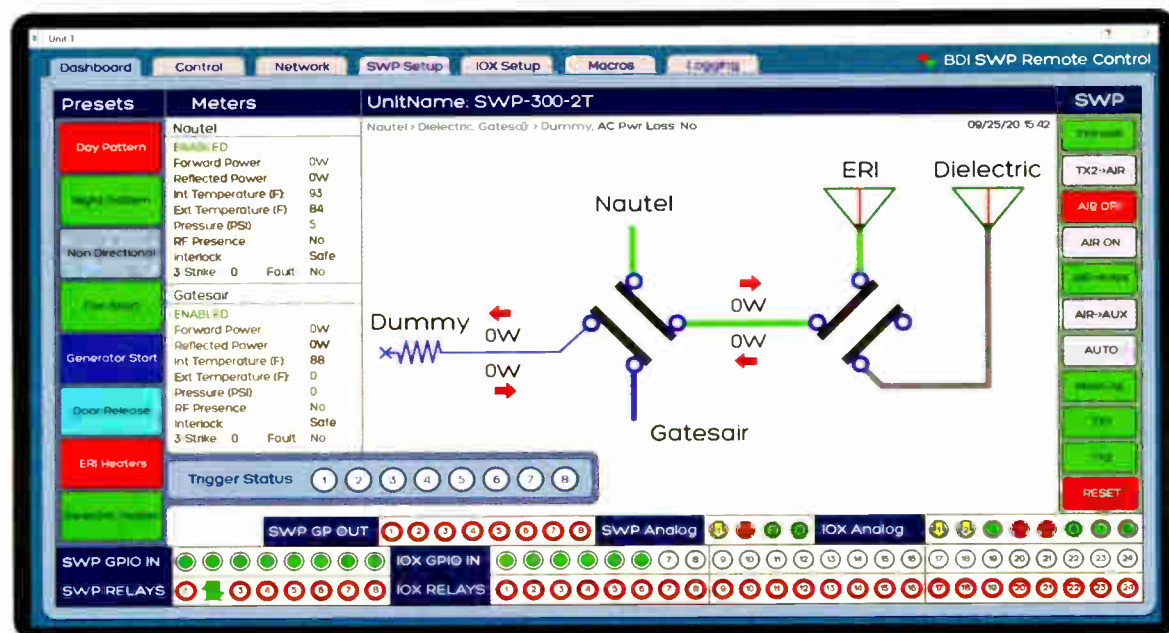
Nicolas Boulay mentioned the growing importance of compatibility with multiple protocols, given the number of manufacturers and brands and even generational differences in equipment found in a NOC.

"It must be able to do I/O, be compatible with field-bus systems such as CAN, SNMP, advanced protocols and even proprietary protocols."

Remote controls, he said, are being asked to provide a comprehensive view of infrastructures that are increasingly complex, even multifunction and multiplatform. They must also provide tools for action once the cause of a problem is identified.

Users also want automated action for better redundancy management. "This applies to a NOC level as well as on a local site level. This is extremely important. In the case of a connection loss between the NOC and the sites, it is crucial to have a local intelligence capable of automatically taking decisions without human interaction."

On top of all this, Boulay added, users want their interfaces to be simple and intuitive, despite the complexity of the job being done by the system.



Screens pack more functionality, as in this SWP-300 Dashboard from Broadcast Devices. Alarms and actions are noted; tabs allow detailed inspection of specific parameters. Basic macros for functions such as switch control are programmed; other macros can be programmed on a button or provide necessary action and alerts. Timed events can be programmed via macro functionality, and macros can be triggered within macros as well providing full feature programming capability.

They also noted that web browser support for Adobe Flash Player is ending this year, which has obligated a number of manufacturers to develop updated web interfaces for their products.

"Several years ago we faced a similar situation with some of our products when web browser support for Java was significantly reduced. Like many others we chose to develop HTML5-based web interfaces, which are now standard across our products. We feel that the shift to interfaces that use web standards like HTML5 has been a positive one for our customers, and as more manufacturers follow suit, that change benefits the industry as a whole in terms of accessibility."

Bob Tarsio said that without question, SNMP has been a game changer.

"With Simple Network Management Protocol as a common standard, a user can interface different

forms can be run from the cloud from virtually anywhere to control anything anywhere else."

Also, Tarsio said, network operations centers are becoming more common. "Again, SNMP technology

SPECIALIZED DEVICES

At CircuitWerkes, Magrill said, "We did see the trend for more internet-based stuff coming back in the early teens. For the past seven years, we have had a streaming audio option on our units that allows the user to stream confidence audio to them or allows the remote control to receive an audio stream as a backup STL."

Magrill expects there will always be demand for new remote controls, especially where telco access or streaming audio are desirable, but says many smaller

(continued on page 13)

MARKETPLACE

HD Radio Tool: 2wcom's latest is the HDR-CC, an HD Radio capture client for the delivery of additional HD Radio channels.

The company explains that by using the unit, users can set-up the importer IP address and directly connect audio to the small box's XLR connectors.

The box is able to accept one digital or analog stereo audio channel and provide it to an importer. The unit also sends the compressed audio via IP using an HD Radio codec. The HDR-CC can thus be located in a different location than the importer. Due to HDR-CC's sound processing capabilities the loudness is almost the same as on the main program.



In addition, 2wcom says the unit simplifies audio switching for emergency alerts. Utilizing a new feature Xperi has implemented in Generation 4 importers, a single HDR-CC is able to provide the entire emergency alert for all supplemental channels on the transmitter.

The company points out that the only set-up required is an AES audio connection to the capture client and a GPI to trigger the alarm. When the alarm is triggered the HDR-CC logs into the importer and replaces all supplemental channels (HD2-HD4) with the alarm program. After the GPI is released the HDR-CC logs out and the importer continues with normal operation.

Info: www.2wcom.com

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Report Profiles P1 Listeners by Format

Infinite Dial research emphasizes that U.S. listeners certainly aren't monolithic

BY PAUL McLANE

A report from Edison Research and Triton Digital contains a wealth of interesting insights into behaviors of listeners of different radio formats.

The researchers took data from the annual Infinite Dial study of digital consumer behaviors and applied it to 11 radio formats to make some conclusions about P1 listeners.

They found that radio "continues to have a hardware challenge," particularly with younger-leaning formats.

"Eleven formats were indexed against the market average for owning a traditional radio receiver in their home," according to a summary.

"Formats whose P1 listeners are more likely to own an in-home radio include classic hits, classic rock, country, hard rock/heavy metal, news/talk, and sports. Formats less likely to own an in-home radio include alternative rock, contemporary Christian and the two formats that index the lowest for in-home radio ownership: hip hop/rap and top 40. R&B is exactly the market average for owning a radio in the household."

Another finding is that smart speakers offer a "partial solution" for radio:

"Technology has provided more devices for listening. Smart speaker ownership is consistently growing, and radio formats with younger P1 listeners, such as alternative rock, hard rock/heavy metal, hip hop/rap, R&B, sports, and top 40, are more likely to own one," they wrote.

Formats whose P1 listeners are less likely to own a smart speaker include country, classic hits, classic rock, contemporary Christian and news/talk.

"Migrating loyal radio listeners from traditional radio hardware to smart speakers and mobile devices is essential to the future of radio," said Director of Research at Edison Research Laura Ivey. "Consumers of audio should be thinking of radio when they make their listening choices."

But the study also found that online

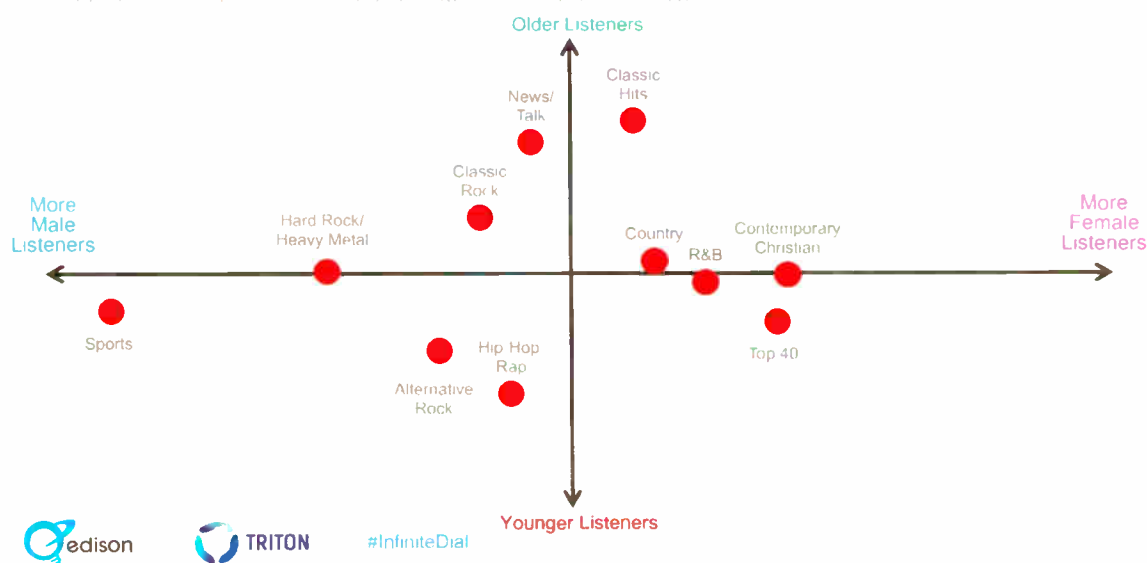
listening remains elusive for AM/FM radio stations. "Over 75% of radio P1 listeners to sports, top 40, alternative rock, hard rock/heavy metal and hip hop/rap reported listening to

any online audio services in the last week. When looking specifically at listening to AM/FM radio online in the last week, however, the percentages drop significantly: sports (45%), R&B (28%), news/talk (26%), alternative rock (26%), hard rock/heavy metal (26%)." Finally, music discovery is moving to YouTube and other places.

"YouTube as a source for music discovery defies age and radio format boundaries and is one of the top three sources for new music discovery by all of the music formats profiled in this study. AM/FM radio was one of the top three sources for new music discovery by all of the music formats with the exception of hip hop/rap."

A webinar on the subject is available at www.edisonresearch.com/the-infinite-dial/.

