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Eric Schecter Can Take the Heat

At CBS Radio Phoenix, engineering and IT cooperatively manage digital products

RADIO IT MANAGEMENT

BY RANDY J. STINE

One in a series of occasional articles about radio technology executives and the evolving broadcast engineering profession.

PHOENIX — Eric Schecter was a wide-eyed 11-year-old when walked into the on-air studio of WABC(AM) in New York City on a glorious Sunday afternoon in 1968 and became hooked on broadcasting.

So indelible is the memory of that radio station tour, which was arranged by a camp counselor, that he remembers the day of the week and who was on the air that day: DJ Roby Yonge. So it goes when you reach a significant turning point of your career path at such an early age.

(Incidentally, Yonge was fired from the station just a year later after reporting on the air that Paul McCartney of the Beatles might be dead, Schecter recalls.)

Photo by Jason Pawlik

Eric Schecter is DOE of CBS Radio/Phoenix. He's shown in the KMLE(FM) on-air studio, one of three Class C FMs for which he's responsible.

Schecter, director of engineering with CBS Radio/Phoenix, is responsible for the technical operations of three full-power Class C FMs in the Valley of the Sun.

KMLE(FM), KOOL(FM) and KZON(FM) have studios downtown and transmitter sites about 1,500 feet above the city on South Mountain, a well-known antenna farm in the region.

The 57-year-old Schecter lists his specialties on his LinkedIn profile page as FM transmitter installation, maintenance and repair, HD Radio broadcast technologies and RDS data transmission.

Schecter, a University of Arizona graduate, is responsible for day-to-day engineering for the cluster of three CBS Radio FMs.

"Everything from studio to transmitter is in our department. I also oversee all capital project management and building management."

Schecter has under him an assistant engineer, Chris Ark, who has been with the stations for approximately two years.

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iStockphoto/Robin Olimb

Let's Talk About FM Translators

Broadcast attorney Garziglia starts a four-part series for RW readers

BY JOHN GARZIGLIA

FM translators have been much in the news in recent years and play an increasingly important part of the multiplatform strategies of many media entities.

This is the first in a series.

An FM translator is just a mini-radio station, correct?

Well, yes and no.

To the radio listener, an FM translator is an FM radio station, although with less coverage than might be expected from a full-service FM station.

To an FM translator licensee, however, FM translators are different than full-service FM stations, as they carry greater risks to continuing operations. FM translators are regulated under a wholly different FCC rule section

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Is the GM/HD Removal Really Temporary?

Automaker aims to bring back tech in future

BY LESLIE STIMSON

As we head into the holidays, I wanted to focus on the General Motors/HD Radio situation, a big story that first emerged around the fall Radio Show. While we had reported it online, we had not done so in print, and I thought it was important to note.

By now, it may be apparent to radio folks that GM has indeed removed HD Radio from five 2015 model-year products: the Chevy Traverse, Chevy Silverado truck, Buick Enclave and Regal, as well as the Chevy Impala.

Photo by Leslie Stimson

This 2014 Chevy Silverado model includes HD Radio in the dash; the 2015 model does not. The photo was taken at the 2014 CES in the Alpine booth.

GM told me then that the situation is "temporary;" it's tweaking its HD Radio implementation and the goal is to bring the technology to more GM models in the future. GM confirmed this again for me recently.

"We are not only focused on providing the right technology for our customers, but also improving upon the technologies even after they have been introduced in our vehicles," said Manager for Engineering and Safety Communications Jennie Ecclestone.

Ecclestone tells me that "based on customer feedback we had received on our initial HD Radio application, we decided to refine this technology and removed it from some vehicles."

That feedback had to do with "blending" back and forth between analog and digital reception. Customers found that disruptive, she said in an interview. "There's a pause when you switch between analog and HD. We're working on tweaking that pattern to see" if there are other "transitions." She couldn't elaborate on what customers said the blend sounded like to them.

"Our goal is to provide our customers with the best possible HD Radio system performance, and we are taking the time to perfect this and bring it back to a larger set of vehicles for our customers to enjoy," said Ecclestone.

She couldn't say exactly when GM would bring HD back into the specific models, though she did noted that barring a mid-cycle change, a full model year lasts 12 months.

When asked if GM was replacing HD Radio with streaming in the dash as part of an infotainment platform change, she said no.

Here's a list of GM vehicles that still include HD Radio. We've reported that all Cadillacs offer HD Radio and it's standard in the 2015 Escalade:

Model Year 2014
- Cadillac — Escalade, Escalade ESV, SRX, XTS, CTS, ELR, ATS
- Buick — Enclave, Lacrosse, Regal
- Chevrolet — Suburban, Tahoe, Silverado LD, Impala, Corvette
- GMC — Yukon, Yukon XL, Sierra

Model Year 2015
- Cadillac — Escalade, Escalade ESV, SRX, XTS, CTS, ELR, ATS, ATS Coupe
- Chevrolet — Suburban, Tahoe
- GMC — Yukon, Yukon XL

OOOM?

Some critics believe the GM move spells doom for the HD Radio receiver rollout. Reader comments posted beneath my earlier article online reiterated the criticism that HD is a "flawed, obsolete technology," or that readers "hope this is the beginning of the end for HD" or were "underwhelmed" by the news.

> **"We are taking the time** to perfect this and bring it back to a larger set of vehicles for our customers to enjoy," said Ecclestone.

Programming consultant Mark Ramsey notably characterized the GM decision as "the nail in HD Radio's coffin." He characterized the technology as a "crappy experience for consumers: a digital solution grafted onto an analog expectation with a jumble of unpredictably random Frankenstein products indifferent to consumer tastes built by and for the broadcasters which finance it."

To be clear, his argument has always been about the programming; he considers all technology "transitional."

IBiquity execs tell me that, despite the GM move, by year-end, about 43 percent of all cars shipped in the U.S. in 2014 would have HD Radio technology available in the dash, standard or as an option. The tech company's estimate for calendar 2015 is about 50 percent of all cars shipped in the U.S. will come factory-equipped with HD Radio receivers.

Auto analyst Roger Lanctot backs that up, noting that just as many new GM "platforms" are adding HD Radio as are dropping it. "So the net is no change, and the long-term outlook is for continued broad-based deployment."

Yet this move looks bad. GM is one of the so-called "Big Three" U.S. automakers. And the GM decision came on top of news about BMW omitting AM radio from the dash in its electric models i3 and i8. HD Radio is standard on those models, we've reported.

So does the GM news indicate a trend? Is "temporary" really temporary

(continued on page 8)

World Radio History

'Twas the Night at the Site

The return of a Radio World classic

by James G. Withers

'Twas the night before Christmas and up at the site,
Not a creature was stirring, not the kind that can bite.
The gear had been checked and checked twice with great care,
In the hopes that on Christmas I'd be here and not there.

The GM was nestled all snug in his bed
While visions of dollar signs danced in his head.
The station was fine; I hung up my cap,
And planned to relax with a long winter's nap.

When there on the nightstand the phone raised a clatter,
Remote control calling, its mechanical chatter
Confirmed what I feared and knew in a flash:
The plates read "point zero." I'd just have to dash.

To the site with the moon on the new fallen snow,
I pulled on my boots and made ready to go.
When I got up the mountain the problem was clear
Some guy thought our building looked just like a deer.

With a dead RF final and drive way too hot
I knew in my gut what it was that got shot.
A hole in the tube! That'll cause it to fail.
"But where is the spare?" I started to wail.

On a shelf? In the cabinet! Where is that darned spare?
In a box marked "Still Good"? Nope, not even there.
I looked on the porch, on the shelf on the wall
I dashed this way and that way and dashed down the hall.

And then in a twinkling, I found what I needed
And did a quick check as the job was completed.
I pushed the plates on, and was turning around
When up the tube's chimney, smoke came with a bound.

I was frozen with fear, from my head to my foot,
As my clothes got all covered with ashes and soot.
A bundle of money had been flung up the stack
And I cursed that guy's gun hanging back in its rack.

My eyes were not merry, my smile likewise buried.
My cheeks were all bristly, my mood was still harried.
My droll little mouth was locked tight in a frown
As I worked toward "back on" instead of "still down."

The shorting rod shook as I gritted my teeth
And the smoke? It circled my head like a wreath.
Now, I have a broad face, some say a round belly
But there was no laughter that night, no bowlful of jelly.

I was crabby and tired, not a Christmas Eve elf
And I yelled and I cursed and felt bad for myself.
In the blink of an eye and a punch of a button
I'd burned up big bucks, just all of a sudden.

I spoke not a word, went straight back to work,
And found a new tube; plugged it in with a jerk.
And keeping my finger real close to "Plate Off,"
Punched it back on with a small, nervous cough.

A spring in my step, I gave out a yell.
It powered right up! I was leaving this hell.
The sun was just up as I drove from the site
Merry Christmas to me, I'm done! ...

For tonight.

iStockphoto/Darie Diederich

World Radio History

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NEWSROUNDUP

TRANSACTION: Entercom Communications Corp. intends to acquire Lincoln Financial Media from Lincoln Financial Group for $105 million plus working capital. Financially, this is the largest announced radio transaction for 2014. The deal signals Lincoln Financial's exit from radio as it focuses on its core life and retirement insurance businesses. The transaction is subject to regulatory approval; parties expect the deal to close in the second quarter of 2015. Under the agreement, Entercom will get 15 stations in the Atlanta, Denver, Miami and San Diego markets; the deal means Entercom would own more than 130 stations. The $105 million price will be paid $77.5 million in cash and $27.5 million in stock issued to Lincoln. Entercom anticipates operating the LFM stations under a time brokerage agreement starting in late January, following regulatory review of the transaction by the Justice Department. In order to comply with the FCC's ownership limitations, Entercom plans to divest KKFN(FM), Denver. LFM was a part of Lincoln National's acquisition of Jefferson-Pilot Corp. for $8 billion in 2006.

SWAP: CBS Radio and Beasley Broadcast Group Inc. completed an agreement to swap 13 CBS stations in Tampa, Fla., and Charlotte, N.C., as well as one AM station in Philadelphia, for two of Beasley's FM stations in Philadelphia and three stations in Miami. The deal gives CBS a radio presence in Miami for the first time, while increasing the CBS Radio presence in Philadelphia to six stations. No money changed hands as part of the transaction first announced in October; the parties expected to close the deal in the fourth quarter. This marks the first time CBS Radio will operate stations in Miami, where CBS already owns two television stations.

LPTV: Broadcasters can tell the FCC what they think of the agency's decision to give LPTV stations a reprieve from the Sept. 1, 2015 deadline to convert to digital. Comments are due to MB Docket 03-185 by Jan. 12, 2015 and replies by January 26. The decision is of interest to radio because it affects LPTVs that focus their operations on aural services, acting as radio stations on 87.7 and 87.9 MHz. The FCC in October suspended expiration dates and construction deadlines for outstanding unexpired CPs for LPTVs and TV translators. As part of a third Notice of Proposed Rulemaking, the agency is reviewing whether to permit digital LPTV stations to operate analog FM radio-type services on an ancillary or supplementary basis. LPTV stations have proposed engineering solutions to continue aural operations. The commission has asked for comment on how a digital LPTV station could operate an analog transmitter without interfering or degrading its co-channel digital operation as well as avoid interference to primary licensees, including FM noncommercial stations.

TRENDS: Apple Pay and programmatic buys are trends to watch in 2015, according to BIA/Kelsey. Regarding Apple Pay, BIA/Keley Chief Analyst and VP Content Micheal Boland said the mobile form of payment will not become mainstream at the retail point of sale in 2015. It will however, cause a dent in app-payments for online fulfillment, similar to Uber. Neither consumer nor merchants will be incentivized to adopt until there's a more compelling value proposition for Apple Pay, like saving consumers time or helping them to skip store lines, he added. Regarding programmatic, or automated, ad buying going local, BIA/Kelsey Managing Director Rick Ducey said, "The explosion of data individuals push out through apps will drive increasingly efficient and effective ad targeting and engagement. Data management platform providers will oversee aggregation and curation of increasingly rich data that will fuel programmatic and real-time bidding activity in both open and private ad exchanges."

EAS: Pathfinder Communications Corporation agreed to pay a civil penalty of $46,000 for misusing EAS tones at WTRC(FM), Niles, Mich. "As many complaints about EAS abuse have noted, misuse of the tones creates a 'Cry Wolf' scenario, which risks desensitizing the public to the significance of the tones in a real emergency," so stated Enforcement Bureau Chief Travis LeBlanc in his order. Pathfinder and the FCC reached an agreement to resolve the case. Pathfinder admitted the station aired an ad that contained the EAS tones and will implement a compliance plan.

World Radio History

SCHECTER

(continued from page 1)

"My department handles all of the regular engineering items, from collating all EAS logs to doing some commercial affidavit stuff for our HD2s," Schecter said. Tim Pohlman is senior vice president/market manager for CBS Radio/Phoenix.

