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AM Band Digital Field Tests Conclude

Driving data gathered in largest market yet

BY LESLIE STIMSON

The last planned NAB Labs field tests of all-digital HD Radio signals on the AM band were conducted in October on Seattle's Fox Sports KRKO on 1380 kHz and Classic Country KKXA on 1520 kHz. IBIquity Digital and several other firms are assisting in the field tests.

NAB EVP/CTO Sam Matheny told attendees at the national SBE convention in

October that test participants are crunching data and preparing to present information to the NAB Radio Board, which meets at the end of the month.

NAB Labs hopes to finish processing the field- and lab-test data and submit it to the FCC sometime in 2015. It plans a session about the testing in its Broadcast Engineering Conference next spring; presumably some of the data would be

(continued on page 6)



Discussing all-digital AM at the fall Radio Show were Greg Borgen, WDGY(AM), Hudson, Wis.; Glynn Walden, CBS Radio; Andy Skotdal, KRKO(AM)/KKXA(AM), Seattle; David Layer, NAB; and Ben Downs, Bryan Broadcasting.

Photo by Jim Peck

NYC Rooftop RF Options Widen

Empire and 1 WTC push and pull in market pitch for RF tenants

BY RANDY J. STINE

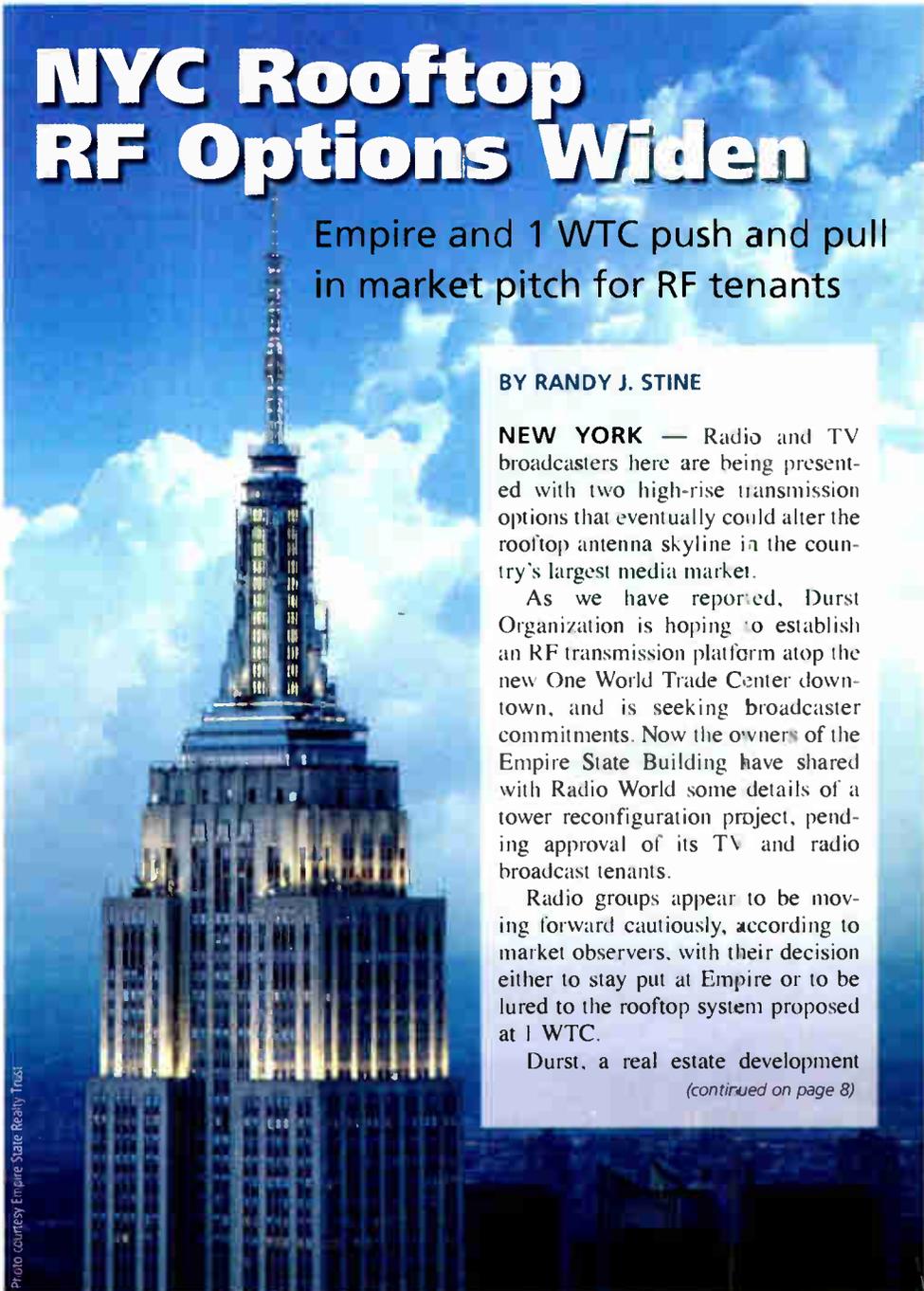
NEW YORK — Radio and TV broadcasters here are being presented with two high-rise transmission options that eventually could alter the rooftop antenna skyline in the country's largest media market.

As we have reported, Durst Organization is hoping to establish an RF transmission platform atop the new One World Trade Center downtown, and is seeking broadcaster commitments. Now the owners of the Empire State Building have shared with Radio World some details of a tower reconfiguration project, pending approval of its TV and radio broadcast tenants.

Radio groups appear to be moving forward cautiously, according to market observers, with their decision either to stay put at Empire or to be lured to the rooftop system proposed at 1 WTC.

Durst, a real estate development *(continued on page 8)*

Photo courtesy Empire State Realty Trust



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iBiquity, Emmis Focus In-Car

Joint venture forms framework for combining technologies in dashboard

CONNECTED CAR

BY LESLIE STIMSON

Focused on the connected dashboard, technical teams at iBiquity Digital and Emmis' NextRadio business have begun working on development of an integrated auto platform that would combine their technologies and services.

This isn't the first time the engineers have worked together. Some six years ago, Emmis TagStation and iBiquity collaborated as part of the Broadcast Traffic Consortium — tying a cloud service provided by Nokia into HD Radio so that participating BTC stations could deliver traffic data as part of their HD Radio signal.

Now staffs at iBiquity and TagStation/NextRadio are working more closely, they tell Radio World.

In a broad sense, they want to marry the interactivity of the NextRadio app with HD Radio technology in the dashboard. "We have a chance to hold ... to strengthen our position in the automobile," said Emmis Communications Chair/President/CEO Jeff Smulyan.

Mindful that NextRadio has been heading towards developing an in-car application, iBiquity President/CEO Bob Struble said, "We don't want Jeff to have to go through what we at iBiquity did, which was many years of banging on doors of auto guys before we finally got in there. We're there. We have relationships, and an installed platform. So, if you can integrate the NextRadio functionality into something [an automaker] is already building, it's going to go a whole lot quicker."

The combined effort will benefit broadcasters as well, according to Struble: "It will be very powerful for us to go to automakers and say: 'This is the combined and complete broadcast solution. You take one meeting. It will be consistent across the industry, and the broadcasters are working together to make that work.'"

HD Radio is in some 20 million vehicles. Struble ticked off features that have been added over time like multicasting, iTunes Tagging and Artist Experience. NextRadio is the next one, he told Radio World. "We're going to bring that into the car." By combining efforts, integration will occur more quickly, he said. When asked how soon the new functionality could be seen in the dash, Struble said, "hopefully as soon as next year, but we'll see."

Emmis EVP/CTO Paul Brenner and iBiquity Digital SVP Broadcast



Photo by Jim Peck

Bob Struble of iBiquity Digital and Jeff Smulyan of Emmis believe their combined efforts to integrate TagStation, NextRadio and HD Radio in the dashboard will send a powerful message to automakers.

Programs & Services Joe D'Angelo said in an interview that OEMs have been asking each company about the other's technology: "We're trying to be proactive," Brenner said. The agreement provides a framework for expanding the NextRadio and HD Radio technology in mobile devices and overseas; but initially, they're focusing their efforts in-car.

Emmis developed TagStation to let stations deliver artist and title information, and to add interactivity. With partial funding from NAB Labs, the broadcast owner developed the NextRadio hybrid radio smartphone app that uses TagStation cloud services so that listeners can hear FM radio on smartphones — right now, mostly from Sprint — by combining the devices' built-in FM tuner with Internet access.

SOFTWARE CAPABILITIES

The teams are working on software capabilities to combine IP delivery of content from the TagStation data service and NextRadio smartphone app with the broadcast distribution of HD Radio stations. TagStation provides a data "backchannel" for the NextRadio FM app. Brenner characterized TagStation as a cloud server that distributes data: "Think about the manual, localized world of radio information and audio. We move all that information up into a cloud, so that we can make it part of a connected car. You can't get to

a connected car from each and every radio station. It has to go to one place. TagStation represents that cloud of data about the audio you're hearing."

The components of both TagStation and NextRadio play a role in making connectivity work for HD Radio in-car, he said.

Struble said the companies are hoping they can eventually approach stations in a more coordinated fashion, offering a "one-stop-shop" to implement the technologies, rather than approaching stations independently. "So when you do what you need to do [to implement] TagStation, you've done what you need to do for HD Radio and vice versa," said Struble.

The collaboration has implications overseas. For example, HD Radio is the digital radio standard in Mexico. As those broadcasters roll out the technology, "We're looking to bring this in to help build the broadcast infrastructure in Mexico as well," said D'Angelo.

Some 2,200 U.S. radio stations, mostly FMs, are broadcasting HD Radio on their main signals; those stations have created an additional 1,500 multicast channels, according to iBiquity Digital.

On the NextRadio side, meanwhile, a majority of FM stations, some 6,700, participate with at least station branding for the app, according to Emmis; and about 75 percent of FMs in the biggest markets have begun delivering interactive content for it.

Connected Car Insights From TS10

Breaking down the numbers to find radio's place in the digital dash

BY TOM VERNON

As traditional radio fights its way in the home and office, the automotive environment becomes ever more important for listening.

In fact, half of all radio listening is done on the road. Nevertheless, many radio managers appear to lack understanding of this space.

That is one of the conclusions in TechSurvey10, conducted by Fred Jacobs, president of Jacobs Media. "TS10" surveyed the listening habits of 11 formats' core audiences spanning five generations, totaling some 37,000 respondents. From Boomers to Millennials, various patterns of consumption emerged.

The automotive environment figures prominently in TS10, as the connected car movement continues to gain momentum. Nearly a fifth (19 percent) of respondents say the vehicle they use most often has a system like Audi Connect or Ford Sync. And the good news for broadcasters is that half of them do the bulk of their radio listening while on the road, and this trend is especially noticeable in younger listeners.

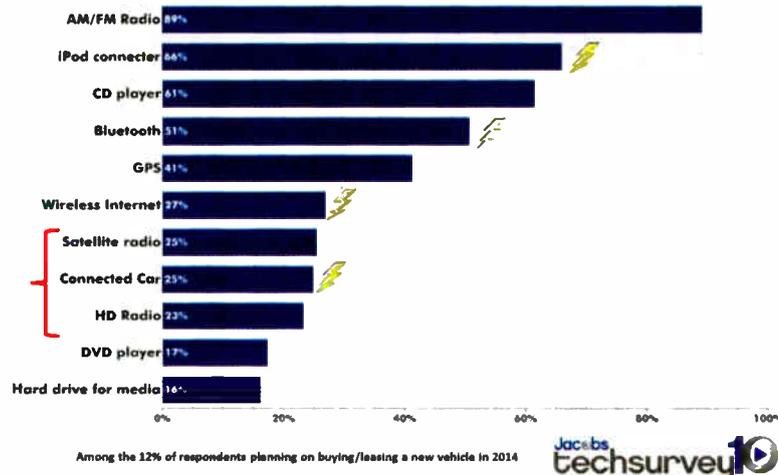
The bad news is that competition for the ears and attention span of drivers is only going to intensify in the coming years. Fortunately, radio has not been forgotten by younger listeners.

HIGH ON THE LIST

"When people are asked what features are most important in a car," said Jacobs, "AM-FM radio is high on the list, the number one item in many surveys." While the AM-FM radio isn't going away, there is no longer a physical button to push. In its place, there are 'soft' buttons that users can prioritize with their choice of Bluetooth, satellite radio, MP3s, Pandora or terrestrial radio. Up to 60 percent of TS10 respondents also connect their phone through the car's external input jack. "This number is somewhat higher for Generation Y and Z listeners," said Jacobs.

The digital dash gives AM-FM radio parity with other media — and this might not be good if stations are not pre-

An AM/FM radio is the most important feature for new car buyers, but connectivity is big, too.



pared. Services like Pandora automatically arrive with metadata such as album art, artist and song title. Radio has made efforts with RDS and HD Radio Artist Experience, but the level and quality of delivery remains inconsistent. "Listeners expect this data to be part of their experience," said Jacobs. "Radio can no longer be about sound coming out of a box."

In this new world of the connected car, the dealers take on a more important role.

The digital dash gives AM-FM radio parity with other media.

"When consumers have problems with the digital dashboard, they call the dealer. This is a great opportunity for stations," Jacobs said. By forming a relationship with dealers, the station can be programmed onto one of the soft buttons so that it is easily accessible. Dealers may also demonstrate to customers how to load broadcast stations onto soft keys.