Sex/Age Positioning of Radio Format P1 Listeners



This intro slide provided some basic context for the report's findings; the webcast, available at www.edisonresearch.com/the-infinite-dial/, then provided visuals about P1 listeners' social media, online audio and listening device habits, among other factors.

MARKETPLACE

Multitrack Madness:

The PodTrak P4 is a new portable multitrack recorder from Zoom North America aimed squarely at podcast production. Weighing just over half a pound, the compact recorder combines a mixer, mic inputs, headphone outputs, sound pads, Bluetooth and more in a unit measuring roughly 4.6 x 6.1 inches, making it a portable option for content creators on the move.

The unit records to SD cards up to 512 GB or can work as a two-input, two-output audio interface, connecting to a computer. Up to eight tracks can be recorded in 16-bit /44.1 kHz audio WAV format and all input sources can be recorded simultaneously on separate tracks.

The P4 provides four 48V phantom-powered XLR inputs, each of which have their own mute buttons and control knobs providing gain up to 70 dB. Correspondingly, there are four 3.5 mm-1/8-inch stereo mini headphone outputs with individual volume controls as well, as there is a mix-



minus feature to help prevent echo and feedback. Remote interviews via phone can be recorded as well via a TRRS cable or via a USB cable attached to a computer running conferencing software. Users who have an optional Zoom BTA-2 Bluetooth Transmitter/Receiver can also wirelessly connect a smartphone to the PodTrak P4 in order to record remote guests, though an Apple Lightning to USB camera adapter required for iPhone users.

For users who want to work in music, ads, jingles, stingers and the rest, a total four assignable stereo sound pads allow them to trigger 11 onboard sounds, as well as load in their own audio for triggering by the pads as well.

The P4 can run up to four hours on a pair of AA batteries or can be powered externally by a USB Type C cable as well as an AC adaptor.

Expected to debut in mid-October, the Zoom PodTrak P4 Portable Multitrack Podcast Recorder has an MSRP of \$199.

Info: <https://zoomcorp.com>

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REMOTE CONTROL

(continued from page 10)

stations can get by with the built-in IP interface that is now part of many transmitters.

“In place of the traditional remote control comes an increased need for remote monitoring,” Magrill said.

“For example, many stations now have multiple audio sources feeding a variety of outlets originating from one, or more locations. There is a need to monitor either the audio or the streams and to sound the alarm if these are disrupted. Although similar to a traditional remote control, there are specialized devices out there, including some that we make, that are more adept at handling these specialized monitoring functions and reacting when something is wrong.”

Magrill feels audio failure seems to be a far more common problem than RF plant failure.

“I like to have a simple backup audio method available to keep the station on the air at all times. For example, many

I like to have a simple backup audio method available to keep the station on the air at all times.

— Kyle Magrill

small stations stream program audio over the internet. They do so knowing that they are trading reliability, complexity and high cost for simplicity, low cost but less reliability.”

This can lead to extended silence periods or frequently disrupted audio during times of high traffic.

“One way to stay on the air is to have a backup audio source at the transmitter site. I personally prefer a local PC running a freeware automation program so that it can play the legal IDs and jingles, but I’ve done this with just a local MP3 player, as well.

“When the audio monitor detects silence, it switches the backup source to the air, thus keeping the station on the air. Note that care must be taken when used with AM/translator combos to not accidentally end up with the AM playing one thing and the FM another. Proper design can avoid that problem.

“If using an onsite PC as a backup, I also like to wire the power switch out to a relay so that I can reboot the PC remotely.”

IN CLOSING

As Matt Leland noted at the beginning of this article, a modern remote control system can do a great deal.

“Trends can be identified and reported automatically by comparing current values with initial values in virtual channels,” he wrote. “Predictive analytics compares multiple parameters and highlights variations in data patterns to spot the need for maintenance. Timer channels track maintenance intervals, automatically scheduling the next service date when each task is completed.”

Remote controls enable engineers to focus on the most critical tasks, reduce off-air time and eliminate unnecessary travel.

And these manufacturers were agreed that remote controls systems will continue to evolve to serve radio’s changing infrastructures. Also, because many offer more than one type or flavor of control system, it’s important to do your homework about how each works, to understand the various levels of capability for different architectures, and to evaluate each company for its customer service because

you want them available should a problem arise.

To learn more about this topic, start with the websites of the manufacturers quoted. Among the resources you’ll find are webinars, blog posts, “how to” and maintenance tips, application notes and white papers.

Vendor YouTube channels and Facebook pages can also be an excellent resource. As Bob Tarsio of Broadcast Devices put it, “Social media has revolutionized how customers can be informed, educated and sometimes entertained.”



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Get More Out of Your Tower Re-Lamp

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WORKBENCH

by John Bisset

Email Workbench tips to johnbisset@gmail.com

Chuck Weber, proprietor of Weber Climbing Services in Elizabethtown, Ind., is often asked for an opinion about a tower company or to recommend one. He answers that a company is only as good as its climbers.

Chuck shared some thoughts to help you get more value out of your next tower re-lamp job.

Ask the climbers to do a visual inspection and perform simple repairs on the way up and during their rest stops. It is an opportunity to gather some information that might save you thousands of dollars, so a little prep work may pay off big. Some repairs, of course, will be limited by the climber's knowledge and experience, but most will be commonsense.

A little small talk and a free lunch will make that initial conversation easier. You might also put together a small tool bag for the climber to take up. You can find a canvas bag and carabiner clip at a surplus or outdoor supply store.

In Chuck's personal re-lamp tool bag, you'll find a two-way radio as well as a cellphone. Never underestimate the importance of a means of quick and easy vocal contact, even if it's just asking for AC power to check all the bulbs on the way down the tower.

The cellphone is not only a backup to the radio but it provides a camera to take photos of things that need attention and to document work done.

Also put a roll of quality electrical tape in the bag. Choose multi-use tape. It's the "duct tape for the tower world," and worth its weight



Fig. 1: During the re-lamp job, your climber can inspect your tower for problems like this where an AC cable for a radome heater is coming loose.

Fig. 2: When you put together your "re-lamp bag" to give to a climber, include a carabiner clip to hook to their belt.

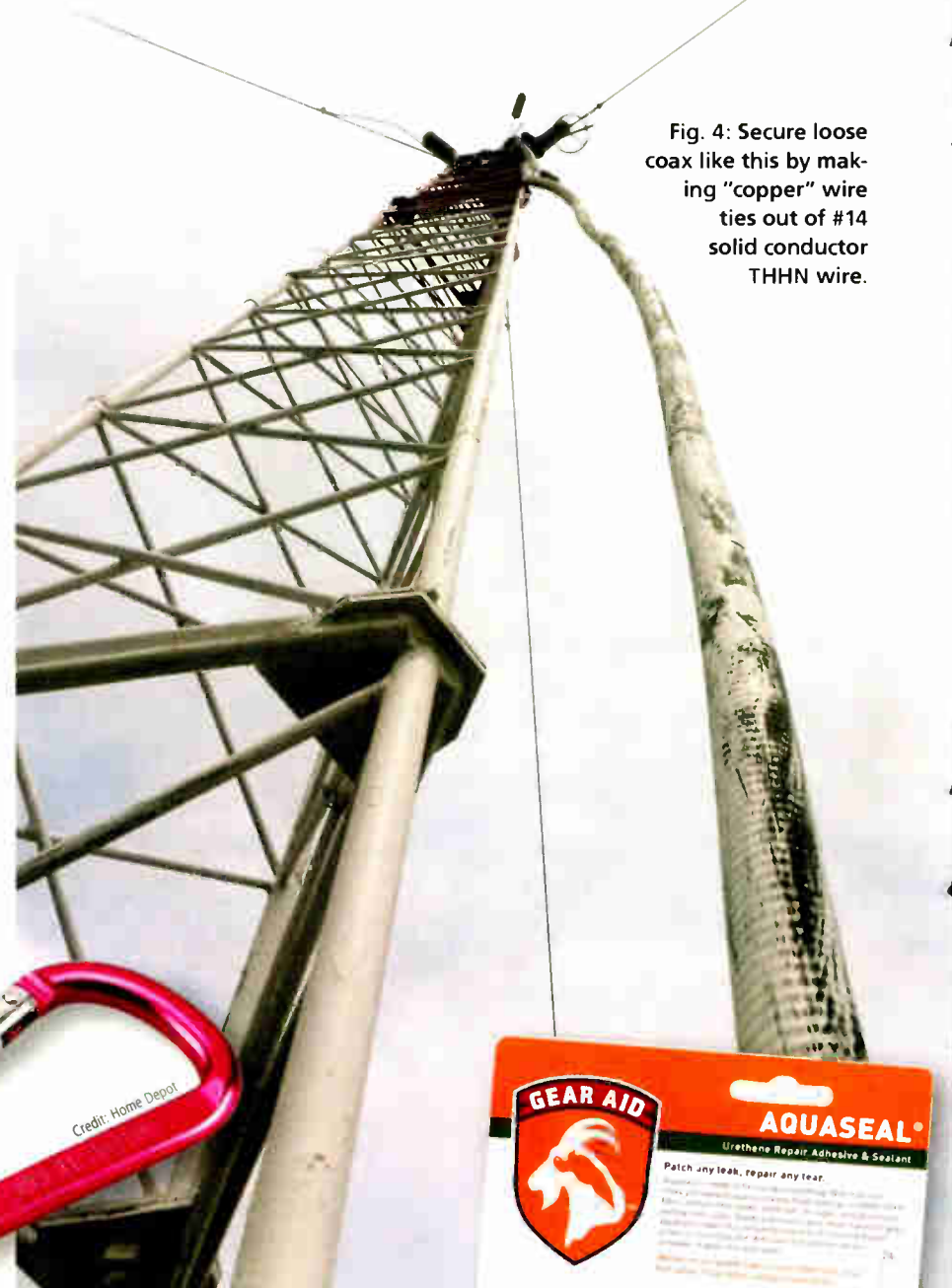


Fig. 4: Secure loose coax like this by making "copper" wire ties out of #14 solid conductor THHN wire.



Fig. 3: A tube of Aquaseal guards against moisture.

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in gold; it may mean the difference between doing a simple repair now and enduring a expensive failure later.