ENGINEERING, IT EFFORTS

The CBS Radio/Phoenix uses an in-building trouble ticket system to alert the engineering staff of equipment and engineering problems, he said.

"It always seems we have 'fix' tasks. We check all backup generators every week. Every day is different really. We might be moving an office one day," he said, then working next on a nontraditional revenue project.

Schecter, who served as interim IT manager at the cluster for a short time, said the engineering department works closely with IT to manage the stations' digital products.

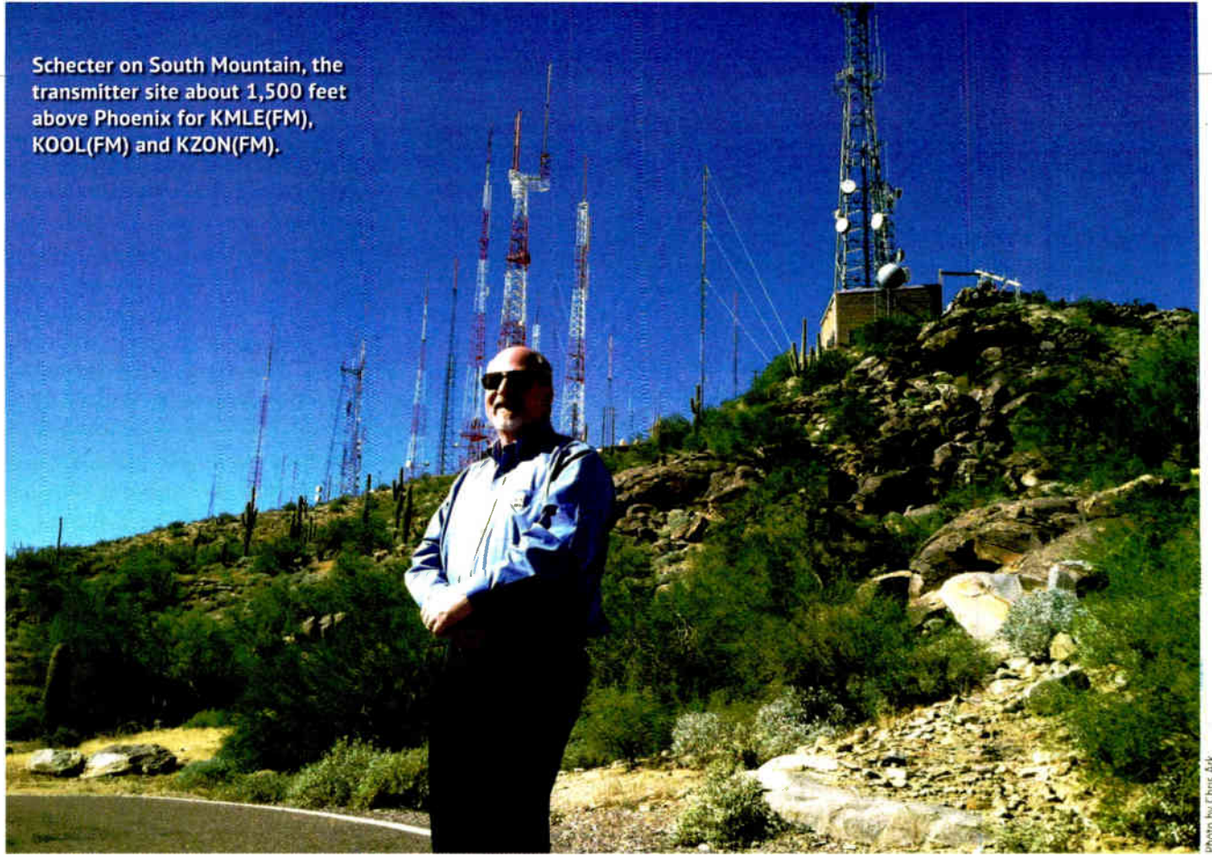
The IT director for the cluster, Mike Sforza, had limited radio experience when he joined the stations; Schecter has been training him on the intricacies of radio.

"Our new IT manager takes great care in providing excellent desktop support to the office staff and takes care of critical server maintenance. We are developing a good synergy so that we help each other out as needed in all aspects of station operation," Schecter said.

The engineering department is responsible for maintaining websites and streaming, he said, working closely with the online content network CBS Interactive.

"We work hard to ensure the quality of the streaming product. We stream everything. And everything that leaves the plant is all encoded with [Portable People Meter] encoding for Nielsen rating purposes," Schecter said. "We capture a lot of live video and audio. We have a live performance studio that we utilize for a lot of content."

He said IT security is handled primarily by corporate at CBS IT and Security in New York. One CBS Radio strategy is to segregate automation systems, which include Broadcast Electronics AudioVault systems in Phoenix, from office networks.



Schecter on South Mountain, the transmitter site about 1,500 feet above Phoenix for KMLE(FM), KOOL(FM) and KZON(FM).

Photo by Chris Ark

"We put the automation systems on a different subnet and lock it down. We firewall everything, and we make sure to change all default passwords on any appliances connected to the Internet," he said.

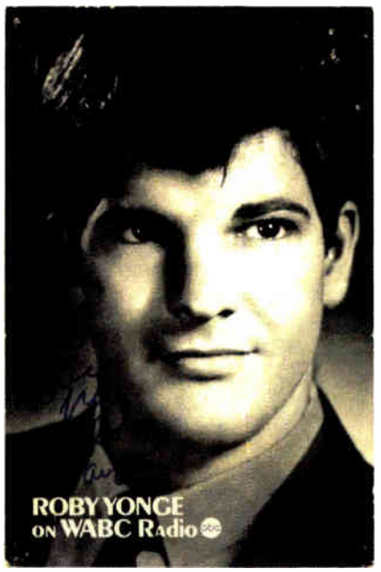
KOOL and KMLE have HD2 channels, and Schecter is launching one soon for KZON. CBS Radio is committed to HD Radio, Schecter said. He believes the technology holds great promise for the evolving auto dashboard.

"Obviously, the demand for HD Radio is more on the mobile front. We now live in a digitally connected world. I think the Artist Experience is a great branding opportunity," he said. "and song tagging is important. Anything to make the consumer experience more interactive is good." CBS was an early backer of iBiquity predecessor, USA Digital Radio Partners and has been a long-time proponent of the technology.

Schecter, who visits the tower sites on South Mountain every two weeks to do routine inspections, said he is meticulous about fine-tuning the HD channels for CBS Radio in Phoenix, maintaining proper alignment to limit the jumps from analog to digital and back that annoy listeners.

"We have all of the routes to get all of the HD data in-house, and then interpreted by the middleware, in this case the Artist Experience, and then to the exporter," Schecter said.

The Phoenix stations' studio automation systems feed the middleware programs — such as TRE, PADapult or Jump2Go — that receives PAD data as well as Artist Experience data (including TagStation) from the Internet and inserts it in the HD UDP stream. That is then sent to the transmitter site via an Ethernet subnet link that is isolated from the business and audio LAN subnets, according to Schecter.



This is an autographed photo of DJ Roby Yonge, whom Schecter met when touring WABC(AM) in New York in 1968. It was his first trip to a radio station.

CBS Radio/Phoenix locates the exporter and the audio processing at the transmitter site, he explained, and then uses a direct Ethernet connection from the exporter to the exgine card in the exciter.

"Then you don't have to deal with latency issues or dropped packets. It really simplifies the whole process. The alignment is really perfect. That way you meet the iBiquity specs and ensure a better listening experience for your audience," Schecter said.

TEMP EXTREMES

There are challenges to maintaining equipment exposed to extreme heat and sun; the average Phoenix July high temperature is 106.

"Keeping all of the air conditioning units working is the top priority. We have seven alone at the transmitter sites. We have a very good preventive maintenance programs. Keeping up with building infrastructure is a challenge, too, since heat takes the toll on roofs," he said.

South Mountain generally is a bit cooler than the desert floor in Phoenix; however it can experience drastic changes in temperature from day to night, which can create havoc with transmission lines, according to Schecter. "All the expansion and contraction can be tough on the lines. You have to watch your pressurization closely."

Schecter began his radio career post college on-air at KWFM(FM) in Tucson, Ariz.; he's spent most of his career in Arizona, working in technical positions for Shamrock, Chancellor, AM/FM, Infinity and now CBS Radio. He also completed a four-year stint in San Diego working for Lincoln Financial at a cluster of radio stations from 2005–09.

Schecter recently was elected to the board of directors of the Society of Broadcast Engineers. He looks back on his technical broadcast career that now

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World Radio History

GM/HD RADIO

(continued from page 3)

in GM's case? Both iBiquity and GM believe it is.

IBiquity President/CEO Bob Struble was careful not to speak for GM, saying: "We are confident that what you heard from GM is correct, and we're working closely with them to make it happen."

Struble says the company knew of GM's decision for approximately two years in advance but couldn't say anything because of their partnership. That's because the automakers themselves want to control what features they promote, or not, for their vehicles.

Consumer dissatisfaction concerning the blending, he said, could result from a bad system design, an issue at the station or an issue with the receiver implementation. Receiver system design has been improved over the years with an increase in car reception performance, "so we don't think that's an issue," he tells me.

The blend can become more annoying if the station has time- or level-alignment issues. "It highlights to the consumer that there's this change going on."

Speaking in general and not specifically about GM, he said early HD implementations, like first implementations of any tech, "tend to be lower-performing" than subsequent iterations.

In order to have as broad digital coverage as it can, iBiquity works with automakers to improve system performance and to ensure they have a good implementation of the HD Radio system.

But how much control does iBiquity have over the radio that goes in the car? "Ultimately, as much as [companies] want to give us," says Struble. Automakers work with Tier 1 suppliers like Delphi, Fujitsu, Visteon and other companies that build the radio for them. Struble said the suppliers are people iBiquity has worked with over the years to test car receiver implementations. I wrote in the spring that companies like Pioneer drive radios over a "torture loop" to tease out performance inconsistencies; iBiquity's team in Detroit does so, too.

Consumer electronics experts tell me that systems that may perform consistently outside of a vehicle can be harder to control once integrated with all of the other components in the complex car environment.

Consumer electronics experts tell me that systems that may perform consistently outside of a vehicle can be harder to control once integrated with all of the other components in the complex car environment.

Struble said even a well-designed system and well-built radio might not always result in a good consumer experience. "Ultimately, it is the OEM and Tier 1 who put that radio in, and we have less influence there. It's their product and their customer."

BMW

Circling back to the BMW situation, the Southern California Broadcasters Association is going ahead with an engineering group to offer to help BMW solve its AM interference problem in new electric vehicles.

That's the case—even though BMW told the National Alliance of State Broadcasters Associations and NAB it doesn't intend to revise its decision. The carmaker will leave AM radio out of its two electric vehicle models because of concerns about interference to AM reception from the electric motor.

Engineers have suggested to me that the European-based automaker may have chosen to optimize the i3 and i8 for other things buyers may value more than AM reception, like longer battery life. That's important to electric vehicle owners, who need to plan trips based on battery range.

Also, vehicle design involves all kinds of tradeoffs, like vehicle weight and size, and of course, price. And, electric motors are prone to causing AM interference. As one engineer put it, "When you design for AM in a vehicle, you need to address more than the radio and the [really long] antenna." Another agreed.

"Getting CPU and LED display driver noise out of an AM radio in close proximity is really tough," says an engineer whose company owns AM and FM facilities. Some automakers "simply see a lot more long-term value in the Wi-Fi and WiMax digital content delivery to vehicles than fighting the AM battle."

Engineers are usually interested in tackling problems. Unsolicited, the Southern California Broadcasters Association is tapping into that spirit. President Thom Callahan canvassed engineering schools and solicited engineering professors from USC, UCLA and the Jet Propulsion Lab to serve as advisors to the ad hoc group. That group has formed, and, from a technical standpoint, intends to "develop the approach needed to get BMW's attention," Callahan tells me.

I checked back in with him recently, and he said the group is proceeding but would prefer to keep its activity private for now.

If successful, what they discover may help other automakers with electric motors as well — even if BMW doesn't change its mind.

NEWSROUNDUP

SIRIUSXM: The satcaster will pay $3.8 million to close investigations by the attorneys general of 46 states into the satellite radio's advertising and customer retention practices. The settlement resolves allegations that the company engaged in misleading advertising and billing practices. The attorneys general said SiriusXM made it difficult for people to cancel their service, was late to credit payments from consumers, and used automatic renewals without consumers' notice or consent, often at rates that were higher than anticipated. In addition to the payments, the satcaster will revise its cancellation practices.

