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November-December 2012 – Vol. 20, No. 6

Steve Church (1955 - 2012)



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DISTRIBUTION, ANALOG & DIGITAL



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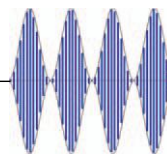
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by Ray Topp – Publisher



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In This Issue

- In *Studio Site*, George Zahn reveals the “Digital Masquerade” that can occur when using low quality computer speakers.
- In our *Transmitter Site* column, Don Mussell shows us how to utilize infrared inspection techniques to locate and diagnose problems on the ground – and in the air.
- A performance tax now seems inevitable. Peter Gutmann describes some of the changes – and fees – radio stations can expect to deal with, in *FCC Focus*.
- In *Tips From the Field*, Tom Bosscher shows us how to construct an XDS Satellite Receiver breakout board, an Internet A/B switch, a UPS bypass controller, and a remote controllable power strip.
- In our last issue, *Safety and Security* focused on rodents and snakes. In this issue, Jeff Johnson deals with spiders and insects in Part-2 of “Critter Gettin.”
- Cloud-based storage has become a safe and secure medium for data storage. Chris Tarr shows us how to take advantage of these services in *Operations Guide*.
- We all know junk when we see it ... or do we? Scott Schmeling gives us some pointers on the differences between the two, and why we keep both, in *Chief Engineer*.
- In *Practical Engineering*, Mike Callaghan provides details on the importance and methodology of good record keeping in transmitter and antenna system logs.
- Leo Ashcraft is changing hats, and bids us farewell in his final *LPFM Guide* column.

– Ray Topp, Publisher



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Dan Jackson, engineer for 92.9 FM in Perth, Australia was faced with a unique challenge. Breakfast hosts Paul Hogan and Lisa Fernandez would be cycling for hours in strong winds and pouring rain as part of the 92.9 Kids Appeal for Telethon.

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Cover Story

Steve Church (1955 - 2012)

A Life Filled With Accomplishment

by Ernie Belanger

Probably one of the most difficult things for a writer is to compose a story that sums up the life of a man. In particular, one who had so many accomplishments and whose life ended before he could create even greater contributions to give the world. This is the story of Steve Church.

As I spoke with friends and business associates, I discovered that Steve Church's life is one that can't be summarized in a paragraph or even a page. But rather, it is one that would take a good sized volume and an excellent biographer to even scratch the surface of a man who was so creatively profound and brilliant in his thinking, so driven in his thirst for knowledge, and one who had such a huge zest for life.

A True Renaissance Man

From the outside looking in, we see Steve the engineer and entrepreneur, the executive, and a man who guided his company to become one of the most successful in the broadcast equipment industry. He did so through the development of innovative and creative products that revolutionized radio. While this would be laurels enough for most men to rest upon, this description doesn't begin to give sufficient testament to the life and times of this "Renaissance" man, as his friend Denny Sanders describes him, "He knew a lot about a lot – and a little about everything."

The Golden Rule

Let's step back in time. Long before there was a Telos, the youthful days of Steve's life is where the true character of this remarkable man was formed. Through his Protestant, Midwestern upbringing, instilled in Steve early on was the "Golden Rule" – *Treat others as you would want to be treated*. This rule, according to Mike "Catfish" Dosch, not only ran in Steve's blood, but it was at the core of his very being. It guided him both in business and in his personal life. "Steve was never dishonorable and made sure that he, and by extension his company, always did the right thing by the staff and its customers," Catfish told us.

He reminisced about times when Steve could have done things to boost the bottom line of the company, as many CEO's might have done. But, instead, because they didn't square with his moral compass, he wouldn't even consider them. In one case, boosting the bottom line would have meant employee layoffs. Steve would have rather lived with a lower bottom line than dismiss dedicated employees. You see, to Steve, once you became a member of the Telos family, you were indeed family.

Church felt an obligation to take care of his "family." – the Golden Rule taught in his childhood coming full circle. Church was like that too, with his relationships in his personal life, "When you became Steve's friend, he'd do anything for you." Dosch said.

Knowledge and Creativity

Somewhere in that upbringing, a seemingly unquenchable thirst for knowledge was ignited, as was the burning desire to discover new and different ways to make things

better. Those closest to him remember Steve as brilliant and gifted. He had a natural curiosity that made him exciting to be around. To that end, he was a voracious reader, soaking up knowledge as a sponge does water. He always asked the questions "why?" or "why not?" In his quest to discover new ways of doing things, he would never take standard answers as to why something couldn't be done. He would set about discovering ways to accomplish what he knew he needed to.

Throughout his life, this quest for knowledge motivated him to learn many things, including the basics of DSP coding while it was still a very cutting edge technology. Later, he convinced Texas Instruments to give him one of the very few initial DSPs, to test his theory of improving the sound of phone lines used in talk radio. We all know the success story of that.

Thinking Outside of the Box

Steve admired and encouraged creativity at all levels – in others as well. He both prodded and inspired those with whom he surrounded himself. He challenged them to be creative and think outside of the box, to take a risk, going against conventional wisdom and pushing themselves in order to discover new and innovative ways to accomplish a goal.

Friends related how another side of Steve revealed that he was both very happy and comfortable around musicians, artists, and performing artists, and he had a great zest for life. He was as comfortable discussing engineering theory as he was watching a performance, or admiring the creativity of piece of art and interacting with its creator.



Steve, in his element, passing the knowledge.

Multi Facetted

Mike Dosch revealed that when he first moved to Cleveland, he learned that Steve seemed to know, and be known, in just about every restaurant in the city, a testimony to Church's love of food. "He was a real foodie," Catfish told me. He went on to explain that one evening, when he made a comment to Steve about this, Steve explained that a friend recommended he become a food critic for a local newspaper because of his great palette and knowledge of food and wines. So he did just that.

This seemed to be a quintessential Steve move: passing his love and knowledge of food to others for their betterment. Somehow, from what I've learned of Steve, I'm sure he challenged the local chefs to be even more creative in their gastronomic offerings.

Initially, Steve became a world traveler for business, in order to promote the company's products. This too, seemed to fit perfectly with his hunger for knowledge. Wherever he traveled, he learned about the culture of the people. In addition, he taught himself their language.

The Renaissance Man Finds His Muse

On a trip to Latvia, life would open a new chapter for Steve. He became so fascinated with the people and culture of this former Soviet Union country, that he taught himself Russian. He also discovered Riga, the old USSR's "Silicon Valley" and moved there to establish a Telos research center. The engineers there offered a wealth of knowledge of leading edge technology and DSPs.

But perhaps most importantly, it was here that Steve discovered the love of his life, Lana – his "muse," as he would come to call her – the woman who captured his heart and eventually became his wife.



Steve and the love of his life, his wife Lana.

A Potential Great Dad

Catfish told me he was happy that Steve had finally found love in his life. The one thing he wished, however, was that Steve could have had the joy of being a father. Mike spoke about watching Steve with his kids. "He would have been a great dad," he said. Children did touch Steve's heart, and one charity he made contributions to was an orphanage in Latvia – a charity he found worthy, because of the work it accomplished caring for children.

Cancer Strikes

Steve's natural curiosity ultimately extended his life by over two years. When he was diagnosed in 2009 with cancer, true to form, he researched everything he could find about the form of cancer with which he had been diagnosed. He then searched and ultimately found a medical research study at UCLA, using an experimental method to treat the disease. He visited, and after engaging the doctors in the study regarding the theory of the treatment, he decided to become a participant, returning to Cleveland where he received the treatment at the Cleveland Clinic. Steve lost his battle with cancer in September of this year.

His Legacy Continues

To say that Steve will be missed is an understatement. His passing, while it creates a huge void, also motivates those closest to him. They will continue his quest, his legacy, his thirst for knowledge, and his admiration of what he called the single greatest accomplishment of mankind – its creativity.

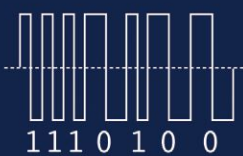


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The Digital Masquerade

George Zahn

Over the last two years, I've occasionally discussed the value of editing on our PC's and Macs to free up valuable studio time. This has been a boon to many smaller stations, allowing creative juices to flow at a desk without the pressure of knowing you have to rush because other staff needs the studio.

Even the most basic digital audio programs allow any of us to record critical voice parts in the studio, and then transport them on CDs, thumb drives, or flash memory to the digital playground that is our desk computer or laptop. Those of us out there are using the gamut from open source Audacity to the larger audio suite components such as Pro Tools, Sound Forge, and Adobe Audition, among many others.

We have the clean voice recording from a nice studio console on our digital medium, plus we can rip any CD source into most computer audio programs. It's all digital and all clean, so what worry do we have in mixing and producing at our desk? This is the beauty of the desktop or laptop editing, but it is also what I call the "Digital Masquerade."

A Mix & EQ Speed Bump

Please remember that just because we're working in digital doesn't make everything perfect. In theory there should not be any computer "noise" added to the signal by ripping or using a decent sound card in the case of analogue transfer to a line-in jack. When we mix down, we still need to monitor, and here's what I mean by the "masquerade."

It's been an insidiously slow creeping tolerance that most all of us have built up to the speakers attached to our computers. You may have the greatest pieces of audio-superb voice, punchy music, and sizzling sound effects to assemble, but if the speakers you are using as a monitor are the \$7.99 special from the discount bin at the computer store, your "vision" of the finished production is likely to fizzle, not sizzle.

This came to light a few weeks ago as I was working on a project in my office. This is the same work PC that I also do my administrative and even graphic duties on (smaller station – many hats). I was using speakers that I'd been using for the last five years, when the proprietary audio cable gave up the ghost and the speakers were out of commission. When my ops director brought in a replacement pair of computer speakers, I realized how misled I had become.

In all honesty, I had not only been using my "trusty" five year old computer speakers for basic mixing and cut and copy editing, but I was also involved with several projects in which I was using those old computer speakers to clean up LP transfers for air by de-popping and de-crackling cuts, as well as doing some fairly important basic EQ work on some vintage TV recordings we were trying to salvage for air.

When the temporary basic replacement speakers were plugged in to my computer, I realized how bleak some computer speakers can be. Even though these

were major name brand speakers, you could find in any computer store, they were muddy – too much bass, and the highs or treble frequencies were non-existent. It made me wonder how I may have tricked myself into trusting my old OEM speakers, and where they may have been deficient. I had simply grown to trust them for the most part – even making some critical EQ adjustments in the office on what likely were sub-par speakers.

There is something to be said about mixing down to a lower common denominator as they used to do in the days of transistor radios. In recording studios during the heyday of AM music, it was common to listen to the mix on a nice set of full fidelity speakers, but before anything went to master, it was often mixed down to mono on something like a small Auratone speaker to see what it would sound like on AM.

Those of us editing on our PCs without decent speakers or studio reference headphones are doing this all backwards. If we're editing on "dumbed down" OEM speakers – the equivalent of a modern day Auratone – we need to be double checking our product in the studio on the big speakers before it airs. The days of listeners on deficient mono speakers are fading as fast. To be safe, I did regularly spot check frequency-critical projects on better speakers.

The Guessing Game

Here's an example for a radio spot effect that could be affected by the digital masquerade: Let's say we're doing a spoof of the over-active subwoofers in some cars these days. We can take any piece of music in a digital editor, and play it with the EQ settings to create the effect of being outside of a car with a subwoofer on steroids. When we EQ the low bass up and we EQ the highs and mids out, how much EQ is enough? Good luck if you're on most basic computer desktop or laptop speakers. It's a guessing game that can only be "proofed" by listening back on "trustworthy" speakers.

If your editing computer is already in the studio, you're in great shape, but remember we've been touting the convenience and productivity of editing in our office spaces, where we don't always have the best speaker available. A line out to a receiver with larger speakers in your office may well beat basic small computer speakers for overall frequency response.

Here's the best part: you don't have to buy an extra sound system for your office to be at least close to a decent mix. When I couldn't live with the muddy replacement speakers any more (about 12 minutes in), I made a trip to an electronics store which had selectable computer speakers on display – at the press of a button, I could actually hear them in action. Even taking into account that I was listening in a store, I was able to pinpoint at least two or three options that I felt gave me a fighting chance to lift the mask off the digital masquerade – giving me as close to studio accuracy as I could get and keep within a meager budget.

High Fidelity – Low Budget

And the kicker was that I found acceptable choices for office editing under \$40. If you have two or three offices in which your staff are doing PC or Mac editing with OEM computer speakers and you're wondering why things don't sound quite as sharp, that may be your reason – and the fix is fairly economical.