The electrical tape can provide temporary repairs for situations like the one in Fig. 2 where an AC cable became separated from a radome heater.

Another "must-have" is a tube of Aquaseal urethane repair adhesive and sealant. Use it to fix a poor or missing STL connector weather seal, or squeeze it into a poorly fit wire entry in a junction box. Like the electrical tape, the sealant can save you from early failures on many fronts.

Choose multi-use tape. It's the "duct tape for the tower world," and worth its weight in gold; it may mean the difference between doing a simple repair now and enduring a expensive failure later.

In your bag, also include a coiled length of #14 solid conductor THHN wire, three to five feet of it. Rarely has Chuck been on a tower for a re-lamp and not found a section of coax hanging loose, as in Fig. 4. The wire can be cut to length to create "copper tie wraps" that will last virtually forever.

Be sure to include a multitool/screw-driver combo, like the ones made by SOG, to tighten cable clamps or remove the base of a broken bulb from its fixture.

Finally, Chuck suggests that you supply extra bulbs to take up, at least one beacon and one side-lamp. Even new bulbs may fail when powered up; a few are bad out of the box. You want the re-lamp to be done — with all new bulbs, not leaving an old bulb left in place because a new one failed. Having extras is cheap insurance, and any left over can be shelved for future use.

Thanks, Chuck, for helping us get our money's worth out of the next re-lamp!

Frequent contributor Dan Slentz has been surfing the web again; he writes about a neat site called "Interesting Engineering" at www.interestingengineering.com.

The site offers an "Ultimate Electrical Engineering Master Class Bundle" that comprises five courses with more than

250 in-depth lessons. It promises to provide a solid understanding of electrical engineering tools and practices. The courses teach simple and complex circuits, as well as repair of household appliances; there's even a course dedicated to the planning, installation and maintenance of solar power sources.

At this writing, the course is offered for \$25.

Dan adds that he did not have formal education in electronics; his training has come through the "school of hard knocks," a Radio Shack 100-in-1 project kit, his antique Knight Kit "lab," and

attending programs such as the Sony school for U-Matic tape decks, Christie projection school and the Harris RF school.

He also has learned from reading sources like Radio World, TV Technology, the late Broadcast Engineering magazine and the super new online material provided by the Society of Broadcast Engineers.

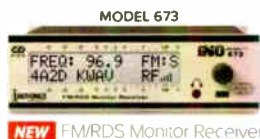
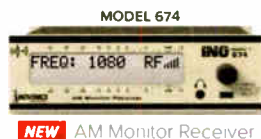
By the way, Dan still uses a cardboard three-wheel Radio Shack resistor value guide, because all he remembers of the resistor colors is "But Violet Goes Willingly."

If you sign up for those courses or can recommend any others, share your experience by emailing me at johnpbisset@gmail.com.

John Bisset has spent over 50 years in the broadcasting industry. He handles western U.S. radio sales for the Telos Alliance. He holds CPBE certification with the Society of Broadcast Engineers and is a past recipient of the SBE's Educator of the Year Award. Workbench submissions are encouraged, qualify for SBE Recertification, and can be emailed to johnpbisset@gmail.com.



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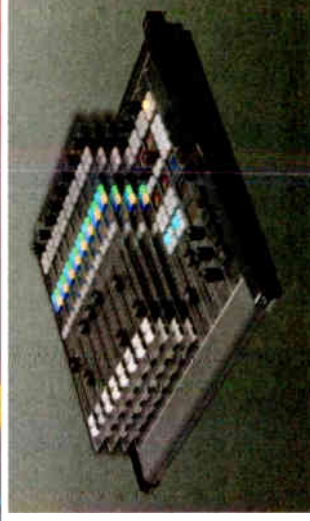
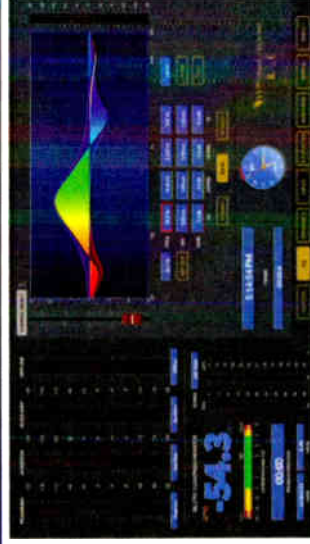
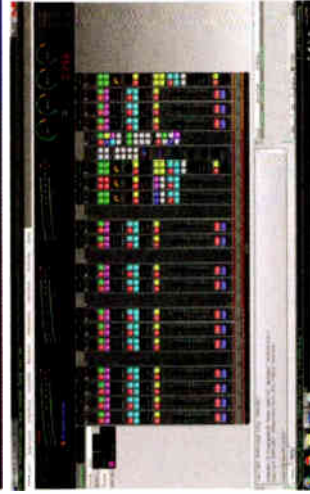


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 BROADCAST AUDIO PERFECTIC MIST'S

Processing for Streaming vs. On-Air

We can't paint these two applications with the same audio processing brush

COMMENTARY

BY JEFF KEITH

The author is senior product development engineer, audio processing for Wheatstone.

We now know that audio processing is needed for streaming, and for many

starts increases the intermodulation and other distortion products that causes codecs to make mistakes and remove or add frequencies that it shouldn't.

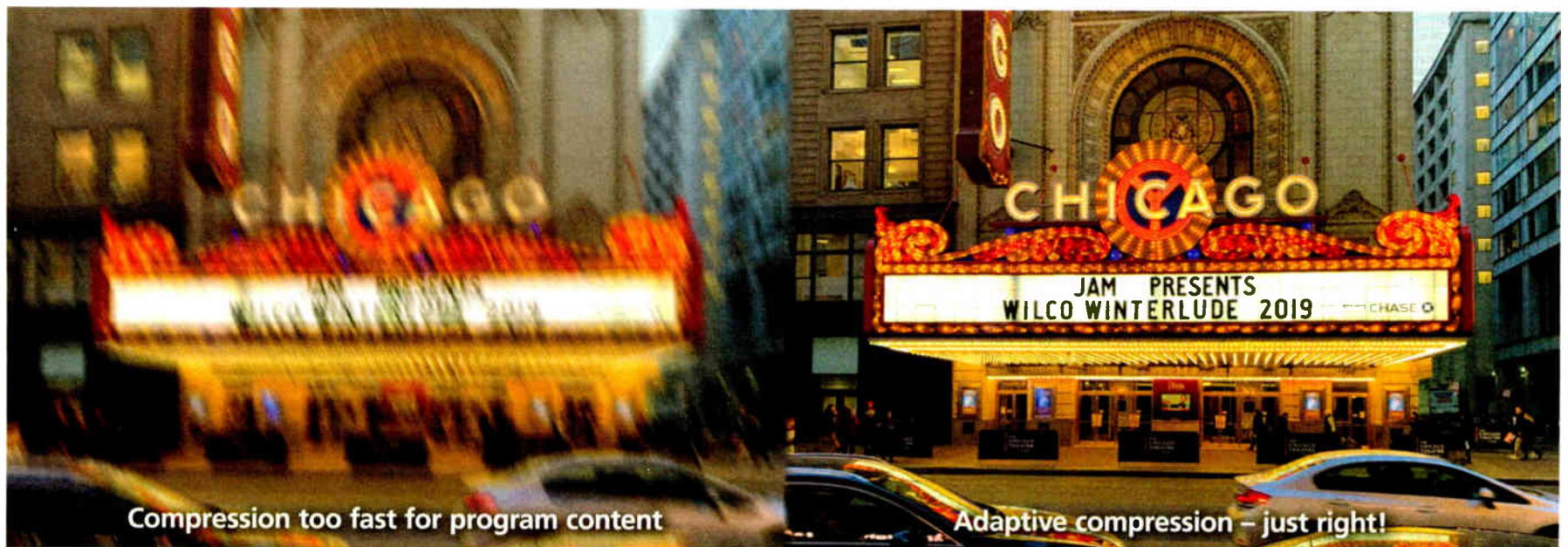
That can be bad for any stream, but it's especially bad for low-bitrate streams that don't have a lot of data bits to begin with. Processors designed for streaming applications use adaptive algorithms and other less extreme measures to create uniform loudness between songs.

quickly that clipping is not a good idea for peak control of program streams because it creates harmonics that aren't in the original program and because the encoder doesn't know what to do with that. In some cases, it throws bits at the bad harmonics, so you actually get more ... bad harmonics.

Clipping byproducts can sound much, much worse once a codec gets a hold of them. The good news is that streaming doesn't need the pre-emphasis can of worms that got FM broadcasters into heavy clipping to be competitive, so clipping isn't necessary or even desired

program content. We experimented with various codecs and bitrates in our lab and in the field, and we found that stereo can be applied in most cases if it's done consistently and without the big L-R swings that skew the codec algorithm in favor of L-R over original content. The exception is extremely low bitrates, in

A good streaming processor will avoid aggressive limiting altogether.



The picture at left represents what happens if you use aggressive compression on encoded audio similar to that used in FM processing. Extreme time constants create distortion that not only mask subtle detail but cause the encoder to allocate bits to that distortion instead of to the desired program content. Less detail makes the audio sound "blurry." Added distortion is bad for any stream but it's especially bad for low-bitrate streams that end up with less of the original audio as it is.

of the same reasons that processing is needed for on-air.

We also know that we can't paint streaming with the same audio processing brush. Here is why:

Fast time constants can interfere with the codec. The conventional approach of applying multiband gain control followed by fast compression to build uniform loudness and density from one music source to the next works beautifully for on-air, but it doesn't work for streaming. This is because applying fast compression time con-

Peak Overshoot is a problem.

Unlike analog, digital audio gets ugly once it tries to go past 0 dBFS, the point at which there are simply no more bits left and nasty distortion ensues.

The recommended peak input level for most codecs is around -3 dBFS so a limiter is necessary to ensure that level is never exceeded. But not any old limiter will do. Aggressive limiting and its byproducts can be problematic because codecs can multiply the audibility of limiting to the point of being objectionable, and often at the expense of removing frequencies that add to the quality of music.

