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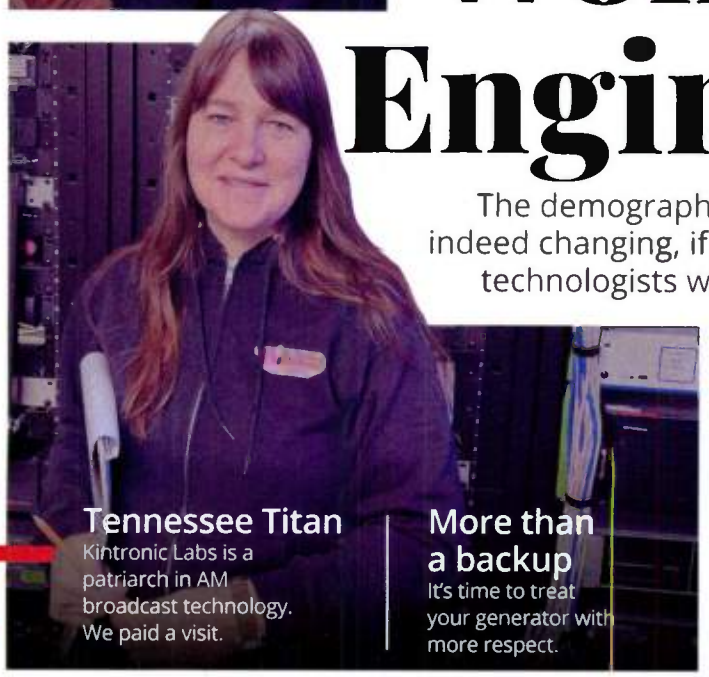
Women in Engineering

The demographics of the profession are indeed changing, if slowly. Meet five broadcast technologists who are helping it evolve.



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Make rooms, make rooms!

Learn about some of radio's latest new studios

Paul McLane
Editor in Chief

I very much look forward each year to putting together your free Radio World ebook about interesting studio projects. Who doesn't love flipping through pictures of new radio studios?

When we launched the first one several years ago, I planned it as a series but worried that I might not have enough stories to share with you. Turns out that's not a problem. Over the course of each 12 months I learn about more notable buildouts than I can possibly report, with information coming to me from engineers, stations and groups, as well as integrators and product manufacturers.

More recently I've wondered if my pipeline might dry up because of the larger infrastructure trends that we've also reported on: the elimination of the main studio rule, changes wrought by Covid, the boom in hybrid and remote arrangements, the growth of the cloud and the downsizing of physical facilities by cost-conscious radio corporations.

Inarguably those forces have brought changes; you can spot their impact in the new ebook.

But I still find no shortage of interesting buildouts to share with you, such as these:

All Classical Radio KQAC(FM) has settled into its new home in Portland, Ore., on the third floor of the historic KOIN Tower.

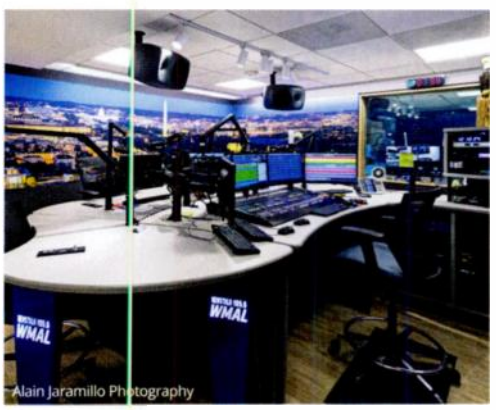
Audacy's KNX News 97.1 and 1070 recently unveiled its new Studio One and newsroom, joining sibling stations on the second floor of its Wilshire Boulevard studios on Los Angeles' Miracle Mile.

Motor Racing Network moved into a 58,000-square-foot multimedia production facility in Concord, N.C.

A new SiriusXM Studio at the Wynn Las Vegas is serving music, sports and talk to listeners across North America.

Chicago Public Media, Educational Media Foundation, Royal FM in Rwanda and RTM in Malaysia all have recent projects of interest.

And shown below is the main studio of Cumulus Media station WMAL, which also is the origination studio for the syndicated "Chris Plante Show."



Alain Jaramillo Photography

Cumulus upgraded its Washington-area offices and studios with a complex "in-place" remodel on the fourth floor of an office building in the Friendship Heights neighborhood.

I hope you'll check out "Amazing Radio Studios 2025" at *http://radioworld.com/ebooks.*

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On the cover
Clockwise from upper left: Shayna Sengstock (with Jonathan DeSousa), Maria Laing (with Lucretia Lee-Arceneaux and Lou Taylor), Jade He, Amanda Hopp, Megan Amoss.

Station Totals


Cavan Images/Getty Images

The number of FM noncom educational stations in the United States is at an all-time high; and for the first time, they outnumber AM stations.

The FCC released its year-end tally. The category of FM educational stations has generally grown for decades, but it jumped by 191 last year and by 270 over the past two years. A filing window for new NCE stations was held in 2021. There are now 4,477 NCE FMs, more than twice as many as at the turn of the 21st century.

What about commercial FMs? At the end of 2024 there were 6,625 of them, down by 38 in a year and down by 61 over two years.

The number of FM translators and boosters is at 8,880, down by 47 licensees in one year and down by 70 in two years. Prior to that, translators had flourished consistently for many years. Now we can expect to see booster numbers go up, if geotargeting finds interest among FM broadcasters.

The number of LPFMs is virtually unchanged from a year earlier, at 1,968. It should grow as the results of the 2023 filing window kick in.

And as of Dec. 31, there were 4,383 AM stations, 61 fewer than a year earlier and about 100 down from two years ago. The category continues to decline, slowly, year by year.

To see a chart showing the trends over 15 years, go to *https://tinyurl.com/rw-station-count* and scroll to the bottom of the page.