Of the basic computer speaker sets that I found intriguing were systems with small subwoofers with adjustable sub volume that allowed for placement of the sub in tight places (under desks or behind components or elsewhere on the desk). The adjustable sub volume kept the bass at an acceptable level. The satellite speakers generally had decent highs and solid midrange – not tinny. I wanted to hear a relatively flat frequency response from bass to treble.

Speaker selection like this is fairly subjective, but a few that I found at a big box store were priced right to be added to even the most Scrooge-like holiday gift list for just about any station that needs them. Among some that should be commonly available include: Two Speakers/No Sub: Logitech X-140; Two Speakers with Small Sub: Logitech LS21, Cyber Acoustics CA-3090, Altec Lansing BXR-1321, and Logitech Z313 to name a few. This is not an exhaustive list, but a brief sampling. There are many other manufacturers, and comparative listening is the best way to choose and help you judge quality and cost. I even found a small subwoofer system at about \$12, but couldn't bear the rattling cone.



Logitech LS21 Speakers

We don't have to settle for the OEM speakers we've been conditioned to expect on most computers! Perhaps in engineering at your station, you could throw together spare gear to make a better listening apparatus for office editing. Just as the old ploy of "Digital Ready Headphones" didn't say anything for the quality of the transducers in the earpieces, simply editing digitally on our computers can't yield a winning product if the mix is "masked" by faulty speakers.

There's really no clear substitute for mixing on great studio speakers or on studio-reference grade headphones, but the cost point to make our office editing even more effective has dropped so low that we should make this a New Year's Resolution if we know someone doing critical editing under the duress of basic equipment computer speakers!

If you have a success story on a decent, budget-saving monitor setup for office editing, let me know, and we may be sharing your story in a future issue!

George Zahn is a Peabody Award winning radio producer and Station Manager for WMKV-FM at maple Knoll Communities in Springdale, Ohio. He is a regular contributor to Radio Guide and welcomes your feedback. Share your stories with others by sending ideas and comments to gzahn@mkcommunities.org

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Transmitter Site

Using Infrared Inspections to Locate and Diagnose Problems

by Don Mussell

A few years ago, I got a frantic call on a weekend morning from one of my clients in Los Angeles. It appeared that the main antenna had stopped working – either shorted or open – and the main transmitter would not come up to normal power, due to the high VSWR.

The station was now on the backup antenna, but the problem looked pretty serious, especially since the entire facility was less than a year old. As you can well imagine, there was quite a bit of concern and curiosity about the cause of the failure.

Initial Inspection

This station's transmitter was located at Mt. Wilson, 5,700 feet above sea level. It normally runs very high power – 55,000 Watts at the input to the four-bay main antenna. Despite the lack of visible physical evidence as viewed from the ground, we knew something had to have gone very wrong.

The next day, we got our riggers up on the tower to take a look. They also did not see anything that looked wrong on the outside of the system. But on a hunch, they opened up the six-inch flange adaptor on the input side of the antenna; black soot and chunks of carbonized copper were evident once the flange was cracked open.



The antenna transformer failure was apparent.

Deciding it was not practical to try to repair the five-foot-long matching section where the failure had occurred on the tower, the riggers brought it down to the ground.

Problem Solved – Or Was It?

The damaged section was shipped to the manufacturer and we had a new section shipped back to us in a couple of days. After installation, the antenna system worked again just like new. But the cause of the failure was still unknown and the manufacturer was unsure about what happened as well.

And that, understandably, made me very nervous.

I decided that if the matching section outer jacket was running above normal ambient temperature, then perhaps the inner conductor might be running at a temperature high enough to cause another failure. But how do you measure the temperature of a copper line section 160 feet up in the air?

At full power, the high RFR levels at the antenna are unsafe for humans. The usual laser-guided infrared temperature gauges failed to accurately measure the temperature due to high RF levels swamping the readings, as well as the distance to the probe taking the readings.

Arranging for a “Different” Inspection

Then I remembered that thermal imaging was very useful in electrical work when trying to find defective circuit break-

ers and bad connections. Perhaps it would work for an antenna up on a tower.

I called a local firm in Southern California and asked about doing an inspection of, not only the antenna system, but all of the electrical systems recently installed at the site. They said it would be no problem, just that we would have to check the tower and antenna after dark when the steel and attachments all cooled to the ambient night temperatures up there.

Everything at the site was less than a year old at the time and I assumed that nothing in the new electrical installation would be a problem. However, since I would already have the company up on the mountain, they might as well look at everything and give us a full report.

A few weeks later, the company representative arrived at the site just after dark. A nice clear summer evening with temperatures in the low 50's – it was the perfect environment for the outside readings.

Covering the Whole System

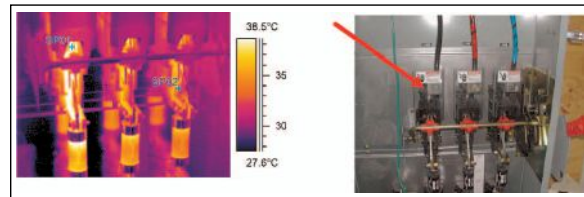
While we waited for the steel on the tower to cool, we inspected the inside electrical systems and the RF plumbing. It was a good thing we did that.



Mike Bivens of Infrared Services, Inc. views the breaker box with an infrared camera.

While I knew that the RF gear ran warm (my hands on the copper feedlines worked for this), I could not as easily check the electrical switchgear.

To say the least, I was very surprised by the inspection of the new breaker boxes and electrical distribution equipment. A brand new three-phase switch was running much hotter than others in the same box and clearly was defective.



The left breaker switch is clearly running hotter – 10.5 degrees C hotter.

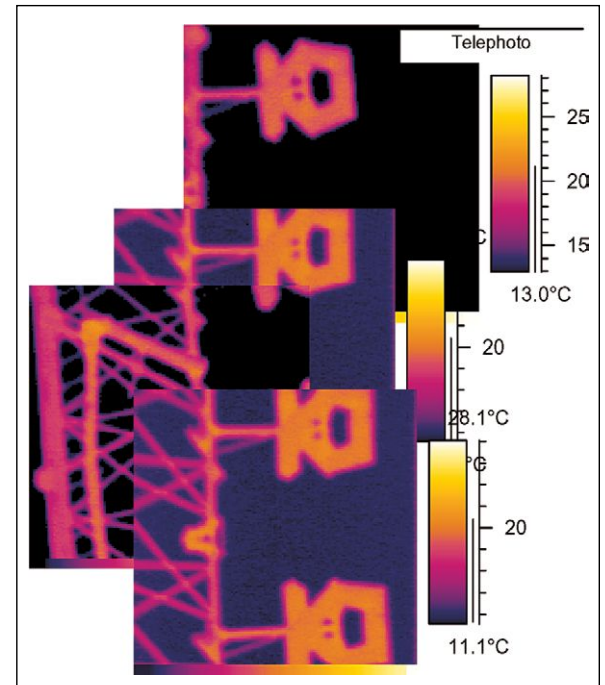
This was a fire hazard and a failure just waiting to happen. Worse than that, it could have put the entire station off the air for an extended period of time.

Since my concerns were more for the antenna system, I had not suspected any issues related to the power feed before this inspection. I had assumed that the new electrical switch gear was nothing to be concerned about. However, I was very wrong.

Onward to the Antenna

By this time, the outside was chilly and the antenna inspection was ready to go. The tech brought out his two-degree lens and focused in on the antenna and transmission line, 160 feet up in the air.

To our relief, the temperature rise was only a few degrees on the antenna and matching section, which is considered within specification at the normal operating power for this facility.



The thermal imagery shows the antenna is working properly with no hot spots.

Even better, now we have pictures that show where the warm spots are, so we have a baseline for normal operation.

This experience has led me to conclude that the station had good reason to hire a thermal image company every couple of years for a follow-up inspection. In fact, any station running significant power would benefit from this periodic maintenance.

Higher Comfort Level

It has been two years since that antenna failure and with the infrared inspection, I feel a bit more comfortable knowing that it is not overheating and ready to fail again.

In reviewing all the things learned during the process, we are now thinking that the cause of the burned-up section might have been due to some parts having become loose during shipping or possibly something to do with the bullets in the six-inch input elbow, including possible contamination.

In any event, it is good to see there are no longer any “hot spots” on the antenna or matching section. It does run warm but, at this point, that appears to be a normal condition with 55,000 Watts applied.

Following the recommendations of the inspector, we replaced the defective breakers, lubricated the knife switches and generally tightened up everything in the electrical service. We also did a second sweep through the building to make sure that all was well.

While not everyone has to worry about running a high-power transmitter a mile above sea level, electrical and transmitter failures can be avoided in every transmitter facility by periodic inspections using both infrared thermal imaging services and, of course, an infrared-model thermometer measurement device.

After all, it is cheap insurance against that early morning phone call.

Don Mussell has been doing broadcast engineering since 1968. Based in Bonny Doon, CA, Don can be reached at dmsml@well.com or via his web site: www.well.com/~dmsml



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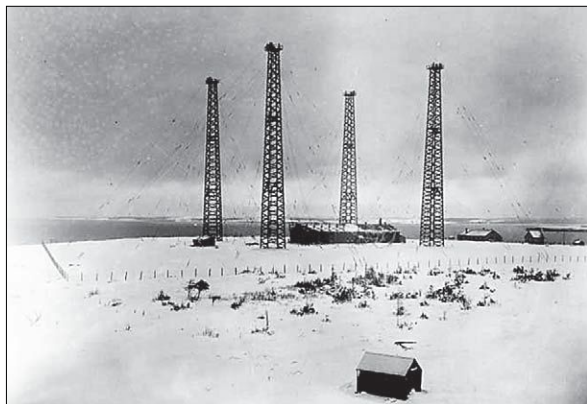
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A Very Extreme Transmitter Site Indeed

Earlier this year, I traveled to northwest Ireland to an area known as Connemara. It's a region that is as rocky and stark as the rest of Ireland is lush and green. My curiosity was piqued when I saw a restaurant in the village of Clifden called "The Marconi Station." I asked around and learned that there used to be a Marconi radio station located near Clifden many years ago but nothing of the station remains to this day. Years before, I had visited the site of another former Marconi station on Cape Cod, so I was anxious to learn more about this bit of radio history and the fascinating story of how Marconi built a radio station at Clifden. Let's open the history books and take a look back at what was truly an extreme transmitter site back in 1905.

Today it's easy for us to pick up our cell phone and call anywhere in the world, but back in the early 1900's, transatlantic communication was only a theory promoted by radio pioneer Guglielmo Marconi. With \$80,000 of funding provided by the Canadian government, Marconi built a temporary wireless station at Signal Hill in Newfoundland, which successfully transmitted the Morse Code letter "S" to its sister station at Poldhu, Cornwall, in England.

Marconi then built a larger high power wireless station at Glace Bay, Cape Breton, Canada which consisted of four, 210 foot wooden towers built in a square. There was a connecting ring at the top of the towers which supported one end of four hundred vertical radiators which today we would call slant wires. The slant wires came down in a conical shape into the transmitter building which was in the center of the towers. Marconi discovered that he could use any combination of the slant wires to directionalize his signal. Up to this point, wireless stations had been single tower, non-directional operations. This ability to steer and directionalize his signal made transatlantic broadcast more feasible, so Marconi now needed a similar wireless station in Europe.



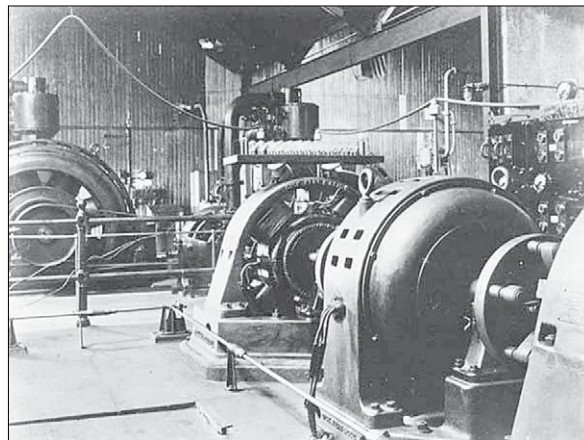
Marconi Wireless Station located at Glace Bay, Canada.