A good streaming processor will avoid aggressive limiting altogether. This is why in the case of StreamBlade, we designed the processor to anticipate overshoots earlier in the processing stages and designed specialized final limiters that don't add the program density that can set off issues with the codec.

Nope. Just nope. We learned

for keeping peak levels in check.

Stereo, not so much. Big swings in L-R can trick certain codecs into disproportionately encoding stereo energy rather than more "up front" and audible

which case mono is preferable.

Comment on this or any article to radioworld@futurenet.com.

The author is Wheatstone's audio processing senior product development engineer and was lead development engineer for the company's StreamBlade audio processor and WheatNet-IP audio network appliance.

MARKETPLACE

Attention! IP audio networking equipment developer Barix says that it is "bringing its IP paging and intercom expertise to large broadcast and emergency response networks with RackBox, a universal cloud-based, any-to-all platform for widespread delivery of critical messages."

The 1RU RackBox can provide standard and emergency paging and intercom needs inside and outside the a broadcast facility. The IP backbone can facilitate messaging across a whole network, putting everyone on the same page. As a native IP device, it will be at home on standard IT networks.

A front-panel XLR connector allows for connection to a microphone. An onboard speaker provides for feedback. It uses a Linux-based heart while supporting major audio formats.

Info: www.barix.com



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World Radio History

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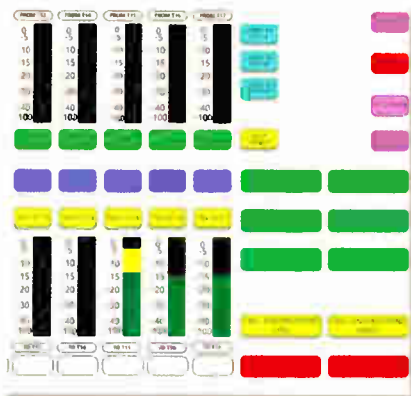
By Al Reynolds
Assistant Director of Integrated
Broadcast Systems
WAMU(FM)

WASHINGTON — WAMU(FM) is an NPR public news/talk station that services the greater Washington, D.C. metropolitan area.

I came here a little over three and a half years ago from an all-Axia plant in Atlanta. When I arrived, they already had Telos Alliance gear and legacy Pathfinder, which made my transition smooth.

Over time, as I settled into the organization and assessed its workflows, we began to look at its Pathfinder system, which was a bit out of date and needed some love. We put together a grand plan to build a whole new Axia network with Pathfinder Core PRO to freshen everything up, clean everything out and get all the systems nice and neat.

Just as we were about to begin our switchover and start making changes



WAMU built a panel that allows its codec manager to work remotely and test all 30 to 40 codecs. A detail is shown.

— in fact, only about a week before — the pandemic shut-downs began across the country. This, of course, blew all of our plans out of the water.

AMBITIOUS REMOTE OPERATIONS

Our station decided very early on to transition to a full remote workflow, and having Pathfinder Core was a big part of reacting accordingly.

We run a national talk show for two hours every day of the week and a local talk show for an hour after that. During these shows, we run through codecs quickly, and in the studio, we had a dedicated person to get people on, connected and checked. We realized that our remote codec position needed some custom help.

For that we turned to Pathfinder Core to build what are called “panels.” A panel is a graphical and functional representation of equipment, signal flows and other functions such as monitoring and internal communication.

We built a panel that allows our codec manager to work remotely and test all 30 to 40 codecs we've got, doing line checks and making sure everyone is good to go before show time, and to troubleshoot issues. This was a large panel that I built, and it was a massive help to our operations.

We also built panels for our producers to remotely produce their shows, giving them a real-time feed of the show over a telephone hybrid and the ability to talk to the host, engineer or codec manager as they need to. The fact that Pathfinder Core allows you to do this with web panels makes distributing them to a ton of producers very easy.

We had 35 people “pitching” during our week of remote fundraising, and web panels allowed our pitch producers to speak to the pitchers to coordinate and cue their segments quickly. We turned our panels pages into a series of short links that make onboarding easier than before.

NEW WAY OF THINKING

The most powerful new feature in Pathfinder Core PRO is the relay combiner in Logic Flow events.

With the codec panel I built, we needed to update Logic Flows with new codec sources and destinations actively. When the codec manager opens a panel,



Detail of Pathfinder panels and logic flows.

they can choose their current codec, which gets written to the “Talk” button's logic.

I could have accomplished this flow in the old system but with many more steps. When I started using the new system, it took me a little while to get used to the new way of thinking about Logic Flows, but once I got up and running, I was amazed at how much I enjoy using the system.

Right now, we are running a hybrid system of legacy Pathfinder and

Pathfinder Core. Any new panels we need are built on Pathfinder Core, while the legacy system is still handling all of our studio switching and air chain events. We are getting close to the point where we will begin migrating over the rest of the systems, and I'm looking forward to having it all up to date.

For information, contact Cam Eicher at The Telos Alliance in Ohio at 1-216-241-7225 or visit www.telosalliance.com.

TECHUPDATES

NEW MAIN/BACKUP CONTROL TOOLS FOR DAVICOM CORTEX 320

Davicom has introduced a dedicated configuration and GUI for main / backup control for its Cortex 320 platform.

The main/backup controller is a plug-and-play solution for 1+1 control of two transmitters. In addition, the system provides continuous health monitoring and alarm capabilities for both transmitters.

The explicit graphical user interface provides visibility of system status and switchover progress. Automatic, manual, maintenance and test modes are available, with activity logging built in. Switching diagnostics help identify problems. Switchover can occur in as little as two seconds, if the interlocks and RF switch allow rapid operation.

Interfacing to the transmitters and switches is achieved via metering and status inputs as well as relay outputs. SNMP control and monitoring is optionally available for transmitters having such capabilities.

Remote access via dial-up, IP networking or low-speed serial links is included.

For information, contact Davicom in Quebec at 1-418-682-3380 or 1-877-282-3380 or visit <https://cortex.davicom.com>.



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Inovonics Provides FM-HD Radio Toolbox

Sofia 568 offers useful monitoring features including Artist Experience data

USERREPORT

BY BRIAN GULLIKSON
CHIEF ENGINEER
KTIS(AM/FM), KDNW(FM),
KDNK(FM) AND KRFG(FM)

ST. PAUL, MINN. — Artist Experience via HD Radio has been around for quite a few years now, but KTIS(FM) just implemented station logo and album artwork about two years ago.

At the time, the only ways to verify whether or not the images were going out over the air properly were various car stereos (built into the vehicles, so not very convenient for rack room monitoring), or the Sparc SHD-T750 Tabletop HD Radio.

Because the SPARC was the only indoor option, we purchased a few units — one for engineering, one for promotions, and one for the assistant PD.

We quickly discovered, however, the limitations (bugs?) of the Sparc unit. Strange unpredictable caching of station logos (why is the old logo still showing up on my radio?) and apparently no logo or artwork functionality on the HD4 channel. And even though they're still being sold on Amazon and promoted on Grace Digital's website, it seems to be an abandoned product that won't be receiving any updates or bug fixes.

Enter the Inovonics Sofia 568 SiteStreamer+. It is a veritable toolbox for FM/HD Radio broadcasters to make sure that what you're intending to put on the air is exactly what's going on the air.

If you've used any of Inovonics' recent equipment, starting with the Aaron 650 and popular INomini SiteStreamer line, you will recognize the web interface. It's organized and divided into sections that make sense. The "Now Playing" tab gives you an overview of your signal condition and various alarms, along with the option

to tune the audio output of the unit to whichever station you'd like.

WHAT THE LISTENER SEES

The "Listener Experience" tab is where the real fun starts.

This tab gives an overview of every single active HD subchannel on the currently-tuned frequency, along with all the metadata and Artist Experience images, while also highlighting which image should be currently displayed on listener's radios.

It will also tell you if your station logo has an "image issue" relating to the requirements specified by iBiquity Digital/Xperi for the station image logo.

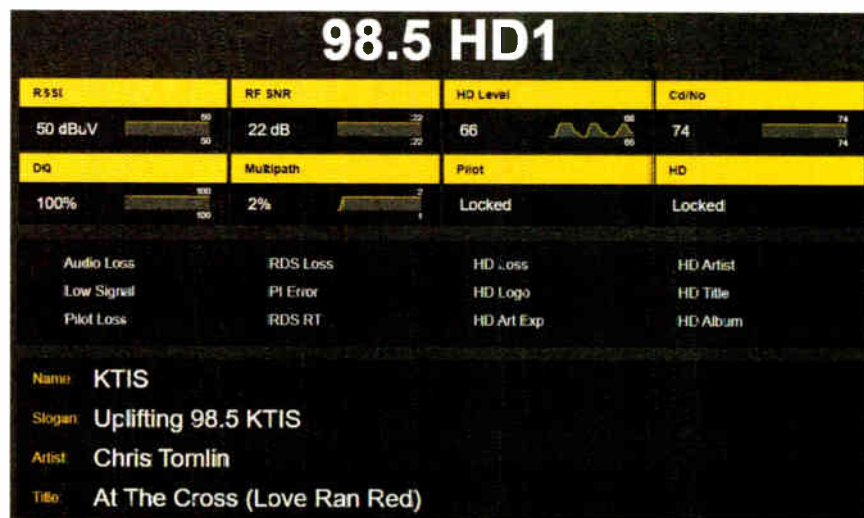
On my particular unit, I'm noticing that my HD2 station logo isn't currently working for some reason, and that my HD3 station logo seems to have an "issue." This doesn't necessarily mean it won't work over the air, but that for best results, you should look into its formatting and resolution, and that it's totally cleared of all EXIF data before being loaded into the Importer/Exporter/MSAC Client.

The Sofia 568 has many options for audio outputs — analog, AES3, streaming via the web interface, and AES67 via a separate Dante network jack. So far, the most useful of these has absolutely been the webstream. It's a quick and easy way to verify things are on the air and sounding normal.