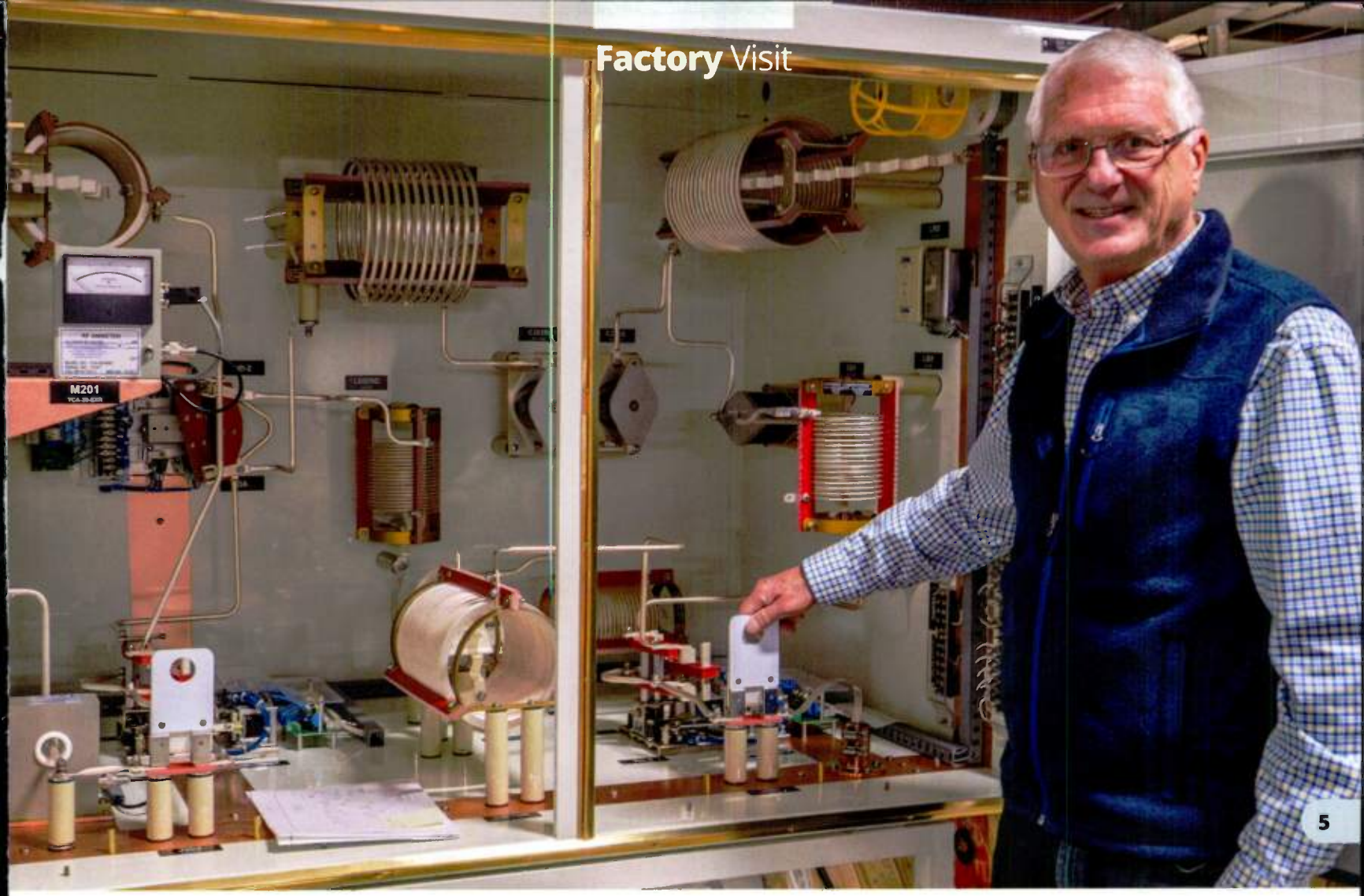
Amateur Radio Fine

A ham operator in Idaho must pay a record $34,000 penalty for causing interference with communications during a fire suppression effort.

The FCC ruled in the case of Jason Frawley, WA7CQ. The case involved radio communications of the U.S. Forest Service, which was attempting to direct operations of fire suppression aircraft working a 1,000-acre fire on national forest land near Elk River, Idaho, in 2021.

Frawley acknowledged that he had operated on a frequency without authorization but argued that he did not interfere with government communications. He said the duration of transmissions was less than one minute and that he had only been trying to help and that he could not afford the fine. He asked for a cancellation or reduction but the commission rejected the appeal.

The FCC took 2-1/2 years to move from a notice of apparent liability to finalizing the fine.



Writer

Mark Persons
CPBE, CBNT, AMD

The author wrote about applications of Ohm's Law in a recent issue.

Medium-wave and high-quality, on the outskirts of Bristol

We paid a visit to the factory of Kintronic Labs

A 2024 road trip took Paula and me to east Tennessee. Nestled in the rolling hills, we found Bluff City, next door to Bristol, which straddles two states and is considered by many to be the birthplace of country music.

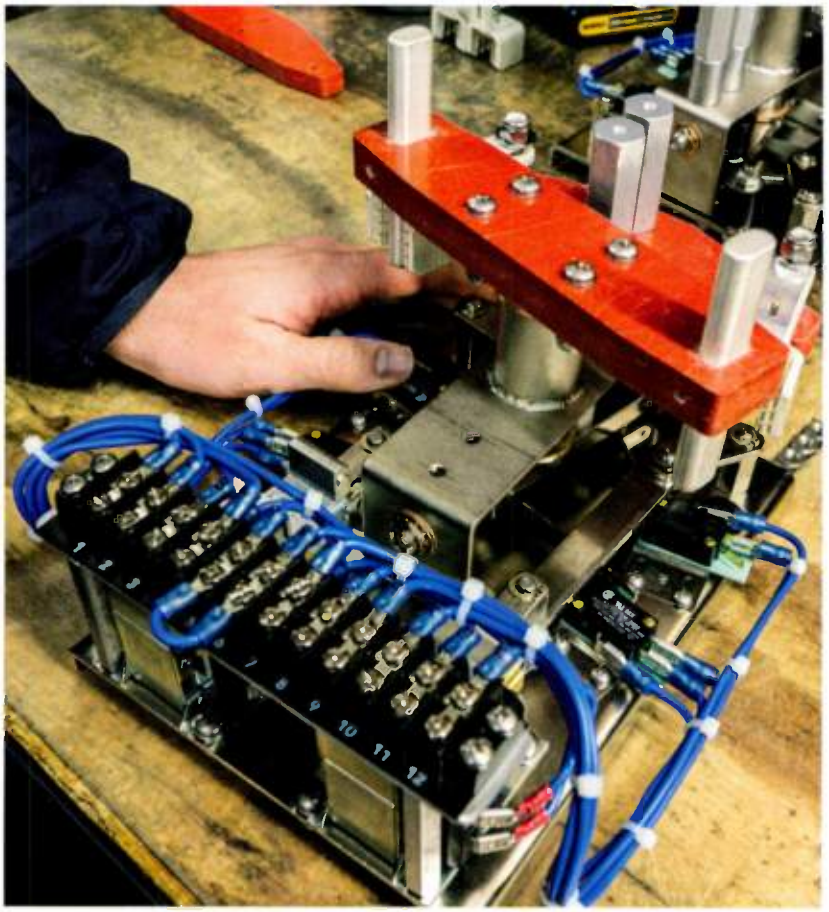
This is also the home of Kintronic Labs, the industry's oldest AM systems provider. It also provides products for other RF applications including FM, TV and STLs.

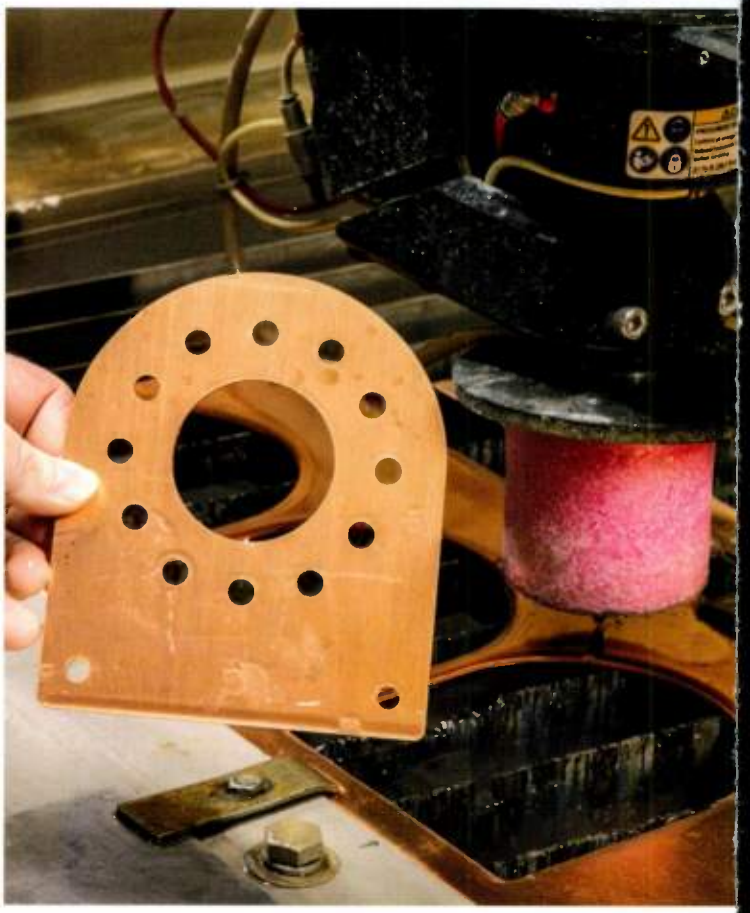
KTL is an ISO 9001 company. Its 30 employees are craftsmen in the trade of building RF hardware in its 54,000-square-foot facility.

Many AM stations have one or more KTL products. Probably the most common are their contactors for switching up to 200 amperes of RF, as shown in Fig. 1 on the next page. To help engineers everywhere, there is an instructional video on the company website showing how to field repair and adjust a contactor. The website is *www.kintronic.com/*.

Back in the 1970s, KTL designed wire-wound dummy load resistors with very little inductance. Dummy loads are a segment of its business, which netted a contract to build equipment for the U.S. government High-frequency Active Auroral Research Program (HAARP) in Alaska. They were

Above
Mark Persons with a two-pattern antenna coupling network.





installed in 2007 and none have failed despite that harsh environment.

KTL builds parts that you just can't find on the shelf elsewhere. It takes tools to make all of this happen.

In Fig. 2, Mike Kistner uses computer-aided design to cut metal with a 55K psi waterjet. In this case, it was a copper mounting bracket for a vacuum variable capacitor, shown in Fig. 3. The part was later silver-plated to provide corrosion protection and good electrical conductivity.