"For broadcasters to effectively play in this space, they'll need a comprehensive strategy in order to maintain presence in the 'center stack,' as well as maintaining and growing advertising revenue."

He also noticed a rather surprising gap between average consumers and radio staff when it comes to ownership of connected cars.

"Around 19 percent of our survey respondents drive a connected car, and

according to our polls of station personnel, the ownership rate is between 5 and 10 percent," said Jacobs. The average age of a car on the road is 11 years old, and radio station staff appear to be on the far end of that curve.

This is another area where a relationship with dealers can help because they can help to educate station staff on the ever-changing car entertainment environment.

DISAPPEARING ANTENNAE

While the high-tech changes in cars seem to be grabbing all the headlines, Jacobs notes that there are some low-tech changes that should concern broadcasters.

The humble AM-FM receiving antenna, once a chrome-plated mast riding proud on the fender, has disappeared from sight. As cars have become more aerodynamic, the antenna is now a strip of wire embedded in the windshield or in the bumper. The problem is that this type of antenna is not nearly as sensitive as those external masts that were used up to the 1990s. Recent A-B comparisons of roof-mounted external antennae and an internal antennae have demonstrated a dramatic difference in received signal strength, not only on HD Radio signals, but conventional FM's as well.

Any discussion of connected cars also raises concerns about distracted drivers. Much of the interface in many of the systems is controlled via voice commands, and there is a general goal to build a great experience that helps drivers get what they're looking for without disrupting their focus on the road. Most developers regularly interface with government agencies, such

FROM THE EDITOR



"Radio can no longer be about sound coming out of a box." So says Fred Jacobs, president of Jacobs Media, writing in the company's latest TechSurvey. Radio World contributor Tom Vernon digs into the numbers.

— Paul McLane

as the National Highway Traffic Safety Administration, to help achieve this.

THIS MEANS WAR

Some of the most fascinating insights from TS10 involve the coming battle for control of the connected car.

Each automotive manufacturer has developed their own system for navigating through and controlling the connected environment — including media functions. This means, for example, getting out of a Ford vehicle, which has Sync, and climbing into a General Motors vehicle that uses MyLink or a Chrysler with uConnect can be a confusing experience.

There are two competing forces striving to bring harmony to this chaos.

On one hand, a move is underway among car manufacturers to develop standards, so that the telematics systems in all vehicles operate in the same way.

On the other hand, Google recently announced formation of the Open Automotive Alliance, a global alliance of technology and auto industry leaders including Audi, GM, Honda, Hyundai, as well as visual computing company Nvidia. They are committed to bringing the Android platform to cars starting in 2014.

And Apple recently announced CarPlay, in which iPhone owners will be able to link their content directly into the dashboard.

"It's really like the Wild West at this point," said Jacobs, echoing a term that has been noted before in Radio World's coverage of the connected car. "Who will win out is anybody's guess."

Jacobs Media co-sponsors a conference in Detroit to examine these issues, with participants from broadcasting, automotive (OEMs and Tier Ones), advertising agencies, car dealerships and other interested sectors. "Radio people have dealt with the auto industry for decades, but usually only when pitching business, setting up a remote, or buying a car themselves," said Jacobs.

Tom Vernon is a longtime contributor to Radio World. Find more of his articles by searching keyword "Vernon" on radioworld.com.

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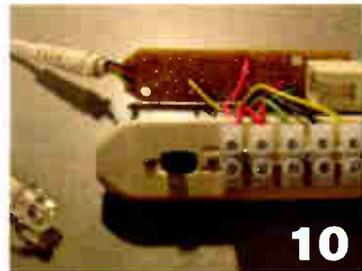
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PRPD HONORS CRAIG OLIVER

PORTLAND, ORE. — The Public Radio Program Directors bestowed its Don Otto Award on audience researcher Craig Oliver at the PRPD Convention in Portland, Ore., in September.

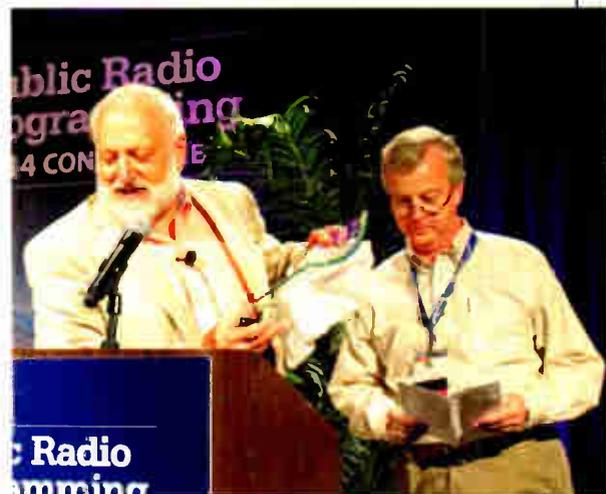
Oliver, owner of a public radio audience research consultancy of the same name, provides expertise to clients of Public Radio International, Greater Public and public radio stations. He co-founded PRPD and was its first president.

Every year, the group recognizes one of its peers, honoring unique public radio individuals "whose talents, smarts and humor have helped public radio move forward over the course of their careers."

The award is named after the late Don Otto, director of Eastern Public Radio, who mentored many of the people who formed PRPD in 1987.

Oliver credited Otto and the late Tom Church, then president of the Radio Research Consortium, for the "PD Bee" workshops that led to formation of PRPD. In prepared remarks shared, Oliver said: "I'm not much on speeches. Otto always said, 'Let's plaque 'em.' And by this he meant, give 'em an award and get 'em outa here.' So in keeping with the Otto tradition, I won't make a speech. I will simply say a gracious thank you to those in public radio who make it possible for me to work."

Oliver — who is married to Radio World News Editor/Washington Bureau Chief Leslie Stimson — began his career at WAMU(FM) in Washington in 1972 as a board op and was news director and program director before making the transition to audience research.



Craig Oliver, right, accepts the Don Otto Award from PRPD President Arthur Cohen.

NEWSROUNDUP

FM CHIP: The effort to embed and activate FM chips in smartphones is now a coordinated effort between proponents in the U.S. and the U.K. The BBC is leading a coalition for the "Universal Smartphone Project," which includes commercial broadcasters from the U.K., the European Broadcast Union, iHeartMedia, Emmis, iBiquity, NAB and Commercial Radio Australia. They're prodding manufacturers and carriers to embed and activate FM and DAB technology into handsets.

widen its outreach beyond traditional broadcast outlets to include Web, cable TV, Internet service providers, telcos, satellite TV and corporate AV. The society has also added a tagline to its logo to better explain what the group does: The Association for Broadcast and Multimedia Technology Professionals.

JANE MAGO: NAB Legal EVP/General Counsel Jane Mago is retiring after 10 years with the association. Mago came to NAB in 2004 after a 26-year career at the FCC. NAB EVP Strategic Planning Rick Kaplan will succeed Mago, who will remain a consultant through the end of 2015.

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DIGITAL

(continued from page 1)

made public then.

Seattle is the largest market in which testing has been conducted. Seattle-Tacoma is Metro Rank #13 based on population, according to Nielsen. The next-largest market in which all-digital testing on the AM band was done was Tucson, Ariz., Metro #62 and home to Cumulus Media's KTUC(AM).

The Seattle tests also were the first to include 50 kW stations in a large market at a diplexed transmitter site, according to KRKO/KKXA President Andy Skotdal.

His stations were the eighth and ninth tested. In addition to Tucson's KTUC, others have included CBS Radio's WBCN, Charlotte, N.C.; Beasley Broadcasting's WNCT, Greenville, N.C.; Greater Media's WBT, Charlotte, N.C.; WRPX Inc.'s WDGY, Hudson, Wis.; West Virginia Radio Corp.'s WSWW, Charleston, W.Va.; and WD2XXM, an iBiquity test station in Frederick, Md.

Years ago, before HD Radio receivers were readily available, tests of signal coverage required special reference receivers. Now, engineers with typical HD Radio-equipped cars can drive around the market and measure the all-digital performance, noting coverage for day and night on specific drive routes.

In this case, five rental Ford vehicles were used. Skotdal took part, driving some 1,200 miles and recording data. Other drivers included KRKO/KKXA Engineer Buzz Anderson; NAB Senior Director of Advanced Engineering David Layer; Hatfield & Dawson Senior Electrical Engineer Of Counsel Jim Hatfield and Senior Electrical Engineer Stephen Lockwood; Cavell Mertz Senior Engineer Mike Rhodes; Nautel Regional Sales Manager for the Central U.S. Jeff Welton; KGRG(AM/FM), Auburn, Wash. Chief Engineer Jon Kasprick; and CBS Radio Seattle DOE/MIS Tom McGinley. He is also a technical advisor to Radio World, which was not involved in the project.

The 50 kW KRKO and KKXA turned off their analog signals for periods of time and transmitted all-digital signals during the Oct. 2-6 day and night tests. The stations also aired promos, asking for listener input.

The overall test project consists of three components: field testing to help demonstrate real-world signal coverage; lab testing to establish interference behavior between stations; and allocation studies to understand the impact on FCC rules should all-digital be authorized on the band.

Skotdal was careful not to reveal actual data nor drive routes. We've reported that NAB Labs and other personnel involved have said the all-digital signal



Photo by Andy Skotdal

The Seattle-area AM digital driving team, from left: David Layer, NAB; Stephen Lockwood, Hatfield & Dawson; Mike Rhodes, Cavell Mertz; Tom McGinley, CBS Radio Seattle; and Andy Skotdal and Buzz Anderson, KRKO(AM)/KKXA(AM), Seattle. McGinley is also a technical advisor to Radio World, which was not involved in the testing. Not pictured: Jim Hatfield, Hatfield & Dawson; Jon Kasprick, KGRG(AM/FM); and Jeff Welton, Nautel.

generally is more robust and that coverage exceeds that of the hybrid digital signal, with coverage dependent on co- and adjacent-channel interference. During a fall Radio Show panel, Layer said the all-digital signal "is significantly better than the hybrid digital AM signal."

The possibility of allowing all-digital on the band has been raised as part of larger industry discussions about "AM revitalization." Proponents believe allowing stations the option of going all-digital would fix or dramatically decrease characteristics of hybrid AM HD Radio technology that have generated criticism, namely a smaller digital coverage footprint and potential interference to the host and neighboring stations.

FEEDBACK

Skotdal said his stations received comments about the AM all-digital testing via email, Facebook and phone calls. Station personnel also received digital skywave reception reports from Montana, Oregon and provinces in Canada.

Generally, people with HD Radio receivers liked what they heard, according to Skotdal. "Some said they heard the station with better clarity than with analog in the same location, some said they heard the station farther. Some said they had enough signal [that] they didn't have to monkey with their AM antenna to get us and that the fading went away for them."

Not all feedback was positive. Skotdal says a few listeners said they only had analog radios, weren't about to buy a new digital ones and wondered whether all-digital was going to happen next year. He told listeners that analog AM radios would be able to work for a long time yet, certainly for 10 years or more, because regulatory efforts take time.

According to the Seattle Area Radio

The possibility of allowing all-digital on the band has been raised as part of larger industry discussions about "AM revitalization."

Association and Ibiqity Digital Corp., there are approximately 223,907 HD Radio-equipped vehicles in Seattle; those receivers can decode both AM and FM HD Radio.

"Listeners in King County with analog radios can receive approximately 26 FM signals," said Chuck Maylin, executive director of the Seattle Area Radio Association, who has taken over the GM role at the stations from Skotdal.

Listeners were told that people with analog AM radios would hear silence during the tests and those who own HD Radio receivers would hear all-digital quality "similar" to FM. Those tuned to music-formatted KXXA in particular would notice stereo separation and the full audio range of the country music that's airing, according to participants.

Reactions to the process from people not involved in the tests were mixed at best.

In comments posted to Radio World's website, one reader wrote that he wishes KAAM in Garland, Texas would test the all-digital system.

Another suggested that rather than authorizing testing of all-digital on AM, the FCC should enforce Part 15 interference regulations, "increase receiver bandwidth to improve fidelity" and reduce

protection for 50 kW clear channels. "And eliminate HD from the band entirely. C-QUAM was a much better system for improving the listener experience."

A third wrote: "This is not the solution to an AM fix. Increase AM bandwidth to 10 kHz, let each Class C and D stations increase their daytime power levels and go night-time on the Class D's with a minimum of 250 watts."

"ANALOG'S TIME IS PAST"

The testing raises the possibility of a "digital sunrise," an era in which some or all U.S. AM stations would transmit all-digital signals. The possibility was discussed at the fall Radio Show in Indianapolis.

Glynn Walden — senior vice president for engineering for CBS Radio, former iBiquity Digital engineering executive and a "father" of HD Radio — was asked which AM stations might have the toughest time converting. He identified stations with poorly maintained transmitters and antenna systems, which have a hard time fighting through the rising man-made noise level. "The cost of implementing HD Radio is going down, but the cost of fixing your antenna system hasn't," he said.

Walden said the current hybrid digital system was always intended to be temporary, with stations able to make the transition to all-digital when it made economic sense.

Going further, Walden says he fears there's not much indoor listening to AM anymore due to the rising noise floor. "Offering digital service is imperative. Analog's time is past. It's time to move on," Walden declared.

Skotdal said at the show that he's a fan of a digital sunrise for the FM band as well, and that broadcasters should explore whether to request the option of going all-digital. FM could see such a digital sunrise before AM, he said.