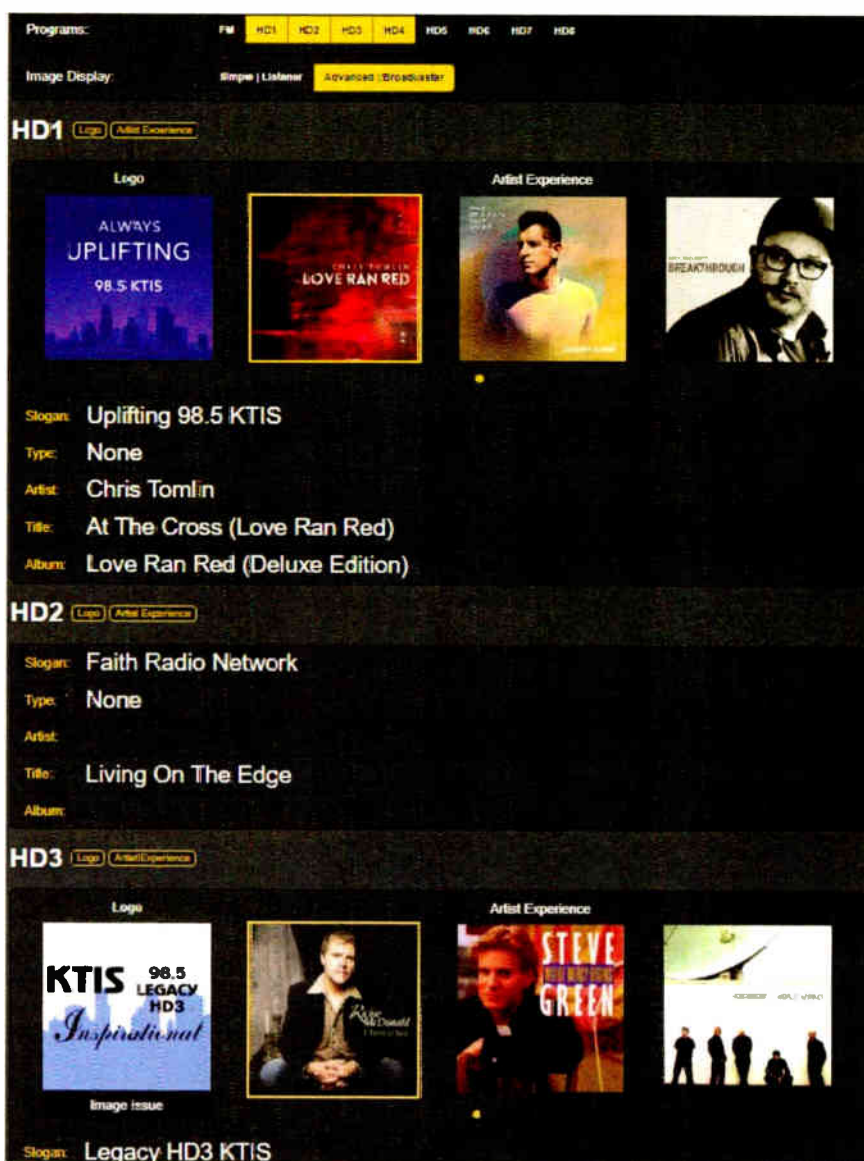
Alarms can be configured to send out an email for audio loss, low signal, RDS issues, pilot issues, HD carrier issues, and HD Artist Experience issues. Also, there are four GPOs on the rear that can be configured as any of those alarms for local signaling to an external monitoring or remote alerting system.

As usual, Inovonics has been extremely helpful in supporting and updating the unit for functionality and bug fixes ever since the original purchase. Overall, having the Sofia 568 in our facility has been a valuable addition to our HD Radio troubleshooting, diagnostic and monitoring toolbox, providing much information that was not otherwise available to us.

For information, contact Gary Luhrman at Inovonics in California at 1-831-458-0552 or visit www.inovonicsbroadcast.com.

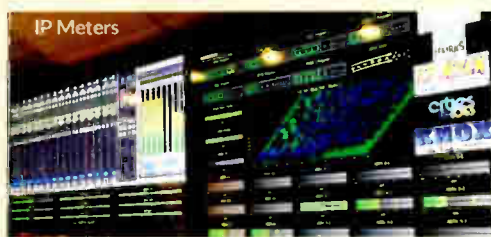


The Sofia 568 has many options for audio outputs; the most useful has been the webstream, a quick easy way to verify that things are on the air and sounding normal.



Signal Monitoring, Remote Control, Test & EAS

TECHUPDATES



METERING THE WHEATNET

Wheatstone notes that AoIP networks give unprecedented access to signal monitoring throughout a studio facility, and that its WheatNet-IP audio network takes advantage of that.

A metering app for the WheatNet-IP audio network called IP Meters can display a "wall of meters" onscreen for ongoing monitoring of audio peak levels, average levels, and various other parameters at selected points throughout the network. Through a software interface, broadcasters can set up signal density meters, FFT graphs, and more. They can set up two or 60 or more cells in one "wall" as horizontal, vertical or eyebrow bargraph meters.

They determine where and what to meter: console inputs, mic outputs, the satellite receiver, studios, webstreams, etc. A separate analysis window shows one audio stream in a variety of informative ways, including FFT, 3D plot, oscilloscope, energy vs. frequency, spectral dynamic range and more. Each meter, or cell, in this wall of meters can even be set up with silence detection, so broadcasters can see at a glance if an audio stream has gone down, and where.

For information, contact Wheatstone in North Carolina at 1-252-638-7000 or visit www.wheatstone.com.

TECHUPDATES

DAS RELEASES UPGRADE FOR DASDEC-II AND ONE-NET SE

Digital Alert Systems recently announced Version 4.2 of its Emergency Alert System software for DASDEC-II and One-Net SE EAS devices.

V4.2 includes new features, expanded security improvements and enhanced interoperability capabilities. The company says this update improves clients' operations and overall security stance.

The new version makes it easier for users to manage the security certificates and key pairs for secure network connections to IPAWS and other interfaces requiring a secure connection.

Also, separate control toggles offer selective control of digital signatures depending on the CAP server, plus improved logging among digital signatures to provide details regarding a particular CAP file.

The EAS-Net communications protocol has been enhanced to support more interface options for traditional hardware and emerging cloud-based services. V4.2 also includes several communication improvements for HALO customers to ensure more robust information exchange between core and field devices.

Version 4.2 and upcoming software releases are available free to Software Assurance Plan customers.

For information, contact Digital Alert Systems in New York at 1-585-765-1155 or visit www.digitalalertsystems.com.



To All the Radio Engineers Out There Helping Stations Stay On-Air:



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MPR/APM Build Links With Burk

Migration/upgrade to ARC Plus and AutoPilot software succeeds

USERREPORT

BY BILL DAHLSTROM
CHIEF ENGINEER
MINNESOTA PUBLIC RADIO

ST. PAUL, MINN. — Minnesota Public Radio and American Public Media are headquartered in downtown St. Paul, Minn. within sight of the state capitol.

It operates 49 public radio stations and 42 translators serving listeners in eight states. MPR delivers three services for broadcast via satellite. The APM program portfolio reaches nearly 20 million listeners each week. Notable programs delivered live include BBC World service, "C24" and "Marketplace."

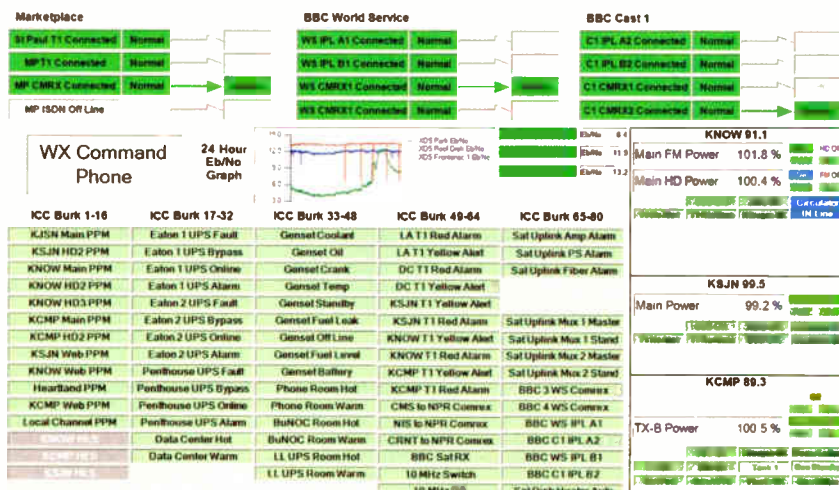
During my 10 years with the company I have seen the Gentner/Burk GSC system migrated entirely to Burk ARC Plus Touch, ARC Plus SL and ARC Solo at 37 sites.

FLYING ON AUTOPILOT

The decision to continue with Burk for a complete remote control system update was not automatic but made sense. The GSC-to-ARC transition was aided by using the Plus-X GSC Adapter which made transition at many of our sites plug-and-play.

While most of our sites are transmitting facilities, we also have a Burk system installed at our Network Operation Center in St. Paul, which monitors codecs, satellite uplink and downlink, building temperatures and UPS status, and at the Public Radio Satellite Systems (PRSS) NOC in Washington, where our live streamed network contribution is nominally uplinked.

Our St. Paul NOC uses AutoPilot to watch over sites on multiple computers.



One of the AutoPilot custom views used at the American Public Media NOC in St. Paul, Minn., providing more than 175 status and metering indications from seven sites.

This gives our NOC operator a machine to use while a member of the radio network team is on another machine remotely. Sites I need to see regularly are best viewed with AutoPilot from my PC. ARC units reliably report to multiple AutoPilot instances. Additionally, the Warp Engine Polling feature minimizes processor load and IP bandwidth on computers running AutoPilot. I am aware of the smartphone options that Burk has but so far have not added that to my device. While we have the relative luxury of a full-time NOC operator, I will probably avoid that.

Transmitter sites require a primary and backup remote control connection, so most sites still have a POTS line to provide a modem connection in the event of an IP failure. We have recently seen situations where the POTS line will not work reliably with the modem and there are a couple of sites that use the Burk RSI voice interface for backup. Burk works well at sites that use wireless

internet as well.

I am a big fan of Custom Views in AutoPilot. One red spot on a screen will stand out even among hundreds of statuses and meters. I have created small custom views for specific purposes, like switching between two transmitters sites or keeping a close eye on equipment experiencing issues.