RIVET: HearHere Radio, parent of Rivet News Radio, has partnered with conference call provider InterCall to provide newscasts-on-hold for the telephone. Their agreement brings Rivet's top news playlists to InterCall's reservation-less service, providing callers with national and world news while they wait for calls to begin. The Rivet app is available for both Android and Apple devices.

SCHECTER

(continued from page 6)

spans nearly 40 years and hopes to encourage others to follow suit in getting into the industry.

The SBE has created a committee on mentoring, which Schecter will chair, to explore ways to widen outreach within the radio engineering industry. "Our ranks have thinned. Broadcast engineering is becoming more IT-centric, and radio faces a challenge of recruiting young engineering talent that have the love of a job that requires a desire to serve," he said.

The next-generation broadcast engineer will have to be excellent at marrying the new IT disciplines with some of the traditional RF skills, he said.

Schecter has trained a number of assistants who have moved on to top engineering jobs at other radio stations; he has a passion for giving back to his profession. "I think that is my calling. To mentor younger people and share this knowledge I have gained."

Schecter, long active in SBE Chapter 9 in Phoenix, said being mentored was important in his career. He credited the late Elliott Klein, who hired Schecter at KNIX(AM) in Phoenix in the early 1980s, for teaching him about AM directional arrays. Other colleagues who encouraged Schecter's professional development were industry engineers Bert Goldman, Bill Croghan and Jeff Littlejohn.

As the SBE mentoring committee takes shape, with the help of former SBE President Ralph Hogan, Schecter is focusing on a project for KOOL this winter that entails replacing a pair of Harris FM-25Ks on South Mountain with new solid-state transmitters and HD Radio equipment.

CBS Radio/Phoenix plans to elevate digital power levels on sideband channels from the current –20 dBc to –14 dBc where technically feasible, he said.

"This will be accomplished on KOOL with that new transmitter replacing a space-combined system with a low-level combined strategy. I've noted that the increase of 6 dBc results in marked improvement both at home and the mobile environments," Schecter said.

Schecter lives with his wife, Soosie, a veterinary technologist from Great Britain, in Scottsdale, Ariz. He is a licensed Extra Class Amateur Radio Operator with call sign KC7ES.

"I have a modest station, but I love to chase distant stations," he said.

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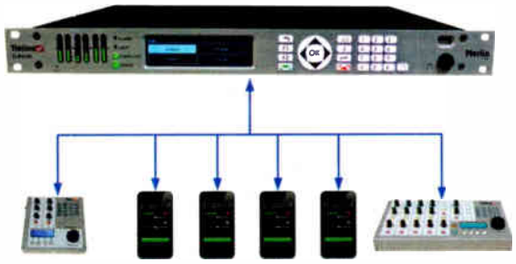

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World Radio History

Document Issues to Demonstrate Maintenance

Also, backdraft dampers can help protect valuable infrastructure

WORKBENCH
by John Bisset
Read more Workbench articles online at radioworld.com

Armed with a cell phone for pictures, Steve Tuzeneu recently visited all the transmitter sites for Townsquare Media Grand Junction, Colo., where he is the new market chief.

At one of the sites, Steve found the air conditioner frozen (shown in Fig 1). Turning the unit off will allow it to thaw out.

Steve's visits are a reminder of the importance of regular site inspections, especially coinciding with the change of seasons.

Be sure to take your camera or phone along. Document issues to help the GM see how you are caring for the station as an investment.

Steve Tuzeneu can be reached at *steve.tuzeneu@townsquaremedia.com*.

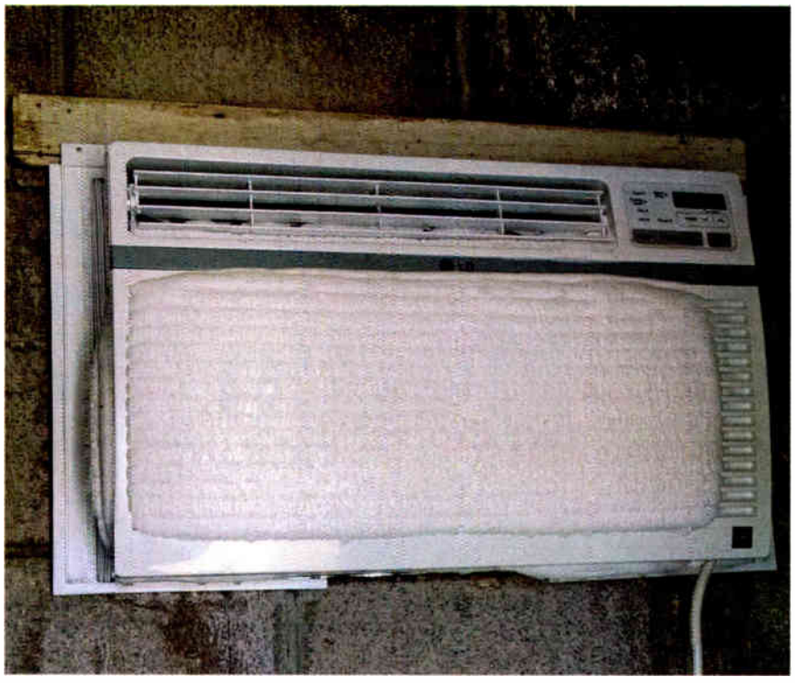

Fig. 1: A routine site inspection found this frozen air conditioner.

John McKenna is director of technology and engineering for the YES Network, "Where Yankees Fans Get Their Yankees!"

He commented on our sad story about the engineer who vented his transmitters only to realize that "backflow" outside air had damaged the components of his idle standby unit.

John was surprised that whoever installed this air system hadn't put a set of louvered shutters on the outside of the vents. These "backdraft dampers" are almost universal in colder parts of the country, venting anything with a blower — such as a transmitter. Not only do the louvers prevent backflow of air, but they keep cold air out of the building if the transmitter is off overnight.

When the blower comes on, air pressure moves the shutters open, allowing the heated air to pass to the outside. When the transmitter shuts down, the shutters close and prevent outside air from coming back through into the equipment.

In the example in our previous column, backflow through the non-operating transmitter would create a negative pressure in the duct and serve to pull the shutters closed even more tightly. This would keep the moist outside air from the equipment.

As you can see in the illustration marked Fig. 2, there's a little V-shaped bend at the bottom of the louver to allow it to close rather tightly around the hinge of its mate below. This does a pretty good job of sealing the opening when it is closed. Any wind blowing against it or negative pressure on the backside will force the louvers even tighter.

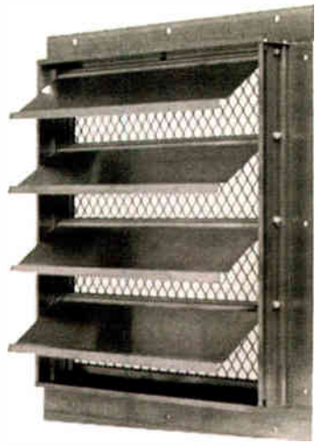

Fig. 2: A backdraft damper protects transmitter equipment.

Of course, the picture is for one that has the airflow coming from inside the building, but there are versions with the mounting flange on the other side to protect air intakes, as well. Note that these can blow open occasionally, should the wind blow right at it, and there's no positive pressure on the inside. An alternative is a hood.

Most HVAC guys will put a hood on the outside, to hide the opening from weather, and a trap inside the building to catch any precipitation that gets forced in, so it doesn't blow into the gear.

Installing a backdraft damper is a lot cheaper than constantly running the blowers on the spare transmitter and potentially causing belt or bearing failure. If you are using outside makeup air for cooling, put a set of shutters, opening into the plant, at the intake port to keep the outside air out when it isn't needed. This saves on air conditioning and heating costs.

(continued on page 15)

World Radio History

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INOVONICS BROADCAST

World Radio History

TWiRT Discusses Radio Tech Using Skype

Podcast is a case study for radio in the 21st century

PODCASTING

BY PHILIP MULIVOR

This fall marked the fifth anniversary of "This Week in Radio Tech," a podcast geared to broadcast radio engineers.

Created by Kirk Harnack, TWiRT's most popular episodes now reach an average audience of about 7,000.

Although occasional glitches (introduced mainly by Skype) intrude on the podcast, TWiRT's audience listens in weekly for the latest technical tips, war stories, interviews with famous engineers and occasional trips into radio history.

"Email feedback comes in from almost all stretches of the globe," said co-host Chris Tobin, former broadcast technologist for CBS Radio stations in New York City and current owner of Content Creator Solutions. "The shows I enjoy most are when we challenge the status quo," he said.

Whatever the topic, TWiRT features casual conversation between engineers "similar to what takes place at an SBE meeting, or at lunch, or in the hall at the NAB," said Harnack. "We're not doing highly produced tutorials."

Harnack's employer, Telos Systems, is TWiRT's oldest sponsor, but he said the show is vendor-neutral. TWiRT welcomes guests from a variety of his company's competitors. "And I really try to watch my language," said Harnack. "Instead of saying Livewire [a Telos brand name], I'll say AoIP."

TWiRT is produced and distributed by the GFQ Network, founded and led by Andrew Zarian. GFQ's 15 weekly podcasts range from unboxing the latest consumer gadgets ("What the Tech") to professional wrestling ("Mat Men"). GFQ makes money by selling advertising time to Podtrac, who in turn places ads on the network's various shows. Telos acquires ad time on TWiRT directly from the podcast, rather than through GFQ.

Each Thursday, Harnack, Tobin and a guest establish a Skype video connection with Zarian at the GFQ Network studio in New York City. Zarian tweaks the connections and then switches between participants throughout the one-hour live show.

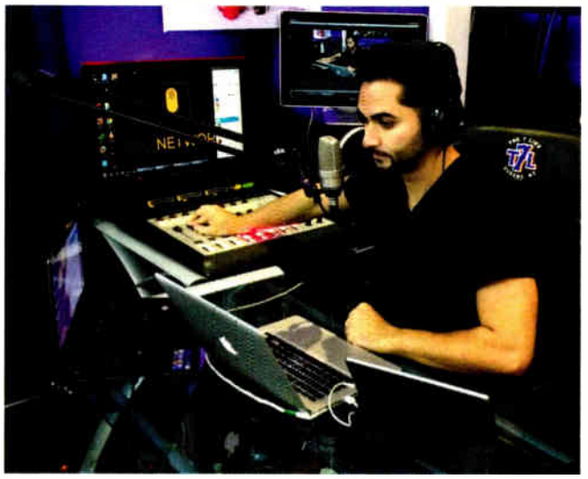
Kirk Harnack hosts "This Week in Radio Tech" from his home studio.

Zarian creates a relaxed but polished look to the show — until Skype gremlins occasionally pop up.

Skype is the weakest link in the chain, said Zarian, despite the fact that GFQ runs separate PCs for each incoming Skype video signal.

But when Skype signals slow down over a bad "hop" on the public Internet, the show can be brought to its knees.

"Then, who do you call? Verizon and Comcast both pass the buck. You will lose your mind when that happens," Zarian said.



Andrew Zarian produces the TWiRT podcast in the GFQ studio in New York.

TWiRT is a video podcast, "but right now, audio is still king," said Zarian. Most TWiRT fans enjoy the show as a download after the live podcast, he said, and audio downloads outnumber video three to one.

"And I honestly believe that most people who download the video are still just listening, not watching," he added.

Nevertheless, TWiRT has offered some visually stunning shows, including a behind-the-scenes tour of NIST station WWV by Tom Ray (of Tom Ray Broadcast Consulting), who occasionally co-hosts the podcast.

Tobin has offered live reports from transmitter facilities atop a New York City skyscraper and other remote locations.

EQUIPMENT

Tobin has assembled a bag with everything he needs to Skype-in from far-flung locations: Two laptop computers (one MacBook, one PC running Windows 7), both configured to give Skype as much CPU time as possible; a Roland UA-25EX USB audio interface (eliminates unbalanced mic audio and noise from a laptop's motherboard); a 25-ft. LAN cable; an AKG D202 mic for noisy environments; a lavaliere mic (Posthorn Recordings Sonotrim STR-BLA6); a Logitech C920a webcam (HD 1080p) with tabletop tripod; a 4G cellular modem card for the laptops; and a small 5000K light.

Tobin said that the kit has served him well in a range of environments — from beaches to New York City park benches — since he designed it more than two years ago.

Back at GFQ, Zarian runs an Axia Radius Console, an Omnia One Multicast to process coded audio and a Telos ProStream for live netcasting.

STEPPING UP THEIR GAME

Zarian said that his hardware choices and other technical decisions at GFQ have been influenced by the podcast.

Hosting TWiRT "really helped us step up our game, and made us rethink everything we're doing," he said. "We're not a radio station, and for someone outside of broadcasting to bring over broadcasting equipment is not something that you see a lot."