AM phasing systems for directional antennas have been their main stay for many years. It all comes together when a customer request comes in. That is where Senior Staff Engineer Bobby Cox fits into the equation, designing RF circuitry to create an FCC-required signal pattern for an AM directional antenna. He has been doing that since 1994 and holds a Ph.D. in electrical engineering.

Above
Fig. 1: RFC-40-20 RF contactor before final assembly.

Above right
Fig. 2: Mike Kistner at computer-aided metal cutting.

Right
Fig. 3: Part formed by a waterjet.

> **"It was a pleasure to visit Kintronic and see its craftsmen at work, reliably creating equipment for the radio broadcast industry for 75 years and counting."**

No two phasor systems are alike. Each one is designed for the job at hand. Mike Burton takes a schematic diagram

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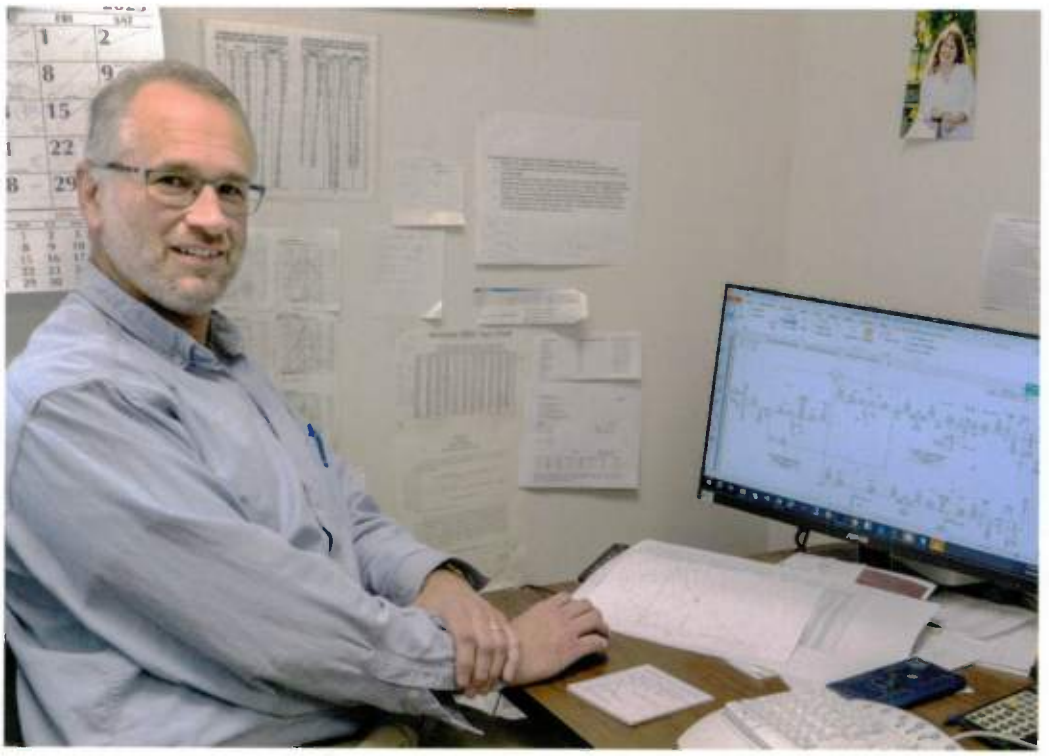
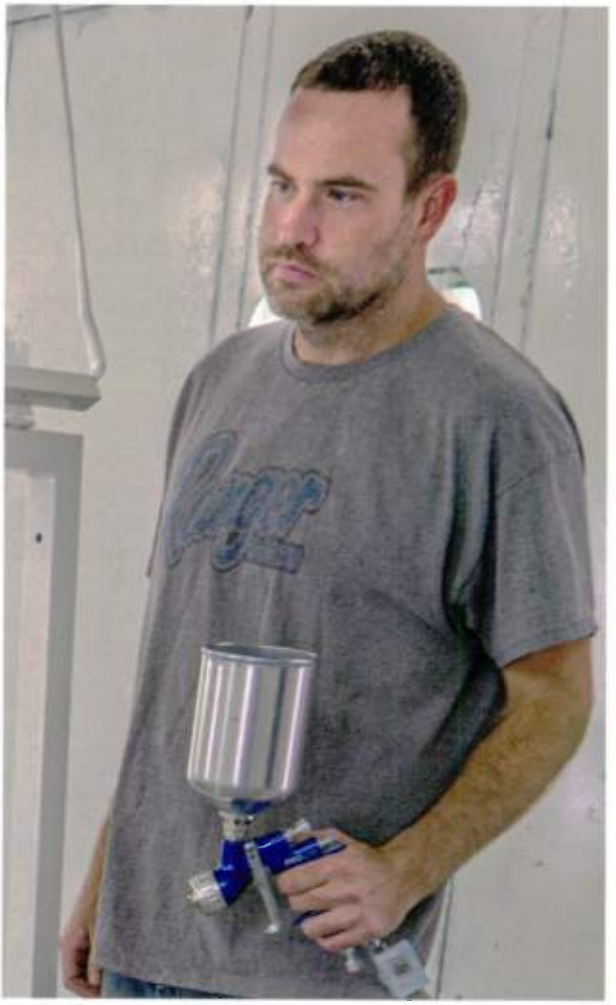
from Cox and creates a layout, putting mounting holes in a bare aluminum phasor cabinet. Then the cabinet parts are sent to the paint bay (below right) before they are populated with components.

Joshua King, BSEE, has been president and CEO of KTL since 2018. His grandfather Louis King founded the company in 1949, and Joshua carries on the tradition of honesty and integrity for which the family-owned company is known. On page 10 he demonstrates a phasor that was built for a station in California.

(Joshua's father Tom King, the longtime president and now a consultant, was away on a mission trip to 4VEH radio in Haiti. He was repairing a Harris DX-10 AM broadcast transmitter to bring the gospel station up from half to full power and adjusted the directional antenna system — Christian mission work to help others.)

Senior Staff Engineer Jim Moser, BSEE and MSEE, joined Kintronic in 1995. He created custom in-house software for





Above
Fig. 4: Senior Staff Engineer Bobby Cox

Below left
Fig. 5: Mike Burton next to a phasor he created.

Below right
Fig. 6: Philip Whisenhunt in the paint bay.

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Right
Fig. 7: President/ CEO Joshua King with a new AM phasor.

Below left
Fig. 8: Senior Staff Engineer Jim Moser

Below right
Fig. 9: A high-powered AM network.

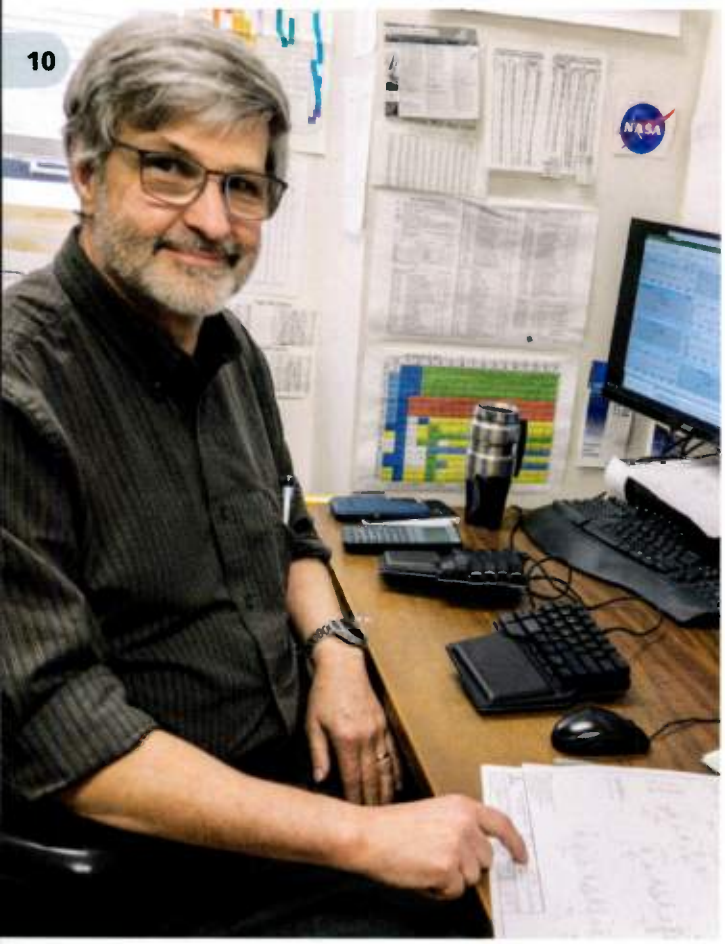
analysis and design of antenna systems. Moser is also a project manager for domestic and international projects.

