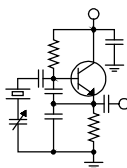


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

FEBRUARY 2021 • VOLUME 31 • ISSUE 2 • W.C. ALEXANDER, CPBE, AMD, DRB EDITOR

‘Tis the Season

Lightning. I hate it. I have spent the past 44 years dealing with lightning – mopping up the damage it causes, trying to prevent strikes and mitigating potential damage. As we roll into February, I am reminded that some of the worst lightning damage I have ever dealt with has come in this month of the year, which is counterintuitive. I can’t explain why February has historically been a bad lightning damage month for us, but I do pay attention to the calendar, and so should all our engineers. At the very least, we should take this opportunity to check our static dissipator arrays, ground straps, ground wires, and tower base transmission line grounds.

I remember 32 years ago buying the first solid-state transmitter this company ever purchased and how skeptical I was that it would survive the first thunderstorm. It was actually two solid-state transmitters, day and night units, purchased together, a Nautel ND10 and AMPFET-1. Those went in at (then) KPBC in Dallas, a location known for lots of convective activity. The folks at Nautel provided me with some good information as well as a box of funny donut-shaped things they wanted me to put on all the wires, cables and transmission lines coming into the cabinets.

Being careful to follow all their instructions and recommendations, I installed the two transmitters, fired them up and crossed my fingers. Amazingly, the only thing I had to deal with after the first severe thunderstorm came through the site was a little water coming in over the top of the front door and leaving a puddle on the tile. But no damage to the transmitters. In fact, I can’t remember ever having to deal with any lightning damage at that site, from installation until we sold the station many years later. Clearly those mitigation measures worked.

Over the years, we and Nautel have refined our approaches to lightning damage mitigation. It’s a pretty rare thing for us to sustain direct damage to a transmitter as the result of a lightning hit. Our official position and recommendations for site lightning protection are memorialized in a white paper at: http://crawfordmediagroup.net/Eng_Files/Lightning%20Protection.pdf

Once in a while, however, we will take a hit that produces damage somewhere, and when that happens at a location where we had things buttoned down and do not have a history of lightning damage, that is a clear indication that something has come loose. In every such case, we have found something.

We took a grand mal strike on the tower at the studio in Detroit that really ate our lunch, and when that happened, we found a broken ground lead on the tower where the transmission lines were bonded before making the turn into the building. Without a place to jump off, the current followed the transmission lines into the building and transmitter.

On another occasion, we took a hit on our 80-foot studio STL tower in Hammond (Chicago), and the current found its way into our equipment racks and did some damage. In that case, the ground rod connections at the tower base had come loose, evidently as a result of being hit by a car (the tower was at the edge of the parking lot behind the studio building). No one noticed until we took that hit and sustained substantial damage. After that, we Cadwelded the rod connections.

I can remember two other occasions where something similar happened, one at Burnham (Chicago) and one on Red Mountain (Birmingham). In both cases, a copper thief had stolen part of the heavy-gauge ground wiring, leaving either the tower, the transmission lines or the building without a good earth ground. That Birmingham copper thief kept coming back, hitting our site and the IHM site next

door until the police laid in wait inside the building and caught him. He went to prison, but when he got out, he started hitting the IHM site again. And he got caught. Again.

The point is, we have got to inspect our ground infrastructure on a regular basis, but especially as we head into lightning season. We've got to follow every ground strap and cable from source to termination, make certain that it is complete and intact, and check the connections for corrosion and mechanical stability. Wherever possible, those connections should be exothermically welded and not just clamped. And if they are in a traffic area, we may need to install bollards or other measures to protect them.

Years ago, Holiday Inn had an advertising slogan: "The best surprise is no surprise." That applies to hotel rooms and tower sites. We should never be surprised by lightning damage that occurs as a result of a compromised ground infrastructure.

The Silent Killer

One other point I'd like to make is something I have learned over the past ten or so years. Even if you have an excellent ground infrastructure that provides a low-impedance path for

lightning current to earth ground, there remains an invisible killer: H-field.

All broadcast engineers should be well acquainted with the principle that whenever current flows in a conductor, there is produced a magnetic flux that links with (encircles) the current in that conductor. When lightning hits a tower and between 5,000 and 20,000 (or more!) amps of current momentarily flow through the steel to ground, a very strong magnetic field is produced. The lines of flux from that field will cut every conductor within shouting distance and induce a current.

Longer conductors will cut more lines of flux and a higher current will be induced. The voltage produced is dependent on the impedance on either end of that conductor, but even with low-impedance terminations, damaging voltages can be produced as a result of the ultra-high-intensity H-field.

Unshielded low-voltage cables, such as audio, AES and Ethernet cables, are the most susceptible, especially long runs of those cables. Thermostat wires are another likely recipient. It is the equipment connected to those conductors – Ethernet switches, NICs, audio and HVAC equipment, that is likely to be damaged.