He later told Radio World: "Assuming we hit critical mass on [receiver] penetration, though, there will still be a big field of AM stations unable to transition. HD can be implemented for any AM license, but implementation costs will be asymmetrical from one facility to the next. Licensees of directional AMs, in particular, are the ones who will be disproportionately impacted from a cost standpoint compared to licensees of omnidirectional sticks."

Should the FCC authorize stations to use all-digital on the AM band, Skotdal tells Radio World he'd like to do so at his stations starting on weekend evenings, and promote that during the week. "It's an incentive for people to hear it. For stations that want to go in this direction, why hold them back?"

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NYC TRANSMISSION

(continued from page 1)

firm, controls 1 WTC in a partnership with The Port Authority of New York and New Jersey. Company officials said the building has space for every station in the market to install transmitters and sufficient mast capacity for all to participate in a hypothetical master antenna on the 408-foot spire. The rooftop has been leased to Durst Broadcasting LLC, the entity that will run the proposed broadcast facility, and is viewed by developers as a successor to the broadcast facilities lost in the collapse of the twin towers in the 9/11 terrorist attacks.

The skyscraper, which stretches to 1,776 feet, now is expected to open in November when its first tenants take occupancy, according to John Lyons, vice president and director of broadcast communications for Durst.

Multimedia publisher Condé Nast is expected to occupy some 1.2 million square feet on floors 20 through 44 at 1 WTC, according to various published reports.

"We are still talking to broadcasters" about the proposed FM antenna, Lyons said.

ESB

Currently, most of the market's major radio and TV broadcasters operate transmission facilities at the Empire State Building. Empire, which stands 1,254 feet tall plus a 200-foot steel broadcast tower.

The building is owned by Empire State Realty Trust, a publicly traded company. In the year ending Dec. 31, 2013, the trust derived approximately \$20 million of revenue from Empire's broadcasting licenses and related leased space for radio, television and data communications services, according to its annual report.

Empire is in mid-town Manhattan. Nineteen FM radio stations call it home to their primary signals; 16 of those are on a three-bay, four-sided radio master antenna built by Electronics Research Inc. and installed in 1994. Three FMs are on a second smaller master antenna, often referred to as Empire's "mini-master." The master FM combiner is on the 85th floor; the mini-master FM combiner is on the 87th.

Fifteen TV stations also operate from the building — 11 full-power and four LPTV stations — with a combiner on the 85th floor.

Pending broadcaster commitments, officials at Empire have proposed building a 19-station master FM combiner and antenna, said Shane O'Donoghue, director of broadcasting for Empire State Realty Trust.

The timing of the Empire tower reconfiguration project depends in part on the FCC's repurposing of the 600 MHz spectrum, expected in 2015; this may result in some TV broadcasters choosing to move frequency, O'Donoghue said. "The TV repack is going to force us to reconfigure TV facilities and antennas, but it also is presenting [Empire] an opportunity to offer radio broadcasters the chance for a new radio transmission antenna infrastructure," he said.

Lyons at 1 WTC told Radio World previously that the TV frequency repurposing is creating uncertainty and making radio and TV broadcasters reluctant to commit to the new RF structure there.

MASTER FM

The Master FM Antenna Group at Empire is a consortium of broadcasters that owns the FM combiner (also built by ERI in 1994). The group includes iHeartMedia, CBS Radio, New York Public Radio, Emmis Communications and several other broadcast groups.

Empire owns the master FM antenna and leases space to broadcasters.

Rob Bertrand, chief engineer for CBS Radio in New York and member of the executive committee for the Master FM Antenna Group, said Empire is still working through significant logistics to develop a plan and present it to the broadcasters. "We have seen a number of potential designs for both the antenna and combiner systems. We have yet to see the terms associated with those plans."

But the consortium, which exists to maintain the facilities at Empire, is not actually in a position to greenlight the proposed antenna reconfiguration project, he said. "The consortium does not act unilaterally; so each broadcaster will be making decisions independently in terms of what to support at the Empire State Building or whether to consider moving to One World Trade Center," Bertrand said.

A challenge at Empire will be managing the sequence of events if not all broadcasters elect to remain at Empire.

"One of the big questions we have is what happens if not everyone buys into what will be proposed at Empire. How do you migrate broadcasters if not everyone is on board?" Bertrand said.

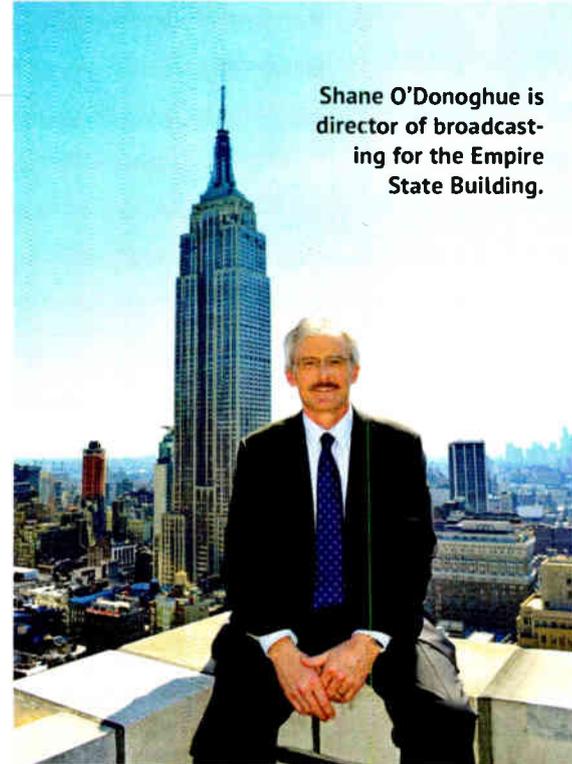
But Bertrand believes competition between two or more rooftop platforms in New York City is good for broadcasters. "I think it helps drive innovation and drives the market in terms of lease structures and that sort of thing."

Bertrand said the master FM system at Empire "is 20 years old, so it's time to look at the facilities and come up with a new long-term plan."

O'Donoghue of Empire said he has "complete design plans and specifications" for its tower reconfiguration. He said construction documents have been bid and leveled with pricing for all options, which have been presented to broadcast tenants.

"There are still many unknowns with the FCC TV spectrum auction. There are many variables still in play there. We want as much data as possible from the FCC before we finalize terms of our project," O'Donoghue said.

Investment bank Greenhill & Co. in October released a study in conjunction with the commission



Shane O'Donoghue is director of broadcasting for the Empire State Building.

Photo by Peggy Miles

that estimated the value of the TV spectrum to give broadcasters some guidance, O'Donoghue said. "We are in close contact with the FCC. I expect we will have a much clearer picture at some point in 2015," he said.

Once broadcasters are ready to proceed, "we stand ready to execute" the design and construction plans, O'Donoghue said. He declined to say what level of commitment from tenants would be needed before ESB would proceed.

Despite Empire's push for a new master FM antenna, O'Donoghue said the current antenna and combiner system is in good shape and has been well maintained. "There is no immediate need for radio broadcasters to make upgrades. This is just an opportunity to take advantage of the timing of the TV spectrum repack."

O'Donoghue said the final decision about when to proceed with the tower reconfiguration project will be Empire's. He described the working relationship between Empire and the Master FM Antenna Group as a partnership that manages the FM combiner, transmitter rooms and the rest of the antenna infrastructure.

"I'm sure [broadcasters] will have their preferences. We are acting more as facilitators and project managers."



RADIO STATIONS THAT TRANSMIT FROM EMPIRE

92.3	WBMP-FM	CBS Radio	
93.1	WPAT-FM	Spanish Broadcasting System	
93.9	WNYC-FM	New York Public Radio	
95.5	WPLJ-FM	Cumulus Media	Mini-Master
96.3	WXNY-FM	Univision	
97.1	WQHT-FM	Emmis Communications	Mini-Master
97.9	WSKQ-FM	Spanish Broadcasting System	
98.7	WEPN-FM	Emmis Communications	
99.5	WBAI-FM	Pacifica Radio	
100.3	WHTZ-FM	iHeartMedia Inc. (Clear Channel)	
101.1	WCBS-FM	CBS Radio	Mini-Master
101.9	WFAN-FM	CBS Radio	
102.7	WWFS-FM	CBS Radio	
103.5	WKTU-FM	iHeartMedia Inc. (Clear Channel)	
104.3	WAXQ-FM	iHeartMedia Inc. (Clear Channel)	
105.1	WWPR-FM	iHeartMedia Inc. (Clear Channel)	
105.9	WQXR-FM	New York Public Radio	
106.7	WLTW-FM	iHeartMedia Inc. (Clear Channel)	
107.5	WBLS-FM	Emmis Communications	

Photo by Peggy Miles



Rob Bertrand, market chief engineer for CBS Radio New York, at the transmission facility for FM stations WCBS, WFAN and WBMP at Empire. He's also a member of the executive committee for the Master FM Antenna Group at Empire.

BIDDING PROCESS

Empire, whose radio broadcast antenna history dates to 1930, has worked with several consultants and antenna manufacturers capable of building a master radio antenna system within the timeframe of the FCC requirements for the DTV buildout. O'Donoghue said, ERI, Dielectric, Jampro and others have participated in the FM master antenna bidding process, he said.

The reconfiguration project would include replacing Empire's older Alford combiner and antenna, in place since 1965 and currently used as a backup, he said. The Alford was the first master FM combiner system anywhere that was designed to allow individual FM stations to broadcast simultaneously from one source.

O'Donoghue said a planned new RF shield will isolate the main antenna from the auxiliary antenna. In addition, the building has already installed RF monitoring systems above and beyond FCC regulatory requirements, he said.

Radio stations would continue to broadcast from Empire during construction. "Building a new aux antenna would be the first part of the project. That would be completed in one summer construction season," according to O'Donoghue. "Then all 19 of the FMs would be placed on the new auxiliary antenna during construction of the new master FM antenna."

As for the competitive situation, O'Donoghue, who has led Empire's broadcasting facilities since 2008, said he welcomes the new rooftop competition from I WTC.

"We think it strengthens the broadcasters' understanding that they are going to get the best by staying at Empire. Not only do we have the internal capability with our engineering expertise but also with the construc-

tion management team in place here," he said.

He emphasized that the Empire State Building, in addition to the broadcast antenna tower, has significant antenna aperture space on all sides of the building from the 90th to 102nd floors, known as the Mooring Mast, according to O'Donoghue. "We call the unique top of the building the Mooring Mast since it was conceptually designed to moor dirigibles, which was a new way to travel in the early 1930s." No aircraft ever did moor there.

The unique aperture space and lower

setbacks on floors 81, 85, 87, 88, 89 and 90 accommodate auxiliary antennas and communications antennas for STL, electronic news gathering and point-to-point microwave, O'Donoghue added.

Also offering broadcast infrastructure in the city is the Condé Nast Building at 4 Times Square in midtown Manhattan. That building, owned and managed by Durst, has 14 FM transmitters and a Shively master FM antenna installed in 2004. The site is used primarily as an auxiliary platform for radio broadcasters and some television, according to Durst officials.

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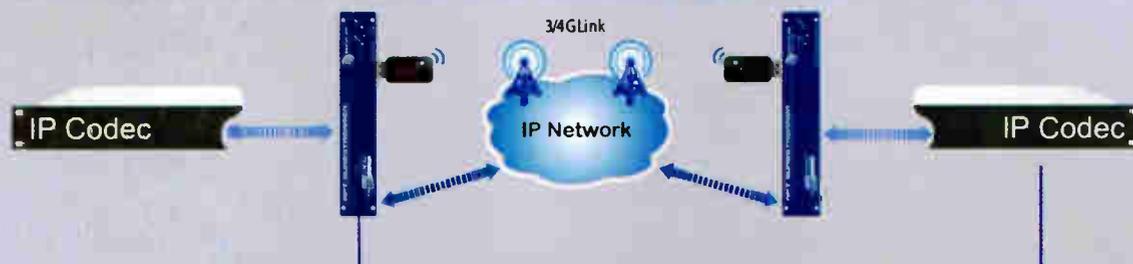
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This Helps Diagnose Phone Problems

Build a simple telco breakout box test fixture

WORKBENCH

by John Bisset

Read more Workbench articles online at radioworld.com

Steven Donnell is with New Hampshire Public Radio and is based in Concord, N.H. He offers a simple project that he put together to help diagnose problems with a pair of phone lines at a remote transmitter site. It provides an easy way to look at the voltage (and current) on a telephone line using a typical multimeter.