The list of creating solutions to problems continues. Networks to combine multiple AM stations into single or multiple towers have been a growing part of their business. Fig. 9 shows preliminary work on a high-power network. The company also makes make isocouplers to get FM and STL signals across the bases of hot AM towers.

Oh, and in the photo at the beginning of this article, I'm inspecting the impressive workmanship in an AM antenna coupling unit. (I recall that back in 1977, I needed equipment from KTL and called the company. I found it a bit difficult to place the order by phone because of the difference in accents between Tennessee and Minnesota. To avoid errors, the best plan was to send my orders by fax!)

It was a pleasure to visit Kintronic and see its craftsmen at work, creating equipment for the radio broadcast industry.

Mark Persons, WØMH is an SBE Life Member, CPBE, CBNT, AMD. He is retired after more than 60 years in radio broadcast engineering, including 44 years in business. He started by turning the dials of broadcast transmitters at age 11 and stays active by mentoring four radio broadcast engineers. His website is www.mwpersons.com.



John Bisset
CPBE
The author is in his 34th year of writing Workbench. He handles western U.S. radio sales for the Telos Alliance and is a past recipient of the SBE's Educator of the Year Award. .

Tips Please
Workbench submissions are encouraged and qualify for SBE recertification credit. Email *johnpbisset@gmail.com*.

Authorization Checklist

1. Main Station authorization (license)
2. Translator authorization (if applicable)
3. Renewal authorization
4. IBOC Notification (if applicable)
5. Equipment Performance Measurements
6. Documentation to determine how FM and TV TPO are determined
7. Antenna Structure Registration (ASR)
8. STL, TSL, RPU, satellite authorizations (if applicable)
9. ABIP certification (if applicable)
10. Chief Operator documentation

Are you authorized?

Keep these 10 documents handy in your "Authorizations Notebook"

We may talk about New Year resolutions, but by early February many of those are probably forgotten! Let's try to stick to ours, particularly if they involve maintaining AM and FM facilities in 2025.

This is a great time to begin your first quarterly tower inspection of the year. And if you are responsible for an AM, remember that you'll need to take an annual occupied bandwidth measurement. Yes, you have 14 months from the prior measurement, but why not get it out of the way?

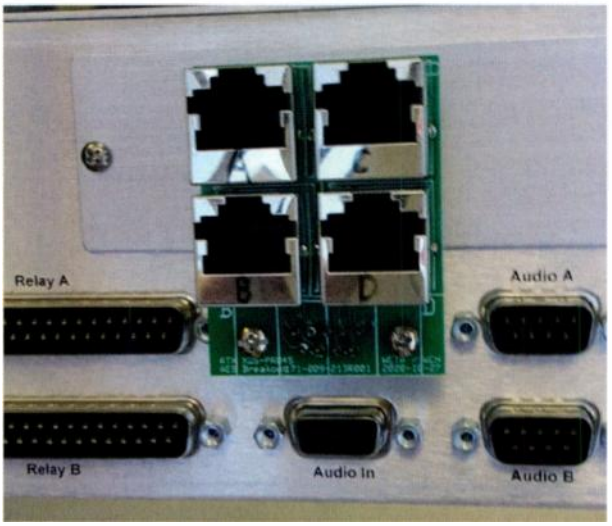
On a related note, Larry Wilkins of the Alabama Broadcasters Association recommends that you keep an Authorization Notebook. In a recent edition of his "Monday Morning Coffee and Technical Notes" email, Larry says a notebook will help you ensure that your authorizations are in place and current. He suggests that you keep on file at least the 10 items listed in the image above.

Larry's weekly email is a must for engineers, free for the asking. Drop a note to *Lwilkins@al-ba.com*, and let him know you read about it in Workbench.

Cardboard to the rescue

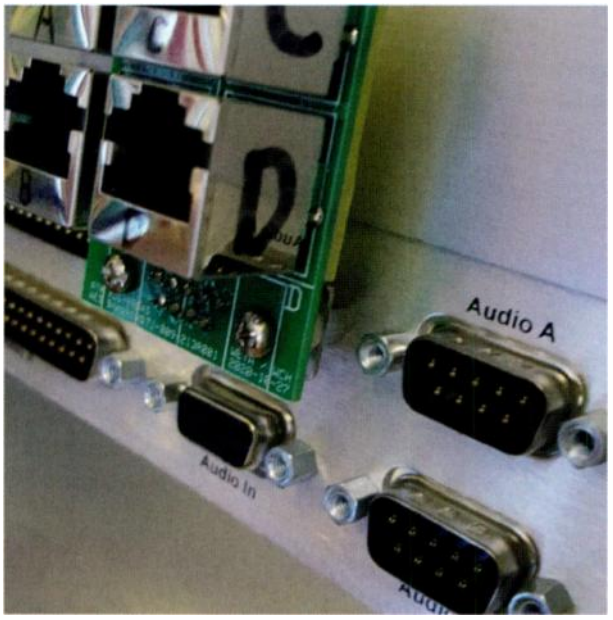
After reading our column in December about items to keep at your transmitter site, Dick Abraham, news editor for SBE Chapter 3, wrote to add one.

He suggests you keep a couple of large corrugated cardboard boxes on hand. These are easy to store flat, out of the way, against a wall, but will come in handy



Top right
This adapter converts the DB9 audio to RJ45 jacks.

Bottom right
Four ports are provided, and the assembly screws onto the satellite receiver.



during winter transmitter site visits to provide "insulation" when you need to stand on a cold concrete slab for any length of time.

One box works well, but two will really make a difference in keeping your feet warm. And if you are stranded on a cold night, they beat sleeping on the concrete floor.

Dick started his career in 1960 at KARD(TV), which eventually merged into the Kansas State Network. Though he retired in 2002 with 42-1/2 years of service, Dick still edits and publishes the local chapter newsletter.

Watch that first step

As "snow fronts" blanketed much of the nation in the last couple of months, veteran engineer Bill Ruck wrote in to say that he has limited cold weather experience. Snow in San Francisco? Very rare.

Yet he learned a lot about cold and snow at 9,000 feet while working with officials in Humboldt County, Nev.

> **"One box works well, but two will really make a difference in keeping your feet warm. And if you are stranded on a cold night, they beat sleeping on the concrete floor."**

Although their doors have cylinders for keys, access is controlled by cards and keypads that electrically unlock the door. With no key, there's no lock to freeze. Bill did add anti-tampering covers to reduce the buildup of blown snow.

Bill and his team also learned that the concrete stoop had to extend well past the door. One of the directors stepped off the stoop and into feet of snow! Bill adds that they changed from poured concrete stoops to a steel-grate stoop. The steel grate provided more traction.

Free COVID test kits

Frequent contributor Frank Hertel reminds us that every U.S. household is eligible to receive four COVID test kits at no charge, courtesy of the federal government and us taxpayers. You simply fill out the form and the kits will be mailed to you. Visit *https://covidtests.gov/*.

Make a connection

William Harrison is chief engineer at WETA(FM) in Washington, D.C. He works with XDS satellite receivers and likes to break out the audio connections to a small printed circuit board, as seen in the accompanying images.

William designed and built the board to convert the DB9 connector to four RJ45 connectors. Using 4-40 screws, the breakout board can be secured to the rear of the satellite receiver. The cost to build adapters for two ATX receivers is about $70.

Want to do the same? He shared his PCB file with us. Just drop an email to *radioworld@futurenet.com* with "Please send me Harrison's PCB file" in the subject line, and Radio World will email them to you.

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INOVONICS BROADCAST

Amoss flourishes at Baltimore Public Media

Now the chief of four FMs, she says the rewards of broadcast engineering are "awesome"

Writer

Elle Kehres

The author is assistant editor of Radio World.

This is one in a series of occasional articles about women in radio engineering.