So what can be done? One possibility is to use shielded cable. I have a love-hate relationship with shielded CAT5/CAT6 cable. I love the shielding and RFI/EMI immunity, but boy is it a pain to put connectors on. Further, you can't in my opinion count on a crimp to make and keep a good electrical connection on the drain wire – you've got to solder it. All that exponentially increases installation time. Is it worth it? Ask yourself that as you're going around after the grand mal strike replacing switches, NICs and op-amps.

Another mitigating measure is to install such cables in conduit. If you have the option of conduit rather than a plenum run, go for the conduit. And yet one more option is the clamp-on ferrite core (see Figure 1). That core will make the conductors in the cable have a high impedance to fast-rise-time H-field induced current. It won't stop it cold, but it will, in many cases, reduce the produced voltage to a level that will not produce damage.

Do yourself and the company a favor – check all your ground infrastructure right away and regularly thereafter, and give some thought to possible routes for H-field damage. You'll save us, and yourself, a lot of grief when lightning strikes.



Figure 1 -- A couple of clamp-on ferrite cores are visible in this rooftop junction box. The others are hidden behind wiring and pull-tape in the box, but every cable in the box has a ferrite installed. Here we employ belt and suspenders -- the CAT5 is also shielded and in conduit! Why take a chance?

The New York Minutes

By

Brian Cunningham, CBRE
Chief Engineer, CBC – Western New York

Hello to all from Western New York! Things quieted down considerably last month as opposed to the events that occurred over the previous two months. It seemed that at every turn, something was breaking down, burning up or just malfunctioning, which kept me hopping to keep up on everything. I know (and expect) breakdowns from time to time, but they could come at some sort of intervals instead of all at once!

I recently received a phone call from a lady who is a teacher in the Buffalo school system and also works part-time at one of the locally owned radio stations. She stated that she had a student who was interested in radio engineering and was inquiring if I would be available to speak with him and give some advice as to what he would academically need to pursue a career in broadcast engineering. I am looking forward to meeting this young man and perhaps having him shadow for a day or two to get a general idea of what broadcast engineering involves.

Inquires such as this are few and far between these days, and hopefully I can elevate his interest in pursuing broadcast engineering as a career. I was fortunate that I had a mentor that took the time to work with me as a teenager pining to get into radio, and I would welcome the opportunity to pay it forward to some youngster who shows a keen interest in this field.

Last month I reported an issue with the PA modules in our BE FSi-201 transmitter at the Rochester FM. Three of the modules were operating at half-power, which indicated that one of the two output MOSFETs had failed. BE has a module exchange program that provides you with a new (or rebuilt) module for the price around \$2,000 each. We opted to send in the defective modules for repair instead of utilizing the exchange program because of that high cost. The first module we sent in has been

repaired at the cost of less than \$450, so this decision was definitely the way to go.

I wish that the modules were field

repairable, but with surface mount components, I do not have the necessary equipment to work on them, and finding the correct parts poses yet another obstacle. How I long for the old days when we used to fix most any problem down to the component level, not swapping modules or boards to rectify a problem.

On January 26th, we experienced some pretty nasty weather here in

Buffalo, starting out with freezing rain, then grapple changing over to snow. As luck would have it, our commercial power went down at the WDCX-FM transmitter site, but the generator failed to come on. We had just recently had this generator serviced, so I was at a loss as to why it did not fire up immediately.

It took me about 45 minutes to drive to the site, but commercial power was restored before I arrived. After checking all of the equipment in the transmitter building to ensure that all was working properly, I turned my attention to the generator issue. I found that it was left in manual mode; therefore it would not have started automatically when power dropped.

I assume this was an oversight when the service contractor serviced it. However, I cannot lay sole blame on the serviceman. I should have double-checked his work after it was completed. This definitely goes down as a lesson learned! I did notice that the sides of the battery were starting to swell, indicating a pending failure of the battery, so I slid down to the local auto parts store and purchased a replacement battery and installed it, making sure that the controller was in the automatic changeover mode.

That about wraps up another month here in the great northeast, and until we meet again here in the pages of *The Local Oscillator*, stay safe, social distance, and happy engineering!



The Motown Update
by
Mike Kernen
Chief Engineer, CBC–Detroit

Event Horizon

Oxford defines event horizon as a theoretical boundary around a black hole beyond which no light or other radiation can escape. An absolute and guaranteed point of no return.

Discrete audio and logic have reached a metaphorical event horizon within broadcast facilities. In truth, all types of audio and visual mediums are evolving and by incorporating AOIP (Audio Over Internet Protocol), facilities like ours are progressing too. Technological progression is perhaps inevitable, but it clearly takes time and effort – and the attendant expenses require thorough justification. Impetus for change almost always lags its necessity.