Steven took a typical DSL filter, shown in Fig. 1, and cracked the plastic box open using a vise. Then he stripped



Fig. 1: The open DSL filter case

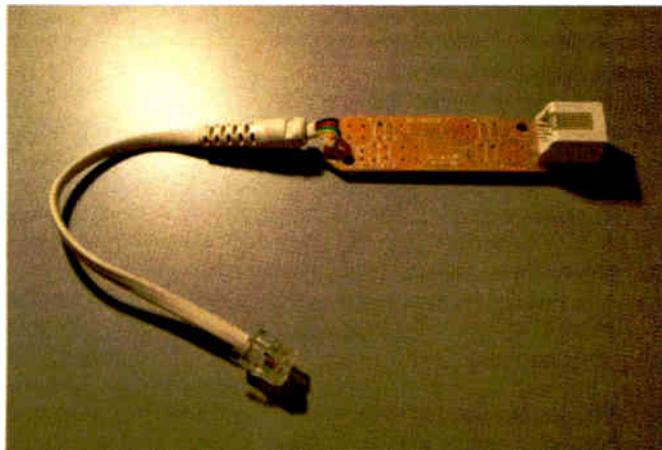


Fig. 2: The stripped circuit board

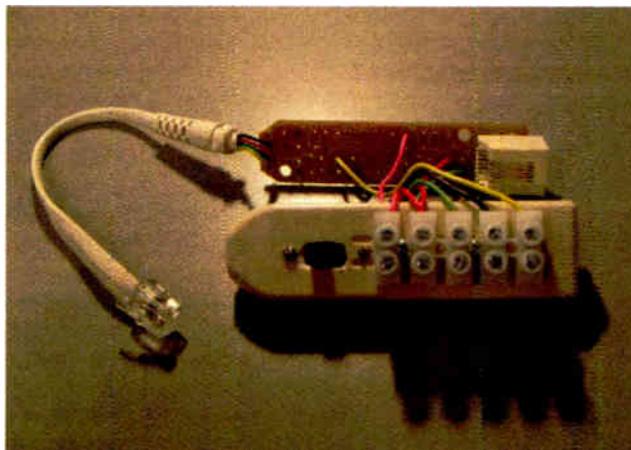


Fig. 4: The finished telco current/voltage test fixture

Typical DSL Filter

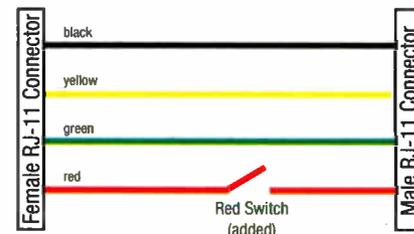


Fig. 3: The simplified test fixture schematic

the capacitors and inductors off of the PC board inside, so that all that was left was the female RJ-11 jack and a short pigtail leading to a male RJ-11 (see Fig. 2). He installed four short jumper wires to connect between the corresponding Red, Green, Yellow and Black wires between the male/female RJ-11 connectors. As you can see in the schematic drawing (Fig. 3), Steven included another lead out to a terminal strip that he attached to the side of the plastic case.

One further step was the addition of a small slide switch to provide a means to open the Red lead. Be sure to include an extra lead from the "switched" side, out to the terminal strip. This adds the ability to "open" the line, in order to look at On/Off Hook line current.

Steven's finished product is seen in Fig. 4.

He also shares a great resource for tools, test equipment and technical information. Head to Mike Sandman's website. Mike is in Chicago and his site is www.sandman.com. Mike has a data sheet that shows what you should expect for voltage and current readings on a phone line (www.sandman.com/files/teldiagchart.pdf).

Reach Steven Donnell at sdonnell@nhpr.org. Steven, thanks for sharing a simple yet effective test fixture with our readers.

Engineering consultant Thomas Osenkowsky writes of an experience that may serve as a helpful reminder to others. Like many broadcast problems, this started with frustration but eventually resolved with satisfaction.

Tom had a propane generator in an outdoor cabinet. One day the generator failed to exercise; but when he moved the control panel switch to Manual, it started and ran fine.

He noticed that the "Auto" status light was not lit. However, when he toggled the switch back into "Auto" it was lit.

(continued on page 12)

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That Personalized Touch

Streaming apps' success hinges on personalization, usability, content

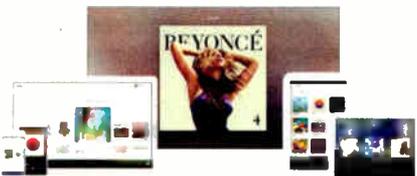


Welcome to the first installment of *Radio World's What'sNext* tech news. James Careless takes a look at interesting streaming services and digital developments related to the radio industry.

RDIO

Surprise! When it comes to giving music streaming listeners what they want, Rdio (www.rdio.com) has decided that they want ... radio stations. That's right: Virtual radio stations are at the heart of Rdio's new free app.

Available for iOS, Android and Windows Phones, "Rdio's free stations-first offering features 15 times more music than the leading Internet radio



service and a wide variety of station types, including algorithmic artist- and genre-based stations, human-curated stations programmed to fit any mood or activity, personalized stations tuned to each individual listener, and stations based on tastemakers," said a Rdio news release in September.

"What we've heard from our listeners is that free matters and stations matter, so we are taking a free stations-first approach to music and putting this at the forefront of the Rdio experience," said spokesperson Lizzie Garlinghouse. This is why "free stations are now at the forefront of the user experience. Stations are threaded throughout the app — we've done away with the 'stations' section,



and have instead built the entire listening experience around stations."

RIVET NEWS RADIO

The Pandora of personalized audio news content, delivered directly to your smartphone: That's the heady goal of Rivet News Radio (www.rivetnewsradio.com).



Operated by Chicago-based HearHere Radio — which raised \$1.7 million in Convertible Promissory Notes to fund this venture — Rivet News Radio uses a personalized algorithmic approach to give listeners the news coverage they want, just as Pandora does for personalizing users' musical selections.

All the user has to do is download the Rivet News Radio app to their Android or Apple (iOS) smartphone, sign in using Facebook or their email account, choose the news categories they want covered, and let the audio news roll in. The Rivet News Radio app also enables listeners to pause,

WORKBENCH

(continued from page 10)

After replacing the DPDT switch, Tom performed an autopsy. Inside, he found a substance contaminating one set of switch contacts. He thought this strange because the transmitter site is in a residential area, with no industry or bodies of water nearby that could contaminate the switch contacts.

About a year later, the generator was running but not producing voltage. The culprit was a bad relay. Opening it up, again he found the contacts contaminated.

During one weekly inspection, Tom found the RF output Fwd power meter on the Harris MX-15 exciter pinned. Turning the AGC off, he returned it to the normal 8W output. But it turned out that one pole of the DPDT AGC switch was intermittently open. Opening the switch again revealed contaminated contacts.

Two years later, he was looking for spare parts, which were stored on a set of metal shelves behind the FM transmitters. Tom noticed a layer of rust colored residue on the shelf below the one he was searching. Tom found a can of wasp spray had exploded and then ate through the shelf.

That residue had a familiar appearance. Directly above the shelf was an exhaust fan, and directly in back of the shelf was the air intake to the FM transmitter with the MX-15

rewind, skip, forward and favorite stories; and see Top Stories on their screen, plus preview what story is coming up next.

"Rivet delivers bite-sized news stories to provide listeners with the information they need in a 15 minute listening session," said Terri Lydon, Rivet News Radio's director of marketing. "Our newsroom has about 50 reporters and producers all led by our head of news, Charlie Meyerson. The team works 20 hours per day to create engaging stories in a conversational tone."

Rivet News Radio is being targeted to business-to-business and business-to-consumer markets, with the company hoping to make money through advertising, subscriptions and licensing. "To date we've had 271K downloads across iOS and Android devices," Lydon said. "In Q2 2014 we had 16K monthly active users, and we are finalizing B to B licensing deals that will be announced next month."

The app is also entering the digital dash. Jaguar Land Rover has chosen it as a "preferred service" for its InControl Apps audio system. As of October, it will be available to Jaguar F-type and XE sedans this and to all JLR models in 2015.

SWELL

Apple's July 2014 purchase of the Swell app closed down a powerful podcast search engine. "The Swell app offers a very simple interface that allows users to easily find podcasts;

much like Pandora, it delivers suggestions based on what a user likes," said Motley Fool contributor Daniel Kline.

"Apple's own podcast app is hard to use and makes discovery relatively impossible. It's fine if you know what you're looking for but useless if you do not."

Now that the Swell app team is working for Apple, Kline anticipates Swell functionality to turn up in a future Apple application. If it does, then a Swellified-iOS app would be further bad news for satellite radio, which is being out-paced by talk-based podcasts.

"SiriusXM used to be the best place for talk radio fans; Since the podcast world exploded that is no longer true as, while SiriusXM has Howard Stern and some other good talk options, the podcast world offers much more," Kline said. "Previously it was hard to find those podcasts, but Swell made it a lot easier. Add that to everyone's iPhones and the idea of paying for satellite radio to get talk shows seems silly."

Is Kline right? Is SiriusXM at risk? We'll have to wait for Swell capabilities to be added to the Apple app, and then see what happens.

James Careless is a longtime contributor. Send ideas for *What'sNext* to radioworld@nbmedia.com.



exciter. Right outside the exhaust fan is the generator.

That wasp spray turned out to be the source of the contamination on both the relay and the two switches.

Tom now makes sure to check the shelves of any new contract stations. You never know what you will find.

I once visited a contract station that kept a glass container of battery acid on a rickety shelf. That stuff is nasty, and I could never understand why it was there — no generator or acid cell batteries were in use.

I discovered it when it fell off the shelf and splattered all over my shoes and jeans, eating holes in them. I was fortunate that my associate was there with me and that he lived nearby. He grabbed some cleaning supplies and a first aid kit from home. This is another example of why you don't want to visit remote transmitter sites by yourself!

Tom Osenkowsky can be reached at tosenkowsky@prodigy.net.

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

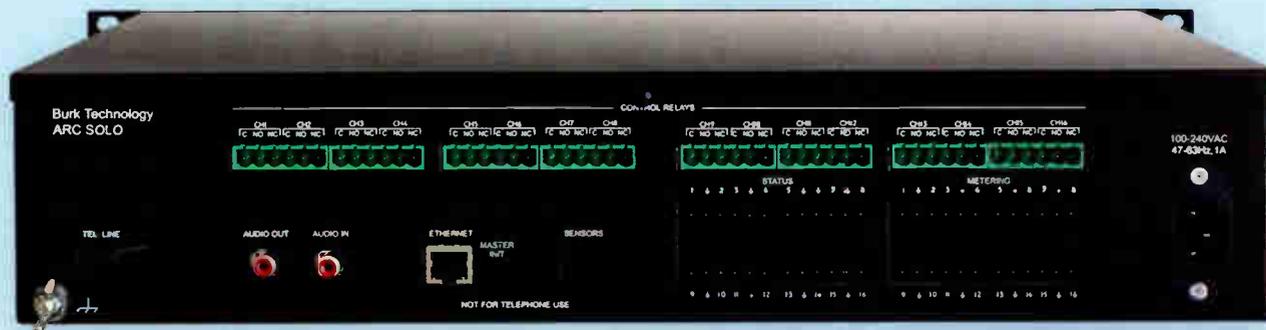
Author John Bisset has spent 45 years in the broadcasting industry and is still learning. He handles West Coast sales for the Telos Alliance. He is SBE certified and is a past recipient of the SBE's Educator of the Year Award.

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FUNDAMENTALS

BY JIM WITHERS

In earlier articles about engineering formulas and components, I wrote about the properties of electrical resistance ("Ohm's Formula One," Jan. 1 issue) and how early scientists and physicists worked out how to calculate the effects of resistance on electrical circuits ("Current Events," April 9).

This time, we'll tackle capacitors.

IT'S ALL GREEK

The Greeks are credited with first recognizing the phenomenon of static electricity. They noticed that a spark could be generated by rubbing amber against a dry cloth — in fact, the word "electricity" is an Anglicized adoption of *elektron*, the Greek word for amber. A charged piece of amber might have been an amusing thing to hide under a toga, but static electricity was nothing more than a curiosity to the ancients.

From the most mundane to the super sophisticated, every single piece of electronic equipment in use today depends on capacitors.

It remained so until Pieter van Musschenbroek, a Dutch professor of mathematics at the University of Leiden in Germany, invented a way to store an electrostatic charge in 1745. He called his device a Leyden Jar. This was the first practical capacitor.

It was a simple glass jar, lined both inside and out with metal foil. The two foil coatings did not extend to the top of the jar, and so were effectively insulated from each other by the glass sides. A lid covered the jar and a metal rod stuck through it into the jar, which was filled with water. When the rod was touched to a rotating metal sphere (used to collect a static charge), the charge was transferred into the jar and stored.

A LARGE CHARGE

Van Musschenbroek's jar worked fine, but even so, neither its inventor nor anyone else of the time was quite certain why. He had filled the jar with water, believing the electricity was stored in that substance.

In fact, capacitors were originally called condensers, because he and others thought the charge "condensed" out of the air and into the water.

Others, including Ben Franklin, who cheated death while capturing lightning in van Musschenbroek's bottle, believed the charge was stored in the insulating glass.

As it turned out, neither idea was correct.

Charles-Augustin de Coulomb, a French physicist, worked out a mathematical formula in 1785 that showed the charge was the result of an electrostatic field between the plates of the capacitor. He determined that the strength of the field obeyed the same rules as the Laws of Gravity, which is to say that the field strength diminished proportionally to the square of the distance from it. This became known as Coulomb's Law and is the basis of all calculations regarding electrical field strengths — such as those used to predict AM and FM radio coverage.

STREAMING ELECTRONS

When a voltage source is connected across the two plates of a capacitor, electrons stream out of the source and onto one of the plates, setting up an electrostatic field. The electrons in the field exert a force that is felt across the insulating material, repelling like-charged electrons off the opposite plate and back into the power source. The plate with an excess of electrons thus becomes negatively charged, while the opposite plate is positively charged. The electrostatic field causes current to flow between the plates of the capacitor, even though the material between them (called the dielectric) is an insulator.

This conflicts with Ohm's Law, which says that there can be no current flow in a true insulator because the resistance is infinite. This conflict is resolved by the unique properties of the electrostatic field in the capacitor, in which electrons on one plate do not actually cross the dielectric; rather, they exert a force on the electrons of the opposite plate, and it is that repelling force that causes current to flow for as long as the charging process continues.

As the process begins, the current flow is highest because that is when there is the largest number of electrons waiting to be bumped around. But as more and more electrons gather on the one plate and more and more are repelled from the other one, the current drops off.