On July 25, 1905, Marconi selected a large peat bog outside of Clifden, Ireland as the site for his new transatlantic wireless station. The area was extremely rural and undeveloped, but was also one of the western-most points in Europe. Construction of the Clifden station started in October of 1905 and took exactly two years because of

some extreme conditions. At the time, there were no paved roads to Clifden, so all supplies and parts for the new wireless station had to be shipped by rail from Galway to Clifden over a narrow gauge railroad that had been built by the Midland Great Western Railway Company. To get his construction supplies to the wireless site outside of town, Marconi had to build his own narrow gauge railroad spur line from Clifden to the wireless site.

Back in the very early days of radio or wireless, every station had a fully operational machine shop. From the transmitter, all the way to the wooden tower, a station's transmission equipment had to be fabricated entirely by its local engineering staff – and on location. It was a far cry from what we do today when we call a vendor to ship us a piece of needed equipment overnight. A station's engineering staff was made up of men who had different manufacturing and technical skills, and those skills were put to the test in an area as remote as Clifden. Imagine having to build your own 200 foot wooden tower!

Widespread commercial electrical power didn't reach this part of Ireland until about 1950, so Marconi had to build his own power generating plant. The 500 horse power engine and 500 kilowatt alternator were installed on July 8, 1906. The steam engine boilers were powered by the plentiful peat which was available on the wireless site. The peat was harvested by local workers and delivered to the power plant at the wireless station by Marconi's rail spur.



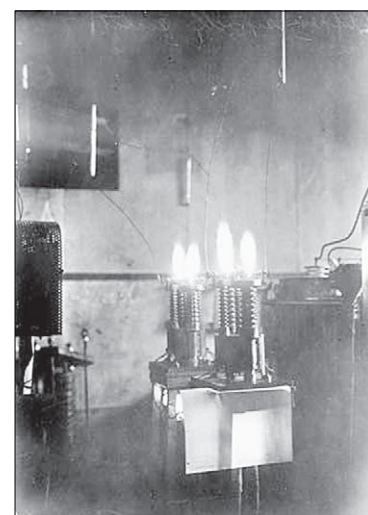
Power generating plant at the Clifden Wireless Station.

The wooden towers, or masts as they are called in Europe, were erected and the main transmitter building, along with buildings for the staff residences were completed. One interesting structure was the condenser house. It was a large building with condenser, or capacitor plates, hanging vertically. Marconi received weekly progress reports of the construction from Arthur Hemmings who was supervising the 40 laborers working at Clifden.

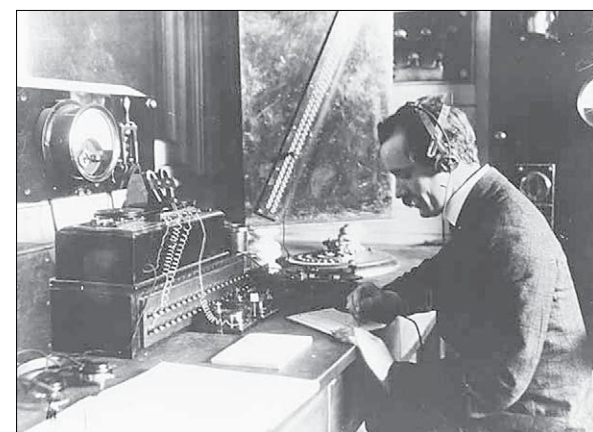
Wireless transmissions at this time were spark-gap signals which used Morse code to send messages back and forth. However, transmission and receiving stations could not be co-located, so the receiving station for the Clifden transmission station was about 40 kilometers away in a small village called Letterfrack.

On October 15, 1907, the inaugural transatlantic broadcast from the Clifden Station consisted of a message from Britain's Lord Avebury to the New York Times at 11:30 am. For the next 15 years, the Marconi Wireless station at Clifden relayed transatlantic messages to and from North America. As if this site wasn't historic enough, on June 15, 1919, a dual engine Vickers Vimy aircraft, flown by John Alcock and Arthur Whitten-Brown crash landed in the peat bog at the Marconi wireless station. Alcock and Brown had just completed the first non-stop transatlantic flight from St. Johns Newfoundland in 16 hours and 27 minutes.

An unusual end came to the Clifden wireless station. Even though Marconi's mother and wife were Irish, in July of 1922, the wireless station was attacked and wrecked by Irish rebels who were fighting for independence from the British and for home rule and it was never rebuilt. Transatlantic wireless operations were transferred to another Marconi station at Caernarvon, Wales.



Transmission spark at Clifden Wireless Station.



Operator's desk at Clifden

Fast forward to the present. While in Clifden, I was told that if I could find the Alcock and Brown aviators memorial, I would be close to the site of the former Marconi Wireless station. I searched and found the stainless steel memorial on the top of a hill between a peat bog and the ocean. A short distance into the bog I found the only remains of the Marconi Transatlantic Wireless Station ... a concrete tower base flush to the ground with the mounting bolts still intact.

We all have had our share of Extreme Transmitter sites, but when I read about the hardships that were overcome to build and operate this transatlantic wireless station, and I walked on that most desolate site, I had a greater respect for the vision of Marconi and the talented crew he assembled at Clifden. Next time you're building a new transmitter site and a subcontractor is an hour late, don't get angry, just remember what Marconi and his staff had to work with back in 1905.

Many thanks to the very informative website <http://www.marconicalling.com/> for information and pictures of the Clifden station and Marconi's other wireless stations on both sides of the Atlantic and to the people I spoke with in Clifden, Ireland.

Steve Callahan is the owner of WVBF, 1530 AM, Middleboro, Mass. and may be reached at wvbf1530@yahoo.com

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Paying to Play Probable and Pending

by Peter Gutmann

The most depressing takeaway from this year's NAB Radio Show was the sinking feeling that a performance tax is both inevitable and imminent. Barely a year ago, broadcasters were celebrating defeat of this scheme.

To be sure, there are far more causes for industry optimism. Analyses of economic indicators point to a surprisingly solid, if modest, recovery for radio. Industry leaders seem to be embracing the transition to digital platforms with increasingly constructive and specific ideas. Powerful arguments are being presented for activation of the FM chips already contained in most smart phones. Auto manufacturers are improving the accessibility of radio on "smart" dashboard consoles. Radio reach remains at historic highs, although time spent listening is declining somewhat. And above all, a far more encouraging aura of optimism pervaded the Radio Show than in the recent past, not only among advocates and group heads but the rank and file as well.

Yet there was a dark cloud hovering over the gathering – the prospect of having to pay for the right to broadcast recorded music. That previously abstract fear now suddenly looms as both probable and pending. While the industry had successfully lobbied to forestall legislation, recent private deals between broadcast groups and record companies have formed the first cracks in a previously solid, unified industry opposition and herald future victory for performance rights.

Trickle Down

Powerful arguments have been mustered on both sides of the issue. Broadcasters rely upon the historical fair trade-off between the right to play records on the air and the free publicity upon which artists depend for exposure and popularity. They further note that the vast majority of performance payments would not trickle down to the artists seeking support, but rather will go to labels (most now foreign-owned) and stay there – except, that is, for the relatively few artists who are in a position to negotiate contracts to obtain a reasonable cut (and who are sufficiently successful to be least in need of this income). A corollary contention is that unfair payment to artists is the responsibility of their labels, and should be dealt with on that level, for which broadcasters cannot be held responsible.

The recording industry responds that a performance fee is nothing more than fair compensation to those who create the performances upon which radio relies for much of its program content. It notes that times have changed, and with it the assumption that artists still depend heavily on radio for record and ticket sales. They note in particular their concern that music-intensive formats rarely announce title, artist or label information that would inform listeners of the identity of what they hear on the air. They also note that the U.S. is the only major country that does not compensate artists for

airplay and that the time is long overdue to conform our laws to internationally-accepted standards. They continue to press for legislation, on the ground that private deals fall short of assuring all artists the legal right to compensation, and insist that a law is required to create a right to reciprocity for airplay on foreign stations.

(Note that this is separate from the music license fees paid to ASCAP, BMI and SESAC, which compensate publishers – and through them composers). Not only is there a venerable historical basis for that arrangement, but it is founded on the more solid theory that artists have concerts and other means to reap the benefits of their celebrity from radio exposure, whereas composers generally do not.)

But this policy dispute has been going on since the 1930s and the battle over the prospect of new legislation continues. So what's new?

Free Exposure

Until quite recently, the industry presented a unified front of intractable opposition to the very concept of paying to play recordings on the air. The NAB asserted that payments would hurt broadcasters, jeopardize jobs and threaten communities that relied on their service. Testimony was mustered from artists who proclaimed their dependence upon radio for essential – and free – exposure. In reaction to the prospect of having to pay for the right to air music performances, some broadcasters were even mulling over the prospect that radio should turn the tables and demand pay for play from labels wanting their artists to be heard. (But remember that the FCC requires disclosure of all consideration received in exchange for airing any program material, so the attractiveness of implementing "pay for play" is dimmed considerably by the need to announce to listeners that "XXXX paid us to play the next song.")

A Standardized Fee

And then in early June the first tremors of a potential tidal wave arrived. A deal was announced in which Clear Channel would pay the Big Machine label group an undisclosed royalty rate on its terrestrial broadcasts in exchange for paying the same, and presumably lower, rate on streamed music than it otherwise would be required to pay under the legislated streaming license.

The mandatory license is a fall-back, which can be superseded by agreement with the copyright holders of recorded media. That is, the license enables broadcasters to stream recorded material upon payment of a standardized fee when no private agreement has been reached with the copyright holder. In nearly every case, the burden of negotiating separate agreements with each record label is so high that stations have no practical choice but to accept (and pay for) the mandatory license. At least for major groups, that may be on the verge of change.

Reaction so far has been mixed. The large broadcast groups tend to favor arrangements that pave the way to a more lucrative streaming business model by reducing royalties, and can best afford to pay license fees out of profits generated by their terrestrial operations. Smaller broadcasters, though, fear further incursion into their primary revenue base and remain unconvinced that even reduced streaming royalties will enable them to create a viable ancillary business. But clearly the pressure is on. Big Machine, for one, has suggested that negotiations are underway with other broadcasters, and presumably other labels will follow suit. Indeed, a second deal with Entercom was announced at the convention, and by the time this is published, there could be more.

A Foot in the Door

Also at issue on both the private and legislative fronts is the amount of proposed fees. MusicFIRST, the artists' foremost advocacy group, insists that the impact would be minimal, comprising less than 1% of gross revenue, and is a small fraction of the cost of announcers and others who contribute less to a format's appeal and success than their music. Broadcasters, though, fear that low initial rates are just the "foot in the door" that establishes a precedent and invariably will lead to escalation, much as with the streaming license fees.

What will be the impact of this trend? Will payment for music drive broadcasters to even safer harbors with the most established performers, or will they turn to artists who are willing to charge less? Time will tell ...

Devastating Penalties

Speaking of money, a constant frustration has been the FCC's refusal to tailor fines for regulatory lapses to the nature of the station involved. While \$10,000 represents a single spot for a major market group owner, the same penalty can devastate a stand-alone AM or college station. Yet the staff's position is that all must stand equal in the eyes of the FCC, and it considers reductions only when a fine would exceed 7% of gross annual revenues (and even that must be substantiated with three years' tax returns).

Yet in a recent case, the Enforcement Bureau recognized that a \$10,000 fine would not suffice as an effective deterrent for Cox Communications, which, the staff noted, had reported 2011 revenue of \$9.4 billion. So what did the Commission do to ensure that Cox could not consider the penalty "simply a cost of doing business?" It applied an "upward adjustment" – to \$20,000. That'll show em!