Shortly after Harnack launched TWiRT in 2009, the show was picked up by TWiT.tv, the podcast network founded by Leo Laporte. (For Radio World's 2011 story about TWiT.tv, visit *radioworld.com*, keyword Netcast.) But during one week in 2012, "TWiT killed nine podcasts, and mine was one of them," Harnack said. "Business models change, and my little niche didn't fit their wider audience marketing anymore."

After TWiRT's break with TWiT.tv, the podcast was acquired by the GFQ Network.

"But I don't know if I ever would have gotten around to [creating TWiRT] if a guy like Leo hadn't said, 'You can do this,'" Harnack said.

TWiRT's plans for the future include the ability to take live calls from folks listening in real time.

"TWiRT has been amazing in getting current technical information — and legacy information — out to an enormous audience of engineers," said Harnack. "It sparks their thinking, and hopefully, broadens their possibilities of doing great technical work."

TWIRT TRIVIA

- TWiRT had released 230 episodes, as of Oct. 12, 2014. If you watched TWiRT 8 hours a day, 7 days a week, you'd make it through the whole archive in about a month.
- Harnack estimates that he spends about two hours off-air preparing for every show.
- When TWiRT streams live on Thursdays at 1900 UTC, a chatroom for viewers to discuss the show opens at *http://www.gfqnetwork.com/live/*.
- Tom Ray and Chris Tarr, co-hosts on some past episodes, have been absent from recent shows due to schedule conflicts. "I wish we could get them all on more often," said Harnack.

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World Radio History

Inductive Reasoning

Discovery of electromagnetic induction sets stage for radio

FUNDAMENTALS

BY JIM WITHERS

In this fourth article in our series (*radioworld.com/fundamentals*) of occasional articles about electronic components and formulas that have been critical to the development of radio, we focus on inductance and how that electrical property was discovered.

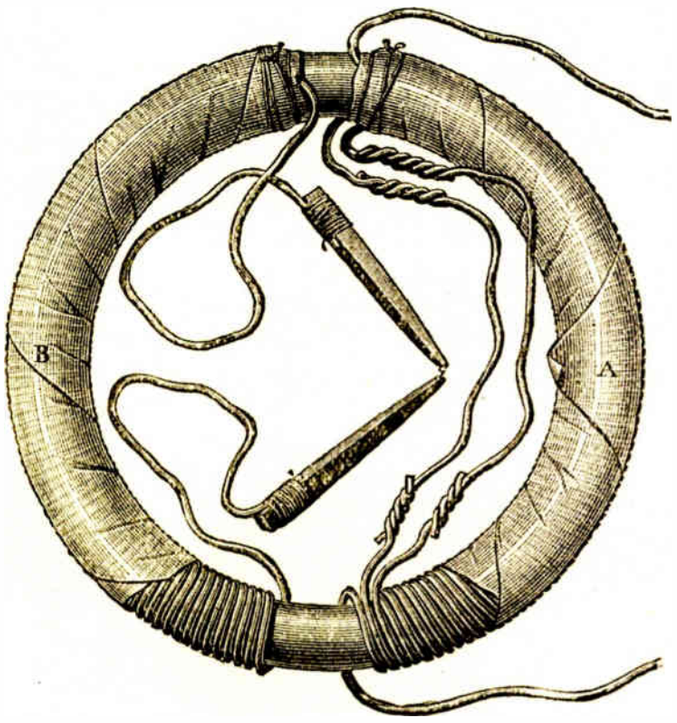
By 1820, when a young Danish physicist named Hans Christian Oersted was experimenting with electricity and magnetism, much was known about those two phenomena, but nothing was known about the interaction between them.

Magnetic compasses and lodestone had been around for centuries.

Pieter van Musschenbroek, Ben Franklin and others had experimented decades earlier with bottled up electricity (literally bottled up in van Musschenbroek's invention, the Leyden Jar), but no one understood the connection between the two.

Oertsed's experiment used a galvanic cell (a battery) to send current through a wire that passed just above a magnetic compass. When current flowed through the wire, the compass needle deflected from north momentarily, but returned almost immediately. When Oersted removed the voltage, the needle momentarily deflected in the opposite direction! Clear evidence that electricity and magnetism were somehow connected, but the key word was "somehow."

He did not have that worked out, and in fact, it would be a few more years until Michael Faraday and lesser-known American scientist Joseph Henry figured out the answer.



Faraday's coil confirmed the connection between magnetism and electricity. This image, found on WikiMedia Commons, was originally published in Frederick Bedell's "The Principles of the Transformer" (1896).

LINES OF FORCE

Faraday and Henry, working independently of one another, showed that, as current from a battery flows through a wire, a momentary current would flow in a second, nearby wire.

Still, like the compass needle in Oersted's experiment, current in the nearby wire only flowed momentarily when voltage was applied, even if the voltage was left on. This was a mystery.

Faraday was the one who finally worked that out in 1831, when he wrapped a ring of iron with two independent coils of wire on opposite sides of the ring. Voltage applied to the "primary" winding *induced* a momentary current flow in the secondary winding. He called this device, appropriately enough, an inductor, and hypothesized that the momentary current flow in the secondary winding was due to waves of some sort, radiating outward from one coil to the other through the iron core.

He was correct, and we know the peaks of those waves as magnetic "lines of force" that emanate from poles of a magnet, as well as from the windings of an inductor.

Faraday's iron ring and its coiled windings was actually a toroidal transformer, which not only validated Oersted's experiment but also led to the discovery of mutual inductance, which makes transformers possible.

Both Faraday and Henry were instrumental in working out the properties of electromagnetism, and the existence of EMF, or electromotive force, but since the international value assigned to capacitance had already been named after Faraday (in truncated form: the farad), the unit for inductance was named the henry.

In any event, Faraday showed that it was the expansion and subsequent collapsing of the magnetic "lines of force" cutting through the secondary windings as voltage was applied and removed that caused the secondary current. That realization, in turn, explained the momentary nature of the current, as well as the reason it changed directions as the primary voltage was removed. His experiments and formulas that confirm the results became the basis for the Law of Induction, which bears his name.

CLICK AND CLACK

With radio's emergence several decades in the future, the first inductors were used primarily as electromagnets.

But in a prescient moment, Joseph Henry soon realized that the principle of using an electrical current to create a magnetic field might be of great value beyond those simple devices. To that end, he designed a very sensitive electromechanical device that "clicked" every time a pulse was received over a pair of wires.

Samuel F.B. Morse immediately adapted it to his coded system of dots and dashes, and the telegraph was born.

Henry also invented an offshoot: the electrical relay. He mechanically linked a set of electrical contacts to a spring-loaded lever and placed the lever over a coil. When he applied power to the coil, the ferrous core magnetized, attracting the lever, which in turn pulled the set of contacts to make them touch a second set of stationary contacts, completing an electrical circuit.

These applications all used DC power, just as did the first experiments with capacitance.

When DC power is applied across a coil, it resists current flow as the magnetic lines of force "use" the current to expand. Once fully expanded, however, the lines of force need essentially no power to stay that way. When the power is removed, the lines of force collapse, giving back the energy that was absorbed when they expanded in the first place (but in the opposite direction as originally applied voltage). If current flow in an inductor is initially at zero when voltage is applied, then according to Ohm's Law, the coil's resistance is infinite and the voltage across it is maximum.

But as the lines of force fully expand and stabilize, current flow correspondingly increases to maximum, at which point the coil's resistance to current flow is limited to no more than the resistance of the wire, which is typically very low. In that state, Ohm's Law says that the voltage drop across the inductor is minimum (although it is not zero, owing to the resistance of the wire itself).

As we found out last time (in the Oct. 22 issue), capacitors work exactly opposite, with current at maximum and resistance (and therefore voltage), at minimum as voltage is first applied. AC is different from DC, since it continuously cycles from positive to negative and back again, and inductors, just like capacitors, continuously react to that change voltage. The difference is in the way they react.

ELI THE ICE MAN

All beginning electrical engineering students are taught to remember this difference in the two types of components by the mnemonic ELI the ICE man, which makes use of the engineering symbols for voltage (E), inductors (L), current (I) and capacitance (C). E Leads I (ELI) in an Inductor, and I Leads E in a Capacitor (ICE).

As it turns out, when AC voltage is applied, these "phase differences" are 90 degrees in both components, so when inductors and capacitors are combined in a circuit, the phase difference can add to 180 degrees (completely out of phase) or can subtract, to be in-phase. This is the key to the operation of tuned circuits, as we shall see in a future article.

The formula for inductive reactance is

$$X_L = 2\pi fL$$

Where X_L is inductive reactance in ohms, π is 3.14; f is the frequency of the applied voltage in hertz, and L is the inductance in henrys.

From this formula, it can be seen that as either frequency or inductance, or both increases, inductive reactance (which is nothing more than resistance to AC current) will increase as well. Another way of saying this is that inductors are low pass filters; they pass DC voltages but resist AC voltages, particularly higher frequency voltages like those found in broadcast transmitter RF amplifiers.

For this reason, some inductors are called RF chokes, since they "choke" the flow of RF current. This

(continued on page 15)

World Radio History

WORKBENCH

(continued from page 10)

For recommendations, John suggests you contact either an air conditioning mechanical company that does sheet metal or an AC supply company.

Reach him at *jmckenna@yesnetwork.com*.

From time to time, entry-level engineers ask me for advice on good broadcast engineering reference books.

Ben Dawson of consulting engineering firm Hatfield and Dawson ranks the "Radio Engineers' Handbook" by Frederick Emmons Terman as a must-have. Ben says this book was printed by the tens of thousands during World War II (evidently at the behest of the military) and copies can often be found in independent used bookstores for $10 or $15.

Over the years, Ben has purchased a number of copies and distributed them to folks all over the world. It is, in Ben's opinion, the one book no radio technician or engineer should be without. Ben recently looked at Amazon's website, which showed it available for about $12.

The next most useful book, for the RF side of broadcasting, is B. Whitfield Griffith's "Radio-Electronic Transmission Fundamentals." It was published in 1962 by McGraw-Hill and reprinted a few years ago by Noble. Amazon has it for $80 or so new, about half that used. Powell's in Portland (in my opinion, the best bookstore in America, maybe even in the world — better than Foyles in London, which was the best for many years) often has it too. The reprinted edition also has the answers to the problems, too.

Ben notes that he and Ron Rackley got Noble to reprint Griffith's book, and it has an introduction from both consultants, though they didn't receive a commission. In fact, it cost both engineers, who had to slice up a copy to be used for reproduction until it was discovered that Whit had the original page proofs, which he graciously supplied for the reprint.

For those who want to understand modern analytical methods for antenna analysis, in Ben's view you can't beat Warren L. Stutzman and Gary A. Thiele's "Antenna Theory & Design." Ben knows folks who've taken classes from one or the other (Stutzman at Virginia Tech, Thiele at Ohio State/University of Dayton) and say they were great teachers; this book demonstrates it. There are at least two editions; it can be found used for under $50.

Ben writes he could go on (as the Hatfield and Dawson office library has about 2,000 books!), but if he were on some deserted island, these would be his choice of textbooks. What are yours?

Reach Ben Dawson at *dawson@hatdaw.com*.

Send Workbench tips to me at *johnphisset@gmail.com* or fax (603) 472-4944.

Contribute to Workbench. You'll help your fellow engineers, and qualify for SBE recertification credit.

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.

(continued from page 14)

resistance to high frequencies is the exact opposite of a capacitor, where the reactance *decreases* as either frequency or capacitance increases.

For any given size of capacitance, then, capacitive reactance is inversely proportional to frequency. At the same time, for any given value of inductance, inductive reactance is directly proportional to frequency. With these two properties in mind, it is easy to see that we can calculate values for a capacitor and inductor so that they each exhibit the exact same reactance to some specific frequency of AC voltage. In that situation, the capacitor and the inductor can be used to create a tuned circuit and that is what we'll take a look at next time.

Jim Withers is the 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.

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Oh, The Voices - Part I: Tidying Up Talent Vocals

by Steve Dove, Minister of Algorithms

What you need to know about getting the most out of talent, from solving sibilance and noise issues to how to outsmart those tricky microphones.

The microphone processor has long been important but in recent years it has become vital. Mainly this is due to the recent trend of referencing audio to 0dBfs (the maximum signal level in a digital system) rather than the cozy old nominal 0dB VU. Most popular music releases are "normalized" or processed so that their highest peaks are at 0 dBfs, if they're not totally squashed and clipped to blazes up against that limit. Compared to a playout system crammed full of this and hyped-up commercials, an unprocessed announcer's voice can seem quite wimpy and out of place.

Consider also the entire radio air-chain. Sitting ahead of the transmitter is usually a Very Serious Processor, which is generally set up (in a music format) to be optimal for music, secondarily for voices. Presenting a processed voice that better suits the "big guy" can pay large benefits in on-air voice sound.