It's safe to say that not every little kid grew up dreaming about being in radio, much less as an engineer. But, for those of us who serendipitously stumbled upon the world of radio a bit later in life, it didn't take much longer to fall in love with the profession.

Megan Amoss is chief engineer for Baltimore Public Media, which includes FM stations WTMD, WYPR, WYPF and WYPO. She has been in the business about 12 years, having started her radio career in 2012 fresh out of college.

While finishing a second bachelor's degree in fine art at Towson University in Maryland, Amoss noticed that university-licensed station WTMD was looking for a traffic coordinator.

"I applied and I was hired," said Amoss. "I didn't know a thing about radio. But I loved it. Radio has the right combination of creativity and technology, a fascinating history and a real-time aspect that makes it exciting. I knew I had found the industry I wanted to work in."

Right
Megan Amoss

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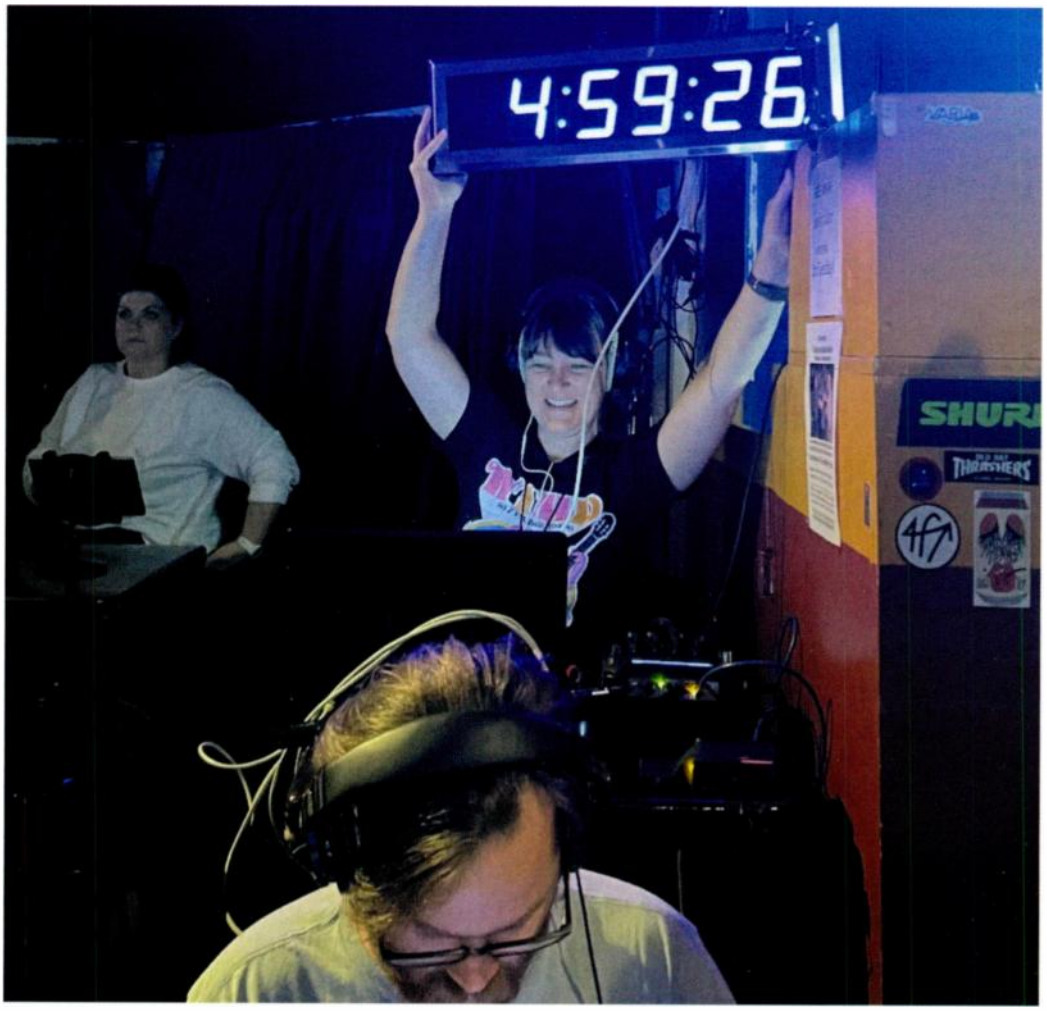
Over the next couple of years, WTMD moved from the basement of the university's media center into a large facility a mile away from campus.

"I was there for the move and conversion of systems. We changed the traffic system, music scheduler, automation — everything. I turned out to be really good at getting all those systems to talk to each other, and they changed my job so that I could do the technical work officially," she said.

"I was lucky that whenever Ed Bukont of E2 Technical Services, our contract engineer, was in town, he let me look over his shoulder. I learned a ton that way, and by reading all the manuals."

In 2018, Amoss took over responsibility for all the engineering aspects of the station. And when WYPR bought WTMD in 2021, she was hired by WYPR as assistant chief engineer, working under WYPR Chief Engineer Ray Hepner.

"I remember in the interview Ray asked me if I could solder and I had to say no ... WTMD was all structured wiring and StudioHub, so I went home that night and learned how."



Above
Amoss holds a large network time clock at a WTMD live remote broadcast for Public Radio Music Day, distributed live by PRSS.

Right
A photo of the completed studio project. "We reused equipment from WTMD to overhaul Baltimore Public Media's studios at WYPR's building when the two stations merged," said Amoss.

Merging sister stations

Since those initial days at WYPR, Amoss has added plenty more skills to her engineering toolbelt, with her years of experience at WTMD coming in handy.

"We are currently in the middle of fully integrating WTMD and WYPR," said Amoss. "This past spring and summer we moved WTMD to WYPR's building. It was my job to design and plan the new AoIP network — building in capacity to integrate WYPR later on — and the rack layouts."

With WTMD now settled in, Amoss and her team have been converting WYPR's studios and air chain from a legacy system using serial communication and a lot of analog wiring to WTMD's Axia AoIP system, mostly reusing WTMD's equipment from the Towson studios. As of January 2025, the first control room/studio pair had been completed.

"I am doing all of the systems design and planning for that project," she said. "A lot of wire is coming out of there and only a little is going back in."

Amoss said WYPR needed a couple of small, temporary studios in the building to handle demand for studios while

she took the big control rooms offline for demolition and rebuilding. So, she converted one small talk studio and one office supply closet into mini production studios.

"Instead of using physical mixing boards in the mini studios, I gave each one an xNode for the mixing and a virtual console built as a Pathfinder Core Pro user panel to control it," said Amoss. "That was super fun to do, and I am very pleased and proud that one of the virtual consoles is used live on a national program when it is hosted from Baltimore."

She added: "One of the exciting parts of the WTMD move project was that we decided to move the WideOrbit automation system while it was live on the air, during the daytime. That was daunting and took a lot of careful planning, but it went smoothly."

As the new year began, Amoss said WYPR was about to pause its studio conversions to replace three transmitters. The station will be replacing its Continental 816 HD with a GatesAir FLX and will also be installing new GatesAir FAX transmitters at WYPO and WYPF.

"This will be my first new transmitter installation experience, and I am looking forward to it."

Learning on the Job

While projects like the integration of WTMD and WYPR are rewarding, Amoss said the road to becoming a chief wasn't without its challenges.

"I came into the job with zero knowledge beyond generic IT experience, and I had to learn everything as I went along. The rewarding aspects are realizing how much I have now learned, and looking at all the things I have built, from physical wiring and studios to virtual logic and software, that are now on the air delivering our programming to listeners."

As a music station, she said, WTMD puts on live broadcasts from its studios and venues in the surrounding areas. "Seeing the community interact with us in such a positive way always really touches my heart."

Of course, Amoss wasn't alone on her journey rising through the engineering ranks of Baltimore Public Media.

Above
On-air host Izzi Bavis gives the thumbs up in the new mini studio that uses a Pathfinder user panel as a virtual console.

Below
Chief Engineer Ray Hepner, left, and Megan Amoss are shown during the improvement project.

Mentorship has played an invaluable role. A key supporter has been Ed Bukont.

"[He] really took me under his wing once he noticed that I had the interest and the aptitude. I got to learn AoIP and systems integration from day one working alongside Ed. His thirst for knowledge is insatiable; and in between working on projects he is always studying or taking courses and learning the latest standards, codes and technology. Seeing that has been a great example for me."