We are getting more versed at employing SNMP, which is taking over transmitter M and C. Our GatesAir FAX transmitters and Intraplex IP Link codecs get along well with Burk SNMP Plus. Our XDS/ATX-Networks satellite receivers display lock status and Eb/No using SNMP on multiple AutoPilot Custom Views.

In conclusion I can say we are pleased with Burk Technology products and are consistently imagining new ways to use this system.

For information, contact Matt Leland at Burk Technology in Massachusetts at 1-978-486-0086 or visit www.burk.com.

TECHUPDATES



NAUTEL RELEASES LEGACY AUI ACCESS APP

A free app is now available from Nautel that enables the use of the current Flash-based Advanced User Interface (AUI) beyond the planned end of online Flash support.

The app will operate on either Windows or MacOS platforms; it uses Adobe AIR to install Nautel's Flash-enabled app on the user's desktop or laptop computer.

A transmitter is accessed by entering its IP address into a window which then opens the AUI for that transmitter on the user's computer.

Standard functions of the AUI are then available to the user. Multiple windows may be run at the same time for users who need to monitor a number of Nautel transmitters and the app retains a list of IP addresses, so they do not need to be entered every time.

Because the app does not rely on browser-based Flash, it will work well beyond the December 2020 end-of-life date for that platform. Nautel plans to keep the app available through the end of 2021, by which time all users should have migrated to the new HTML5 AUI, which is in the final stages of development and is expected to enter beta testing in the next few months.

The app was developed for Nautel by Veriskope, specialists in Adobe technology, and is free for download from Nautel's FTP site. It will operate on Windows 7 and above, or MacOS 10.10 and above.

For information, contact Nautel in Nova Scotia at 1-902-823-5131 or visit www.nautel.com.

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AMB-22-4E	AMB16-4E MINI	HMB-14-4E	HMB8-4E

STUDIO ITEMS INC. www.studioitems.com (847)-487-7575

TECHUPDATES

2WCOM A30 OFFERS ENHANCED MONITORING

2wcom says its A30 monitoring receiver now goes a step further. To avoid penalties with regulatory authorities regarding MPX power and MPX peak signal deviation, the device offers a detailed graphical user interface and historical logs for all activated FM tuners.

If a measurement exceeds a user-definable threshold, an alarm can be forwarded via SNMP, email and/or relay and will be stored in a separate alarm log (time stamp, type of alert and the corresponding frequency). For issues reported by third parties, engineers can analyze the log by date and time parameters, MPX power as well as MPX peak signal deviation and store the results.

The A30 provides useful features for efficient monitoring of radio frequencies and fleet control. Its remote management solution enables operators to manage and evaluate all A30 monitoring receivers in one stop via location/device management. Moreover, monitoring by live listening is possible for each individual A30 in a fleet and additionally the respective MP3 audio stream of a monitored station can be recorded and stored.

Other targets include analog/digital audio input, MPX input, DAB input, analog/digital audio MPX outputs, GPls, SNMP and two parallel MP3 streams. It is possible to configure two built-in FM tuners to monitor two separate stations or the second FM tuner can operate in scan-mode, monitoring up to 30 frequencies (round-robin).

Technicians can benefit from accurate measurements of FM parameters like



RF level, "no pilot" detection, pilot deviation and RDS parameters (RDS deviation, PI, PS, PTY, RT, TA, TMC, etc.). In addition, operators can use an optional DAB+ tuner to monitor a DAB+ multiplex e.g. RF, SNR, CNR, FIC quality, dynamic label, or slide show.

For information, contact 2wcom in Germany at +49-461-662830-0 or visit www.2wcom.com.



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BE Avatar Reveals Just About Everything

Handy little box packs in a signal measurement tool cornucopia

USERREPORT

BY **J.R. RICHARDSON**
CONTRACT ENGINEER
J.R. RICHARDSON ELECTRONICS

WESTMINSTER, Md. — The first time I saw a USB device with an antenna connection, I said there was no way to have a complete spectrum analyzer on that device: when I saw what it would do, I was hooked.

When you look at the Broadcast Electronics Avatar Test Receiver, you get the same first impression. However, when you load the software, hook up an antenna and plug the USB cable into the computer, a new world opens up.

The Avatar allows you to analyze not only your signal but all the signals on the FM radio band. Here is the list:

- RF spectrum and waterfall displays of your signal;
- Multiplex spectrum display;
- Modulation power (how "loud" the station is);
- RDS — see all the transmitted information;
- Instantaneous deviation;
- Deviation history;
- Deviation histogram;
- Audio spectrum: L & R, plus peak and average;
- Stereo Lissajous display — see the relative phase and amplitude of the L&R;
- Stereo quality;
- Audio S/N (even without cutting modulation).

The Avatar's ability to look at all of those parameters on a computer gives the technician the look-see at what is happening. Much of the work that we perform involves questions like "Am I over-modulating," "Is someone interfering with the signal," "What is my RDS sending out" and "Do I have good stereo separation?"

The RF spectrum shows where your signal is in the FM band, and your spectral occupancy. The MPX spectrum



gives you a look at your L+R, L-R pilot, RDS and any SCAs you may have. Modulation power shows a relative indication of how loud you are and of course the RDS analysis shows what is being transmitted.

Something I really like is that the device looks for the stereo pilot and if it is not there, it shows the mono signal on the stereo quality signal.

PRACTICAL CONSIDERATIONS

My Avatar is set up with an external antenna in my office, so that I can

monitor several of the stations that I contract for. You have to be careful about multipath, which can cause apparent overmodulation to be displayed. For clean measurements, use the RF pickup tap on your transmitter.

I will be arranging a remote pickup site for my unit at one of my backup sites. I would consider two antennas, one omni and the other with a high-gain directional antenna on a rotor. I could then log in with a remote desktop connection and get a good reading.

The Avatar works well on a desktop

computer or on my portable laptop in the truck. For this location, I have a whip antenna with a magnetic base, which would give you the same signal as if you were listening on the truck radio.

Using the Avatar for new installations, I'd suggest you do a screen grab and have a reference for future use. I have suggested the Avatar to a group that has a station in Key West, Fla., while their home office is in Valdosta, Ga. With remote access via PCAnywhere, LogMeIn or VNC they can monitor the station constantly.

The Avatar RF spectrum display shows the HD sidebands but does not decode them. Audio is analog. The unit also has an input for the AM frequency band, and can display the spectrum on that band, but the software currently does not support AM station analysis.

You are able to switch between 10 presets that you can program. You are also able to label the tabs with the call letters of the station.

The unit is very small and is powered by the USB cable, it fits easily in your toolbox.

Would I buy another Broadcast Electronics Avatar? At the price of \$1,495 it is well worth it.

For information, contact Frank Grundstein at 1-610-353-1970 or for Latin America sales Daniel Bizet at 1-217-592-4225 or visit www.bdcast.com.

TECHUPDATES

GORMAN-REDLICH COUNTERS EAS CLOCK TIME DRIFT

Gorman-Redlich Mfg. Co. says its CAP-DEC1 can now keep an EAS clock accurate.

When the Emergency Alert System was introduced in

1997, the company says, it was a boon for quickly distributing emergency notifications to radio and TV audiences but was not without drawbacks. One was the delay introduced by the "daisy chain" propagation of the message for stations that do not have direct reception of upstream State Primary message originating stations.

Each EAS message header includes a message origination time, which is when the message needs to reach the recipients to warn them. With each hop in the daisy chain, the company notes, vital time is lost in transmitting the message to remote stations. Over several hops, a two-minute message may arrive well after the origination time.



When the Common Alerting Protocol-based Integrated Public Alert and Warning System was introduced to distribute messages over the internet, it enabled stations to simultaneously receive messages instantly over the internet using equipment like the Gorman-Redlich CAP-DEC1.

Gorman-Redlich emphasizes that timing has become even more critical with recent changes to FCC § 11.33(a) (10), which constrained valid messages to be those with the Origination Date/Time not more than 15 minutes in the future.

Its CAP-DEC1 has always automatically updated its clock from internet time servers, but legacy EAS devices to which it was connected still needed to have their clocks periodically maintained by a technician.

With the latest software and Gorman-Redlich EAS1 firmware, the CAP-DEC1 can now automatically update the clock of the EAS equipment to coincide with its own accurate clock (see picture).

Gorman-Redlich also reminds current users to make sure your equipment is updated.

For information, contact Gorman-Redlich Mfg. Co. in Ohio at 1-740-593-3150 or visit www.gorman-redlich.com.

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TECHUPDATES

BROADCAST DEVICES SWP-300 IS A TRANSMITTER REMOTE CONTROL SYSTEM

Broadcast Devices describes its SWP-300 Remote Control as a complete solution at a lower cost,



suitable for main or aux sites, translator sites or as a backup remote control.

It features direct plug-in interface to popular RF motorized switches for transmitter changeovers.

The SWP-300 controllers have direct interface capability to up to two BDI DPS-100D True RMS power meters. Parameters displayed on a DPS-100D including forward/reflected power, temperature, transmission line pressure and six general purpose inputs are converted for display on the SWP-300 with no scaling needed.

The SWP-300 series features a single connector interface for control of two transmitters including TX on/off and interlock control. In addition to the direct control of two transmitters, the unit features 16 control outputs, eight status inputs and four analog inputs for legacy equipment.

The SWP-300 series has Ethernet interfaces and is SNMP-capable. Front controls include master transmitter on/off and motorized switch control. Front display of transmitter selected to air, forward and reflected power, temperature and transmission line pressure is available. The SWP-300 is furnished with a GUI software package for use with Windows XP, 7, 8 and 10.

The SWP-300 series are available in one and two RF switch models.

For information contact Broadcast Devices in New York at 1-914-737-5032 or visit www.broadcast-devices.com.

TECHUPDATES

AUDEMAT FM MC5 UPGRADE BRINGS ITU COMPLIANCE

WorldCast's Audemat FM MC5 is an FM test and measurement solution. The system offers both mobile RF coverage measurement and extensive modulation analysis in one system, the company says.

The company says that with enhancements in its most recent versions (3.10 and up), it is the only test and measurement equipment available in compliance with ITU-R SM.1268-5, published in August 2019.