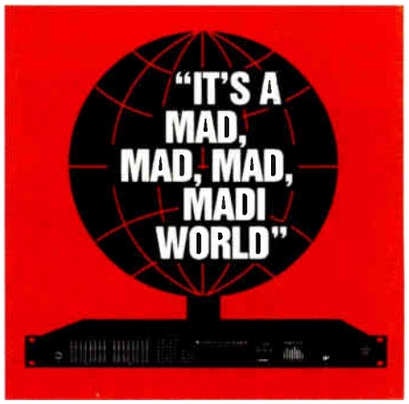
Other program distribution chains such as that produced by highly bit-reduced streaming codecs benefit from attention to the voice, whilst talk radio lives and dies by - voices. A good mic processor brings much to all these scenarios.

Let's run through the sorts of things we might want to do to a voice to tidy it up, improve listenability, and better integrate with today's technological expectations.

Get to the real meat of Steve's article...

Go to: INN17.wheatstone.com

It's a MAD, MAD, MAD, MADI World



MADI can act as a common transport mechanism between two systems that use different native formats. Our MADI interface seamlessly integrates WheatNet-IP audio network into an existing Wheatstone TDM router system so you can have the best of all worlds!

MADI's been around for a long time, so it's understandable if you have forgotten what this acronym actually stands for (which is, Multichannel Audio Digital Interface, also known as AES10).

But, don't lose track of how useful MADI can be to broadcasters. The list is fairly long, and getting longer. After all, there are very few alternatives for sending up to 64 channels of digital audio (48kHz sample) over one 75-ohm coaxial cable. Not only does this digital audio routing standard by AES make it possible to send a lot of channels through hundreds of feet of cable, it delivers lossless audio through all those channels. That lends itself to some practical applications.

Learn how MADI is making it possible to bridge the old and new worlds.

Go to: INN17.wheatstone.com

IPv6 and Networking

Your WheatNet-IP audio network will never require as many IP addresses as what's needed for the public internet. But the migration to IPv6 is something our technology partner Tieline says you should keep in mind as you consider bringing in audio contributions from outside the studio.

We can say with certainty that you'll never run out of IP addresses for your private WheatNet-IP audio network.

The same can't be said for the public internet, which is migrating to IPv6 to keep it in IP addresses. The length of an IPv6 address is 128 bits, compared to 32 bits for existing IPv4 addresses, or that unique numerical string that's needed by every device to connect to the internet. Who would have thought that the internet would blow through 4.29 billion available IPv4 addresses, the last and final block of which was allocated not so long ago? IPv6 will give us, well, a whole lot more. It's the difference between being able to fill a golf ball versus the sun with IP addresses!

What does IPv6 mean to networked IP Audio?

Go to: INN17.wheatstone.com

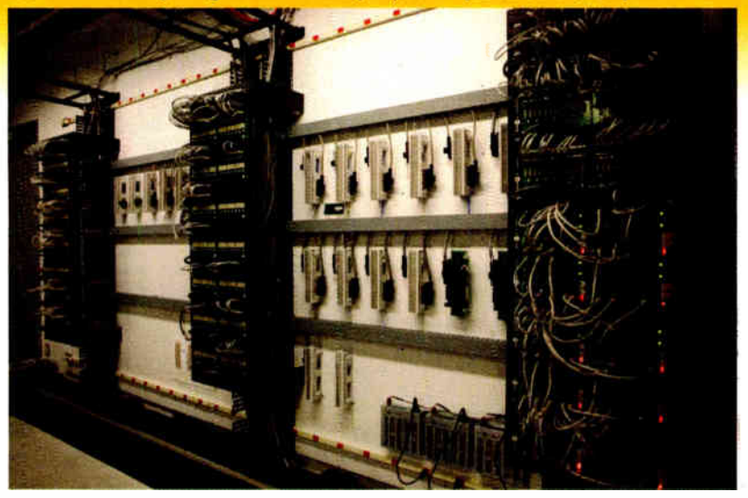
OK, this spread is an advertising space paid for by Wheatstone. But hopefully you'll find it informative, entertaining and compelling.

World Radio History

Trends in Routing

Though we write often in Radio World about overarching trends and benefits of routing infrastructure systems, here we invited several companies that build such systems to get really specific and tell us about one interesting, new or unique product — or even a specific feature or capability — that has helped or could help solve an interesting problem.

The Cat-6 "Everything Wall" at KYW(AM)'s new plant in Philadelphia.



Make It Twisted Pair

"In the broadcast engineer's world, 'convergence' is code for 'now we do IT,'" said Dan Braverman, president of Radio Systems Inc. "So most engineers and manufacturers I know now spend much of their time writing code, configuring networks and browsing links, simultaneously doubling our capabilities and workloads.

"But from an infrastructure standpoint (code for wiring) the situation has gotten easier, not harder," he continued.

"That's because Cat-6 twisted pair and the gear, companies and installers that support it now provide one universal, cheap and 100 percent compatible way to wire it all together. Cat-6 (and Cat-5) supports all your signals: analog, digital, VoIP and Ethernet. There just really is no need or reason to ever install shielded audio cable again."

Braverman says this is important for several reasons. "No plant is static in todays' market. Cables pulled for legacy analog lines today could be tasked to run an IP Ethernet links tomorrow. Cat-6 can do it all. Run twisted pair everywhere. Run a lot of it and use it exclusively. You will future-proof your work. And when a new facility is put together, there is always a local 'low-voltage' wiring contractor hired to provide low-cost, dependable, high-speed Cat-5 runs and switches for what used to be just for your enterprise phones and PCs. Double their contract and let them pull some of these same lines from the studios to TOC. It will be the best (and least) money you'll spend on your new facility.

"Every major console manufacturer now sports RJ-45s to connect directly to the Cat-6 infrastructure. And companies like Radio Systems make a myriad of adapters to connect to gear that still doesn't support this topography natively. But whether you buy it pre-made or roll your own, make it twisted pair. It the only way to go."

Info: *www.radiosystems.com*

High Density, Small Space

"This is a small-scale item but has proven useful for many customers," says John Davis, technical support manager for Logitek.

"Logitek's JetStream Mini router packs the I/O needed for a studio operation into just two rack units. Because it uses fanless cooling, it can reside in an air studio along with the other equipment. This is a space-saving way to manage individual studios in facilities that want the advantages of assignable inputs and other router-based functions at a console, even if they don't want to network their studios together."

Logitek JetStream Mini

Davis said the company achieves high density in a small space in three ways.

"JetStream is a hybrid of TDM and AoIP, so where possible we keep the audio within the same router frame and do not need to send it off to an external box to get mixed. That means that you only network the signals that need to leave the frame and everything is processed with the lowest latency possible," he said.

"Second, we employ system-on-chip technologies for AoIP to encode and decode up to 160 channels of audio, depending upon the size of the JetStream frame. Third, by aggressively using multiple low-voltage power supplies within the JetStream, we have an efficient device that consumes fewer watts than our older products, generates less heat and is easier to keep cool."

Info: *www.logitekaudio.com*

Customizing AoIP Without All the Programming

"For all that IP audio networking has done to make our lives easier, a lack of management tools has made it largely inaccessible to the typical broadcaster," says Wheatstone's Jay Tyler.

"Putting the control and flexibility of AoIP directly into the hands of broadcasters is the thinking behind our new Screen Builder app," Tyler said. "Screen Builder lets broadcasters do all those things with their WheatNet-IP audio networks that were only possible by programmer types before."

Wheatstone Screen Builder

With this custom application, you could, for example, create a screen so your show producer could IFB to the host by tapping on a headphone icon. You could create dedicated screens that let him turn microphones on or off, monitor program sources or mix feeds. This is all done through a touchscreen app that gives broadcasters access to any aspect of the WheatNet-IP environment.

"Broadcasters simply drag, drop and assign attributes to faders, meters, labels, buttons, clocks, timers and other widgets that they can arrange on a PC screen and program to fire salvos, switch between crosspoints, turn equipment on or off, and more," said Tyler. "It's all completely scriptable using WheatNet-IP's Script Wizard."

Info: *www.wheatstone.com*

(continued on page 20)

World Radio History

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World Radio History

TRENDS IN ROUTING

(continued from page 18)

Cobranet products from AudioScience are at the core of Arrakis AARC-NET.

Integrating Consoles/Automation, Cobranet and Software

When you have more than one on-air studio, you quickly recognize how important it is to plan your wiring, says Ben Palmer of Arrakis Systems.

"If you're in the situation of updating your old consoles, and find the rat's nest of cables from your old setup, or if you are starting brand new and want it done right the first time, then using a network is the way to go."

Arrakis Systems offers AARC-NET. "This is a seamless integration of Arrakis consoles and automation, Cobranet audio networking products and Arrakis software," Palmer said.

"One of the benefits of Cobranet is that it is a common network technology, with over 1 million nodes installed. Therefore, all Cobranet products from different manufacturers work together to form a powerful audio network."

He said the core of the AARC-NET network are Cobranet products from AudioScience, which are plug-in compatible with the Arrakis ARC, MARC and X-Mixer consoles, so that installation and setup take minutes.

"No more punchblocks or multipair cables. Changing a wiring connection is a simple software choice. This makes AARC-NET is fast, easy and inexpensive," he said.

Palmer said a notable feature of AARC-NET is that it integrates standard analog and digital consoles onto the network instead of using expensive network-based digital mix engines. "You can therefore integrate consoles that you already own into the system. This makes repair and maintenance easy, and your console doesn't fail when the network crashes. Most importantly, AARC-NET is world standard Cobranet, not a custom one-of-a-kind network."

He said the cost of a standard AARC-NET system is a third to half that of competing systems.

Info: *www.arrakis-systems.com*

Console Remote Control Gives You "Virtual Faders"

"Many modern AoIP consoles have remote-control applications that allow broadcasters to use a PC or tablet to operate the board from a different location, as if they were sitting right in front of it," said Clark Novak of Axia Audio.

"With these apps, talent can change sources, start audio, tweak EQ, take calls, trim faders and more, just as if you were there. Axia Audio's SoftSurface software for Windows has this sort of rich toolset, and naturally, talent in the field love it."

Axia SoftSurface

However, he said, there are some less well-known SoftSurface abilities that allow operators in the studio to get even more from their consoles.

"For instance, Axia Element and Fusion consoles can have up to 40 physical faders. But Axia mixing engines enough horsepower to support up to 48 faders. Using SoftSurface, these 'virtual faders' can be controlled directly, allowing talent access to more 'faders' than their console actually has."

He said broadcasters have found this ability especially useful in live interview and "roundtable" settings, when there may be more mics needed than console faders.

"It's also handy for giving moderators in a discussion studio the ability to directly control guest mics from a compact, portable tablet, or allowing on-the-fly mixing of in-studio live musical performances."

Novak said that when used with multi-touch touchscreen tablets, these abilities are even more enhanced, with talent able to adjust groups of faders simultaneously. "And SoftSurface can connect to any Element or Fusion console in the facility."

Info: *www.axiaaudio.com/brochures*

Intelligent Edge Devices, Increased Connectivity

GatesAir continues to emphasize the value proposition of distributed studio architectures over the classic consolidated system, where one massive, centralized box routes audio and data facility-wide.

"Through GatesAir's Flexiva routing tools like the VMConnect audio management frame and VMQuadra automation and computer interface, the company is simplifying routing infrastructure by bringing these compact systems closer, and even into, on-air and production studios," said Joseph Marshall, product line manager for GatesAir.

"As a result, these intelligent edge devices help broadcasters establish the shortest physical path for connecting sources and destinations, while increasing local I/O capacity and network connectivity."

The networkable console is one of these important connected sources of distributed routing architecture. GatesAir offers its RMXengine device to add more networking flexibility for customers of its large-format RMXdigital consoles.

"Essentially, the RMXengine enables advanced dual-console operation for dual-anchor studio operations in networked systems, and provides flexible options for mix-minus and IFB talkback channel," Marshall said.

"Between our Flexiva VM Series tools and RMXengine, we're looking to not only maximize flexibility in routing and on-air infrastructure, but also add scalability across the board."

GatesAir VMConnect

He pointed to the RMXengine as particularly useful because broadcasters can scale the solution to meet their needs in a variety of ways.

"For example, a prominent customer of ours in New York City recently had a very unique need to join two consoles for dual-operator use during one daypart. RMXengine addressed this need by networking two consoles into a common operation, while delivering the added bonus of enabling mix-minus on every fader." Other customers, he said, might start with mix-minus capability on two faders, and assign that capability to additional faders as requirements change.

"We believe this kind of flexibility and scalability applies to broadcasters of any size, in any market."

Info: *www.gatesair.com*

World Radio History

FM TRANSLATORS

(continued from page 1)

(Part 74) than full-service FM stations (Part 73).