Peter Gutmann is a partner in the Washington, DC office of the law firm of Womble Carlyle Sandridge & Rice, LLP. He specializes in broadcast regulation and transactions. His email is: pgutmann@wcsr.com

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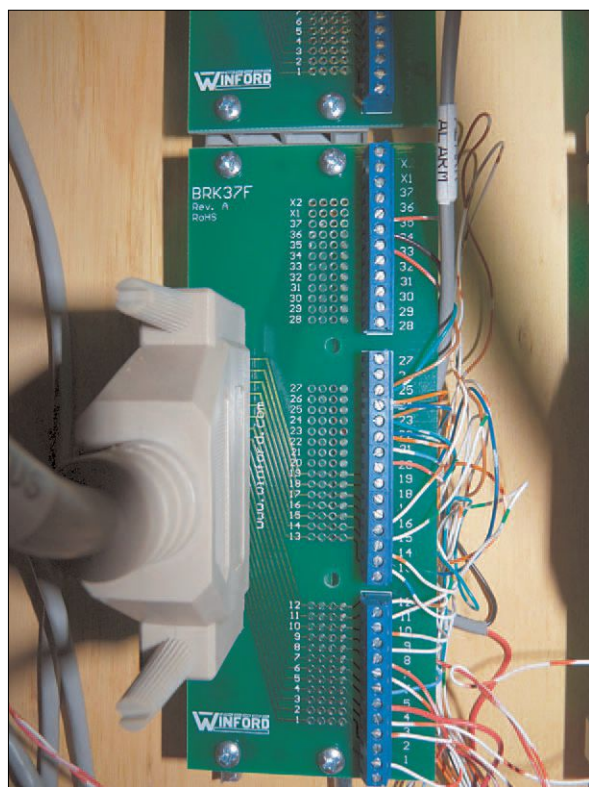
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Tips From the Field

XDS Satellite Receiver Breakout • Internet A/B Switch UPS Bypass Controller • Remote Control Power Strip

by Tom Bosscher

Those new XDS satellite receivers are really nice. Very well thought out, and equipped with not one, but two DB-37 connectors for relay functions on the back. So you solder up a 10 conductor cable to connect the receiver's relays to your automation for the programs you use today. But then it happens. At 4:30 p.m. on a Friday afternoon, the PD tells you that your third station in the cluster will be using a satellite fed program, starting next Monday at 10:00 a.m. You now get to tear into that nice and neat solder job.



Windford Breakout Board

There is a better way. Go to www.winfordeng.com and click on "Breakout Boards" on one of the buttons on the left. Scroll down to the DB-37, click on it, and the BRK37F-S-DIN is the one you want. On other pages, Winford has 3, 6 and 10 foot male/female cables for a very reasonable price. Add a foot long metal DIN rail, and you now have very easy access to all the connections to the XDS receiver.

Internet A/B Feed Switch

Over the last four decades, I have noticed a ritual of respect from fellow staffers at the radio station when there are technical crises. If a station is off the air, the staff is very understanding that "Sparks" has to go the mountain and wave the magic wand. But in the last few years, I have noticed that there is one area where patience runs thin, and that is when the Internet is down. When a transmitter is down, if you are live and local, that announcer for that station is really the only person affected.

But the Internet? No Facebook, no news, no gossip, no email. Psychologists are making money off people who have "Social Media Disconnect Disorder." We

had best do what we can to prevent our fellow staffers from doom and despair.

The simple solution is to make sure you have two Internet feeds. At most stations, this is easy. You can have a DSL feed, a cable modem, a direct DS1 or DS3, wireless Internet, and even a G3 or G4 USB stick. But we need a way to switch between the two feeds. There are many dual WAN routers on the market. However, over the last five years, I have had three routers fail on me – the last a dual WAN unit. I needed to switch the Internet feed after the router, and the solution came from L-Com – model number 6100900. This is a CAT 6 rated switch, but not an Ethernet "distribution amp" switch. It allows you switch from either the A or B input to the C output. You can order this switch to be controlled serially, via Ethernet, but I chose the unit that uses dry contact closures.



L-Com A/B Switch

You might wonder why, in this day and age of everything IP-based, why not control the A/B switch using the Ethernet jack? Well, if your primary Internet feed is down, you can't get to the A/B switch. I have this A/B switch controlled from the studio dial-up remote control. I can still dial into it with my cell phone, or the old POTS line from home. And yes, I can also control the studio remote control (a repurposed transmitter VRC-2500) from a Logmein equipped computer using the Burk Lynx program.

Now, a word about the routers. In my case, I have one router connected to a drop from Cornerstone University's 250 Mbps Internet feed, throttled to 50 Mbps. I have another router looking at a static IP from a business class Comcast Internet drop. It is critical to program the LAN side of the routers the same. I use the 192.168.101.xxx range, with DHCP running from .41 to .199. What is even more important, is to make sure at least one of your two choices for DHCP router supplied DNS is to be the same on both routers. If you have been running for weeks on the primary router, the backup router has no idea what IP's have been handed out by the primary router. I have found that if you have the same DHCP range, and at least one common DNS, when you switch to the backup router, most of the computers will work just fine. You might need a Ipconfig release/renew, but usually not.

Another advantage of this A/B switch is that you can have the more trusted staff switch it for you. It's very nice to have a backup at your fingertips on a Friday afternoon, when the 'Net is down and everyone wants a Facebook fix.

UPS Bypass Controller

A while back I talked about building a box to automatically bypass your UPS when it dies. Well the king of the automatic UPS bypass controllers is the Pulizzi (now Eaton) TPC2234-A. These run around \$300 each. However, a few months ago, I bought seven of them for \$300 total on Ebay. But I was curious – what is the "secret sauce?" Upon opening the Pulizzi box, I was rather surprised to see a rather standard looking relay, a Shrack Model # RM 205615. I found it's a DPDT relay, with a specification of less than 10 millisecond release time – less than \$20 from Newark as part #17M1758.

Even better, the 3PDT version specs out with the same release time, but with the third pole you can send your remote control an "I've got a problem" alarm. The 3-pole version is Shrack part #RM 705615, or Newark part #14J7240. (Thank you Jerry Mathis for this lead.) While I usually like to buy new or like new surplus, for \$21 for the relay, and another \$20 for a NEMA PVC box, my guess is that you can wire up a UPS auto bypass relay box for less than \$60 and two hours of time. If you think that this bypass box is a luxury, wait till you go off the air, and after huffing and puffing to the transmitter site, you find out the UPS failed. Somehow Tweeting your feelings doesn't really solve anything, now does it?

Remote Controlled Power Strip

And lastly, on the subject of remote resetting all things electronic, there are a tremendous number of IP or Ethernet controlled AC power strips. Many can turn individual outlets on and off, or recycle them, and the device can even auto-ping remote units and reset upon the failure of a ping routine. However, you have to ask the question, how can you get to the device from your house or your Iphone, if the Internet feed is down? Again, I like to rely on the simple but proven dial-up remote control, using a POTS line. I had to do some serious research on the 'Net, but I found an eight outlet AC strip that supplies NC power to the outlets, but upon a contact closure, it drops the AC power.



Dataprobe Controlled Power Strip

The unit of concern is made by Dataprobe, model number SBB-N15. They make other units that are controlled by IP, as well. At my facility, I have three independent Internet feeds, five routers and three independent IP networks. With this device in the rack, I can positively remotely reset eight critical devices. I know that items are supposed to run forever, but well, they just don't. Rather than a 30 minute drive in, a 30 second reset, and a 30 minute drive back, I prefer to simply reset a cantankerous router with one of my eight grand children on my lap. That makes broadcast engineering fun again.

Tom Bosscher is the Chief Engineer at Cornerstone University Radio. Email him at: tom@bosscher.org

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Safety and Security

A regular column on protecting property and persons.

Critter Gettin' – Part II

By Jeff Johnson, CPBE

Practicing our profession, we often find ourselves where humankind rarely ventures, but danger lurks.

The following is an article written for *Radio Guide* readers by Dr. Charles Grossman, of Xavier University. Dr. Grossman discusses dangerous or annoying insects and spiders.

Annoying, Nuisance or Dangerous Arachnids and Insects:

Authors note: Previously I discussed some bacterial and viral infections that could be transmitted in the environment of the radio station. We have also discussed mammal and reptile pests. Now we will look at spiders and insects that can cause problems. I welcome answering questions that may arise in specific situations that you may encounter. You can contact me at the Biology Department at Xavier University in Cincinnati Ohio. My email address is Grossman@Xavier.Edu. Charles J. Grossman, PhD and Professor.

Spiders (Arachnids): are frequently encountered hiding in closed spaces and backs of equipment racks as well as in junk piles, corners, boxes and under toilet seats especially in old style out-houses (especially the Black Widow).

Of the various kinds of spiders that can be encountered, the **Brown Recluse** is of special concern. It is very small in size and therefore can easily hide; its bites can cause serious tissue necrosis and permanent damage and scarring. I was

bitten by one of these spiders many years ago when I put on my shoe where it was hiding. The resultant scar on the top of my foot is the size of the 50 cent piece and took many months to heal. A violin shaped mark on its back can identify this spider.

The **Black Widow** spider, which has a bad reputation, is actually quite retiring and will not bite unless seriously disturbed. Only the female bites humans. It has a large body about 1/2- inch long. The Southern Black widow can be identified by the red hour glass mark on its belly. The Northern Black Widow has a row of red, yellow or white spots along the middle of its abdomen with red legs and two red cross bars on its underside.

Pholcidae “daddy long-leg” web spiders are quite harmless but annoying, producing webs in closed spaces, corners, and inside equipment racks. They are however, quite helpful in killing other insects.

Note: Glue pads sold for capturing mice are also quite useful for capture of crawling critters. Place them in corners and near cracks where they will be most likely to be encountered.



A brown recluse spider.

Vespid Paper

Wasps are dangerous, especially in large numbers, living in such locations as under eaves, in hollow spaces in walls, in radio towers especially inside transformer boxes and lights. Their sting can be very serious, especially if multiple stings are involved and the person is allergic. Like other insect stings, the venom can cause anaphylactic reaction requiring hospitalization. Allergic persons should always carry an Epi-pen with them at all times.

Note: An EPI-pen containing epinephrine is for the emergency treatment of life-threatening allergic reactions (anaphylaxis) caused by allergens, exercise, or unknown triggers; and for people who are at increased risk for these reactions. They are intended for immediate self-administration as emergency supportive therapy only. Seek immediate emergency medical treatment after use. See: <http://www.epipen.com/>

Yellow Jackets, which are a form of ground dwelling wasp (they are not bees) are dangerous if nests are disturbed, because of the aggressive nature of their attack. Multiple stings can cause serious anaphylactic allergic reactions. While they are most likely not going to be found inside radio station buildings, they can be a problem in outside environments. Allergic persons should carry an Epi-pen with them at all times.



Recluse spiders on glue pad.

(Continued on Page 20)

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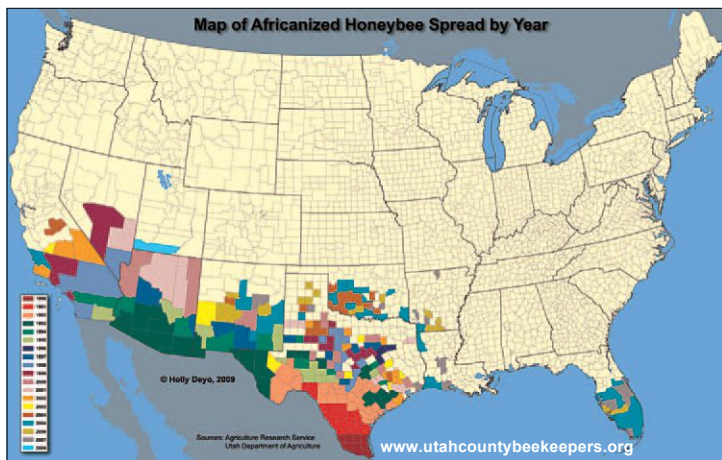
By Jeff Johnson, CPBE

Critter Gettin' – Part II

– Continued from Page 18 –

Africanized Bees are present in more southerly areas. Their nests can be a problem and are frequently in high locations. Thus they maybe found in trees, telephone poles and radio towers. Their attacks are highly aggressive and are usually unexpected and elicited without any apparent provocation. Like other stinging insects, their venom is very dangerous and can cause anaphylactic reactions and death in allergic individuals. These bees are destructive to other honey producing bee varieties and trained professionals should eradicate nests whenever and wherever they are encountered. Allergic individuals should carry an Epi-pen at all times.

Africanized Honey Bees (*Apis mellifera scutellata*) and **European Honey Bees** (*Apis m. mellifera*) are the same species – they look the same, sting in defense of themselves or their nest, can only sting once, and have the same venom.



Africanized bees distribution map.

Africanized honeybees are slightly smaller (but because the bees look so much alike only a laboratory analysis can tell them apart). They also differ in that they respond more quickly and more bees sting. They can sense a threat from people or animals 50 feet or more from their nest, sense vibrations from power equipment 100 feet or more from their nest, may pursue a victim 1/4 to 1/2 mile, remain agitated for an hour or more after an attack, swarm frequently to establish new nests, nest in smaller cavities and sheltered areas, and move their entire colony readily (abscond) if food is scarce. Away from the hive, however, they are no more defensive than other bees or wasps. They will not form large swarms and hunt for you.

Silver Fish are annoying but not dangerous, unless you consider that they can contaminate food with bacteria and have been reported to eat the paper pages in books and thus do damage to them.

Bed Bugs had been much in the news lately and can live in dark closed spaces and bite people for a blood meal. Their bites follow underlying blood vessels

so this frequently produces red itchy lines on the legs.