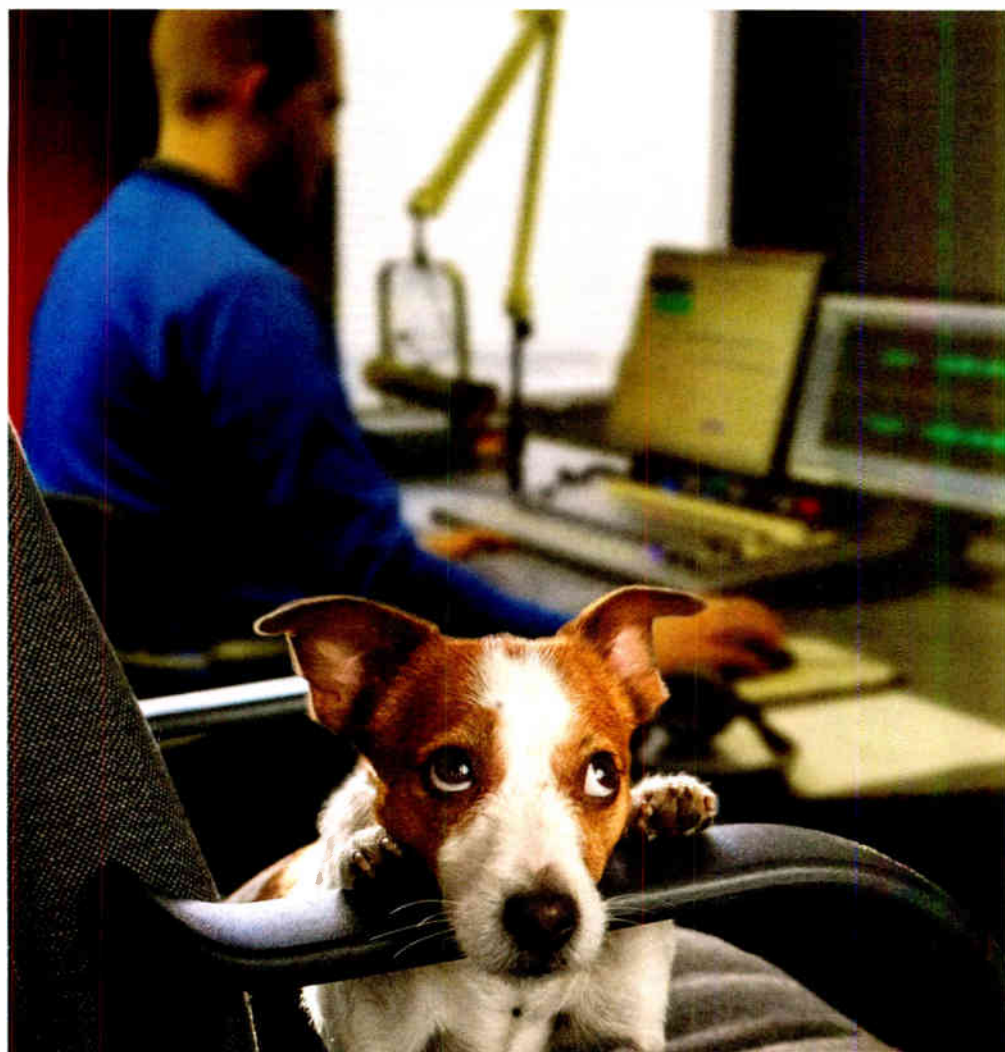
That evolution of the recommendation redefines the criteria for validating FM deviation measurements. For an MPX trip measurement to be valid, four criteria are now taken into account, compared to two in the past. It also integrates new measurements as defined by the ITU, such as condition verification before measurements.



In addition to ITU compliance, the latest software updates aim to improve the user experience. For example radio technicians and engineers benefit from fixed point measurements and a simpler, more complete interface, as well as easier analysis of mobile measurement campaigns.

Also new for the Audemat FM MC5 is the possibility to customize the equipment with on-demand software options for mobile measurement, a spectrum analyzer, automatic measurement, generators, measurement reporting and GoldenEar.

For information, contact WorldCast Systems in Florida at 1-305-249-3110 or in France at +33-5-57-92-89-28 or visit www.worldcastsystems.com.



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

MISCELLANEOUS

WANT TO SELL

UPGRADE consoles to international specs with world standard Weston 30B illuminated 4" vu meters. 4 in like-new condition. GramOphone@earthlink.net

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

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

WANT TO BUY

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

Wanted: ITC interconnect cables between ITC cart machine and record amp. Manual and idlers for Harris CB-1201 turntables. Don, k8drs1@gmail.com

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

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

HEADPHONES/ SPEAKERS/AMPS

WANT TO SELL

1934 RCA 77A double ribbon microphone, originally used by Arthur Godfrey at WFBR Baltimore. 100% perfect condition. Contact Bill Cook, 719-684-6010.

WANT TO BUY

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 214 738-7873 or sixtiesradio@yahoo.com.

MISCELLANEOUS

WANT TO SELL

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

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

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.

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, KSFY, KOBV, 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.

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AM Stereo radio. Call 417-881-1846.

RECORDING & PLAYBACK HARDWARE

WANT TO BUY

1960s-vintage MacKenzie Repeater machines, magazines, spare parts and manuals, complete or "parts" machines consid-

ered, James, 870-777-4653.

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DRM Is Advanced Radio for All

Virtual event brought new developments signaling significant progress

COMMENTARY

The author is chairman of Digital Radio Mondiale. Her commentaries appear regularly in Radio World.

A recent Digital Radio Mondiale virtual showcase proved to be a real box of delights and new announcements, demonstrating that the digital radio industry remains resilient and innovative even in pandemic times.

"The best DRM IBC show with the lowest carbon footprint and best attendance" was one of many comments we received. And there was plenty to excite the more than 100 participants from literally all over the world.

The highlights grouped around big themes including:

- DRM in practice, extensively proven and used in the FM band;
- DRM and its possible major role in delivering educational content to large and remote areas in times when many students cannot attend face-to-face lessons;
- Use of DRM in public signage, which can be applied for education, health and emergency announcements; and
- A new and "live" way of monitoring on-air transmissions, which can be beneficial to both the engineers and the editorial staff of broadcasters.

TECH IMPROVEMENTS

While the all-band, open DRM standard is stable and well-established, technical improvements can always be implemented like the recent updating of the DRM system specification ETSI ES 201 980.

Three improvements were announced by the DRM Technical Chair (BBC) and are to do with removal of some obsolete or unused modulation features and enhanced signaling when using emergency warnings.

The changes, which are backward-compatible, will make DRM's implementation in chipsets and receivers more reliable, and add additional support for receiver text displays to be able to support different scripts from around the world.

We now know that the publication of the new ETSI version is expected early in 2021.

Around that time a DRM medium-wave pilot to be run by the BBC for the Middle East is also expected to start, as out of the 468 million people tuning to the BBC worldwide, we were told by the



An image from the video "DRM — From Broadcaster to Listener."

BBC representative that a quarter are still doing so on AM.

Meanwhile shortwave, a bit of a blast from the past for some, is not forgotten in places like Russia, China and many other countries, where the demand for SW digital transmitters is quite healthy.

Ampegon's representative said demand now is mainly for transmitters of bigger capacity, above 25 kW going to 50 kW, able to cover wide areas with good analog and digital sound and delivering big energy savings. Ampegon is working on satisfying these demands in its new factory.

DRM MULTIPLEX FOR FM

Improvements in the professional monitoring of these transmissions were discussed.

RFmondial announced the upgraded HTML5 GUI in its DRM/AM Monitoring and Measurement Receiver Family RF-SE and the possible software update of older versions. The German company also unveiled a new exciter version.

Their German colleagues at Fraunhofer IIS completed the picture with end-to-end implementations offering solutions (content server and multimedia player, data services like Journaline and Emergency Warning Functionality), services for supporting DRM field trials and rollout, as well as unique expertise.

But the DRM Showcase was not all about better hardware. It was also about technical innovation. The one that elicited most of the questions was the extended DRM multiplex for FM, an idea that benefited from the input of Nautel and RFmondial engineers.

This solution allows one analog FM transmission (200 kHz) and four DRM

channels (two in each of the 200 kHz guard spaces as a DRM channel only occupies 100 kHz). Or, if the whole 600 kHz are used in pure DRM, then up to six DRM channels (each service with up to three audio and one data services) can be offered from the same transmitter, same antenna, with possible sharing of costs among several broadcasters. The individual broadcasters remain in control of their transmissions without the involvement of third parties.

GLOBAL ROUNDUP

Participants were also interested in what is happening in the various countries about implementing DRM.

While India remains the top DRM country, alongside China, adoption of DRM in all bands by Pakistan and its public broadcaster PBC was one of the big surprises of the showcase. The comprehensive three-phase plan to introduce DRM in FM, and medium-wave, first, in all the key areas of the country has been endorsed and praised by top Pakistani officials.

Indonesia and its public radio (RRI) representative discussed five FM transmitters that went on air over the last few months and excellent results of Emergency Warning Functionality demonstrated on a DRM FM transmitter in Jakarta in August.

A recent tender in Brazil for digital DRM transmitters in SW, MW and FM was welcome news, and the expectation is that a locally produced SW DRM transmitter will be soon transmitting from the key public broadcaster central site.

Africa always gets a mention, though South Africa really scored a first with the policy announced a couple of months ago that it recommends both DRM and

DAB as a way to digitize radio in the country — a true torch-bearer for other African countries that are so reliant on AM and FM radio.

In India, the 2.5 million of cars with DRM receivers place the country in a class of its own.

Receivers are fitted at no cost in cars from the top brands. Work is continuing to increase pure DRM hours for five All India Radio (AIR) transmitters to full day and diversify content. Possibilities are being explored to have an educational channel and also to invite some private broadcasters to use the extra channels available through DRM on AIR transmitters. Six more medium-wave transmitters are to be added to the existing 35 MW DRM transmitters. One of this new batch of DRM transmitters using the extra DRM features will be launched officially in Hyderabad soon.

The increase of DRM presence and the general technical effort being made in India will stimulate receiver production and availability.

RECEIVERS

A good part of the event was devoted to the development of receiver and receiver solutions.

One trend we noticed was the extension of DRM reception to FM so that it can cover analog and AM as well as FM broadcasts. Receiver manufacturers have announced the availability of attractive features like support for xHE-AAC codec, Journaline and Emergency Warnings.