REGULATION

In considering the FCC regulatory aspects of FM translator stations, there is the perspective of the FM translator licensee itself (which may or may not also be the licensee of the primary station carried by the FM translator), the particular perspective of an AM broadcaster that would like to acquire an FM translator, and finally the perspective of a full-service FM station that may have its signal impacted by an FM translator.

The most significant regulatory difference between FM translators and full-service FM stations is that, under the current FCC rules, FM translators are secondary services. An FM translator station can continue to exist only if there is no cognizable interference to bona fide listeners of existing stations. This secondary status of an FM translator currently applies whether the translator is carrying a distant station or providing fill-in service for an AM station or HD sub-channel.

FM translators may not, with limited exceptions, originate programming. Rather, the programming carried on an FM translator must be concurrently broadcast over a full-service FM or AM station that is known as the primary station.

One exception is that programming produced by an AM station daytime-only station may be carried during nighttime hours when the AM daytime-only station is off the air. Another exception is that an FM translator may carry no more than 30 seconds of locally originated support acknowledgements each hour.

An FM translator may be commercial or non-commercial, a status determined by the commercial or non-commercial status of the primary station carried.

FILL-IN OR NOT

There are two types of FM translators: fill-in FM translators that have the service contour completely contained within the service contour of the primary FM or AM station, and non-fill-in FM translators that extend the service contour of the primary FM station (non-fill-in FM translators may not carry AM stations).

A non-fill-in commercial FM translator cannot be owned by a commercial broadcaster under the FCC's rules because it would extend service outside of the service contour of the primary station carried. The service contour is the 60 dBμ contour for all FM stations except for Class B and B1 stations for which the service contours are the 54 dBμ and 57 dBμ contours respectively. The relevant contour for AM stations is the 2 mV/m contour.

In the past five years or so, with the FCC now allowing AMs and HD sub-channels to be carried as primary stations, most FM translator activity has been with fill-in trans-

(continued on page 22)

Left: a Shively 6812B 3-bay half-wave spaced translator transmitting antenna on a very busy tower in Great Falls, Va. At right is a zoomed-out view of the same tower. John Garziglia, who took both photos, asks if you can spot the FM translator antenna in all this mess? (Hint: it is about two-thirds of the way up on the right-hand side.)

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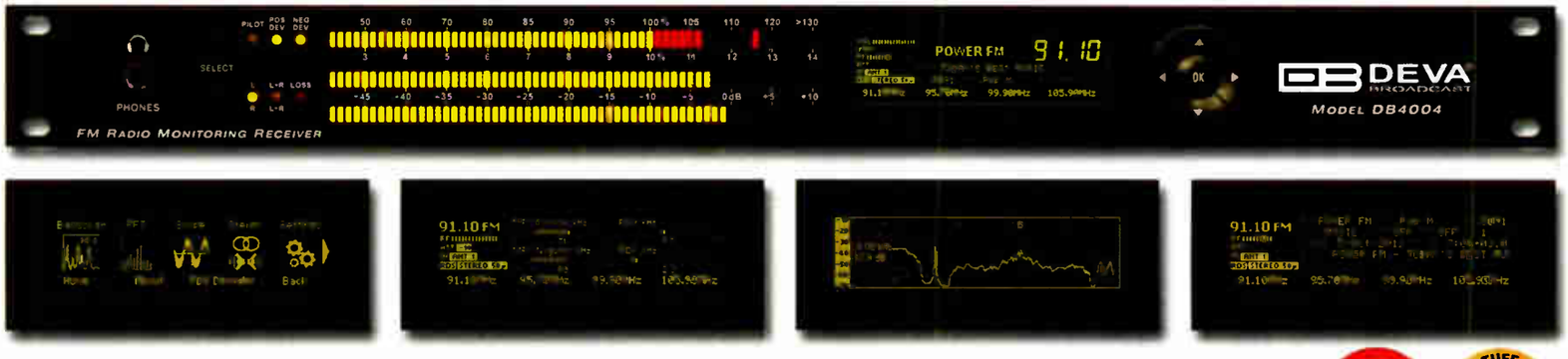

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FM TRANSLATORS

(continued from page 21)

lators. A non-fill-in FM translator cannot be owned by, or have any connection with, the licensee of the primary station.

The most significant technical distinction between a fill-in and a non-fill-in FM translator is the power and height limitations on non-fill-in translators. For a non-fill-in FM translator located east of the Mississippi River or in Zone 1, maximum effective power can be limited under FCC rules to as low as 10 watts with antenna heights of 141 meters HAAT and above.

Conversely, a fill-in translator does not have antenna height/power limitations. This lack of height/power limitations for fill-in translators results in many FM translators having significant coverage areas with antenna heights above average terrain in the hundreds or thousands of feet. For fill-in FM translators, the maximum effective radiated power can be 250 watts with no antenna height limitation.

Until several years ago when the FCC changed its rules and policies to allow FM translators to re-broadcast AM stations and HD sub-channels, fill-in FM translators were primarily used in more rugged terrain to enhance coverage to signal-shadowed areas. Now, the use of FM translators to enhance AM reception and provide HD sub-channel reception capability on non-HD radios is flourishing.

FM translator ownership is not subject to the FCC's full-service station numerical ownership limitations. Therefore, full-service broadcasters with full market complements of AM and FM stations may acquire as many fill-in FM translators as they may find, to re-broadcast as many HD sub-channels as may be available, whether or not owned by the licensee.

THE BENEFITS

Finally, it is worth noting that an FM translator offers an aspiring broadcaster a low-cost, low-regulatory-obligation way of delivering diverse programming to a small or medium market audience.

I have suggested to more than one aspiring broadcaster the possibility of acquiring an FM translator combined with the lease of an HD sub-channel serving as the primary station. While full-service FM stations command multi-million dollar prices in most markets, FM translators still are often traded for five figures. Pairing an FM translator with a leased HD sub-channel creates a new radio station that, while not having the vast coverage of a full-service station, is a credible entryway into broadcasting.

In Part 2, we will approach FM translators from the perspective of an FM translator licensee and in particular, the licensee of an in-contour fill-in FM translator station carrying either an AM station, or an HD sub-channel.

John F. Garziglia is a veteran radio and television attorney offering assistance in all areas of Federal Communications Commission law in the Washington, D.C., offices of Womble Carlyle. For other publications, see listings at www.linkedin.com/in/johngarziglia.

This first in a four-part series explores basic FCC regulatory aspects of FM translator stations. Part 2 will approach FM translators from the perspective of an FM translator licensee and, in particular, the licensee of an in-contour fill-in FM translator station carrying either an AM station or an HD sub-channel. Part 3 looks at challenges AM licensees may face in acquiring an FM translator, either in the marketplace or in the proposed AM-only FCC FM translator filing window. Part 4 considers issues that full-service stations may have with possible interference from FM translators.

Photo by Gary Cavell

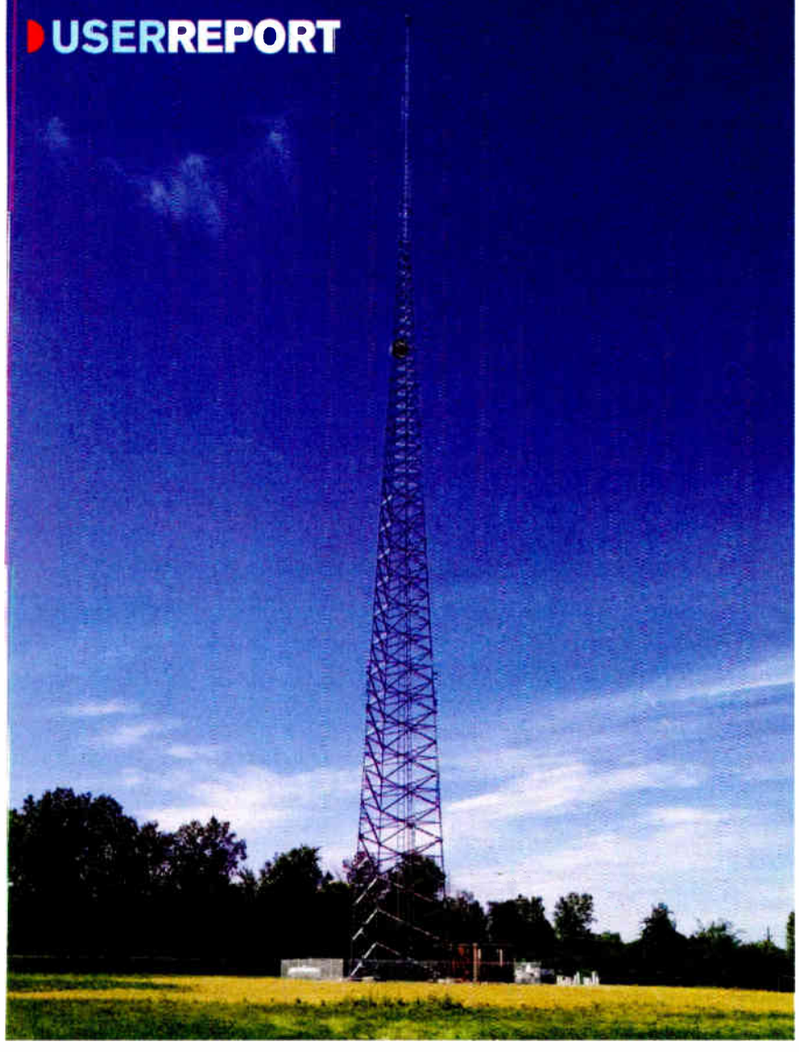
This photo shows equipment typically used at a fill-in FM translator site. From top to bottom: Belar FM Modulation Monitor; Bext Model LEX 100 FM Transmitter; Marti Model SR 20 Studio Transmitter Link Receiver; PTEK Model FM1S0ES FM Transmitter

World Radio History

WLDE Gets a New Tower

Old landfill proves no problem for ERI structure

USERREPORT



BY JAMIE TILL
Chief Engineer
WAJI/WLDE Radio

FORT WAYNE, IND. — Our company had been looking for several years at the opportunity to move our transmitter location to accommodate a power upgrade from 3 kW to 6 kW. After our last tower inspection, we were faced with the fact that our existing tower was nearing its end of life and would need major upgrades or replacement. We decided this was the opportunity to move.

SHOPPING

We secured new real estate and started the process for bids and permits. This would be a completely new site with new hardware and electronics from the ground up, including a 375-foot free-standing tower.

All the major players were contacted for quotes, and after hours of studying proposals and facing the middle-aged reality of reading glasses, I narrowed down my choices and selected ERI for the tower and antenna system.

ERI was not the cheapest tower bid received, but I have worked on many towers, and ERI structures have always seemed to age well. For example: no rusty scratches from thin galvanizing or bent cross members just because some 6-foot, 4-inch 245-pound tower maintenance guy stepped on it. Perhaps what impressed me most were the engineering specs included in the bid. The tower was engineered to exceed my specific needs, and the engineering showed a very comfortable margin of error. Many of the other bids contained some basic information but few showed much math. Several companies threw prepackaged towers at me and said, "This will do the job."

This is the first tower of any size for which I had direct influence over the purchase, although I had executed numerous projects in which others made the buying decisions. My experience coupled with the reputation of the company led me to select ERI. Additionally, I am blessed to work for a company that believes in doing things right the first time, so choosing long-term value is part of our corporate culture.

The antenna system was nothing tricky, as the pattern is omnidirectional. I selected an ERI four-bay Lynx antenna. It was competitive with others and again, ERI has a solid reputation.

Fast forward a few months, and I received an email from the engineer at the ERI test range presenting me with 14 options for fine tuning. I expected two or three. The attention to detail was impressive. They modeled the tower against the antenna and sent me the outputs, allowing me to fine tune the sweet spots.

We finalized the property purchase, permitting, federal filings, Indian Burial Ground studies, environmental studies, zoning and more federal filings. Finally, in February of 2014, I started ordering equipment. I was a little disappointed that ERI could not start the erection until after July 4 due to project backlogs.

CONSTRUCTION

Did I mention that we bought a landfill?

We purchased a section of an old closed landfill that had been closed and capped for roughly 40 years. Environmental boring revealed a 10-foot clay cap, on top of 10 feet of residential trash, on top of native clay. This meant that the top 20 feet of the foundation piers would be disregarded as having no friction value. Geotech showed the foundation piers needed to be 45 feet deep and 6 feet in diameter, which meant almost 300 tons of concrete would be used for a relatively small tower.

Between February and May we had driveways and fencing installed. The foundation crew arrived early in May. The reinforcement steel was assembled and the drilling began. I was told if they dug up a car or something it might cost extra. We all laughed at that … sort of. The foundation work went reasonably well, and seven days later we had nearly 175 yards of concrete in the ground.