House Centipedes have a single set of legs on each body segment and fangs on the head containing poison. This poison can cause problems if you are bitten, although they are not aggressive towards humans. They are however carnivorous to other insects so they do kill and eat Silver Fish and spiders (a good thing). Don't confuse them with

millipedes, which have multiple legs on each body segment and are vegetarians.

Cockroaches are actually five species. They are: American, German, Brown Banded, and Oriental. All are pests and can contaminate food with feces and body parts. Some have been documented to carry Salmonella and a species of Mycobacterium, which can potentially cause TB. Droppings have been reported to cause allergic reactions in sensitive people and studies have suggested that roach antigen is a cause of asthma in children living in high-density housing projects.

Common House Fly and the **Black Fly** (as well as others) can contaminate food with bacteria on their sticky pads. Black Flies also bite. Studies have suggested that flies can transmit TB, E-coli infections and Typhoid.

Book Lice: This tiny insect is hard to eradicate once established and can eat and thus damage the pages of books.

Dust Mites, which are found in house dust in corners and rugs, actually eat the dead skin cells that we all shed. While they do not carry disease the fecal material from the mite is strongly allergic in many people and can account for asthma in adults and children.

Mosquitoes: These insects are nothing but trouble because they transmit a variety of infectious diseases to humans as well as animals and birds. They transmit West Nile Virus which has been a serious problem in Texas, they also transmit Dengue Fever virus which is a growing threat in the southern states as well as Central and South America, they transmit Malaria which is a world problem and growing, and they transmit other tropical diseases such as sleeping sickness, yellow fever, etc.

Keep mosquitoes out of your buildings and wear repellent containing Deet. Remove all standing water from around your facilities including old tires and buckets – and treat swampy areas to kill the larva. The only good mosquito is a dead mosquito.

Jeff Johnson can be reached at: jeff@rfproof.com



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Operations Guide

Being Efficient in the Digital Age

by Chris Tarr

Change is often the driver for more change. For example, my recent change in employment gave me an opportunity to look at certain workflows and find ways to make life more efficient with all the new tools out there at our disposal. Going from a Fortune 500 company to a 15 employee non-profit, really opens your eyes to how technology can make life easy, or not so easy!

I'm finding more and more that "cloud computing" is an ideal solution for many different applications. However, before you dive in and start swimming, you truly need know what you're getting into and make sure you're prepared for what lies ahead after the transition.

Here at Radio Milwaukee, the previous Engineer moved everyone off of a file server and onto a cloud storage system. The biggest reason for that was necessity – the studios and administration offices are in two separate buildings with two separate networks, and getting them to work together was always a challenge. This eliminates that. Now everyone can access things from anywhere, anytime. There was a bit of a learning curve, but the staff seems to have taken to it pretty quickly. Reviewing the results of that got me thinking about how we could leverage cloud services to not only increase productivity, but also give us capabilities that were previously out of our reach as a small organization.

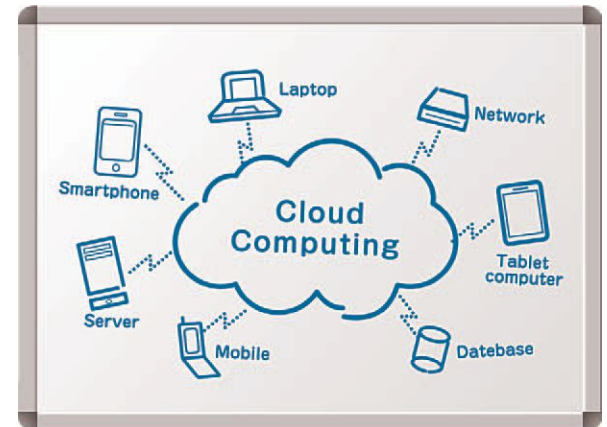
Shortly after I started, I was tasked with moving our organization off of the email system we were on. We were (due to co-location) on the local School District's servers, which left us with very little control over email. If we needed accounts added or deleted, it often took time to get through the proper channels. Plus, there was no ability to customize the service – it was designed to handle the needs of a major market school district, not a small non-profit organization. After looking at several alternatives, I ended up using a cloud solution for that as well. It's accessible from anywhere, anytime, and the user and account management is as good as any enterprise application.

Of course, there are some caveats and dangers to moving to the cloud, however I tend to look at them as different dangers from rolling your own servers, not new dangers.

For example, with cloud services your data is just floating around out there somewhere. Can anyone outside your organization see it? Is it encrypted and secure? Who is able physically access the servers that hold your data? Those are important questions that should be addressed. In our case, the cloud provider for our data encrypts the data on the server, and has a very clear privacy and access policy, as well as terms of service

that spells out who owns the data (we do) and the retention and backup policies.

In the case of the email system, the service in it's stock configuration wasn't quite robust enough. We needed data retention for a certain period of time, plus I wanted to be able to back up all the information in the accounts. I was able to purchase "add-ons" to the service to give me the configuration that I wanted. Now I can retain unlimited amounts of data without having to worry about buying larger and larger storage devices – and I get daily reports of the backup results.



Now, having said all of that, what are the risks? Well, of course you risk losing all of your data, if for some reason the provider isn't backing up the way they've agreed. There's also the possibility that the provider you use goes out of business and you lose access to your data. To counter that, do your homework on the provider. Make sure they offer a way to download all of your data in bulk. (Continued on Page 24)

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Teles
A TELOS ALLIANCE COMPANY

by Chris Tarr

Being Efficient in the Digital Age

– Continued from Page 22 –

Make sure their agreement spells that out – even in the event of a closure, they should give you a reasonable amount of time to remove your data. Aside from that, it's always a good idea to occasionally cache your content from the cloud servers and back it up, just to be safe.

The next potential problem is the loss of Internet connectivity. Yes, that can be a problem. However, most current services allow you to sync data and cache it locally so that you can access it while off-line – the changes then sync back up once connectivity is restored. As a plus, most providers now have mobile apps that allow you to access data that way as well. One of the benefits is that because cloud services are mobile by design, you can always go somewhere with connectivity and continue working.

That leads to another point: security. Because your information is available anywhere, anytime – and on any device – it is extremely important that you implement security policies in your organization. Make sure you require device passwords, and that you can remotely wipe any mobile devices in the field. An unlocked device is an open door to your data. For added

security, many of the mobile apps allow you to set a second passcode just for that app, so be sure to enforce that as well. It's also very important that when an employee is terminated, you remove their access to the cloud systems. Since they no longer need to be in your facility to access your data, they can walk out the door, fire up their smartphone and start deleting documents. Fortunately, most services now do non-destructive deletes, so you can recover from something like that. Still, I strongly recommend coming up with a termination workflow checklist to make sure you're covered.

There are other things that cloud services are great for, such as database backups. I've located a PCI compliant, secure on-line backup service that I use to do a daily backup of our SQL databases. What's great about the service I'm using is that the software is written specifically to backup SQL databases directly, so initial setup only takes a couple of clicks. Before the backup is sent up to the server for storage it's encrypted locally on the server. They also include the option to store a copy of the encrypted file locally before uploading, so you have a redundant copy. It's totally secure, with no hard drives with databases floating around or worries about a natural disaster destroying all of our data.

The biggest benefit of using cloud services is reduced cost – not only in infrastructure, but also with labor. Instead of having to buy and maintain servers for email, file serving, and data backups, you simply pay your fees and let someone else worry about the hassles of maintaining the hardware. Yes, there have been some stories about cloud services occasionally going down and taking things off-line. However, unless you have a

large IT staff and lots of money to throw at redundant hardware, chances are pretty good that you'll have the occasional failure if you do it locally as well. The way I see it is that for a small business, it certainly takes the weight off of an already stretched out staff and gives them more time for other pursuits. There's nothing worse than having an email or file server go down when you're working on a transmitter!

Another obvious benefit is work flexibility. When we move to our new facility next year, I'm going to be installing a Voice over IP system for our phones, along with some "softphone" licenses. With VoIP and cloud computing, our staff will literally be able to work from anywhere, as if they were at their desk. That's a great tool to have for recruiting employees – the ability to offer flexible in-office hours, while still being able to get full productivity in the times that they're out of office. I know there are some winter days here in Wisconsin where it would be nice to not have to trudge in through the wind and snow!

A few years ago when cloud computing was in its infancy, it wasn't much more than a novel idea. However, several reputable companies have seen the future, listened to the users, and have created some fantastic services that let small companies have close to enterprise-level file serving, email, backups, and more, without the cost and complexity of having it all set up in-house. All it takes to do it smart is to do your research and look at how you can integrate the services into your workflow.

Christopher Tarr CSRE, CBNE, DRB is the Director of Radio Operations/Engineering for 88Nine, Radio Milwaukee. He can be reached at chris@radiomilwaukee.org

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Chief Engineer

Is It Stuff ... Or Is It Junk

by Scott Schmeling

I'm going to start this column with a startling statement: I'm NOT perfect! I have often said that if you're going to look to me as an example, you may be disappointed from time to time. That doesn't mean I'm not trying to improve. In fact, I have a couple ideas I'd like to share with you today.

As engineers, one of our responsibilities is to keep our equipment operating properly for as long as possible. We try to keep our entire systems running smoothly and efficiently, and we try to do that while keeping expenses as low as possible.

But I have a question for you. When a piece of equipment is replaced, how many of us hang on to the old one for a while? I know that I, for one, absolutely hate to throw something out if it still has a potential use. Sometimes that use is nothing more than a quick source of available replacement parts for a similar unit still in service. Sometimes the unit was replaced, even though it was still working properly—in favor of a newer model.

Generally speaking, we engineers are often labeled as "pack-rats." In fact, I'll bet most of you have a "pile of stuff" somewhere where you can get at it when you need to. Let me make an important distinction here: in my mind, there is a huge difference between "stuff"

and "junk". STUFF still has a potential use or value—JUNK does not!



Is This Stuff – Or is it Junk?

I said in the beginning that I am not perfect. I'll admit that I have a tendency to hang on to things longer than I should. (I could quote the third axiom of Murphy's Law here, but I won't.) I have watched some of my stuff turn to junk right there on the shelf! By the same token, that "stuff" has also gotten us out of a jam more than once. The trick is, knowing when your stuff has crossed the threshold and no longer has value.

But how *do* you know when to save and when to toss? I know I have a cassette machine or two in there. You could say it's a pretty safe bet they will never be used again. Likewise with reel-to-reel recorders (I'll keep *one* just in case) and dial-up modems.



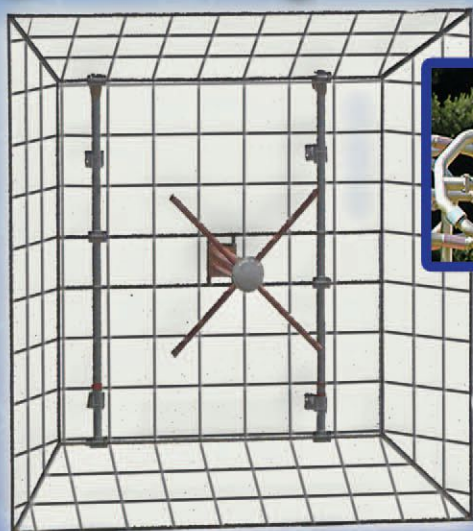

But here is where my inner conflict presents itself. Our news director recently purchased (on e-bay) a portable Marantz digital recorder. Everything was there except the shoulder strap. Knowing I had a Marantz cassette recorder in my "stash" I retrieved the strap for her, proving *that item* had not yet made the transformation from stuff to junk, and justifying keeping it! That is just one example of why this next statement is so difficult. I have made an early New Year's Resolution. I am going to throw something away every day! With luck, I might have it all cleared out—in a couple years!

Knowing that some items have parts more valuable than the item itself, I will, in some cases, dismantle and discard the item—but save some of the parts. That does still count for throwing away, doesn't it? One other quick note, be sure to check local regulations for proper disposal of electronics.