Amoss found another mentor in WYPR Chief Engineer Ray Hepner, "who has the deep old-school knowledge, curiosity and excitement for innovation. Ray can fix anything, and he has the resourcefulness and imagination to devise ingenious solutions to problems. I have learned a ton about installation, repairs, wiring, breadboarding and more from Ray."

Be your own advocate

When it comes to making space for women in STEM careers — or allowing little girls to dream big engineering dreams — Amoss said a lot of work has already been done, but there is always more to do.

"I find myself often not being taken as seriously initially as my male counterparts in situations like calling in service requests or making observations or recommendations," said Amoss. "People can also assume that credit for women's work in engineering goes to the men in the room.

"It's important to speak up and get the credit you have earned for your hard work."

For women who are interested in starting a broadcast engineering role, Amoss offers the following advice:

"Don't worry if you don't have the radio-specific knowledge when you start out. If you have a technical knack and a motivation to learn, it's easy to build up the knowledge, and the rewards are awesome."

Writer
Elle Kehres

A sampler of our WIE series

You can read more about these women on the RW website

Having kicked off in March 2024 for Women's History Month, Radio World's "Women in Engineering" spotlight features women in broadcast engineering roles and other technical positions, highlighting their work and careers in a traditionally male-dominated field.

The profile of Megan Amoss on the previous pages is part of this series. And what follows here are excerpts from additional profiles that you can read on the Radio World website at *http://radioworld.com*.

It has been a joy to write these features about some of the amazing women working in our industry, and I look forward to shining a light on more in 2025. Many women, myself included, know the feeling of imposter syndrome all too well. I hope this series encourages more women to pursue STEM careers fearlessly, with the conviction that they are, in fact, more than "good enough."

Want to nominate someone to be featured in the next Women in Engineering spotlight? Email me at *elle.kehres@futurenet.com*.

Below
Amanda Hopp and Cris Alexander supervise an FM antenna replacement at Crawford's Lookout Mountain site. "I love the hands-on work. It makes you care," she said.

Amanda Hopp

Crawford Broadcasting

Radio engineering has been a family affair for Amanda Hopp, who began working alongside her father — longtime Radio World contributor Cris Alexander — as a part-time board op at 670 KLTT(AM) at age 16.

Today, Hopp is a chief engineer for Crawford Broadcasting, a family-owned media company based in Denver. It's a role she started back in 2008, at the ripe age of 22, and has grown into ever since.

Overseeing four stations and seven signals in the Denver area, Hopp keeps busy, making sure operations at Crawford's Colorado stations KLTT(AM/FM), KLZ(AM/FM), KLDC(AM) and KLVZ(AM/FM) are running smoothly.

"It's a lot of responsibility and it can be kind of scary at times," said Hopp. "But I love the hands-on work. It makes you care."

When she's not running around Crawford's office and studio space — which boasts some pretty spectacular views on the 12th floor of a mixed-use building in Aurora — you might find her hosting meetings for the Denver chapter of the Society of Broadcast Engineers a few floors down.

Hopp is chairwoman of Chapter 48 and is responsible for managing meetings, planning events and keeping the chapter's website and social media accounts up to date.

"It takes a lot to create a highly engaged group," said Hopp. "I do a lot of the work, but I enjoy it. It has been fun getting the chapter to wake up again."

Unsurprisingly, when it comes to mentors, foremost is her father.

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"For me, one of the most rewarding things is just getting to work with my dad," said Hopp. "I know not everybody enjoys working with their parents, but I do."

Hopp says mentorship is especially important as the broadcast industry faces a shortage of engineers, with more industry veterans entering retirement.

When asked about how to get the word out about radio engineering — well, that's just the million-dollar question, isn't it? She said stations can't necessarily hire on experience alone. Skills can be taught; however, passion and willingness to take on whatever jobs need doing are invaluable traits.

"At Crawford Broadcasting, it isn't just computers and equipment," said Hopp. "I get to go out and mow on a tractor all day. I maybe have to go use a plunger on the toilet. It could be anything. So, you have to find the person who is okay with doing all of it."

Read the full story at *https://tinyurl.com/rw-hopp.*

Below
Maria Laing at the 2024 NAB Show. ""It is so important to advocate and bring awareness to this often-overlooked field."

Maria Laing

Mr. Master

Maria Laing is senior vice president of Mr. Master, which provides compliance and content distribution software solutions to radio groups, including iHeartMedia, Cumulus Media, Townsquare Media and Audacy.

Many know her for her work with the organization Mentoring and Inspiring Women in Radio, or MIW. It's a non-profit dedicated to the advancement of female leadership in radio broadcasting, and her role only seems to be growing.

In addition to sitting on its board of directors, Laing is part of the team that steers the MIW Engineering Mentorship Program, which has expanded in recent years.

At the end of 2023, MIW and the National Association of Broadcasters Leadership Foundation announced the first "Launch" program recipient. Launch is a partnership dedicated to supporting women in radio who are relatively new to the industry. When it came to taking on the program's first engineering mentee, Laing was more than up to the task.

"I am a huge advocate for engineering — especially women in engineering — and worked to get engineering into the curriculum for the Radio Talent Institute, now the National Radio Talent System, who introduce students to radio," said Laing.

With guidance from MIW, Laing is a co-mentor to Lucretia Lee-Arceneaux — a broadcast IT engineer for iHeartMedia in Phoenix, Ariz., and an aspiring RF engineer — alongside Lou Taylor of 4Remotes.

Having already received training at SAE Atlanta, Colorado Media School and the Colorado Broadcasters Association CBA Engineering Academy, Lee-Arceneaux was well on her way to establishing herself as a broadcast engineer, but Laing said she was missing one thing.

"When we spoke for the first time and we started getting to know each other, I could hear that she had everything else, but she didn't have a voice," said Laing. "You know, I always have my voice. So, I thought if she just had more confidence, that's all she needed from me."

On top of her career, Laing is very involved with the Los Angeles chapter of the Society of Broadcast Engineers. However, while she is deeply rooted in the engineering world now, that wasn't always the case.

Laing first walked into a SBE Chapter 47 meeting 15 years ago to "learn how to talk to engineers" for her work. She recalls what it was like to make an impression and find community amidst a sea of men. "I put on a dress on purpose," she said.

And an impression she did make.

Just one year after joining, Laing was asked to fill a vacancy as vice-chair for the L.A. chapter. She continues to hold that office today, in addition to being a Senior member of the society.

"Engineering in itself is discriminated against, especially women in engineering," said Laing. "It is so important to advocate and bring awareness to this often-overlooked field. It is an exciting time for women in technology."

Read the full story at *https://tinyurl.com/rw-laing-2.*

Jade He

NEP Group

When she was a second-semester senior at Hofstra University in Hempstead, N.Y., Jade He already had an impressive repertoire of technical experience under her belt.

In spring 2024 she was the general manager of Hofstra's student-run TV program the HEAT Network; a former student technical director and station manager of Hofstra's college radio station WRHU(FM); a Technology Apprenticeship Program Fellow with the NAB Leadership Foundation; and a part-time project manager assistant at WABC/ABC7 New York.

Last May, she became part of Hofstra University's class of 2024, receiving her Bachelor of Science degree in video/television.

With such a lengthy résumé at just 22, it was no surprise that Jade He has big hopes for the future. But while she looks ahead, she also has taken time to reflect on her broadcast education thus far. She shared with Radio World how it feels to navigate a field that is still dominated by men.

"Oftentimes, being the only woman or person of color in the room is incredibly daunting, and even exhausting," said He. "It is something I have honestly struggled with a lot, not only in engineering, but in all aspects of my life for as long as I can remember.

"As I am usually the youngest person on a team as well, it can be difficult to speak up and feel as though my opinion is valuable."

Despite these difficulties, affirming mentors and valuable mentorship opportunities have helped her find her career path. She said her technical education has been boosted by people who helped show her the "engineering ropes." One is WRHU Chief Engineer Andy Gladding.

Above
Jade He works on a project at WFNP at State University of New York (SUNY) at New Paltz. "There are very few opportunities in life where you are invited into a space and encouraged to break things, but that is the culture."

"I have always been interested in technology and how things work, but it did not occur to me that I could pursue that as a career until the latter half of college, when I was introduced to Andy Gladding, who helped make things click," said He.