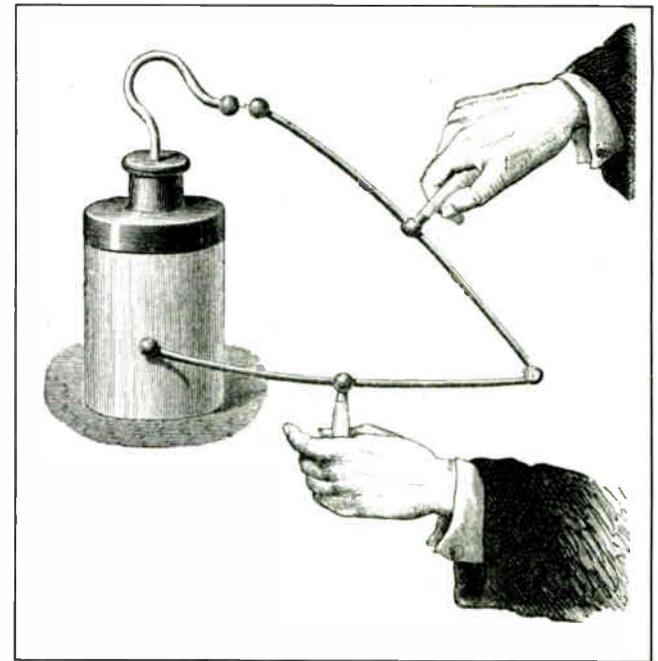
At some point (determined by a combination of the size of the plates and the thickness of the dielectric, as well as the applied voltage) the capacitor charges as much as it can, and no more electrons flow across the field. In essence, then, the capacitor exhibits a sort of variable resistance; the resistance steadily increasing as the charging process continues until it reaches theoretical maximum as the charge is complete and current flow stops.

To differentiate this ambiguous resistance in the capacitor with that of a resistor, the capacitor's resistance is called reactance, even though, like pure resistance, it is measured in ohms. The unit of capacitance itself is measured in farads, a truncated version of Michael Faraday's name, in recognition of his work in the fields of electrostatics and electromagnetism.

DC VS. AC

The above example explains the action of a capacitor when DC voltage is applied, but what happens when a capacitor is connected across an AC voltage source? In that case, things change, since AC voltage is a sine wave that cycles from positive to negative and back again, continuously.

Our capacitor still starts to charge up as electrons stream onto one plate and push their counterparts off of the other plate. But after the first one-half of the cycle,



A Leyden jar being discharged, from an 1878 science text. This image originally appeared in Augustin Privat-Deschanel's 1878 "Elementary Treatise on Natural Philosophy, Part 3: Electricity and Magnetism," D. Appleton and Co., New York, translated and edited by J. D. Everett, p. 571, Fig. 384.

the voltage polarity has changed, and the plate of the capacitor that had a negative voltage applied to it, now has a positive voltage, and vice versa.

Of course, the capacitor immediately responds by trying to charge in the opposite direction from what it was doing just a fraction of a second ago and current flows in the opposite direction. But the cycles of the sine wave are unremitting; the capacitor might have time to fully charge before the polarity changes, but then again, it might not.

And that is a function of two things. If the plates are large (meaning a high capacitance value), it will take them a long period of time to fully charge — perhaps longer than one-half cycle of the applied voltage. In that case, there will always be current flow across the capacitor, as the charging process never quite keeps up with the changing polarity of the applied voltage. Likewise, if the frequency is high enough, it might change polarity so fast that even a very small capacitor would not fully charge.

From these statements, we can see that the reactance of a capacitor is inversely proportional to the size of the capacitor and the frequency. The capacitor, then, is a "high-pass" filter, which is to say that the higher the frequency of an applied voltage, or the larger the capacitance of the device, the easier it becomes for current to flow through it. The exact formula is:

$$X_C = \frac{1}{2\pi fC}$$

where X_C is capacitive reactance in ohms; π is 3.14, f is the frequency in Hz (cycles per second) and C is capacitance in farads.

IT'S ALL IN THE DESIGN

Circuit designers can do neat things with such a device.

For one thing, large capacitors are used to "filter"

DC voltage that has been converted from the power company's AC line voltage. The rectifiers that change AC into DC leave large amounts of "ripple" in the DC. The ripple occurs at twice the line voltage frequency, so it can be heard as a 120 Hz hum. The solution is the filter capacitor. Voltage ripples can be thought of as ripples in a pond. As the ripple becomes a trough in the "pond" of our DC power supply, the filter capacitor fills in the trough by giving up its charge. At the peak of the ripple, the capacitor returns to full charge, smoothing out the peak while waiting for the next trough.

All well and good, but that ability can also lead to a dangerous condition when proper safety precautions are not followed.

In a console or a solid-state transmitter, the power supply might only charge the capacitor to 24 or maybe 50 volts. Shocking perhaps, but not lethal. But tube type broadcast transmitters can run on 10,000 or even 12,000 volts. The capacitors in those rigs charge up to the full voltage potential (and in fact, charge to a bit more than that), and 10,000 volts will stop the heart of even the most stout engineer.

Furthermore, high-voltage power supply capacitors are quite large because they are designed to smooth out ripples in circuits that can draw several amps of current. The larger the capacitor, the longer it takes for the charge to "bleed" off when the transmitter is shut down. For this reason, all tube type transmitters are built with "bleeder" resistors across the high voltage power supply. Those resistors draw some current all the time and perform no useful service at all, other than to stay connected across the power supply and bleed off voltage from the filter capacitors when the power is removed (doubtless saving more than a few lives over the decades).

Still, bleeder resistors can fail, and so most high-power transmitters are also equipped with "shorting bars," which are nothing more than a spring-loaded copper bar that will short the high voltage directly to ground if the door is opened (while also scaring the wits out of the poor soul who makes the mistake

of opening the door without turning off the high voltage first).

Capacitors are also used in analog passive equalizers and as speaker crossover networks. Different value capacitors are arranged across an audio source so that the output of each capacitor contains a separate band of frequencies. Adjustable resistors are then used to vary the amplitude of each band to achieve the desired audio characteristics, and the separately adjusted audio bandpasses are joined back together at the output.

Similarly, a capacitor in a dual cone

speaker system is placed in series with the wire feeding the tweeter and sized to block all frequencies below a certain point, so only higher frequency sound makes it to that speaker and the bass is confined to the woofer.

Finally, designers long ago learned how to make variable capacitors: ones that could be easily adjusted to have more or less capacitance with the turn of a knob. When coupled with inductors, the result is the tuned resonant circuit, which is what makes radio, and in fact all wireless communications, possible.

From the most mundane to the super

sophisticated, every single piece of electronic equipment in use today depends on capacitors. The whole field of electronics would be impossible without them — which just proves that Franklin was right way back in 1752. He really did capture lightning in a bottle.

Jim Withers is owner of KYRK(FM) in Corpus Christi, Texas, and a longtime RW contributor. He has four decades of broadcast engineering experience at radio and television stations around the country.

Comment on this or any story. Email radioworld@nbmedia.com.

NEW...
MAGAZINE

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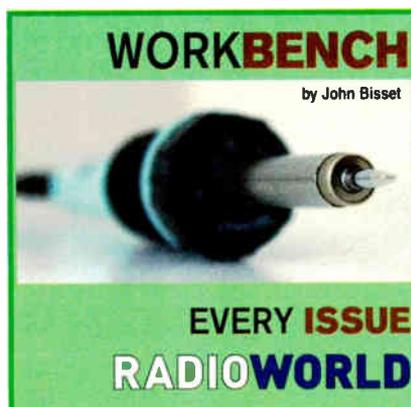


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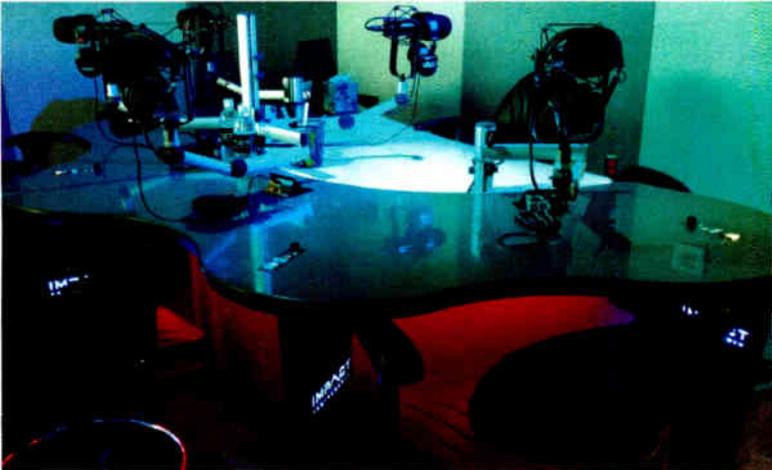
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Impact Studios Gets Talent Stations

Talent Stations take their place among the, well... talent!

Marc Lehmuth sent us these recent photos of Impact Partnership's new 10-studio installation in Kennesaw, Georgia. Shown is Studio A with several mic positions and Wheatstone TS-4 Talent Stations (with mic on/off/cough, talkback, and headphone source) mounted into the desktop, all networked through the WheatNet-IP audio system. The new recording studio was built for Impact Partnership's radio "dream team," which develops talk programming for financial advisors as well as related spots for radio. This isn't Marc's first experience with Wheatstone. Marc was previously the engineering director for Cumulus Media in Atlanta, where he started out with Wheatstone's TDM routing technology and added WheatNet-IP audio networking and control surfaces using a MADI interface. When Marc became the director of engineering for Impact Partnership earlier this year, he brought along some Wheat. See more photos...

INN15.wheatstone.com



We've Split the Scene!

The LX-24 can get even MORE modular!

Look what we showed off at IBC this year! This split frame LX-24 control surface arrived in Amsterdam in two pods, six modules on each side. With all the console action off to the side, announcers can work the show from their keyboard, monitor and mouse in the middle. There's no need for a backplane for the modules, and the motherboard is conveniently mounted under the table. (Look closely - you'll see two TS-4 Talent Stations, table-mounted, as well).

If you missed us at IBC, come see us at NATEXPO in Moscow, Russia, November 19-21; we'll be in booth A69.

INN15.wheatstone.com



Sound Off

Our friends south of the border sure know how to do radio. When we sent our audio processing specialist Mike Erickson packing to Radio Grupo in the Mexican city of Aguascalientes last month, we expected him to come back with tales of AM flamethrowers and hot tamales.

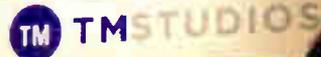
Instead, he wound up doing something he rarely gets to do at a Top 40 station: setting the sound for clarity first and loudness second. "They were going for long term listening and clean sound, which is a welcome change for guys like me who appreciate some dynamic range," says Mike. "When processing for CHR, it's usually loud and exaggerated. But they wanted open, clear and engaging!"

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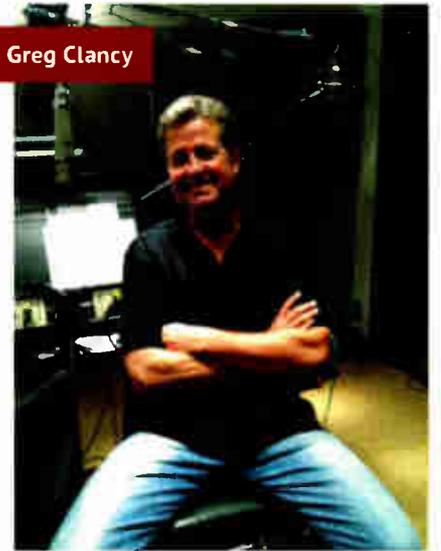
TM Studios: Inside Jingle Central

INSIDE THE INDUSTRY



Jingles might change but the pioneering jingle house is still on top

Greg Clancy



ins," Clancy said.

"Often we use vocalists in different parts of the country. We'll have a singer in Orlando and add a Dallas singer. They perform together virtually, even though they don't know each other. What's fun is we can pass sessions around from different parts of the world. When we use musicians in Nashville for a country session, they send the music over to us digitally; we open it here and can mix it or add singers. Someone can touch a session in Dallas, then in Europe, and finally the jingles get delivered to Canada. It's a smaller world with this technology. At TM we now have a sound that's agnostic from a geographical standpoint. We can sound like Los Angeles, Europe or whatever we need to come up with to compete."

Clancy adds, "We have our own in-house FTP site that we use for most of our off-site track transport. We have also used Dropbox and WeTransfer as well."

MUSIC AND MEMORY

The concept of branding has been well known to advertisers for decades.

(continued on page 20)

BY KEN DEUTSCH

You're listening to your favorite station in the car. A cluster of commercials finally ends, a band kicks in and a group of singers belts out: "94.5 — Kool-FM" or "Music and friends to start your day, big fun and family. Spirit 105.3."

These 10-second wonders are known in radio parlance as jingles, and many of them come from TM Studios, a full-service production house in Dallas. By "full-service" we mean that TM, in addition to creating sung station identification jingles, purveys other items of an audio nature that radio stations use: production music libraries, instrumental logos, voiced promos and anything else that can be used for audio branding.

TM Studios was founded in the late 1960s and is the oldest jingle company in Dallas, although it has undergone several minor changes in name and several major changes in ownership. Its past owners include its founders (broadcaster Jim Long and the late arranger Tom Merriman), Shamrock Communications and Disney/ABC; today it is owned by Westwood One, part of Cumulus Media.