I've developed another bad habit. I stop at my transmitter sites frequently just to check things, but I don't always take a set of readings or do a quick clean up. In fact if everything looks OK I sometimes give the transmitter a quick nod and head out the door. That's going to change, too. Early New Year's Resolution # 2—I am taking readings at every visit. The real purpose of taking the meter readings, in my mind, is not so much to confirm that everything is still running like it

(Continued on Page 28)

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Chief Engineer

by Scott Schmeling

Is It Stuff ... Or Is It Junk

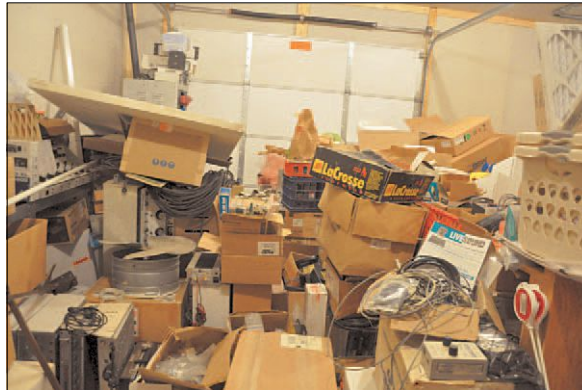
– Continued from Page 26 –

should, as it is to spot deficiencies before a real problem develops. For example, to see that a driver's output is starting to drop, even though Auto Power Control has maintained the TPO at 100%.

And while I'm at it, a little dusting and vacuuming may be in order. Here in Minnesota, crops have all been harvested and the fields are being prepared for their long winter's rest. My sites are all out in fields and in some cases field debris has blown in when the door was open. Or there may be dirt that had been tracked in as mud and has since dried. But even worse is the spider webs (or cobwebs – I'm really not sure what the difference is, but I don't like either one!). If I have to make a late night trip to a site, for instance to change that previously mentioned driver tube, it would be so much more peasant if it was a little cleaner – a properly administered vacuum can make a world of difference where that is concerned.

Speaking of vacuums at transmitter sites, I have your good old basic Shop-Vac at all my sites. Most of what gets picked up is a fairly fine dust, and I was finding that all that dust was plugging the Shop-Vac's

paper filter, causing it to lose suction. Being cheap (make that frugal), I used to take the filter outside and shake it clean (be sure to check the wind direction before you do that or you'll have a face full of dust) rather than replace it with a new one. But some time ago I found Shop-Vac filter bags that go in the tank. All the stuff you pick up goes inside the bag and because there is so much more surface area, it is much less likely that you will lose suction because of a plugged filter. Using a bag also makes emptying the vacuum much cleaner and easier.



Is This Junk – Or Is It Stuff?

And if you are shopping for a vacuum, I suggest looking for one that doubles as a blower. They will have two round holes for the hose to plug in – one for the vacuum and one for the blower. The blower option is really nice because sometimes the vacuum action just doesn't quite do it. I mention this because I have a couple vac's that I didn't realize were "vacuum only" when I purchased them. I've learned to pay closer


attention. Just as in life, sometimes you have to suck it up – sometimes you have to blow it off.

This is the last column of the year, so maybe a little housekeeping is in order. First, I would like to thank every one of you who took the time to read this column. And a very special thank you to those who respond in one way or another. Over the past year I have received many e-mails from readers with questions or comments or relating similar personal experiences. In fact, just last week I got a request for more information on the STL-10 power supply modification I wrote about nearly a year and a half ago. I read and reply to every e-mail I receive. I especially like reading your personal accounts of similar situations.

In the last column, I talked about a number of computer programs, both free and fee. I got an e-mail from Jim Trapani, who operates JT Communications. On his website (jtcomms.com) he lists a totally free "cartwall" program called Playright, which features nine playback decks. You will find a download link from the "What's New" button on his home page. Jim invites you to check it out for yourself. If any of you have a favorite website or software application you'd like to share, please let me know about it.

As this year draws to an end, I hope you all have had a wonderful 2012. In early November of this year, Hurricane/Superstorm Sandy came ashore and caused great devastation especially in parts of New Jersey and New York. My thoughts and prayers are with everyone affected. May we all look forward to a happy and prosperous 2013.

Scott Schmeling is the Chief Engineer for Minnesota Valley Broadcasting. Email him scottschmeling@radiomankato.com



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The more you saw, the more convinced you were that IP consoles made sense for your station. Problem was, you had small spaces to work in. Some behemoth board that looks like a '78 Oldsmobile just wouldn't fit. But there was no way you'd settle for some cheap plastic PA mixer that looked like a refugee from the church basement. "Wouldn't it be great," you thought, "if someone made an IP console that didn't take up a whole room?"

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But what sealed the deal was finding out you could run two RAQ or DESQ consoles with just one Axia QOR.16 mixing engine — you know, the one with all of the audio I/O, the power supply and the Ethernet switch built in. That brought the cost down so low that when you told your GM the price, he actually didn't swear at you (for once). Make another decision like this, and you might just be changing the sign on your door from "Chief Engineer" to "Genius."

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Maintenance Logs

Important Diaries for Important Equipment

by Mike Callaghan

When you buy a used car, one of the nicest bonuses you can find is that the previous owner kept good service records.

It shows you the history of what was done, what the car needed, and how it was maintained. Knowing this, prepares you for the future, and you can see what to expect, what the weak points were, and what it took to fix them and keep the car running happily.

You can see where I'm going with this. Along with your car, there's probably a transmitter or two you need to keep running. Knowing what the normal parameters have been in the past will be valuable to you when something changes in the present.

If the output power suddenly drops to half of what it should be, the numbers you jotted down a week ago when it was running properly can point to a smoking gun faster than anything – and they'll give you a starting point to begin your search.

When you write down the readings of the various parameters on a piece of paper, and also what adjustments and fixes you applied to a piece of equipment, it becomes a maintenance log.

The time was when the Commission required a formal maintenance log, and you made an entry each and every time you went to the transmitter. The rules said you'd visit

the transmitter at least once every day. This was later amended to five times a week. Now the rules specify a visit whenever you feel like it; but they also say you are responsible if anything goes wrong.

If you agree that logging the values is a wise thing, the easiest way to do it is to make up a formal maintenance log, with a space for everything you want to write down. This will not only make sure you don't forget any readings, it will also allow easy comparisons between previous and present numbers. For example, if you noticed the plate voltage was dropping by 200 Volts a week, that trend might encourage you to take a glance inside before it dropped to zero.

If your transmitter uses a tube-type driver, you'll have additional drive, screen grid, and cathode values that want attention. These are just as important as the final stage values; the driver can do you in just as assuredly as the power amplifier.

This sort of log is exactly what spreadsheets are meant for. I like Excel; it's easy to use, and the colors it provides are a big help in making the log interesting and easy to use.

In places where you show a choice, like which antenna pattern or which transmitter was in use, consider using an abbreviation for the choice that can be circled instead of just a blank to fill in.

This reminds you of what the choices are and leaves no doubt as to what you meant.

After you've provided spaces for the specific readings on the sheet, leave a number of blank lines for the maintenance comments. These include what was changed, tuning adjustments, overload and VSWR resets, air filter changes, etc. It's important to know when these are done, so you can look back and get an idea of how long the transmitter will go before it needs more TLC. This freeform part of the log is also where you note equipment failures that are important to the FCC. Antenna monitor, tower light, and perimeter fence issues should all be noted here, as well as when they are restored and functional again.

If you're lucky enough to have a main and a backup transmitter, put the readings for the main on the front of the log page, and those for the backup on the back of it. This way, the sequential readings for one transmitter will always be adjacent to each other, even if it's not used for a period of time. You'll be able to spot trends without flipping between different pages.

Directional AM stations have a lot more to keep track of than FM's or Non-directional AM's do. The ever-critical antenna phases and ratios must be monitored and kept within tolerance.

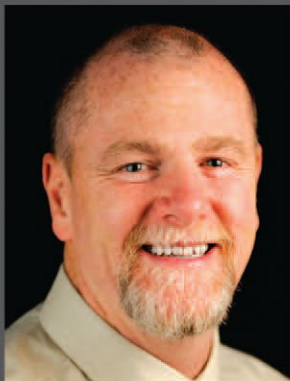
Depending on the antenna system, a good rainstorm or flood can saturate the ground and throw things asunder. When these numbers start to drift, it can be a three-bell alarm. This is why a separate log just for the antenna system is a good idea. By arranging the columns for easy comparison, it's easier to know when you're headed for trouble. The sheet I use has the minimum legal value in the far left column, and the maximum value in the right-most one. The columns for the values are between these two, so when you write in a value, it's easy to glance at the left and the right to make sure the number you have is legal between the two of them. (Cont. on Page 32)



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Maintenance Logs

– Continued from Page 30 –

Don't forget to include spaces for the peripheral readings as well: the STL signal strength, AFC voltage, exciter output, driver VSWR, and coax line pressure are also important. If your facility broadcasts in HD, the parameters of that operation are important to the FCC as well.

If you have room, consider a space to verify that you've compared the important remote control readings with those on the transmitter. The commission expects these to be within 2% of each other. This can be a simple checkmark, and the verification is that you draw a circle around it.

Try to arrange the readings in the same sequence as they are taken from the equipment, starting at the top of the page and working down. A separate area for the transmitter and exciter, then one for the peripherals, and finally the HD, makes it easy to use. Leave space for the date, time spent, and your signature as well. These labels should go down the left margin of the page, one in each row of the spreadsheet. Then, to the right of each label, you'll have a column to write down the readings when you take them. You should have room for seven of these columns on a normal page.

The beauty of having the readings side by side is that it will be easy to compare the values you found on different successive dates. Trends, both good and bad, will be easy to spot.

After the forms are printed, you can punch them and keep them in a binder. This also allows space for service notes and other information pertinent to the equipment. If you have a difficult problem and run out of comment space on the log forms, you'll be able to supplement those notes will filler paper to gain more space. Don't cut things short when you're

documenting a repair or the work you've done. It's much better to have too many notes than not enough. Include phone numbers, names, part numbers, advice you've been given, dates, times, things you tried that didn't work, that did work, smells, noises, just about everything that you noticed. These will all be valuable when you describe things to the manufacturer or someone trying to help you.

Having reliable data about when parts or tubes were installed is valuable when something fails early and you want to claim a warranty adjustment or replacement. If a tube fails early, the operating parameters it had when it was working will help the tube manufacturer diagnose what went wrong and how it can be avoided later.

The Commission used to require the logs be kept for two years, but many stations keep maintenance logs indefinitely. Considering how long most transmitters are kept, it makes sense to see how they were running 5 or 10 years ago. As parts age, the internal operation of the transmitter will change. You can see it happen if you have good records of the different parameters.

Be sure to include work performed on any equipment related to the transmitter plant; tower work, air conditioner repairs, lock combinations changed, etc. These will be important if you need further work done and questions arise about warranty intervals, who was on-site, and who did what. In some cases, the insurance people will want to know details related to things that have happened, and it's a lot better to have it logged than to have to rely on hazy and distant memories.

Many of the techniques you use for the transmitter log can also be applied to the equipment used in the studios. A separate sheet for each device kept in a binder will go a long ways towards knowing what parts are most likely to fail, what the costs are to keep specific equipment running, and how long gear can be expected to last. The days of expend-

KBIG Transmitter Maintenance Log	
104.3 Mhz 82,000 watts STL WBS-371 (943.5 Mhz.) Clear Channel Radio, Los Angeles	
Date:	11/9/12 11/6/12
Nautel NV-40	
Forward Power	34.8 34.9
Reflected Power	1.2 1.4
P.A. Voltage	42 42
P.A. Amps	1135 1131
DC to RF Eff. %	67 70
P.A. Dissipation	14.6 14.6
PA Volts	38 38
PA Amps	114 110
RF Drive (Watts)	206 200
IBOC Fwd. Pwr.	365 361
IBOC Refl. Pwr.	12 13
STL RF Level	68 70
Pilot Level (d)	9.3 9.3
Ambient Temp. (F)	71 74
IBC Cal. Verified	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Time In	1410 0910
Time Out	1445 1015
Eng. Initials	MB MB
Comments:	11/9/1220 DEIGERS OFF. IROC RESET. 11/10 MET TECH FOR SENSET OIL CHANGE @ 1015

ables are mostly behind us; we don't change tape heads and pressure rollers these days, but lasers in CD players have a finite life, and display monitors often have a meaningful demise if they go black during the morning show.

This sort of log is also a good reminder if you have to prepare monthly or weekly reports about what has happened on your watch. It never hurts to let your manager know how busy you've been, and how well you've been maintaining his station.