She said the training she received at WRHU was invaluable. "There are very few opportunities in life where you are invited into a space and encouraged to break things, but that is the culture. I broke plenty of things, but it was there I learned how to put them back together."

While Women's History Month is confined to the month of March, He's efforts to make space for women to learn about and succeed in STEM careers will continue.

"I think my life would look extremely different if a series of happy accidents did not occur to land me where I am, here, thriving in the sciences. I think everyone deserves the chance to be great, but half of us are not always given the same odds."

After our story's original publication in March 2024 and following her graduation, Jade He secured a full-time position at NEP Group as an associate broadcast engineer for its New York City studios.

Read the full story at *https://tinyurl.com/rw-jade-he.*

Shayna Sengstock

New York Public Radio

Shayna Sengstock, 24, an up-and-coming broadcast engineer at New York Public Radio, stumbled upon her career. With degrees in journalism and writing studies from Hofstra University in Hempstead, N.Y., she found her passion for radio engineering by joining Hoftra's station WRHU(FM), even though she had not been seeking a technical position.

She started at WRHU because she wanted to write scripts for its news show "Newsline." Once she joined the station, Sengstock became the student morning show director in her sophomore and junior years. However, she then would become the student technical director while finishing her studies. And like Jade He, noted above, Sengstock received encouragement from WRHU's Andy Gladding.

"I actually wasn't really thinking of running for the student technical director position and I wanted to be the next student talk programming director. However, one of the things I found myself constantly doing was following Chief Engineer Andy Gladding and the previous Student Technical Director Jonathan Sanelli around the station."

Above
Shayna Sengstock is shown running the board for WRHU's live coverage of the 2020 election. "Right now it is our time as women to take over and add diversity to the ever-changing tech field."

What started as a fascination to understand their work blossomed into a desire to pursue engineering full-time.

"Once I grew a love for engineering, I decided it was only appropriate to run for student technical director," said Sengstock. "Thankfully, I won the position, and I have never looked back. Andy later helped me get my job at New York Public Radio." Sengstock was a month from graduating when she began her work at WNYC in November of 2022.

Her proudest accomplishment during her time at WRHU was getting the station's technical department off the ground. While "student technical director" had always been a title, there was no actual tech department at WRHU until Sengstock became the student director in 2021.

Soon enough, Sengstock said there were enough students who showed a passion for tech to not only launch the official WRHU Technical Department, but to create what would soon be known as "Tech Thursdays," a program that also has been featured in Radio World.

When it comes to women looking to join and/or advance in technical careers, Sengstock said mentorship opportunities are especially important.

"It was only until the late 1960s through the early 1980s that women were even getting some opportunities to attend some Ivy League schools. We as women should want to learn all that we can and realize we are very fortunate to be living in a time where we have more equality than our previous ancestors," said Sengstock.

"I do realize that a lot of broadcast engineers tend to be older men, but right now it is our time as women to take over and add diversity to the ever-changing tech field."

Read the full story at *https://tinyurl.com/rw-sengstock.*

Generator power is primary at this site

It may be all that keeps you from being off the air for days

Cris Alexander
CPBE, AMD, DRB
The author is director of director of engineering for Crawford Broadcasting.

Power outages at most broadcast facilities are relatively rare. Across most of Crawford Broadcasting, such outages normally amount to an hour or two a year. In many cases we have none.

A lot of that depends on geography. For example, in areas where thunderstorms are common, we're prone to more storm-related outages. It also depends on the infrastructure. Areas with really old power grids tend to have more problems than those with newer grid components. Still, outages tend to be short-term.

In one location, however, we've had some long service disruptions, even though the area is not known for thunderstorms and has a fairly new power grid, especially the last mile to our facility.

One such outage occurred in late 2024. Starting in mid-November, we received several notices from Southern California Edison (SCE) telling us that for a two-hour period on Nov. 25, the Oak Flat transmitter site of 50 kW AM station KBRT in Costa Mesa would be without utility power so the utility could "upgrade equipment."

We were well prepared for this outage. We have a pair of identical 70 kW diesel generators at the site. Their fuel tanks were close to full, and we knew the generator was in good working order because our operations manager exercises it every Thursday. So when the power went out on the 25th, the generator started, the transfer switch

Above
Cam lock connections from the generator.

connected the site to the generator's 480-volt three-phase output, and the station stayed on the air.

How many days, did you say?

The first indication of trouble came an hour and a half or so later.

I got an email from SCE advising that the work had been completed and our power had been restored. I immediately hit the KBRT remote control system and saw that the "Generator Power" status indicator was lit red. If we'd been back on shore power, the status indicator would have been green and the status text would have said "Edison Power."

Status	
#	Value
1	NX50 RF On
2	NX50 OK
3	NX50 Remote Control
4	NX50 Exciter A
5	NX50 PDM OK
7	Generator Power
8	ANT to NX50
9	XL12 RF Off
10	XL OK
11	XL12 Remote Control
12	XL12 Exciter A
13	TWR 1 Light OK
14	TWR 2 Light OK
15	TWR 3 Light OK
16	TWR 4 Light OK

Above
Line 7 of the remote-control screen reads "Generator Power" and is red when the generator is in use. When the site is running on shore power, the line reads "Edison Power" and the indicator is green.

I didn't think too much about it at the time, figuring that I had checked too soon and that we were still within the time delay on power restoration, which keeps the gen from shutting down too soon if there is a momentary restoration of power that doesn't stick. It happens sometimes.

But I continued to check that status over the next couple of hours, and it remained showing generator power with a red indication.

I got on the phone with Operations Manager Todd Stickler and told him about it, advising him to submit a trouble report with SCE. Was it possible they had restored power and didn't know that our site was still down? Todd submitted an outage report.

Not long after we got another email from SCE telling us that power would be restored on Dec. 7.

What? WHAT?!? Dec. 7 was ten days away! Surely that was a mistake.

As time went on, it became clear that it was no mistake. Power remained off, and we got nothing but crickets from SCE.

Right
The generator connection to our building and transfer switch. The small connection is the control wiring for start/run/shutdown.

Todd tried and tried to get in touch with someone — anyone — at SCE who could tell us what was going on. It was not until more than a week later that he finally connected with a real person who told him what we had about figured out on our own: SCE had pulled that piece of equipment, probably a transformer, with the intent of replacing it, but found other issues with the

infrastructure and did not have the materials on hand to fix it. I'd heard the same thing through the site manager grapevine, so confidence was fairly high that this was in fact the case.

For 10 days, to keep us operating on generator power, Todd and Stickler and Mike Duffy, the transmitter contract engineer, took turns going to the fuel depot every other day, picking up three 55-gallon drums of red dyed off-road diesel, hauling it up that five-mile switchback dirt track up to the site and pumping it into the main generator tanks. It took two refueling trips every other day, 165 gallons per trip, to keep the generator fueled. We figured that we were burning an average of three gallons per hour, 75 gallons a day.

On the afternoon of Dec. 7, at long last, shore power came back on and our generator was able to shut down. Mike Duffy made one last refueling run, topping off the tanks and leaving some extra fuel in drums at the site.

Take 2

The reprieve, however, was short-lived.

Just a couple of days later, SCE performed a public safety shutdown for a couple of days. Fire weather had set in, and we all saw news coverage of the wildfire in Malibu. SCE wanted to avoid sparking a fire in those tinder-box dry, super-windy conditions.

"It took two refueling trips every other day, 165 gallons per trip, to keep the generator fueled. We figured that we were burning an average of three gallons per hour, 75 gallons a day."

We get quite a few of these public safety shutdowns each year. Utility companies have taken to heart the lessons learned from the 2018 Camp Fire, in which some 85 people lost their lives and more than 18,000 structures were lost. Pacific Gas & Electric was bankrupted by that awful fire, which was sparked by its distribution lines during a fire weather event.

And just a few years later, the Marshall Fire in the north part of the Denver metro area where I live destroyed the

towns of Superior and Louisville in Boulder County, killing two and destroying almost 1,000 homes. A sparking Xcel Energy distribution line was strongly suspected as the cause of that fire.

Who can blame these utilities for being proactive during fire weather events?

Thankfully, SCE restored our power a couple of days later when conditions improved, and we were able to get our generator service technician up to the site to perform an oil change and full inspection of the main generator, which had run a lot of hours continuously over two weeks.