MORE CONTROL

Greg Clancy, now general manager/vice president creative at TM Studios, is a second-generation jingle singer. His father, Jim Clancy, sang bass for various Dallas producers beginning in the late '60s. Clancy the younger not only sings, but is also an arranger/producer/businessman.

"The style and culture of music have changed, and jingles have shifted dra-

A classic jingle session



matically even over the last few years," he said. "In years past you needed singers who knew how to blend with other singers. We still use vocal groups, but they are smaller and more contemporary. The old five-voice group sound has aged out.

"Now what we look for is the sound of the individual singer. And we rarely have several singers at a single microphone. Each singer has his/her own mic, which gives us more control over pitch or aligning corrections we need to make after the session."

And not only are there fewer singers these days, they may not even be in the same room together.

"The great thing about TM is that we have followed the evolution in technology. We use an SSL C300 console and Pro Tools HD with all the latest plug-

Inside the control room — the crew uses an SSL C300 console.



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JINGLE

(continued from page 18)

Brief yet distinctive musical sounds, like the five-note logos for Intel and McDonalds, are heard on radio and TV and instantly trigger brand recognition.

"Intel took something people don't understand, like a microprocessor, and they made it friendly and relevant by putting a sound to it," said Clancy. "People are once again realizing the value of branding something sonically, even if there's no singing involved. Think about the NBC chimes! With radio, you may only have the attention of a listener for 15 minutes a few times a week, so there is very little time to make an impression.

"Radio stations have to make sure their branding is consistent around the clock. We try to write logos that get stuck in people's heads. A seven-second jingle has to have as much care and craftsmanship as the three-minute song that preceded it."

TM is aware of how its products are perceived over the air.

"Contemporary Christian and country artists release two versions of their hits, one for consumers to buy on iTunes, and one for broadcast," said Clancy. "The broadcast one will have less compression. The reason is that by the time a song goes through the station's process-



Musicians lay down a track or two.

ing chain with limiters and EQ, a really compressed song will sound smaller. We want our jingles to sound big, rich and expensive, so we'll work with the stations on a case-by-case basis to determine what kind of processing to use."

BEST PRICE IS FREE

In the late 1950s, many radio stations got jingles on a barter basis from companies like PAMS of Dallas or Pepper Tanner in Memphis. Stations would air commercials for an advertising agency that would get paid by its advertisers. The agency would then purchase the jingles from the producers. This arrangement fell out of fashion as economics changed in the 1960s, but now barter is back.

"Because of our relationship with

Westwood One and its clients, we can use barter," said Clancy. "In fact, barter represents the majority of our business. It's great because stations don't have to put forth cash to get jingles."

Greg Clancy also fulfills several non-musical functions at TM Studios.

"I spend half my time writing, producing, singing and leading vocal groups. Then I'll get on the computer and make deals with producer/partners, talk to clients and handle employee issues. It's just all over the map, and I love it. The day goes by in five minutes."

TM's website is www.tmstudios.com. Its blog has tips on producing jingles and other notes on the company.

Ken Deutsch is a former jingle writer whose books can be found at

TM'S KIT

Per Greg Clancy, here are some tools that the TM Studios crew uses in their production workflow:

Microphones: We tend to use our Telefunken 251, Neumann U 47 and U 87, and an Audio-Technica 4060 for our vocals. A combination of AKG 414s, the Neumanns, Sanken SU-41s and our Royer 122 works well for our brass and string sessions.

Processors: We will make use of our outboard reverb boxes, which include a Lexicon 224X and a TC Electronic M-One.

Software: We have accumulated various plug-ins for our Pro Tools systems. I would say that the largest set that we tend to use is from Waves. Aside from the traditional handwritten music adaptations, some of our writers will use the music notation that is built into Logic, and others use iterations of Finale.

<http://kendeutsch.com/books.htm>.

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Burk ARC Solo Solves Problems

Small group owner finds Burk system has "16 of everything you need"

USERREPORT

BY DAVID GATES

Founder

Cesium Communications

DALLAS — With both a domestic and international client base, Cesium Communications, our engineering, project and consulting firm, has seen and worked with just about every type of remote control deployed in broadcasting.

We also own and operate a small group of profitable radio stations in a portion of the Dallas DMA, the nation's fifth-largest broadcast market. With a commitment to total excellence, those stations provide a trusted proving ground for cutting-edge equipment and technologies. Cesium Communications tests many devices, software and methods there prior to recommending them to our demanding customer base. Over the last 18 months we have been studying remote control systems.

We have purchased, installed and tested new remote control units from several manufacturers. After this extensive process, and discarding units that failed real-world testing and

use, we have found "nirvana" in Burk Technology's newest offering, the ARC Solo 16-Channel Remote Control.

16 OF EVERYTHING

The form factor of the Burk ARC Solo is 2 RU-high and requires only 12 inches of depth into the rack. All connections are on the back; with "16 of everything you need:" 16 relays, 16



status monitors and 16 metering inputs. With the increasing demands and complexity of today's sites, the "16 of everything" approach is particularly helpful.

For those of us who have worked on a myriad of previous Burk remote control systems, the ARC Solo has the comfortable software we know, and the cleanest and most direct mechanical layout to date. The unit is controllable by traditional telco (including a comprehensive preloaded voice library) as

well as Internet. The ARC Solo can be utilized exclusively via Internet or telco; however, within a few minutes I suspect that most users with Internet site connections will favor the Internet method, with telco serving as a backup.

Accessories such as the Burk BTU-4 remote temperature sensing and the Burk TS-1 transient suppression are plug-and-play and recommended. The

temperature measurement system is so sensitive and accurate that the BTU-4 temperature metering alone informs us when with the maintenance engineer opens the transmitter door for a few moments while performing normal duties.

The ARC Solo has been the easiest, quickest and cleanest install for a remote site. The connectors are the larger Phoenix-style, which makes it fast. The ARC Solo can power cycle without sending pulses to remote equipment, so the unit can be taken off-line for software updates and regular maintenance without disrupting station/site operations. A lighted safety remote/local lock-out button on the front pro-

vides additional security for site staff.

Geographically, we are prone to lightning strikes in Texas, and the specific site in question is on a large cattle ranch where the tower is the tallest object for many miles. Even with careful attention to proper grounding, other manufacturers' remote control units were blown within a few weeks. The Burk ARC Solo has never had such issues. Our investigation of the new Burk system has led us to understand that Burk moved the telco speech interface card off of the motherboard, to better separate and protect the ARC Solo from tower- or telco-sourced lightning and voltage spikes. In our case, that advancement has paid off — particularly when compared to other units tested which failed in the same environment.

It seems that every site in the world has something that makes it unique or requires special monitoring. In our case, the main site is grandfathered just off the end of a private airport in the final approach path. Because of the airport liabilities, our stations are particular about FAA/FCC compliance with paint and lighting. Tower lighting for the site is much more extensive than that of most stations, with many more monitoring points and methods. The Burk ARC Solo accommodated our special requirements. Burk's Jet active flowchart software allows monitoring and outbound alarm notification unique to various hours of the day and night.

Finally, the Burk ARC Solo has been a dream to set up for Internet interface. By contrast, other units tested were abysmal to configure, and worse to run.

(continued on page 23)

TECHUPDATE

WHEATSTONE SCREEN BUILDER PUTS USERS IN CONTROL

Wheatstone says its new Screen Builder app for the WheatNet-IP audio network system gives broadcasters the means to build their own control interfaces for almost any purpose.

The Screen Builder app has faders, meters, knobs, buttons, clocks, timers and other widgets that can be arranged and programmed to:

- Monitor transmitter levels and logic at various sites
- Control mics and speakers in an interview room
- Locate, control and monitor hardware in the audio network
- Monitor studios in various locations

The simplified layout environment lets operators drag, drop and assign values to widgets and script control attributes using Script Wizard.

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



PRODUCT SPOTLIGHT

ADVERTISEMENT

Audio-Technica System 10 2.4 GHz Digital Portable Wireless Microphone System

As the latest addition to Audio-Technica's System 10 line, this compact, digital wireless microphone system is ideally suited to capture audio on the go. Featuring a selectable (balanced or unbalanced) output jack with level control, the receiver's small size allows it to attach directly to a DSLR camera, iDevice, portable recorder or other device, while the headphone output allows for easy monitoring. The receiver pairs with up to eight transmitters, and is available in lavalier (ATW-1701/L) and handheld (ATW-1702) mic configurations that provide high-fidelity audio in any environment.



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Audemat Unites Transmitters

MBC had several makes of transmitters and needed them to be linked and monitored

USERREPORT

BY AMILL LONE
Technical Operations Manager
MBC Group, Saudi Arabia

RIYADH, SAUDI ARABIA — As well as being a major pan-Arab satellite TV broadcaster, the MBC group operates two radio stations, MBC FM, Saudi Arabia's first commercial radio station, and Panorama FM.

The scale of these stations is massive, with millions of loyal listeners throughout the Gulf region. We broadcast 24 hours a day from studios in Dubai, Riyadh and Jeddah via almost 30 transmission sites across Saudi Arabia, as well as transmission facilities in Iraq, Bahrain and Qatar.

PROPOSALS SATISFIED

The majority of these sites are not manned 24/7 and so, a few years back, we began a project to look into how we could most efficiently and accurately monitor and supervise these remote locations. By "we," I mean the Technical Operations department that I lead, a group of 45 engineers who look after all the technical aspects of our TV and radio facilities.

We looked at solutions from three leading manufacturers of remote control solutions, and we felt that the Audemat proposal from WorldCast Systems was the one which stood out. It easily met our technical requirements, was available at

a highly competitive price and, importantly, offered much better integration with our existing equipment.

An additional factor was the fact that



we had worked with several Audemat products, mainly in the area of RDS; we also have WorldCast Systems products from the Eceso and APT brands within our network, so we felt that this was a partner we could trust.

The proposal we received from WorldCast comprised three separate elements. The first was the hardware itself: in our case the Audemat Control Modular unit, formerly known as the IP2Choice, together with the associated I/O boards

and accessories. The system has since been rolled out throughout our 28 Saudi sites, at least 20 of which are unmanned locations. We monitor equipment from five transmitter manufacturers, including Larcen, Rohde and Schwarz and Eceso, keeping track of major parameters, such as output power, reflected power, VSWR,

temperature, voltage, increase/decrease power, switching transmitter, output audio, on-air and standby.

The flexibility of configuration was a key point for us as, with five different transmitter models, we required five connections/configurations. The Audemat Control unit offers a large choice of communication ports so that we can meet the requirements for sites with single or multiple transmitters. It can connect to any external equipment via digital, ana-

log or audio inputs, relays, serial ports or through IP connections such as SNMP. We can then receive information from the remote devices via LAN/WAN, 3G, GSM or PSTN.

The second element of the WorldCast proposal involved customization of the system in terms of what we monitor and how this information is displayed. This is all done using a sophisticated piece of software known as ScriptEasy. In order to help us get up and running as quickly as possible, we provided WorldCast with our main requirements and suggestions and they prepared some views for us in advance. Critically, ScriptEasy enables us to read specific values such as multimeter readings on the various models of transmitter that were not always available to us with the other makes of remote control equipment we had initially considered.

The final part of the proposal covered the installation and training elements. Two of WorldCast's remote control experts, together with Advanced Semi-Conductor, the system integrator involved, visited our operations center in Riyadh in order to oversee the installation of the Audemat equipment there and in the first five remote sites. This ensured that the rollout went smoothly. During the installation process, the WorldCast staff also provided detailed training to the MBC team that enabled us to complete the installation of the 23 remaining sites. This means that our staff is autonomous should we need to add additional equipment or sensors to any of the sites in the future.

In order to bring the management and monitoring of the full network under centralized control, we invested in Audemat's Broadcast Manager solution. This is a powerful and comprehensive software application that links all of our remote control units together and enables us to perform continuous monitoring from a single seat using a map-based view with the ability to drill-down into individual sites, units and parameters. It also allows extensive alarm management as the Broadcast Manager centralizes any alarms it receives and ensures that they are dispatched to the relevant personnel in real-time via SMS, email or voice call as appropriate.

Overall, the Audemat Control Modular has provided us with a robust solution that offers excellent performance, making it easy to remotely manage our large networks or sites; it has been working flawlessly since installation in 2010. The fact that it is compatible with all communication protocols means that we have a single solution to help monitor multiple units from different manufacturers across a wide area.

For information, contact **Tony Peterle at Audemat/WorldCast Systems in Florida at (305) 249-3110 or visit www.audemat.com.**

TECHUPDATE

INOVONICS AARON OFFERS SPECTRUM ANALYZER



The Aaron 650 from Inovonics is a new FM rebroadcast/translator receiver built for challenging reception scenarios. Besides receiver features, it offers diagnostic and monitoring tools: baseband FFT spectrum analyzer, a band scanner and a left/right audio XY plot for helping out with signal monitoring duties.

It promises excellent receiver sensitivity and selectivity for use at translator sites. The front panel displays left and right audio metering, local LED alarms and a high-resolution OLED screen for monitoring and editing of operating parameters.

The Aaron 650's rear provides dual antenna inputs, dual composite outputs, balanced analog and AES digital audio outputs, raw RDS output (for logging) and remote IP access. Rear-panel and self-logging alarms check for audio loss, RF loss and RDS loss (or "hijacking") and online notifications alert multiple personnel with email or SMS messages when issues occur.