Mike Callaghan is the Chief Engineer at KIIS-FM in Los Angeles, CA. His email is: mc@amandfm.com



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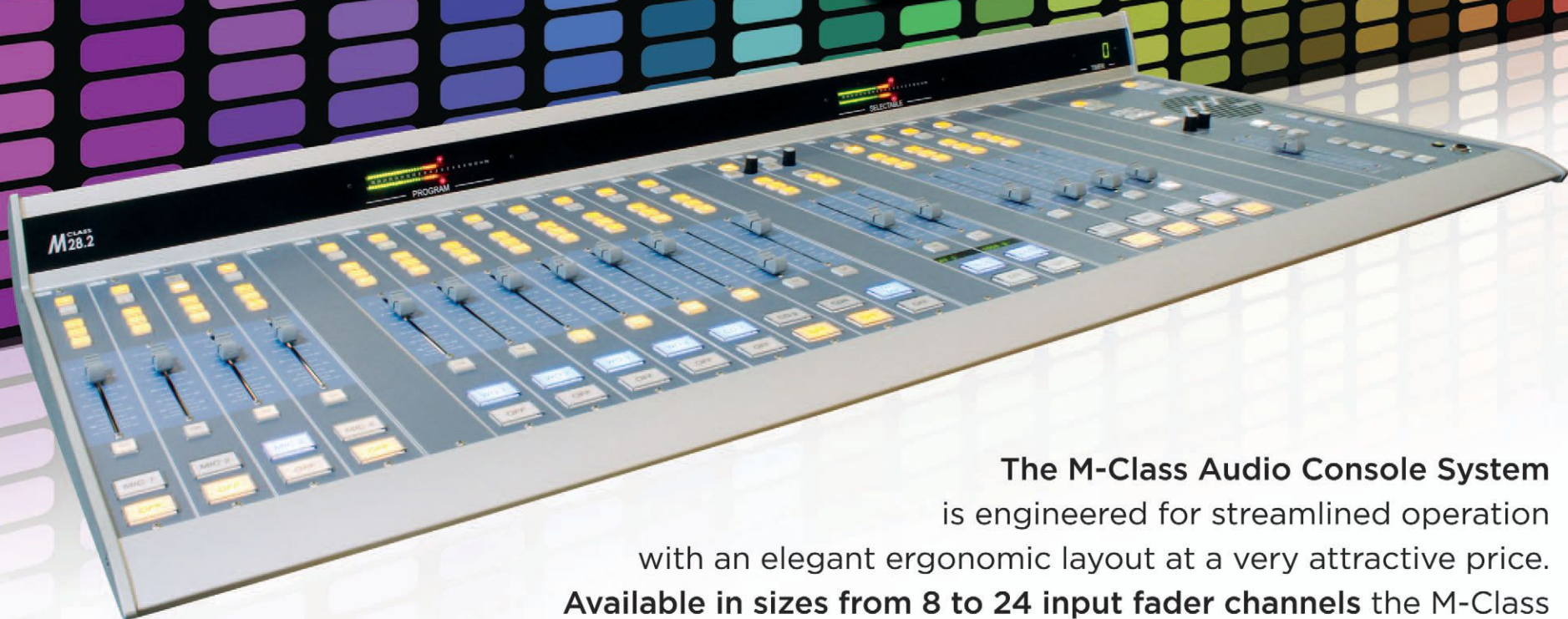
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Antenna Topics

The NAVTEX System

Considerations for the AM Broadcast Band

by Steve Callahan

If you're like me, you slow down when you pass a tower you aren't familiar with and you give it a close look. One Sunday afternoon I was out riding around, and I saw one very nice AM tower in the middle of a field, a couple of towns over from where I live. I wasn't familiar with any AM station associated with a tower in that area and the multitude of *No Trespassing - Government Property* signs were enough of a warning for me not to take that closer look. I later discovered that the mysterious tower I had found was a government Loran-C facility that had been around for decades. It started me thinking about long-distance radio navigational aids, and some of the teletype-like sounds I used to hear on my shortwave receiver when I was a young DX-er.

NAVTEX or navigational telex, is an international system that delivers navigational and meteorological messages and marine safety warnings to ships. It is an automated system that can be received approximately 400 miles off shore. It operates just below the standard AM broadcast band, at 518 kHz and 490 kHz. The 518 kHz is the international frequency, and is broadcast in English. The 490 kHz broadcasts are used for local languages, and is not used in the continental US.

A NAVTEX message is delightfully low tech. It utilizes binary, frequency-shift keying at 100 bits per second,

with a 170 Hz frequency shift using forward error correction by transmitting each character twice. Contained within a typical message is a ten second phasing signal, a four character code showing the originating station, a message subject code, a no-repeat code, and then the actual message text, an end of information four-character code of NNNN and an end of emission idle signal. These codes allow messages of no interest to a particular user, or previously received messages, to be rejected. If you watch some of the TV reality shows about off-shore fishermen, you've probably seen the captain of a vessel refer to a fax machine-like device and that is a NAVTEX receiver.



In the U.S., NAVTEX messages are broadcast from Coast Guard facilities at Cape Cod, MA, Chesapeake VA, Savannah GA, Miami FL, New Orleans LA, San Juan PR,

Cambria CA, Pt. Reyes CA, Astoria OR, Kodiak AK, Honolulu, HI, and Guam.

My curiosity about the technology behind the NAVTEX system drew me to the LBA Group who had just replaced a conventional, three tower NAVTEX array on Guam with one of their small aperture antennas. We've all heard about low profile AM antennas which supposedly replace conventional quarter wave AM radiators (but so far without anywhere near the efficiency of the quarter wave radiator), so I was curious to see what LBA Group had come up with.



On Guam, the U.S. Navy NAVTEX site previously had used three, 300 foot vertical towers, but LBA used a suite of subsystems called SAMWAS-200 which incorporates a single grounded 199 foot, electrically short transmission antenna rated at 2500 Watts.

The benefits of such a system to commercial broadcasters are obvious. A shorter tower eliminates the need for aircraft lighting and makes tower maintenance easier and less costly. A grounded tower reduces system vulnerability to lightning and reduces RF safety hazards. Jerry Brown at LBA Group shared with me that LBA has a long experience with short antenna systems. The SAMWAS-200 is a specific derivation of a family that is offered in the 300 to 500 kHz range.

(Continued on Page 36)

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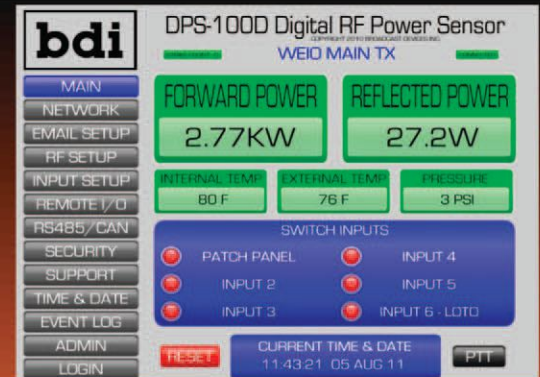
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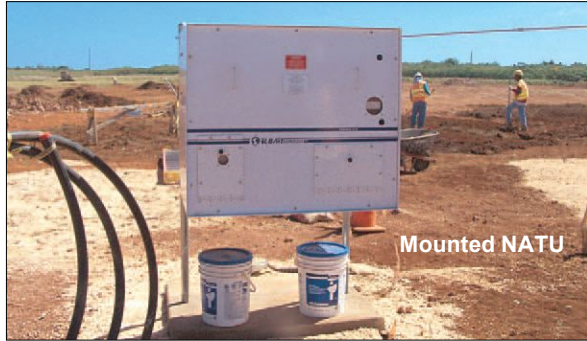


Antenna Topics

by Steve Callahan

– Continued from Page 34 –

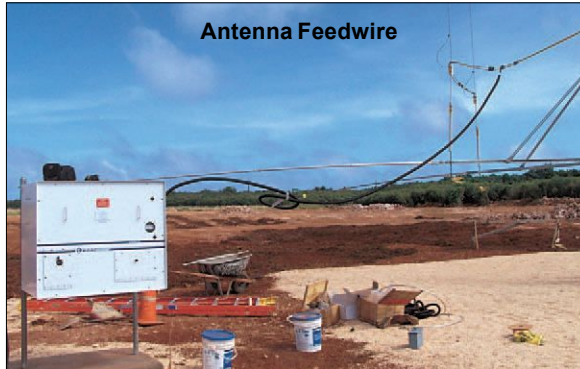
A unique feature of this system installed at Guam was the time division duplexing of both the 490 kHz and 518 kHz signals. Other factors considered at the Guam facility was that the transmitter building was a full 3,000 feet from the tower, with an existing buried 3-1/8 inch coaxial cable run, with no power or control feeds to the tower.



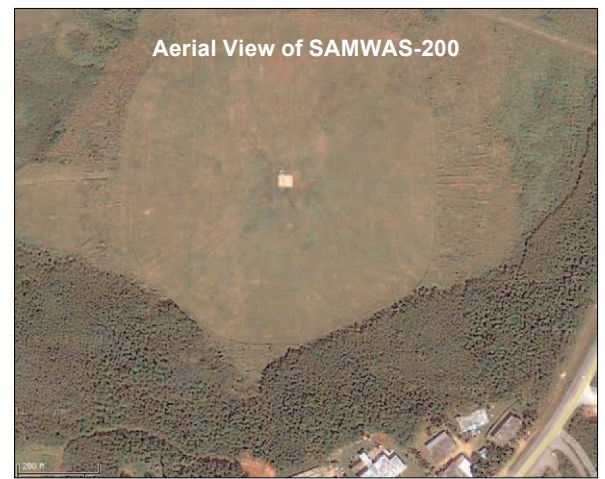
Remembering basic AM transmission theory, I asked if the SAMWAS-200 needed a ground plane, and what challenges that presented on a Pacific island. Jerry noted that the Guam facility had a standard 1/4-wave buried ground system, consisting of 120 radials much like a broadcast ground system. It seems that on Guam, because of coral rock, they had to excavate the entire ground system area to lay out the radials, and then they backfilled the entire field.

My curiosity was really piqued now. Their relatively short tower incorporated a proprietary design of loading

elements and feedwire systems, much like a modified folded unipole. Jerry added that while it has good efficiency on the order of 85% of field, it was designed for stability. As we all know, most short AM towers require Antenna Tuning Units to keep the VSWR that the transmitter sees reasonable. A lot of RF energy is lost in an ATU achieving an acceptable match with a short tower, but the SAMWAS-200 is inherently stable and doesn't require an ATU.



I just had to ask Jerry if this technology was experimental or ground breaking, and he said that LBA has employed variations in bandwidth enhanced antennas for some time. LBA has a series of mobile systems that cover the whole broadcast band with a 100 foot tower with powers of up to 5 kW, which are tunable and trailer-mounted. LBA also offers a man-portable system which has been used for temporary antennas and field surveys. The Marines use this technology in Afghanistan, and the Army Corps of Engineers have used it for non-broadcast applications. Chances are very good if you have a problem like the Navy had on Guam, LBA Technology Group can probably help you too.



In my travels, I see quite a few aging AM transmission facilities which were built just after WW2 in the growth spurt of new local AM stations at that time. Judging by the many local AM stations that still continue to serve their communities of license, AM is still worth maintaining. Some AM stations have been beautifully maintained but others have suffered the ravages of time. Any proven technology which can make it easier for the AM station to maximize its signal and to continue to be heard in its coverage area is a good thing.

Take a moment and think about your AM station's coverage issues which might have gotten worse over the years. We can't stop the proliferation of computer monitors and fluorescent light bulbs, but chances are good that you can maximize your station's signal with some creative technical solutions.

You can reach Giles Lambertson at LBA Technology Group through lbawireless@lbagroup.com

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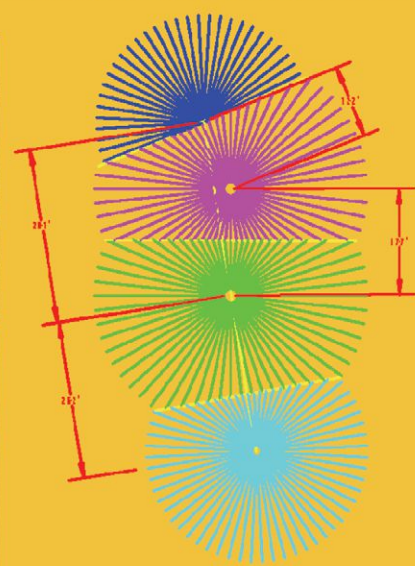
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LPFM Guide

FCC Announces Final LPFM Meeting Window to Follow

by Leo Ashcraft

In the past few weeks, with the election and the arrival of Hurricane Sandy, we have all been reminded of the importance of radio to provide news and life saving information. Many station operators remained on the air with backup generators and strengthened their communities with local information.