The Crawford Broadcasting facility in Detroit has undoubtedly moved beyond a point of necessity, which was recognized a few years ago when several writer/producer studios were equipped with Wheatstone E6 consoles. Partially upgraded areas of the TOC also use WheatNet networks to deliver audio packet-style to various places.

Almost ironically, WheatNet is used in our NexGen system but then converted to discrete AES audio prior to its delivery to the “Bridge” TDM router, which delivered it to studios where other satellite routers are connected. As of today, only the three Detroit control room studios remain on their Wheatstone G6 surfaces and satellite cages, which have marked roughly fifteen years of duty helping God’s Word reach our listeners.

Sturdy and useful as they once were, the Wheatstone Bridge and G6 surfaces are no longer reliable, nor are they sanitary. They also seem to have become inordinately sensitive to H-fields the 500-foot lightning rod just out back occasionally whacks them with.

The old Wheaties deserve an honorable sendoff, though, having been continuously on the air for something like 79 million minutes. What would be a fitting tribute for these? A burial at sea? Behind a velvet rope in the broadcast history display at the Smithsonian? Shot into space by a railgun aimed precisely toward a deep-space black hole, perhaps? I think I favor that last one, but I’m fine with any place I

don’t have to worry about them spontaneously rebooting or getting peppered with faults every time it rains.



Pre-launch Sequence

AOIP totality and the end of an improvised fusion of technologies is excitingly now just around the bend. Currently crammed into my office are the switches, blades, and even an LXE surface that will replace our Wheatstone Bridge system, which stood as a respectable 15-year placeholder between traditional discrete audio and an enduring AOIP design. And while the Wheatstone Bridge combined powerful TDM audio concentration and cross-point

routing with studio consoles, it could not offer what AOIP does – traversal via commonplace and proven Ethernet network infrastructure. Even though such networks have some unique requirements, capable hardware is neither expensive nor particularly exotic.

On the launchpad are Wheatstone’s flagship “LXE” surfaces, which are a collection of building blocks like WheatNet itself. Input faders, monitor panels, button panels, software, and even imbedded single board computers comprise today’s state-of-the-art flexibility and durability, a system light-years from the stalwart and heavily modified LPB Signature II that I sat behind at my first job.

I’ve worked with other Wheatstone AOIP consoles, a few A500s, some Axia AOIP, PR&E BMX IIs and IIIs, an AMX, an ABX and even a 48 channel Rupert Neve with SMPTE timecode, but nothing comes close to what can be done with the LXE. Every display, every button, every knob, every fader and every light can be mapped and customized. Macro scripts (called salvos) can be generated and run with a button press, and the whole thing can be operated from anywhere you can snag yourself an internet connection or deployed in a studio on-screen only if you just don’t want the bulk of a physical control surface.

I’ll be prepping and installing these into our studios over the next few weeks. As my colleagues who have done this already can attest, it’s a big job but remarkably easy compared to what wiring up a new console was like in years past. Hopefully, I won’t fall into my own black hole trying to learn everything I need to know to get these safely into orbit.

News from the South

by

Stephen Poole, CBRE, AMD
Chief Engineer, CBC–Alabama

The psychologist types like to talk about “survivor’s guilt.” I’ve never suffered too badly from that; I figure God is in control and knows what He’s doing. If it’s my time to go, I’m gone. If something happens and I manage to survive it, I take that as a sign that He has more for me to do.

That said, I still feel a little odd when I thank Him for looking after us during the severe storms that we’ve had in the past several months. The most recent event occurred on my birthday (Jan 25th), and I’m sure that some of you have seen this in the news. A 14-year-old boy was killed when an F3 tornado struck Fultondale, AL and moved through his neighborhood. This family had done all of the right things, too – they were in the basement, well away from windows and doors. But a tree fell on their home and it not only killed that boy, it severely injured two other family members. My prayers are with them.

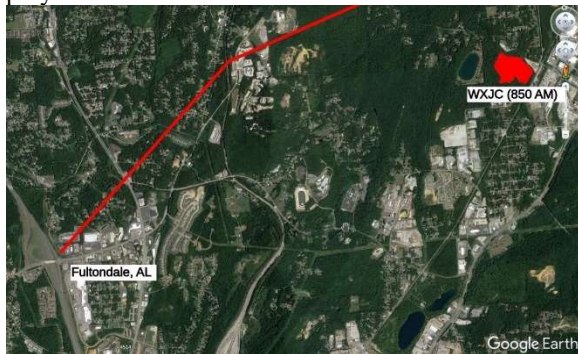


Figure 1 - Another close one! Thank you, Lord!