A responsive Web interface provides the baseband FFT spectrum analyzer, FM band scanner and left/right audio XY plot. These metering tools are helpful particularly during antenna calibration and when monitoring issues with pilot, stereo information and subcarrier activity. The Web interface also provides a 128 kbps live audio stream back from the receiver, allowing audio verification and quality assurance from a mobile device.

For information, contact Inovonics in California at (831) 458-0552 or visit www.inovonicsbroadcast.com.

Davicom DVs Monitor Distant Sites

SNMP functionality brings a new set of control and monitoring capabilities

USERREPORT

BY DENIS BARRIAULT
Chief Engineer
Dougall Media

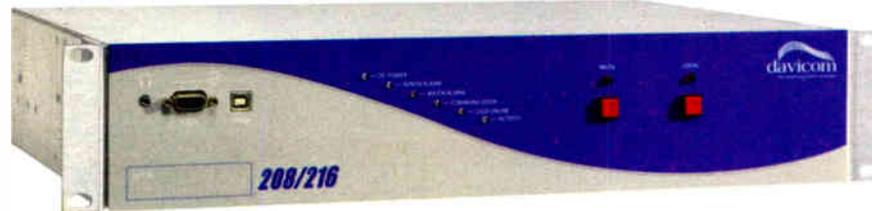
THUNDER BAY, ONTARIO — I use Davicom remote telemetry units, or RTUs, at our radio and television stations to relay a variety of signal parameters from our remote transmitter sites. In those locations, we find hard-wired devices constantly sending and receiving analog data or status signals to our Davicom DV-208s and DV-216s.

For decades these systems have been giving us real-time status and responses as data was received and analyzed. Reliable real-time status and control has always been essential, and Davicom RTUs have been at the center of this process.

HARDWARE

These RTUs have reliable analog inputs, user-selectable status inputs and versatile relay outputs. We interface with our RTUs via Davicom's Davlink software, allowing us to view and control equipment in a user-programmable graphical interface. The RTUs provide user-definable control logic functions that give the RTU the ability to automatically respond to input variations. All we have to do is let the Davicom work in the background 24/7, allow them to respond then send alerts via telephone, email or SMS, as required.

Broadcast engineers have been able to monitor basic remote site device param-



eters for decades. What is empowering lately is the level of information that can now be remotely acquired beyond traditional power levels or environmental data with the recent implementation of SNMP.

The borrowed technology from the computer networking world called Simple Network Management Protocol has been introduced in the broadcast equipment world, causing an improvement in remote monitoring in a big way. SNMP adoption opened brand new avenues for site and plant monitoring using our Davicom RTUs.

Many broadcast hardware manufacturers have adopted the protocol and Davicom is no exception. For those who may not have had any exposure to it, SNMP is a protocol that allows us to retrieve information or send control signals with very small data packets encapsulated within IP. This new way of querying equipment has found its way into broadcast equipment and has reshaped how we approach our site monitoring mission.

By using Davicom Davlink desktop interface and customizable workspaces with which we are familiar and comfortable, we stay informed and react

in real time to potential problems even from multiple geographic locations. We are able to break the barrier of hard-wired devices, thus allowing us to measure parameters in many locations and react to those from any another physical location. As an example, we turn on standby equipment from a separate location than that of our main transmitter site without any human intervention. We also monitor and control sites that are 100 percent SNMP with a Davicom RTU that is hundreds of miles away.

It is safe to say that more equip-

ment manufacturers will implement SNMP. The existing SNMP integration in the RTUs allows us to drill deeper into equipment control and monitoring parameters. SNMP also allows us to increase the pieces of equipment monitored, automatically control more devices remotely and monitor new non-broadcast equipment. With the regular software updates, Davicom has been quick to implement new protocols such as SNMP to react to market demands.

A colleague and I held a workshop on SNMP at a recent Central Canada Broadcast Engineers conference in Barrie, Ontario, where we set up a Davicom RTU that controlled and monitored a simulated transmitter site. I was surprised at how easily attendees were able to put in practice those lessons learned. The protocol is simple yet powerful.

I recommend anyone in the market for an RTU to visit the Davicom website for a description of features. And, if you are looking for a new RTU, please make sure it supports SNMP.

For information, contact Guy Fournier at Davicom in Quebec at (877) 282-3380 or visit www.davicom.com.

BURK

(continued from page 21)

The security methods on the Burk ARC Solo appear to be robust. Once the interface is configured via laptop, every function, calibration, notification and change can be accomplished from the comfort of a computer in the home office or anywhere. We have monitored, modified and tweaked the programming on Burk ARC Solo on every platform from freestanding Windows-based machines to laptops

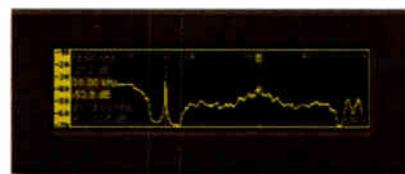
to Apple products, including iPads.

With the simplicity and comfort of making changes with the ARC Solo, we have found ourselves advancing the sophistication of our initial programming every few weeks as we take advantage of additional reporting features and monitoring. The Burk ARC Solo gets an A+ from our real-world broadcast test laboratory in a highly competitive market.

For information, contact Matt Leland at Burk Systems in Massachusetts (978) 486-0086 x703 or visit www.burk.com.



DB4004 Modulation Monitor
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Built-in 50 channels Data Logger and FTP Server



TECHUPDATES

DIGITAL ALERT SYSTEMS AIMS AT LPFM MARKET

Digital Alert Systems is expanding its line of DASDEC-II LC CAP/EAS systems, giving low-power FM stations lower-cost options.

The new DASLC+ and DASLC+R accept more monitoring source inputs while providing EAS/CAP decoding functionality, audio switching and radios, the company says. It adds a new expansion slot on each model to give users room for future upgrades.

The company says that, like their two-input predecessors, the DASLC+ and DASLC+R offer broadcasters functionality in a low-cost design. The DASLC+R features three integrated AM/FM/NOAA radio receivers. Both models meet FCC Part 11 rules and conform to FEMA CAP v1.2 and IPAWS 1.0 standards, giving most low-power stations what they should need for FCC EAS compliance.

DAS says that the DASLC+ and DASLC+R are easy to set up and use. Required reports can be emailed to specific station personnel. New expansion slots assure scalability, an optional software license key allows each unit to be upgraded for full encoder/decoder operation. Users can choose to enable the video output in order to view a full-screen video display of the EAS/CAP message.

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



FLEXIBLE MONITORING WITH 2WCOM

2wcom's FlexMon FM02 FM receiver provides multiple functions: demodulation, source-switching for FM backup and FM/RDS parameter monitoring.

With its integrated Web server and multiple remote control and reporting capabilities, the FM02 can be used to meet a range of broadcasting scenarios. The dual-channel capability allows the unit to receive one FM signal for rebroadcasting, while monitoring a second FM signal with the second tuner; or to receive the same signal on both tuners with one acting as a backup. An FM tuner is key to the FM02's specification.

For source-switching in a backup solution, the FM02 receives MPX signals and loops through directly to the output. In case of failure, the FM02 uses its tuner as a back-up solution to receive the MPX signal off the air. The unit is able to loop through the signal even during a power failure. Extending the versatility of the unit, the FM02 can be used as part of a monitoring solution for both FM and RDS parameters, the company said.

For more information, contact 2wcom in Germany at 011-49-461-6628300 or visit www.2wcom.com.

TRANSRADIO TAKES TRANSMISSION CONTROL

Transradio says its System Control Desk is a tailored option for control and monitoring of relevant parameters and status information of an MF broadcast, LF broadcast or LF communication transmitting system.



The System Control Desk is equipped with one or two industrial-grade 12-inch color touchscreens featuring a graphical user interface (the number of touchscreens depending on the actual system configuration).

Flexible architecture allows the System Control Desk to be configured for a range of transmitting systems. Those include single-transmitter systems; exciter reserve systems; passive transmitter reserve systems (one active transmitter, one reserve transmitter); active transmitter reserve systems (two active transmitters with paralleling unit); and full passive reserve systems (two complete, independent transmitter-antenna chains).

Beyond providing operator access to the operating parameters of the transmitter(s), the System Control Desk monitors and controls system components such as the medium- and low-voltage distribution, external air cooling system, antenna selector switch, dummy load and antenna tuning unit.

The System Control Desk also handles switching procedures such as antenna/dummy load selection, automatic changeover to the reserve transmitter in case of failure or automatic switchover to a mains backup system.

If required by the client, the System Control Desk can be complemented with interfaces and logic for handling additional tasks (e.g., room temperature control, observation of access doors, etc.).

For information, contact Transradio in Germany at 011-49-30-33978-501 or visit www.transradio.de.

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Deutsche Welle Calls on RTW

German broadcaster finds RTW TouchMonitors have many talents

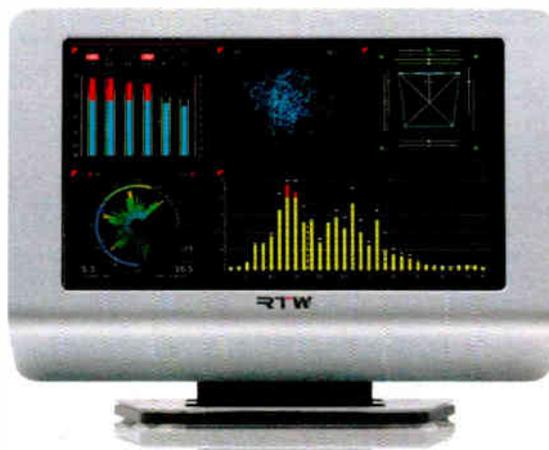
USERREPORT

BY HANNES BRANDT
 Technical Assistant
 Deutsche Welle

BERLIN — As Germany's premier international broadcaster and a member of the ARD network of German public broadcasters, Deutsche Welle wanted to make its programming compliant with the EBU-R128 loudness mandate. To help us do so, we turned to RTW, the market leader in visual audio meters and monitoring devices and its TouchMonitor line of audio meters, to make the transition. With their ability to offer intuitive, precise monitoring, along with their ease of installation, RTW's TM3, TM7 and TM9 TouchMonitor meters were the perfect fit for the job.

We took delivery of the RTW TouchMonitor units last September, employing a combination of 65 TM3, TM7 and TM9 meters with various configurations and feature sets in several recording studios, editing suites and workplaces in our Bonn and Berlin facilities. AVS Medientechnik GmbH, based in Berlin, oversaw the procurement and implementation of the units.

We chose RTW on the recommendation of an ARD working group that had tested loudness meters from several manufacturers. He also noted his company had experience with the RTW metering systems. Our



RTW TM9

production workplaces were using digital and/or analog peak meters by RTW, as well as metering instruments from their PortaMonitor series, and the experience we had with those products, along with RTW customer support, also contributed to the decision to go with RTW.

Our engineers working at Deutsche Welle's Berlin and Bonn sites employ the RTW TM3 units in a combined setup with the existing RTW PortaMonitor, which is used for monitoring level, loudness, frequency response and phase of analog and digital signals sys-

tems, as well as the RTW TM7 units at our dubbing suites (mainly the TM7-VID version, which is installed in the company's Tektronix mainframes). The TM9 units are being used with an installed "radar" option, for a more detailed look into the composition of the metering data.

The RTW TM3, TM7 and TM9 units are modular, which has made installation into our Deutsche Welle workflow straightforward. The majority of the meters comprise typical desktop units, along with TM7-VID modules supplied with 19-inch rackmount adapters for waveform monitors as well as TM9 OEM units for installation into mixing consoles. As with other members of RTW's TouchMonitor family, the TM3, TM7 and TM9 TouchMonitor units can be enhanced with additional software licenses as future needs arise.

We use a reference setting of either -17 LUFS or the traditional 0 dB QPPM. This allows our users to familiarize themselves with level adjustment based on loudness. However, we still support QPPM-based level adjustment. For that purpose, we configured two different layouts on the installed units. As soon as all workplaces are equipped with TM units and all users have undergone appropriate training, we will switch our in-house reference to -23 LUFS by changing the layout presets.

Another major benefit is the configurability of instrument layouts on the user interface. This way, we can adjust our meter scales to the requirements at hand. In addition, the ongoing software refinement and additional software options ensure maximum protection of our investments.

For information, contact RTW/1SourceVideo in New Jersey at (844) 270-2442 or visit www.rtw.com.

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TECHUPDATES**NAUTEL INCREASES CONTROL CAPABILITIES OF AUI**

Nautel says the release this year of the GV Series and GV Release 4 firmware brought with it expanded flexibility of its AUI — Advanced User Interface — to handle site control operations, transmitter monitoring and control.

AUI is intended to place enhanced control capabilities in the hands of engineers. It allows users to be more proactive and possibly avoid trips to the site. In addition to its built-in commercial-grade instrumentation (including an instrument-grade audio spectrum analyzer), the AUI offers remote access to Nautel transmitters, SNMP support, logging of events, email notifications, presets, easy transmitter control and enhanced support services.

Release 4, implemented in the GV Series of high-power FM transmitters, has expanded its functions to include a new oscilloscope view, which monitors audio source signals in the time domain. Site control functions have been added for monitoring and control of items external to the transmitter, such as doors or generators.

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

**DAYSEQUERRA RECEIVER MONITORS HD RADIO DIVERSITY DELAY**

DaySequerra's M4.2Si can monitor HD Radio diversity delay with its proprietary TimeLock algorithm.

The M4.2Si receives the off-air broadcast, measures the timing difference between the MPS and HD-1 streams with accuracy to one audio sample. Out-of-tolerance conditions can be reported via email and via its built-in Web server using any browser on a network. The M4.2Si can be flash-updated using its Ethernet port and has four additional rear alarm tallies. It has XLR balanced analog outputs and a headphone monitor.