Soon the FCC will open the doors to allow even more radio stations on the air to serve hyper-locally, which will further strengthen communities across the country. In an FCC open meeting on November 30, LPFM Radio will dominate the proceeding as they begin to finalize the Local Community Radio Act, and the long anticipated filing window date will likely be set. This filing window will likely be the Summer of 2013.

The commissioners will also consider final procedures to deal with more than 6,000 pending applications for FM translator repeater stations. These issues overlap because translators compete for the same spots on the dial as LPFM stations. The actual rules and procedures to be decided, have yet to be released by the Commission.

Many interested parties such as the National Association of Broadcasters, religious broadcasters, National Public Radio, and LPFM advocacy groups, have been participating in this proceeding with final comments following up the May 2012 comment period.

Many positive changes for LPFM are on the list, notably power level increases, new 2nd adjacent waiver procedures, local originated programming requirements, the future of LP10 – versus LP50 class – and several other issues. Please review my previous articles at Radio-Guide.com for a full listing on the proposed changes to the LPFM service.

This meeting should be the final FCC meeting before the Commission takes a vote on the final displacement and date of the upcoming LPFM filing window. With close to 13 years since the first and only LPFM filing window, this meeting and subsequent filing window cannot come soon enough for LPFM Radio supporters.

Times They Are a Changin'

As many of you have followed my regular column here in *Radio Guide* over the years, you have probably come to the conclusion that I am an avid LPFM Radio supporter. You would be correct. Even so, I operate a successful Broadcast Engineering Firm known as Nexus Broadcast, LLC. I began my engineering career in 1985, literally as a kid. I have witnessed the industry change drastically during this period. It has been an experience that I would not change for the world. There is nothing like helping visionaries build communities through radio around the world.

But times are changing, and now with close to 30 years under my belt, I am interested in trying my hand at new things. Though I will never lose my love for radio, "It gets in your blood." I will begin dropping many services provided by Nexus beginning in January 2013. I will continue to support LPFM Radio and intend to be here for those that wish to file applications during the Summer 2013 window, however. This is in no way a reflection on the industry, since local radio – especially hyper-local radio such as LPFM – is doing very well right now, as this country attempts to find it's direction – and its roots.

Local radio is where it's at, and where its always been. Though large radio conglomerates continue to make the same mistakes and continue to see failures, local radio is now seeing a huge come back. Concentration on what their listeners actually want and need is the key to their success – something the conglomerates can't (or won't) pursue. That's good news for the small local radio station operator.

Child's Play – Rebellious Times

When I began my career as a local DJ on my home built PA system at a local hotel that my parents owned, I never had any doubts about what I would be doing for a living when I grew up. I expanded by learning to build my own transmitters and antennas – going from just a block of coverage to eventually the entire city. It was my way of going against the system as a teen. Well, not really, I just wanted to be on the radio!

As a 13 year old kid, my FM station was covering an entire city. It was fully staffed with volunteers 24 hours a day. We spun those famous hits from the 80's, from vinyl and cassette.

(Continued on Page 40)

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LPFM Guide

Final LPFM Meeting ... Window to Follow

— Continued from Page 38 —

I learned the payphone at the hotel could receive calls free, so I tapped into that – and voila, we had a request line. The ringer on the pay phone never worked, so that wasn't an issue. But it rang constantly with requests in the radio booth.

We were a mono station – but I already had marketing skills. I pulled up a 19 kHz audio tone and mixed it into the signal to light up the stereo light. We called it Digital 107.9 and people swore they loved the high tech “digital” sound!

I got scared one day, when the police arrived and asked my station manager if we had a license. He handled it well and they went away. But that started me on my legal path in radio. The issue was actually over a noise complaint, as one of the DJ's had set a boom box outside while smoking a cigarette.

I shut it down the next day not knowing what would happen next. Nothing.

Now it Gets Interesting

But I did receive a call from a local non-commercial station – WLPJ radio in Port Richey, Florida. They asked me to come in, and hired me for the weekday afternoons. I remained at WLPJ for a year as a volunteer until I got my foot in at WGUL radio as the “swing shift” guy on Sunday evenings. I wouldn't leave them

alone, so the Program Manager at the time, Glenn Atkins, put me on the shift. I didn't know what that meant, but I don't think he intended for me to go right on the air, since he told me to come in Sunday and “ride shotgun.” Glenn and I later became good friends and those are the days I miss the most in my life.

There was a misunderstanding, and the guy that was supposed to train me was fed up with his job and thought I was sent to replace him! After banging on the door for ten minutes on my first day, the guy finally opened the door and screamed some profanity – what do you want! I told him, and he finally let me in. He answered a call – screamed at the caller – then looked at me and screamed some more profanities and said, “You want this job? You got it!” And he proceeded to leave the building!

Training? What Training?

So here I am, 14 years old in a real radio station with a real Autogram 8-channel mixer, six reel-to-reels of automation tapes, cart machines, and literally no idea of what to do. I expected him to come back – maybe a joke? He never returned, but I managed to figure it all out with no training – and without missing a beat. You can imagine his surprise when the General Manager called at 5:00 a.m., asking where the guy was! And even more surprising was that this 14 year old kid had been running this commercial FM station all night, and the place wasn't on fire!

The GM was Les Forestor, and we became good friends during my time there. I quickly received more time on the radio – and raises. But even then I knew I wasn't going to make a really good living as a DJ on the radio. I got to know the Chief Engineer Jeff Miller and many Ham operators. I was a sponge for knowledge, and though prior to the Internet days, there was never a

shortage or unwillingness to teach. So my broadcast engineering career began, and continues to this day.

An Era Completes ... A New Beginning – More to Come

I will have additional articles about my days in radio on my blog soon – LeoAshcraft.com. But for now, as part of my partial departure from radio, I will no longer hold a regular column in *Radio Guide* due to time constraints. I will periodically submit articles to the Guide and wish to thank those of you that supported me all of these years. Each time I sat down to prepare another article, I thought of the many friends I have made as a result of these articles. Thanks for your support, constructive input, and friendships!

If you're ever in Northeast Texas, stop by my new venture – The *Radio Diner* – for the best hamburgers in Texas! Yup, I told you I am trying some new things! But somehow I felt I needed to hold on to the good ole' days of radio – it's one of those things you can never get out of your system! One day we may have an actual radio station operating within the restaurant – once they open this LPFM filing window!

Leo Ashcraft is CEO of Nexus Broadcast “Broadcast Outside The Box!” He is a broadcast consultant with over 28 years engineering experience and an avid LPFM advocate for over 15 years. More information at NexusBroadcast.com or 888-672-4234



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Small Market Guide

Resurrecting a Classic “Power Rock” for a Standby Transmitter

by Roger Paskvan

In small markets, economics dictate a lot of happenings. Our station decided that a backup transmitter would be a novel idea. This is all fine and good, but “don’t spend a lot of money on it,” was the directive from management. Well, we found a Collins 828E AM transmitter for a whopping \$400. What a buy – just get it here, plug it in, and away we go. Wrong!

The transmitter arrived with a freight charge that exceeded the cost of the transmitter by several hundred dollars. And getting the 900 pound box into the station basement was not an easy treat. It was too heavy for a couple of guys to handle and had to go down a flight of wooden steps. A local moving company came to the rescue, but requested that the steps be beefed up before bringing this kind of weight downstairs. A carpenter, a lot of wood, and the forty-year-old transmitter was in place. Now, it needed three-phase power – the services of our local licensed electrician proved effective.

An inspection determined that the long journey from Dallas, Texas was hard on the box. A lot of components were loose and some wiring needed repair. A vacuum capacitor was shattered, requiring replacement. The vacuum capacitor price was more than the cost of the transmitter. Well, EBAY is a wonderful

resource and a Russian vacuum cap was soon on its way for a fraction of the price.

With the new parts in place, applying electric power to the unit proved interesting. The 100 Amp main breaker blew, and this meant power supply diode problems. Testing exposed that three of the six diodes were shorted and had to be replaced. Electricity finally came to the old beast and it hummed away. The fan motor sounded like it was grinding metal to metal, but this was fixed by realizing that the long bolts holding the motor together were extremely loose – tightening these made a world of difference.

The transmitter came on a frequency of 790 kHz and we had to retune it to 1300 kHz. This proved to be a considerable job for the inexperienced. Lesson learned, was to fix it *first* on the channel it came, *before* changing frequency. Closer inspection revealed that the final tube was running at 6.5 volts. Yes, these Collins 828E’s were notorious for burning up the filament rheostats – we replaced them both. Now the transmitter tubes were cooking, but still no output. Being a class D transmitter, it had a pulse control modulator card that had three shorted transistors. Finding some 2N6547 transistors was difficult (ECG386 will work). Our standard DigiKey, Newark vendors provided nothing, so we ended up ordering tran-

sistors from China. Three weeks later, the card was good as new, but the power was still less than 200 Watts.

Mr. Art Collins was a brilliant man, but he built a transmitter that had no loading control. What was he thinking? The output network for the 828E is a series of filters made out of huge coils and large 25 kV caps. Everything is tuned by taps, in a horribly complex method outlined in the manual. Hours were spent to tune this network that would not tune up. A word to the wise, forget the fancy test equipment, follow the tap procedure given in the manual and you will be very close to the correct settings.

Finally, some RF power – 1000 Watts to the antenna at an efficiency of 55%. “What’s burning,” came out of our station manager’s mouth. Yes something was hot, and the culprit was a large CDE capacitor in the output filter network. This four-inch capacitor was internally shorted. A \$500 replacement was ordered and like magic, the output network finally tuned up like the book said.

Our excitement was short lived, and the new transmitter put out 2500 Watts for less than an hour. The power dribbled down to 400 Watts and just sat there. Varying the filament voltage varied the output power signifying – a soft final. The modulator tube wasn’t far behind. A quick call to Econco had two 4CX3000F7 tubes on their way for a hefty \$3,000 bill. With new tubes, our transmitter really came to life, putting out rated power at an efficiency of 87%.

The boat anchor was resurrected. The Collins 828E was nicknamed the “power rock” because of its clean sound and good modulation. Some \$6,000 later (and at least 100 hours of engineering time) we have a standby transmitter ready for emergencies in our small town radio station.

Roger Paskvan is an Associate Professor of Mass Communications at Bemidji State University, Bemidji, MN. You may contact him at: rpaskvan@bemidjistate.edu

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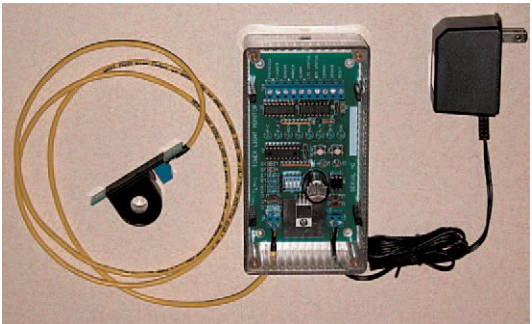
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*Kris Rodts, Director of Engineering, IT & Facilities,
CKUA Radio Network*

“Considering the LX-24’s attractive good looks, modularity, traditional console layout and functionality, I can’t wait to get my hands on one!”

*Greg Landgraf, Senior Engineering Manager,
Corus Radio Western Canada*

“I didn’t think Wheatstone could improve upon the E-Series of consoles, but they have done it with the new LX-24. This is a beautiful, well designed console and the individual faders, integrated meters with overload indicators and low profile table-top design make this a must have for our facilities.”

*Michael Cooney, Vice President of Engineering & CTO,
Beasley Broadcast Group, Inc.*

“Cool and sexy (I sound like Bruno from Dancing with the Stars). A great addition to the WheatNet-IP family.”

*Norman Philips, Vice President of Engineering,
Townsquare Media*

“I am very impressed with the sleek new design that incorporates single channel-strip architecture, integrated metering and stereo cue speakers in a thin, sloping chassis that needs no cabinetry cut out. Well done.”

*Erik Kuhlmann, Senior Vice President of Engineering,
Clear Channel Media + Entertainment*

“Wheatstone’s innovation continues to make AoIP a viable product for professional broadcasting facilities. Just a few things that make the LX-24 stand out to me are the clear and decisive metering, individual fader modules, and “out of the box” thinking with faders for the headphone and monitor volume controls instead of rotary knobs.”

Phillip Vaughan, Chief Engineer KFROG, CBS Radio

“The LX caught my attention on the NAB Show floor. The look, form and function are unlike any other IP console available today. The easy-to-read buttons and displays are just second to none, not to mention the most bang for the buck. I can’t wait ‘til I have the opportunity to deploy my first LX.”

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