He also did a load bank test on the backup generator, which we hold in reserve. The newer backup generator has the same capacity as the older main (70 kW), but being newer it has tighter emission controls, drinks diesel exhaust fluid and will shut down if loaded to capacity. The main will run the site at full power, including MDCL, without an issue; if we're on the backup we have to reduce power a bit.

Above
Power and control cables are used to connect the trailer-mounted generator.

More than a backup

All's well that ends well. We went through some 900 gallons of diesel, which cost us several thousand dollars. We usually spend right at $200 per day to power KBRT from utility power. Running on generator power costs us about $300 a day, not including our expenses in hauling fuel to the site.

This long-term outage cemented in our minds what we already knew: Generator power is *primary* at that site. We can't look at our generators as backup equipment. Too often, they are all that stands between us and being off the air for days on end.

That was driven home in the weeks after. The conditions that propagated the Palisade, Eaton and other massive Los Angeles wildfires kept us running on generator during public safety shutdowns triggered by the extreme fire weather. Our 10-day outage late last year was, as it turns out, a dress rehearsal for even more time on generator power.

For a related commentary see page 29.

Alan Jurison, a vocal proponent of active metadata management, joined **Quu Inc.**, a service provider of that technology.

Jurison was senior operations engineer at iHeartMedia, where he worked for 13 years until November. Prior he worked for companies including Citadel and Pilot Communications. He has written for Radio World readers about best practices for RDS and HD Radio data display and speaks frequently at industry trade shows.

He chairs the National Radio Systems Committee's IBOC Standards Development Working Group and has been active in the NAB Radio Technology Committee; he continues in those roles.

Jurison received Radio World's Excellence in Engineering Award in 2024.

Dielectric promoted **Kim Savage** to vice president of marketing and business services.

Savage will report to President Keith Pelletier. She will continue to head marketing and business services and oversee team functions while adding responsibilities in business services.

Savage has been with Dielectric since 1999, starting in a project management position with then-owner SPX Technology. In 2011, she was named director of marketing and business services.

The release said Savage expects to add more partners through Dielectric's business services department through 2026. She also anticipates the pursuit of AI technology from third parties.

BSW named **Bryan Seeley** as its president and CEO. **Tim Schwieger** remains as chairman of the board for the company.

Broadcast Supply Worldwide is an equipment dealer. Seeley has been with BSW for 13 years, most recently as director of marketing and sales.

BSW said he played a key role in launching a new website and modernized point-of-sale system and has been responsible for a market expansion and diversification of product offerings.

He has 24 years in the audio industry and a degree in jazz performance from Cornish College of the Arts. He plays bass in the band SWAY.

Orban named **Mike Pappas** its senior vice president of sales.

The processing manufacturer said Pappas' promotion was part of a senior leadership restructuring. Previously, he handled U.S. sales along with corporate development as VP of business development.

In August, we reported on the retirement of **Peter Lee**, Orban's longtime SVP of global sales and European operations.

Orban CEO David Day said Pappas will continue with some of his business development responsibilities, while Day will add some of the functions to his role.

BROADCAST EQUIPMENT EXCHANGE

BROADCAST EQUIPMENT EXCHANGE

Writer

Charles S. Fitch
P.E.

The author is a longtime contributor whose articles about engineering and radio history are a popular recurring feature.

We're gonna need a bigger power plant

Radio managers must take the coming threat more seriously

Several recent events across the country again highlighted the nexus between broadcasting and the power grid.

Power in the United States comprises two camps, generation and delivery. Both areas have been under assault — the former from excessive demand on limited facility, the latter by an insufficient and deteriorating distribution network that is particularly susceptible to severe weather.

On the generation side, there's a large and broad discussion about the nearly exponential increase in demand for electric power as a function of the use of electric vehicles and, more dramatically, of AI and the mining of Bitcoin.

The October 2024 issue of the monthly IEEE Spectrum journal featured an article about nuclear power plants and their relevance to the cloud, AI and big data.

It showed an interesting graphic comparing the "watt hours" consumed by a Google search vs. an AI-powered web search — respectively, 0.3 and 6.9 watt-hours. An increase of 23 times! We're seeing the common present to the projected new.

I think this suggests the power shortages to come. We're going to need a lot more power if this one AI example is valid.

As far as Bitcoin mining, I expect to see a practical arrangement that has already started to take hold. As in the making of aluminum, which also requires a massive amount of power, hydro dams and nuclear plants will be able to forecast times of low demand. High consumption activities will run off-hours using power that otherwise would be forfeit.

Why all this matters to radio is that we're fast approaching a point where our standby generators will become "bridging power" to carry us through the periods of brownouts and blackouts that I believe are coming.

The mother's milk of broadcasting is power. No power, no radio.

So what should we do, what is the decision chain?

I and my Radio World contributor colleagues like Mark Persons and Cris Alexander have written extensively about alternate power sources over the years. The important universal thread is power quality — especially in waveform, as so much of our system requires clean sinewave power.

Beyond such considerations, stations will have to face some big-money decisions and decide how much they're willing to invest to keep their signals and businesses running. Do they want just to stay on the air

when power fails, adopting a minimalist approach that protects only basic functionality? Or do they want to assure seamless programming? Or do they still want to conduct full business even if power fails, e.g. production, news, sales, all business systems, total creature comforts such as HVAC, vehicle chargers for the station autos?

Executives need to start thinking about the reliability of their power sources and how to protect them better.

The new administration in Washington promises a comprehensive energy approach; if it delivers, we may get some respite. Yet our power problem will grow significantly, regardless, as demand mushrooms. The hour of decisions will soon be upon us.

Readers' Forum

Wanted: Help in buying a generator

I read Paul McLane's recent article about the Michigan folks with multiple transmitters and a backup, etc. ("Lunch With a Bit of PEP," *http://radioworld.com*, search "lunch"). He asked for ideas and what folks are doing to assist their local authorities.

Now, we don't have the money for multiple transmitters and such (though we'd love it), but we did just build a specialized system utilizing a phone line that will pick up, accept a PIN code to identify the agency and the caller can leave an emergency message.

The automation system then takes the message and inserts it into the playlist at the next available spot (after the song finishes) and plays it regardless of whether anyone is manning the station or not. That way, an emergency message can always be sent — and since this system is at the transmitter site, it will even work if the studio is offline or the data connection to it is down.

I don't know if that's been done before, but I think it is nice to have in an emergency that happens "off-hours" and as such, puts the ability to make immediate announcements in the hands of local emergency management directly. We're just finishing up the testing and once that is done, we're going to meet with all area emergency management to give them their code-cards (printed plastic cards with instructions and their unique codes).

Our only weakness is that we have not been able to afford a site generator yet. Would any readers know if there are FEMA grants or low-interest loans available for stations to purchase emergency-related equipment like a generator?

We are the biggest signal in the area and cover it very well. It would be great for our rural community to have a de-facto standard place for emergency information in the case of complete grid failure. No other station in the area has a generator either. Any insight would be greatly helpful.

Thane Conriocht
General Manager
KZLF(FM)
Edmond, Okla.

How to submit

Radio World welcomes comment on all relevant topics. Email *radioworld@futurenet.com* with "Letter to the Editor" in the subject field.

Do in-car visuals matter?

Hi, I continue to look forward to each issue of Radio World and appreciate the job y'all do to keep the torch burning.

One thing I've noticed is the focus on the information that a station conveys via in-dash displays. I get this; but I think the focus should actually be on upping the quality of the stations' presented product rather than what bytes they convey.

People have a lot of entertainment options these days but will always gravitate toward that which they perceive has the most to offer them.

In-dash information is helpful, sure, but it isn't what attracts or retains listeners. People don't watch or listen to Joe Rogan because of how his set looks, ya know?

Eric Smith
Founder
Auralex
Indianapolis, Ind.

Ohm's Law

Regarding the Mark Persons article "Look What You Can Do With Ohm's Law" in the Jan. 1 issue:

A well-known manufacturer/engineer has been known to say that certain industry colleagues were "a little light on Ohm's Law."

I will readily admit I'm a little light on Kirchhoff's Laws, but I use Ohm's all the time for all sorts of things, including USB charging aspects. It's something for even managers to be aware of, and fundamental to engineering.

Thanks for the commitment to support our industry colleagues at all levels.

Rolf Taylor
Rocket Engineering & Consulting
Springfield, Va.

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