The receivers, introduced in excellent videos like that of Avion (India), came in all shapes and forms, from the rich variety of Gopell (China) and its GR series and DRM car stereos, to the Indian multifunctional receivers and SDR-based solutions of Inntot (India).

RF2 digital (Korea/Germany) came up with an SDR receiver solution for analog and all DRM bands; it is a multistandard device. Cambridge Consultants (U.K.) is working on a very low-energy and low-cost solution, as is Starwaves (Germany/Switzerland), which presented a "tuk-tuk" radio, stripped down but very functional. It also announced the world premiere of the Starwaves W293BT receiver, available now to order.

So DRM is making great strides technically, geographically and in ingenious receiver solutions. To encourage as many digital radio practitioners, stakeholders and decision-makers to embrace and implement DRM, the consortium launched its own new video. Just search the title "DRM — From Broadcaster to Listener," on YouTube.

Comment on this or any article to radioworld@futurenet.com.

NRB 2021 Aims to Equip and Advocate

National Religious Broadcasters plans for a physical convention in Texas in March

NEWSMAKER

NRB 2021 is the upcoming annual convention of the National Religious Broadcasters. As of early October the organization was moving ahead with plans for a physical event. Radio World asked Daniel Darling, senior VP of communications for NRB, about it.

Radio World: NRB 2021 is slated for March, and we understand the organization intends to hold it in person, which would make it one of the first of our industry's large events to go back to "boots on the ground." What's NRB's thinking about this decision, and could it change?

Daniel Darling: We've been in consultation with our members and with the property (Gaylord Texan in Grapevine, Texas) and are committed to following the protocols for the state of Texas.

We feel very confident about March for a few reasons. First, there are several Christian gatherings of our size planned for the early spring window, including some in Texas. Many of our peers have opted to do virtual events, though they canceled gatherings that were in fall of 2020 or early 2021. We feel March is a good runway for us, given the expectation that a vaccine will likely have at least been distributed to the vulnerable population and the availability of new treatments.

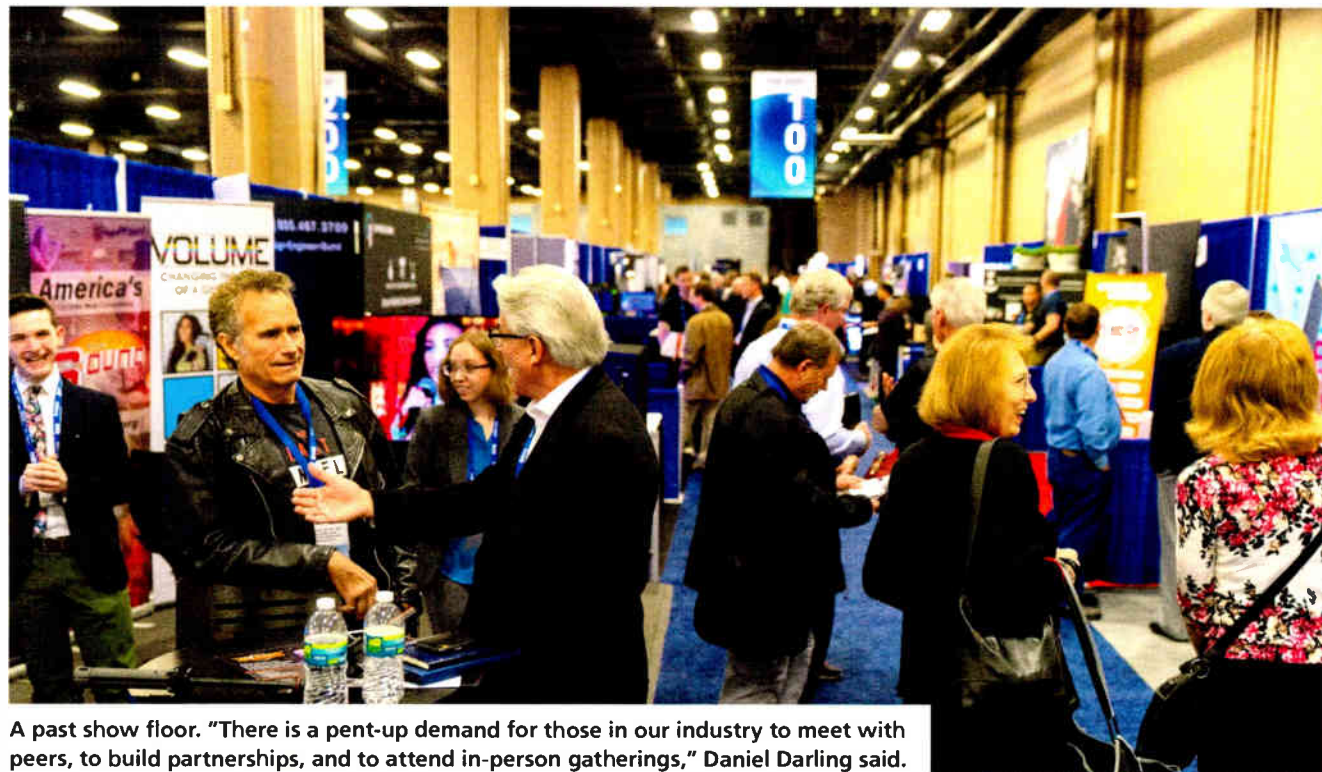
The uniqueness of the NRB convention is the networking across a range of Christian media professionals. Our content is top-notch and some could be streamed online, but you cannot replace the in-person gathering, networking, and equipping that makes NRB special. So we anticipate a great turnout and a successful NRB 2021.

RW: What are your members and exhibitors telling you so far about their own intentions to travel and to be there, or any concerns they have?

Darling: We've surveyed our members a few times and we are hearing more and more positive feedback about the convention in March. There is a pent-up demand for those in our industry to meet with peers, to build partnerships, and to attend in-person gatherings. Our registration and sponsorship numbers are ahead of pace historically so we are cautiously optimistic for this year.

RW: The city and venue are different this year; tell us about that and about the benefits of the change.

Darling: The NRB convention has



A past show floor. "There is a pent-up demand for those in our industry to meet with peers, to build partnerships, and to attend in-person gatherings," Daniel Darling said.

rotated cities in the past, though has most often been in Nashville.

Texas is a really good location for us, as many of our members are headquartered either in the state or within driving distance or easy flying distance. Like Nashville, the Dallas-Fort Worth Metroplex is a major hub for evangelical ministries and institutions.

We're also just thrilled with the venue: The Gaylord Texan. It is a wonderful meeting place with plenty of event and hotel space to ensure a safe, comfortable and memorable gathering.

RW: What are the major show themes or issues that sessions are expected to explore?

Darling: We are continuing to serve our mission to both equip and advocate.

On the equipping side, we'll have content to equip a range of Christian media professionals, from radio and TV broadcasting to digital media such as podcasting, streaming and social media. We also have a really large film presence with filmmakers showcasing a variety of faith-based films and new TV and streaming content. This year we are honored to host the ICVM Crown awards for Christian film.

We are also aware of how COVID has really pushed many churches and Christian ministries to take the next step in their digital presence, so we've made an intentional effort to emphasize digital innovation, with increased work-

NRB 2021

CHRISTIAN MEDIA CONVENTION

shops on podcasting, streaming, and other digital tools. We've got experts from the various platforms, such as Faithlife, Rightnow Media, Vimeo and many others.

And on the advocacy side, we'll have conversations about platform censorship, Section 320, FCC, rural broadband, religious liberty and other topics.

RW: The pandemic has meant changes in the workflow for many organizations throughout the world of radio. Within the world of Christian broadcasting, how has that played out?

Darling: We are hearing from our members how they've been forced to be innovative in terms of workflows. Many of our radio stations had to quickly move to a work from home model with hosts broadcasting from their homes. And our TV stations have had to innovate as well. Thankfully, we have very creative members who find new ways to broadcast, record, and create content.

And of course many of our members have continued a work from home model that many see as an ongoing option. COVID-19 has produced a major disruption in both the way we work and the advancing of innovation.



Daniel Darling

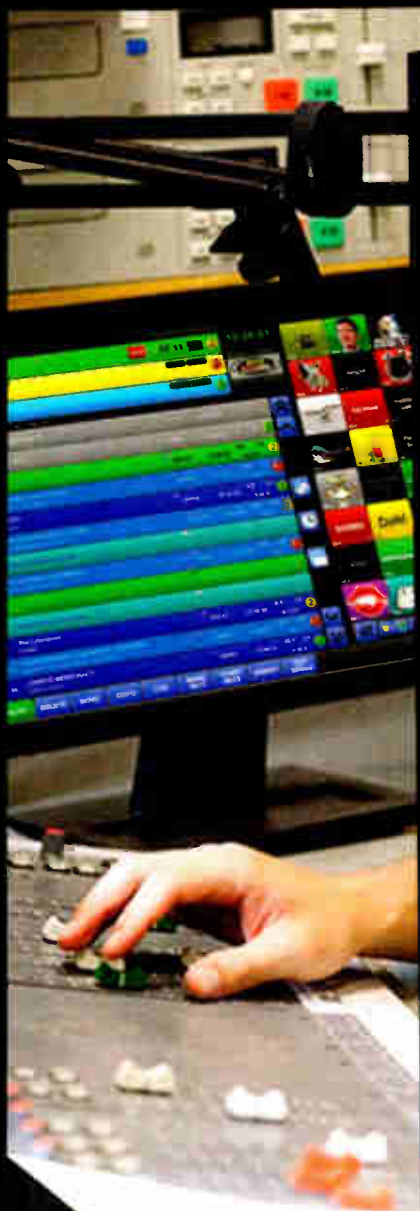
RW: There's a "racial reconciliation panel" on the show agenda, what does that involve?

Darling: With the ongoing racial tension and the conversations that have arisen this year, NRB wants to help lead both the church and in society toward racial unity. So this panel will help us hear, listen and move forward as diverse members share their experiences.

RW: How many attendees and exhibitors do you expect?

Darling: We expect a turnout close to what we've seen in previous years, several thousand attendees and hundreds of sponsors, though we are ever mindful of the unique conditions we are in during a global pandemic.

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