At the beginning of July, the tower crew, contracted by ERI, arrived to receive and unload the tower steel, antenna, feed lines and lighting system from the factory. They did a complete inventory and sorted the parts into lots based on how they planned to assemble the tower. The crew was smaller than I expected, with two or three people onsite the entire time, and up to six when necessary. They assembled the individual 20-foot sections on the ground and laid them out in a big arc, cleverly planned for the swing radius of the crane.

Two weeks of ground work gave way to three days of stacking. The first 140 feet were stacked with a small crane and the remaining height lifted in a single day with the 450-foot crane. I was present for almost the entire stacking process. They stacked the tower sections with all of the bolts tightened on the ground, and

I would give ERI a solid A on the project.

I only heard them use a hammer once during the entire stacking process. This was obviously not their first goat rodeo. It took another five days to put up the feed lines, antennas and hardware, and to install the ground system. They were gracious enough to unload our precast building with their cranes, at no additional cost.

The ERI antenna tech arrived near the end of the process to tune the antenna. It took the tech and climbers about 3–4 hours to do a complete sweep and tune the antenna system. ERI emailed me a comprehensive report a few days later. I was pleased the next week when I turned up the new transmitter it showed only 1 W reflected from 3.3 kW output. The VSWR is 1.01 after tuning.

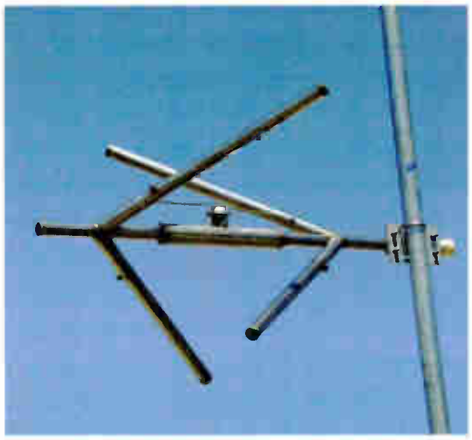
With all of the work completed, the tower crew departed with a plan to return in three days to complete some CAD welds. I took the opportunity to have a third-party inspection done on the tower. It was inspected and photographed from top to bottom, over 300 pictures, and a wrench put to at least 50 percent of the bolts. The report came back with one loose bolt and one missing lock washer, and the climbing pegs were out of sequence in one section. Everything was fixed the next day.

I would give ERI a solid A on the project. The final quote for the project was thorough. The cost overrun was $306, for the rental of a storage container and some generator fuel. ERI did what they said they were going to do, and they did it in a very professional manner.

For information, contact Joe Meleski at ERI in Indiana at (812) 925-6000 or visit www.eriinc.com.

World Radio History

TECHUPDATES



JAMPRO ANTENNAS' JCPB IS AN FM BROADBAND BROADCAST ANTENNA

Jampro says that its JCPB sidemount antenna is ideal for broadband and multifrequency applications. The JCPB is a broadband version of the well-known Jampro Penetrator antenna. As such, it has excellent VSWR and bandwidth characteristics.

Each bay consists of a Penetrator-style radiating element supported by a galvanized steel mounting bracket. Standard round leg mounting brackets for a uniform face tower are included. Silver-plated inner conductor connectors are used throughout for maximum contact life and minimum power loss, says Jampro.

The antenna has a power rating of 2.5kW for the JCPB-M unit, and 5kW for the JCPB-H.

For information, contact Jampro Antennas at (916) 383-1177 or visit www.jampro.com.

CFA LTD PROMOTES NEW MODEL

Crossed field antennas have been operating for at least 10 years outside of the United States. CFA Ltd. says it has built a new model in the U.S. that includes improvements. The company is seeking funding and hopes to secure permission from the FCC for future use in the United States.

Circuitry has been improved, making the antenna easier to tune. In addition, efficiency has been improved, making it comparable to standard λ/4 and λ/2 transmitting towers.

A crossed field antenna is generally no taller than 4 percent of a standard broadcast tower, thus eliminating lighting and guy wires. Its developers say it requires no ground system, meaning that it uses almost no land, and often can be installed on the roof of the transmitter building. It is broadband, allowing it to transmit an analog and a digital signal simultaneously. Skywave can be controlled to the point where it is almost nonexistent, meaning that many stations can broadcast with full power 24/7.

For information, contact CFA Ltd. in Connecticut at (860) 677-9688.

DCR-T IS THE NEWEST FROM DIELECTRIC

Antenna maker Dielectric says that the DCR-T antenna is an economical, low-power antenna that is the latest addition to the company's popular DCR series FM ring-style antennas.

The antenna kit contains all radiating elements jumpers and power dividers. It is available in one- to eight-bay configurations either full-wave or half wave spaced with a power rating of up to 4 kW. Each array is field-adjustable to any FM channel within 88–108 MHz band.

The antenna's elements are constructed of aluminum with a 7-16 DIN input. They are a mere 20 inches in diameter and weigh only 17.5 pounds each, according to the company. An integrated clamp mounting design simplifies easy installation on a variety of towers. The antenna arrays can have optional beam tilt and/or null fill. The antennas have a 1 5/8-inch EIA input.

For information, contact Dielectric in Maine at (856) 256-8190 or visit www.dielectric.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**.

PRODUCTS & SERVICES SHOWCASE

World Radio History

MYAT OFFERS ROHS-COMPLIANT SWITCHES

Myat says it has improved its line of coaxial switches by making them RoHS-compliant.

The company says that more broadcasters are looking for ways to "green" their operations and facilities, and the transmission plant is no exception. The smaller footprint and more efficient transmitters of today save space and money. Myat says the compact and lightweight designs of its switches aid broadcasters in making the most of reduced footprints in the transmitter room.

The company says that the radial port configuration makes "plumbing" them into a transmission system fast and efficient, often with fewer elbows than are required for "traditional" single-sided access switches. The Myat line of 3-1/8-inch, 1-5/8-inch, 7/8-inch and 7-16 DIN male and female switches are highlighted for their dependability, with low VSWR, high isolation and low insertion loss, according to the company.

RoHS refers to a directive regarding restriction of hazardous substances. Myat said the forward-thinking nature of RoHS compliance makes a transmission facility ready for whatever regulations or requirements the future may hold.

For information, contact Myat in New Jersey at (201) 684-0100 or visit www.myat.com.

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According to Sine Control, the PowerClamp line of transient voltage surge suppressor units has been improved with an updated design that improves performance and reliability.

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PowerClamp TVSS units employ a combination of technologies that react to both the amplitude and the rise time of line disturbances. Their automatic sine wave tracking maintains a very narrow threshold over which the clamping circuitry activates. Spikes and surges are attenuated without causing clipping or distortion of the AC sine wave.

Because PowerClamp units are installed in parallel with the incoming AC service, performance always remains constant under changing load conditions, the company says. There is no insertion loss; the transmitter will remain on the air even if the PowerClamp fuse blows.

PowerClamp TVSS units are available for single-phase and three-phase power. They're suitable for transmitter sites, studios, translators, computer rooms and other mission-critical installations.

For more information, contact Sine Control Technology in California at (562) 493-3589 or visit www.sinecontrol.com.

World Radio History

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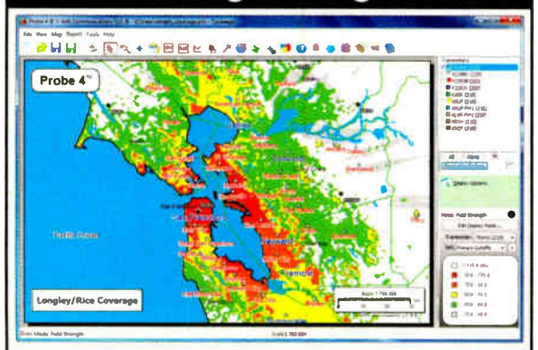

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Looking for KFRC signoff radio broadcast from 1930 Andy Potter, running time is 0:22 & also the KLX kitchen the program guest is Susanne Caygill, a discussion of women's affairs with a long promotion for Caygill's appearance at a local store. Anne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

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

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World Radio History

NABA Turns Up Radio Dial

Association adds focus to radio sector

COMMENTARY

BY MICHAEL MCEWEN

The author is director-general of the North American Broadcasters Association.

Radio has been slow to embrace the digital revolution, but it is upon us and now includes all the transitional issues that television faced and continues to deal with. The North American Broadcasters Association will help to define and facilitate the radio industry's transition to a truly multiplatform and interactive world.

NABA is a nonprofit association of broadcasting organizations in Canada, Mexico and the United States committed to advancing the interests of broadcasters both in North America and internationally.

As part of the World Broadcasting Unions, NABA works with our sister unions (e.g., European Broadcasting Union, Asian Broadcasting Union) to share information, identify common interests and reach consensus on issues and technology that cross borders and have international implications. Our membership is made up of both private and public networks, station groups and pay and specialty services, as well as those vendors who supply services to the North American broadcast community.

Michael McEwen

Since its founding in 1972, NABA has been principally focused on television issues and has participated in some historic changes in the industry, including the introduction of electronic news gathering and the transition from analog to digital HD television.

Despite this, many of our members also include radio operations or interests. Our membership is as follows, with an asterisk indicating radio interests):

Full Members: Bell Media*, CBC/Radio-Canada*, CBS Broadcasting Inc.*, DIRECTV, Inc., DisneyIABC Television Group*, Fox Entertainment Group Inc., Grupo Televisa S.A.*, NBC Universal, Time Warner Inc., TV Azteca S.A. de C.V.*, Univision Communications Inc.*

Associate Members: Emmis Communications*, National Association of Broadcasters*, NPR*, Public Broadcasting Service, Shaw Communications*

Affiliate Members: Ad-ID, Dolby Laboratories Inc., Ericsson Television Inc., Eutelsat America Corp., Evertz Microsystems, Harmonic Inc., HERE*, iBiquity Digital Corp.*, Inmarsat, Intelsat, Level 3, Numeris, SES, Via Sat Inc.

This group recognized that their technology and services operate in a tripartite radio market, a kind of North American Free Trade zone of broadcasting. To put it another way: If you are going to introduce HD Radio in the United States, you are not likely to have a different technology in Mexico or Canada.

Late in 2013, this core group of radio interests proposed to the NABA board of directors that a standing committee be formed to focus on radio.

The board agreed; and over the past year, the committee has developed its mandate and work plan. NABA added new members Univision, Bell Media, Emmis, Rogers, Mexican radio station groups and important suppliers like iBiquity and HERE, a Nokia company. As I write, we are also in discussions with other station groups and networks to broaden participation. It is only by being inclusive that we can serve the interests of radio and the markets they serve.

While to dwell on the mandate would take too much time, a few points are important to note.

Our primary goals are to share best practices, understanding the common interest in all three countries and reflecting their views to the regulators, suppliers, business interests, and as appropriate to international forums and institutions.

Further goals are to *focus* on how radio remains competitive, relevant and operational in a transitional environment from one traditional transmission service to multi-platform delivered audio product; where investments are costly to realize these new services, and as a result, legacy equipment and operations languish for lack of resources or attention.

It is only by being inclusive that we can serve the interests of radio and the markets they serve.

RESPONDING TO THE MANDATE

The committee, under the leadership of its Chair Julie McCambley (director, production services, CBC/Radio-Canada) and Vice-Chair Paul Brenner (senior vice president and CTO, Emmis), decided that an honest public discussion should be in order to ensure that the committee was dealing with the right agenda and that the North American radio community would buy into that agenda.

The result was the announcement of a Future of Radio & Audio Symposium. This will be a part of NABA's Annual General Meeting Event hosted by CBC/Radio Canada from Feb. 17–19, 2015.

(continued on page 30)

FUTURE OF RADIO & AUDIO SYMPOSIUM

Feb. 17–19, 2015

Remarks and Keynotes Include:

- Jeff Smulyan, CEO, Emmis
- Chris Boyce, Executive Director, Radio & Audio, English Services, CBC/Radio-Canada
- Paul Brenner, SVP, Chief Technology Officer, Emmis Communications and Vice-Chair, NABA-RC

Session 1: Future of Delivery — A Roundtable
(Moderated by Marty Garrison CTO, NPR)

- Confirmed panelists from CBC/Radio-Canada, Emmis, TuneIn, Global Radio UK

Session 2: Digital Radio: Where It's at and How It Fits Into a Broadband World
(Moderated by David Layer, Senior Director, Advanced Engineering, NAB)

- Confirmed panelists from CBC/Radio-Canada, HERE, iBiquity.

Session 3: Radio as a First Responder: The Importance of Radio in Emergency Situations
(Moderated by Kym Geddes, News Director, Newstalk 1010 Toronto)

- Confirmed panelists from CRTC, Pelmorex, NAB, Ontario Paramedic Association, etc.

Session 4: "Local" — Radio's Competitive Advantage
(Moderated by Paul Ski, President, Rogers Radio)

- Confirmed panelists from AccuRadio, CRTC and Edison Research.