The M4.2Si has complete monitoring of HD Radio AM/FM broadcasts including FM multicast channels HD2 through HD8: user-selectable tuning steps and analog FM 50/75 μ Sec de-emphasis.

The M4.2Si's front-panel LCD displays RBDS and HD Radio PAD/SIS information, along with network and alarm condition, audio level, digital audio quality and carrier quality indications. Users can also monitor a broadcast's album art, station logo and advertiser branding through the Artist Experience. Existing M4.0X or M4.2R units can be upgraded to M4.2Si TimeLock.

For information, contact DaySequerra in New Jersey at (856) 719-9900 or visit www.daysequerra.com.

**DEVA DB7007 RECEIVES, MEASURES FM SIGNALS**

The DB7007 is a second-generation digitally-tuned FM rebroadcast receiver from DEVA Broadcast. DEVA says it has equipped it with two selective DSP-based FM tuners to solve critical rebroadcast scenarios.

The DB7007 measures important parameters of the FM transmission with tools such as a basic spectrum analyzer, RF, pilot, L-R, MPX and RDS data.



On detection of audio loss at the inputs, DB7007 will notify the maintenance staff and automatically switch to the second backup RF frequency. In case a failure of the second station is detected, DB7007 will shift to the onboard IP stream player or MP3/AAC backup audio player. The backup audio sources priority is user-defined.

The IF bandwidth filters of the device have high signal selectivity, while difficult adjacent-channel problems are eliminated, the company says.

RDS information contained in the processed MPX signal is decoded and visualized as RDS/RBDS data and statistics.

For information, contact DEVA Broadcast in Florida at (305) 767-1207 or visit www.devabroadcast.com.

BROADCAST TOOLS SITE SENTINEL 4 WATCHES THE SITE

The Site Sentinel 4 provides a cost-effective, one-third-rack solution for Web-based site remote control, according to Broadcast Tools.

Each input — analog (metering), status/logic, stereo silence sensor, temperature sensor (probe optional), power failure along with all relays can be controlled and/or monitored over any IP network including private networks, IP-based industrial control networks and the Internet. Users can operate the product using a Web browser and/or smartphone, while email noti-



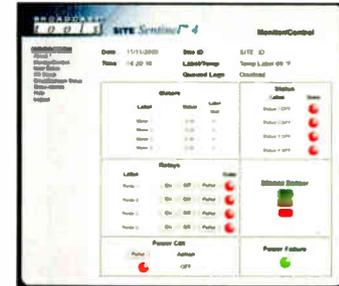
fication may be configured to alert up to eight recipients when alarms are detected. The user may enable a sound effect to play on the monitoring PC when an alarm is generated.

Logging of system status, along with the site ID may be emailed in time spans from once an hour to once a day. SNMP and SMTP username and passwords are supported.

The Site Sentinel 4 is equipped with four buffered high-resolution +10 VDC metering (analog) channels, while each of the four optically isolated status/logic channels may be configured for 5 to 24 VDC wet or dry (contact closures) status/logic monitoring.

The four control channels are equipped with independent SPST one-Amp relays and may be latched on, off or pulsed with user-configured timing along with user programmable event action sequences. The temperature monitoring is within the range of -67 degrees F to +257 degrees F (-55 degrees C to +125 degrees C). The Site Sentinel 4 is equipped with a power controller port.

For information, contact Broadcast Tools in Washington state at (360) 854-9559 or visit www.broadcasttools.com.

**ABOUT BUYER'S GUIDE**

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

OMNIA MPX PACKS IN TOOLS

Omnia says that its MPX Tool/Modulation Analyzer provides the tools needed to understand and improve sonic presence. Included in its 2 RU design are an oversampled digital oscilloscope, real-time analyzer and FFT spectrum analyzer to scrutinize a station's modulation and transmission characteristics.



Stereo baseband audio can be sent to the MPX Tool/Modulation Analyzer via analog, AES, Livewire/AES67 inputs, two analog composite inputs plus support for Omnia Direct (digital MPX).

A built-in FM tuner demodulates and decodes FM, HD Radio, DAB and DAB+ signals, for analyzing and monitoring off-air signals of your station or others in range. Omnia MPX Tool/Modulation Analyzer provides analysis of a station's impact in the market and how it compares to the others.

Users can check modulation or the level of pilot or RDS signal, look for loudness-robbing peaks and overshoots, and compare the output of a processor to the off-air signal to verify performance of the exciter and transmitter.

With the Omnia MPX a backup processor can be plugged in and its performance compared to the main air chain. ITU-R BS1770 loudness and BS.412 compliance metering are provided. Control can be via the front-panel touchscreen or asserted from elsewhere via IP. Audio can be streamed to a PC.

Dual redundant power supplies are standard.

For information, contact Omnia Audio in Ohio at (216) 241-7225 or visit www.omniaaudio.com.

BELAR FMCS-1 COVERS THE FM BASES

Belar Electronics Laboratory considers the FMCS-1 FM modulation monitor the flagship in its line of FM modulation monitors.

The FMCS-1 provides a frequency-agile RF amplifier, frequency-agile down converter, FM demod, stereo demod, RDS decoder, two SCA decoders, and an FFT spectrum analyzer in one box.

Belar says the high-powered DSP techniques and digital domain processing result in excellent specifications for distortion, separation, frequency response, SNR and crosstalk. Features include compact 2 RU design, a 640 x 240 color LED backlight display and rotary encoder. With the included RJ-45 Ethernet Interface and Belar WizWin software, the unit's display screens, settings and alarms may be monitored and controlled remotely.

For information, contact Belar Electronics Laboratory in Pennsylvania at (610) 687-5550 or visit www.belar.com.



V-SOFT PROBE 4 PROVIDES PROPAGATION ANALYSIS

V-Soft Communications says that its Probe radio wave propagation analysis and prediction software maps out broadcast FM, TV, DTV, DVB-T and public safety communications in the 20 to 20,000 MHz range.

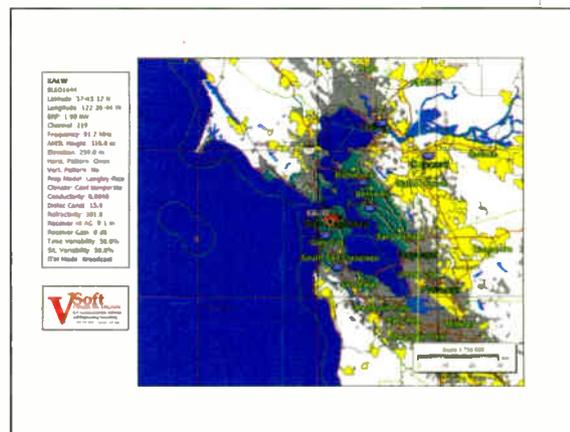
The latest version, Probe 4, offers many features and has been optimized with multithread processing to take advantage of multicore computers.

Probe 4 offers mapping tools and uses numerous professional propagation models.

The company says Probe 4's integrated, worldwide geographic mapping engine combines polygon mapping graphics with precision coordinate information and map projections. Probe produces detailed color coverage and interference maps. Aspects can be edited and manipulated. The program contains a set of editing and drawing tools for adding text, pointer arrows, circles, squares, lines and other information to the maps.

Reports can be generated along a number of criteria. Databases for Probe 4 can be updated with the latest information when it becomes available.

For information, contact V-Soft Communications in Iowa at (800) 743-3684 or visit www.v-soft.com.



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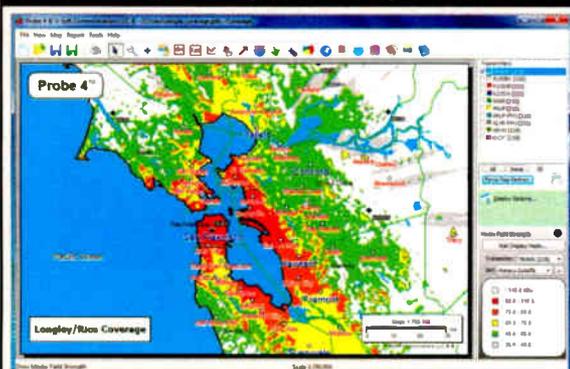
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Radio broadcasts of Major League Baseball, NFL, and some college football games that are on cassette tapes, approx 100 to 125 games, time period of entire collection os from the 1950's - 1970's, BO. Must purchase entire collection. Contact Ron, 925-284-5428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

WANT TO BUY

Collector wants to buy: old vintage pro gears, compressor/limiter, microphone, mixing consoles, amplifiers, mic preamps, speakers, turntables, EQ working or not, working transformers (UTC Western Electric), Fairchild, Western Electric, Langevin, RCA, Gates, Urei, Altec, Pultec, Collins. Cash - pick up 773-339-9035 or ilg821@aol.com.

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

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

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

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

Looking for KFRC signoff radio broadcast from 1930 Andy Potter, running time is 0:22 & also the KLX kitchen the program guest is Susanne Caygill, a discussion of women's affairs with a long promotion for Caygill's appearance at a local store. Anne Truax, Susanne Caygill, running time

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

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

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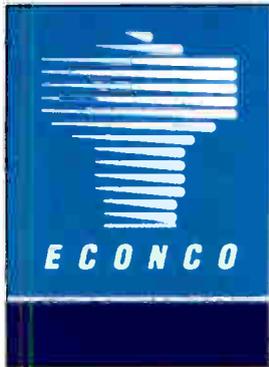
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READER'S FORUM

CROWD NOISE

For Mark Persons:

Just read your Tech Tips article in the Aug. 13 issue ("Capture the Sporting Spirit, Get in the Game!") and thought you'd be interested in some of my observations.

I have to agree with you about crowd noise to a point. Not all of it is the sportscaster's fault though.

Out here in Connecticut, we're unfortunate enough to be between two huge rival American League baseball teams: the New York Yankees and the Boston Red Sox.

Depending on which marketing person you listen to, some people think Connecticut is a Red Sox state, while others think it's a Yankees state. I grew up about 50 miles from New York City, so I'm a Yankees fan. Luckily, their games are broadcast on WFAN 660 (50 kW non-D) about 75 miles from me; and this year WELI, a local 5 kW station, carried their games via the Yankees Radio Network, which originates at WFAN.

Out at the ballpark, there are two announcers/sportscasters (John Sterling and Suzyn Waldman) who do play-by-play and other gibber-jabber chit-chat; and an engineer/producer who runs the local board, tells them when to read spots, and sends cue tones over the network to WFAN where they go up to the satellite. The tones trigger station IDs and commercial breaks at the various network member stations, such as WELI here in town. Most of the network stations are automated. This works fine until there's a rain delay or postponement, then human intervention is needed.

During those commercial breaks, the announcers either stop talking or their mics are turned off. Unfortunately the crowd mic is still alive and kicking.

I've noticed several things about the crowd noise:

1. It's always way too loud at home games at Yankee Stadium; the away games always have much softer crowd noise, and it doesn't seem to be as obnoxious.



istockphoto/Pavlo61

Even the chief engineer of WELI noticed this. He was able to listen to the audio coming right off the satellite receiver and commented that home game crowd noise is much louder than away game crowd noise.

2. The crowd noise is certainly 10–20 dB lower than the announcer's voices, but during quiet times like when a station ID is playing or there's a break in the action, there must be several AGC amps doing their best to raise the audio level to 99 percent and the crowd noise just builds and builds and builds over a 15-second period. When the announcers do come back and either touch their mics or utter their first syllable, all those AGCs now have to duck way down to reduce the gain. Some overshoot and eventually recover, but you can hear the ducking and quiet that follow. The crowd noise reaches the same level as the voice at the output of the satellite receiver, so it doesn't need much help from all the other AGCs.

3. I usually watch the games on YES, the Yankees Entertainment and Sports network channel via DirecTV satellite. I also listen to their audio, and while they too have crowd noise, it doesn't seem to be affected by AGC nearly as much as it is on the radio network. I have a Dorrrough Loudness Meter on the audio output of my satellite receiver, and I can watch the crowd noise sit around -26 dB for 30 seconds while the announcers silently watch the play, and it never get any louder. I can't do that on the radio.

Unfortunately the TV announcers will talk about everything *except* the game, so I often turn the sound

off and listen to the radio audio. I use the DVR in the satellite receiver to delay the video to sync it with the radio audio and it works great. I get the best of both worlds that way, except for the crowd noise.

4. I can pick up the Yankees Radio Network on several stations besides WFAN and WELI. All of them suffer the same strong AGC action on crowd noise. I definitely get ear-tired listening to the constant 99 percent modulated roar that goes on in home games. For all I know, there's an AGC at the game feeding the WFAN studio, possibly an AGC coming out of WFAN feeding the satellite transmitter, definitely an AGC in the network station's automation system switcher, and multiple AGCs and limiters in the network station's audio chain so it can get to the transmitter. They all work great, except for crowd noise.

I remember back in the '60s and '70s when it was cool to essentially "eat the mic" and talk real close to it. It gave the DJ a sense of intimacy with his/her listening audience. Unfortunately, you also got to hear every inhale breath, every P, every S, etc. I still hear that today on some radio stations — but only on some announcers, and it gets really tiring. All they have to do is move the mic out of direct mouth-shot and put it off to the side or even above the mouth, and move it a few inches away.

Yes, everybody has to breathe, but we don't need to have it exaggerated to the point of being louder than the voice we're trying to listen to.

Bob Meister
Hamden, Conn.



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