Session S: Revitalizing the AM Band — Keynote and Panel
(Moderated by Karl Lahm, Director of Radio Frequency, Univision Communications)

- Panelists include Garrison C. Cavell and (invited) FCC Chair Ajit Pai.

Session 6: The Next Generation of the Auto Dashboard and What It Means for Radio
(Moderated by Julie McCambley, Director Radio Production CBC/Radio Canada)

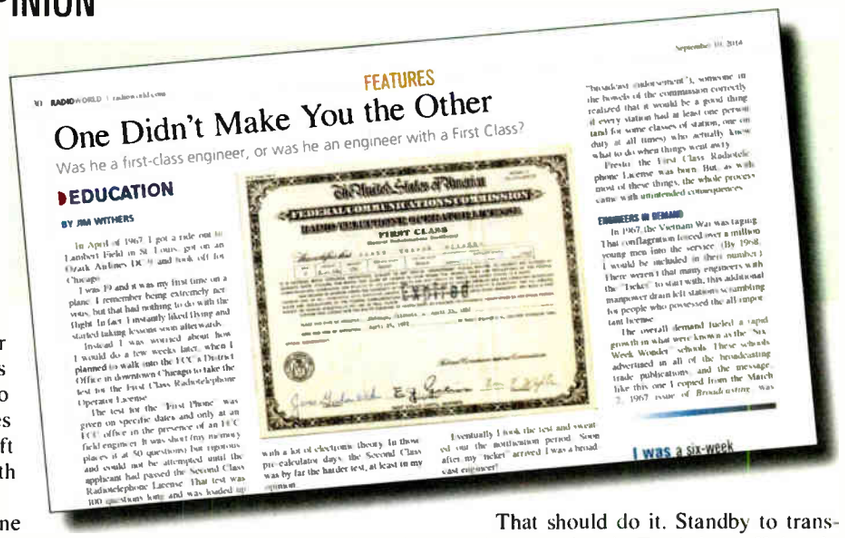
- Potential panelists from Strategy Analytics, GM, iBiquity and Pandora

World Radio History

READER'SFORUM

SIX-WEEK WONDERS

Letters under this heading were written in response to Jim Withers' article in the Sept. 10 issue "One Didn't Make You the Other" about taking the test for the First Class Radiotelephone Operator License.



FEATURES

One Didn't Make You the Other

Was he a first-class engineer, or was he an engineer with a First Class?

EDUCATION

BY JIM WITHERS

I was a six-week

I had my FCC First Class while still in college; I took it into the Navy with me.

As a Navy pilot, my call sign was "Marconi," for "all that radio knowledge." But when they put the aircraft carrier into dry dock for an 18-month overhaul, there just weren't a whole lot of submarines to be worried about finding from the Anti-Submarine Warfare Center. While we all had other duties assigned, my workload was completed before the end of every day.

A chance encounter at the county fair with the local AM broadcaster and suddenly I found myself being recommended as the new contract chief engineer at KITZ(AM) in Bremerton, Wash. Navy-first, understood; but, at $25 an hour in 1989 for a part-time job of personal fun, why not?

My immediate chore was to prioritize station deficiencies. First among them was the safety-of-life issue of hard wiring around the AC mains input fuses to the backup transmitter. There was a wall-mounted industrial switch box, but no AC circuit breakers from the mains! "Nobody touches this transmitter until it is repaired," I instructed.

Arnal Cook is at the far right wearing a flight suit. As a Navy helicopter pilot, he says he was allowed the beard at the time.

Before I got there, a contract tech (inspector/builder) had identified this same issue as #1; other matches with my list cemented my hiring without much of an interview. The wiring was quickly and easily corrected and new fuses installed. Replacement fuses were taped just above those fuse holders, and other spares loaded into the parts drawers. An insulated fuse removal pry bar, with notch filed in one end, was also taped with the replacement fuses inside the backup transmitter's door. One night's use to verify it all still worked (process to turn on, frequency check, audio levels and modulation checks). A few other fixes and all was good to go for my time as CHENG.

Simple "0.1 hour of work" every morning driving in to the ship-in-dry-dock by tuning up KITZ and checking 1) transmitter and programming was still on the air, 2) audio quality, and sometimes 3) day/night power shift when it coincided with the 0600 drive time.

Sure enough, one windy pre-dawn winter drive was met with station silence/static.

Dropping 25 cents into a pier phone booth (before cell phones) to call the DJ. "Do you know you are off the air?"

"No, man, I'm on the air just fine."

"Is your console switch in monitor or off-air?" (I should have hard-wired that switch to off-air!) Silence. Then more silence when he moved it to, obviously, off-air. I walked him through the backup transmitter activation, warmup, antenna switch and audio switch-over. I had him back on the air and still made Navy morning muster in time.

It would be the windy afternoon before I could get there for the checks and repairs. While my head and shoulders were deep inside the commercial transmitter for repairs, the station general manager was giving a tour to a local government official, giving the standard values we provided to then and the county, values in an emergency, then — click!, boom! — the lights flashed brighter, dimmer, then back on and then, the backup transmitter went hard off the air.

The windstorm outside had caused a mains phase imbalance and several circuit breakers and fuses popped. Now we were double-off the air, main and backup transmitters. The lights quickly settled down to normal.

Backup transmitter door open. All lights off, indicating those main's fuses had blown. Step to the wall box, switch off. VOM set to 250 VAC, no voltage before or after the fuses (any high-voltage caps holding a charge on the other side?). Ohm meter showed two open cartridge fuses on the 240 V input. Chicken stick applied, just in case. Plastic tool right there to pop out the fuses. VOM to 250 VAC to confirm no voltage. (Electronics is fun, but *electricity* scares the living bejesus out of me! Respectfully.) Fuses taken off the panel, packages unceremoniously ripped open, inserted into the cold ends, notched side of the insulated tool to push into the hot side. VOM check — first voltage, then for 0 ohms — checked good. Transmitter switch to standby, AC wall box switched on.

Backup transmitter glows. Check the antenna switch still to "backup." Hmmmm, 30 seconds to warm up? That should do it. Standby to transmit, and we are back on the air. Total time off the air, only about 3 minutes, including the warm-up!

Station manager gives me a wink, a nod and a veteran's salute. I taped two new cartridge fuses inside the backup transmitter door to replace what I had used, and the tool. Closed the door.

Now, back to that pesky main transmitter. Found its problem, repaired with parts on hand. Back to the main transmitter, and to normal.

Station manager called me into his office. "I've never given a raise for less time before, but it seems warranted. Just 3 minutes off the air? I wouldn't have believed it if I didn't see it all myself. More importantly, our [local government] guest commented on how well we managed our down time and how quickly we got back on the air. I'm sure we will continue to get their support."

Sometimes, being prepared works out just right.

Arnal Cook
Antenna Test Engineer
Marysville, Ohio

In 1972, I was hired to be chief engineer and build an FM in upstate New York, so off I went to Brown Institute in Minneapolis. I learned a bit, actually, and took the test for First and Radar Endorsement. While there I worked as night manager for Arby's on West Lake Drive. Being in Minneapolis in the summer was great.

Even greater was heading back to New York ready to be a chief engineer.

Timothy Braddock
Assistant Chief Engineer
Emmis Communications
New York

I had gotten my Third Class in 1976 and went to St. Louis in August 1977 to take the test just to see what it was like and managed to walk out with a Second Class, missing the First by four TV-related questions I knew absolutely nothing about.

Studied up on that and got the First in Chicago in January '78.

Mark Mueller
Mueller Broadcast Design
La Grange, Ill.

More "First Phone" memories on page 30.

World Radio History

READER'SFORUM

MORE FIRST PHONE

I got my Second in 1965, followed by the First in 1978, but not through a six-week wonder course. Independent study and three years as an Air Force electronics instructor helped. I still didn't really know what it took to become a real engineer but have had the chance to learn over the years.

Now, at 70, I'm the chief engineer for the eight Lotus stations in Las Vegas, chapter chair and certification chair for SBE Chapter 128 in Las Vegas. I hold a Life certification as a Certified Professional Broadcast Engineer from the SBE where I am a senior member. It also helped me get my Amateur Extra.

That First phone was the ticket (pun intended) that let me move up in radio. Mine never expired, but was replaced by the lifetime General in 1985.

The First hangs in the frame behind it on my wall. Thanks for the memories.

Bill Croghan, CPBE WBØKSW
Chief Engineer
Lotus Broadcasting
Las Vegas

I remember the First Phone vividly. I passed my test when I was 16 or 17 years old in 1959 after taking a correspondence course from the old Grantham School of Radio. My first job was in a one-horse station in Texas where I had to do all the switching, projection, etc. and log the AM, FM and TV transmitters as well!

WRITE TO RW

SEND A LETTER TO THE EDITOR:
Email **radioworld@nbmedia.com** with "Letter to the Editor" in the subject field. Please include the issue date.

In those days, we were always having to fix something... almost everything had tubes; transistors were newfangled. We were constantly sweating it, hoping nothing would go wrong at an inopportune moment. Nowadays, if something goes wrong with a piece of equipment, my impression is that they just throw it out. This was well before local stations had videotape so everything was live or film. I helped install an RCA VTR, serial number 00002, in

Things were always hectic in the control room in the local stations.

1961. It was five racks of equipment six feet tall. I went on to get a BSEE and did some summer work for KRLD(TV) in Dallas and with CBS News in Houston covering space shots in the mid-'60s.

Things were always hectic in the control room in the local stations. I remember one night I was working with a soldering iron on a vidicon camera, and I accidentally blew the fuse on the film chain right before the station break! So the film projectors went down along with the slides, and we missed the entire break. We went to black for the entire time until we rejoined the network. The manager called up, and of course, was furious. I told him what happened but I'm not sure he believed me. I think he thought we had all gone to sleep in the control room. Boy, was I embarrassed. But things like that were not uncommon 50 or 60 years ago.

I remember the license wall, too. At my first station, there were only four of us, including the chief engineer, who was about 24 years old and a genius. Now I guess you don't have to know anything to run a broadcast station. But we had more fun! Best job I ever had.

Morris S. Arnold
Little Rock, Ark.

NABA

(continued from page 28)

with the symposium held on the 19th at the CBC's Glenn Gould Studio, 250 Front Street West in downtown Toronto.

In many ways, the symposium agenda has (and will) become the ongoing agenda for the Radio Committee too, and will mark the genesis for greater industry consensus on the issues and milestones for deliverables over the next few years. See the sidebar (page 28) for symposium sessions.

These issues are front and center to a successful transition from analog radio to an interactive multiplatform set of services. They require both detailed business planning and regulatory support, and they will define the radio discussion for the next few years at least.

The event is open to NABA members and non-members alike. Our interest is to create a forum for dialogue, leading to positive action in order to maintain radio as a core value for listeners throughout the broad North American market.

We hope those in radio and those who support radio with services will join us Feb. 19 in Toronto and make this first North American Symposium a defining moment in radio history.

If you would like to know more about NABA, its standing committees including the Radio Committee, and the Symposium agenda, please contact Senior Coordinator Jason Paris at *jparis@nabanet.com*. To register for the Symposium, visit *http://tinyurl.com/mmfx5wq* and use keyword "Transmissions2015."

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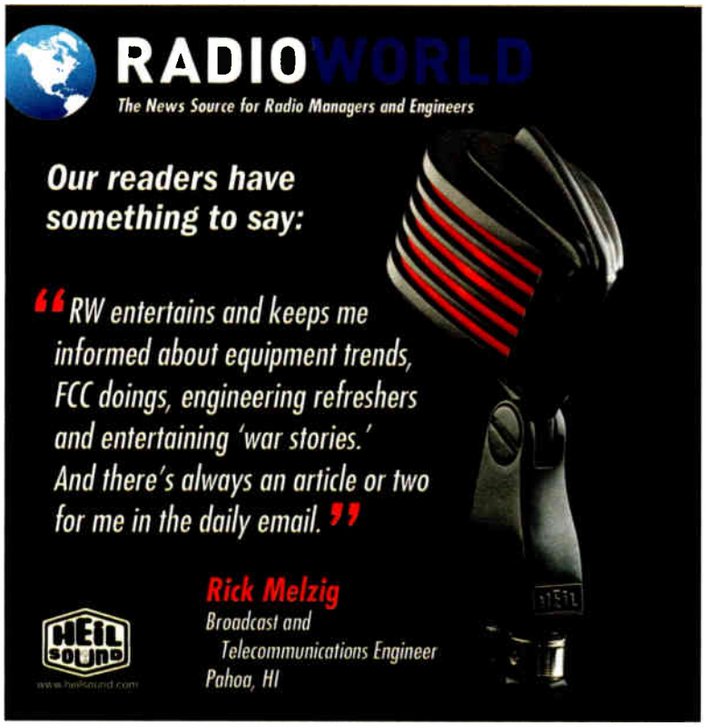

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