That said, I do thank God for looking after Sandy and me, and for looking after our facilities. Figure 1 shows the (preliminary, and very rough) track that the tornado followed. At one point, it was perhaps a mile from WXJC, AM 850. This is the third or fourth time that a tornado has threatened that site but left us alone. We didn’t even lose power. So yes, I can thank God out of gratefulness, fully aware that I don’t deserve His blessings.

The weather service had issued warnings earlier that day, but this tornado was a quick spin-up.

The victims are reporting that they only had at most a few minutes to get to a safe place in the house before they heard the familiar “freight train” roaring through. Roofs came off, trees were flying all over the place, and power lines were snapped in a matter of minutes. Then, just as quickly as it had come, it

was over and people started climbing out to view the damage and help their neighbors.

Back to Figure 1. For those who are interested, the Hampton Inn hotel that was featured in so many news reports is right near the start of the red line that marks the track, just north of Fultondale. The tornado tracked right over Carson and New Castle roads, where (coincidentally) we have several monitor points for 850. Well do I

know those neighborhoods. That tornado touched down and then quickly strengthened to an F3 by the time it was over the Carson/New Castle areas, and continued on to Center Point, AL before it finally dissipated.

I was going to take some pictures of the damage, but decided against it for several reasons. First of all, you can find all you want online (start at al.com, if you like). Second, law enforcement has wisely blocked many of the roads that would lead to the worst damage. Finally, it feels kind of macabre to be snapping away with my smartphone while people



Figure 2 - Downed trees and power lines on US31 South.

are crawling through their destroyed homes, looking for whatever can be salvaged.

I'll just leave you with Figure 2, which is a shot that I took through the right window of my Ford truck on US 31 south near Fultondale. To get your bearings, looking directly over the side mirror. The aforementioned Hampton Inn is about 1/2 mile from where I took the picture. It's behind the hill and not visible. Not a very good image, but you can see how the trees were flattened and scattered. The damage is much worse in some other places.

Cutting Plastic

The cost of parts from some transmitter manufacturers are beyond outrageous. To be fair to them, some of these items must be custom-made to order, especially for older models that are no longer in production. Harris/Gates/Whatever-Their-Name-Is-This-Week is somewhat legendary for this, but honestly, it's true of other manufacturers. Growing up as I did in NC on a very limited budget (and working for stations with equally tight purses), I learned to make do.

It's here that I'll put in a quick plug for Nautel. They use off-the-shelf parts whenever possible, and even name the manufacturer in their service literature. (For example, the power supplies in our GV40 FM transmitters are pretty much stock GE units. Allied Electronics carries one that would probably work.) There are no secret parts, changed item numbers or assemblies encased in epoxy goo. They get a big, happy thump on the back for that. The only time we've ever had trouble obtaining a part through Nautel has been when the original manufacturer has stopped making it. Even then, Nautel has been good about helping us with a workaround. Their service support is beyond outstanding.

Now for the plastic work that we did. The plastic shelf in the BE FM-30T's RF cavity is there primarily to force cooling air flow through the tube. It also helps keep the tuning chimney in place. The original was damaged, and we needed a replacement, so I bought some nice acrylic and asked Jack to cut it with a router. Using a 1/4" bit, he did a good job; the transmitter works fine and runs as cool as ever. He even put in the little notch that you use when lifting the chimney for tube access. Well done, Jack (Figure 3).

As for Todd ... he and Jack both continue to put the finishing touches on our Wheatnet installation. I thought about running a picture of him at work, but it would probably look like Cousin Itt from the Addams Family, only instead of hair, he'd

be covered with orange CAT6e cable.



Figure 3 - Jack routed a replacement plastic plate for this FM-30T.

The Cancel Culture

You know me; I'm never shy about sharing an opinion. Folks, if we're truly going to have free speech, free press and free religion – which I shall inaccurately lump together under the blanket term, “freedom of conscience and expression” – then the one thing you can't expect is freedom from being offended. Those of us who are Believers, in fact, are only too familiar with this. Society routinely hammers us with images and sounds that we might personally find deeply troubling; and what do we do? We change the channel or walk away, while praying for the person who is trying to offend us.

People who are much better theologians than I have written and preached about this at length. That which used to be considered wrong is now praised, and that which used to be praiseworthy is considered (at best) archaic, or even (at worst) criminally offensive. As I write this, there have been several stories of people who've lost their jobs simply because they were Trump supporters. Facebook, Twitter and other social media have clamped down on conservative voices to an extent that is breathtaking.

What does this have to do with little ol' us, in our radio business? Here in Alabama, it's admittedly not a huge problem. (Yet.) We're in the Bible belt, and anyone who gets too rambunctious will soon discover that he/she is marginalized – not because we do it to them by any malign design, but see above re: we change the channel and/or walk away. It's unlikely that Alabama's elected officials are going to pass laws preventing us from practicing our faith as we believe the Lord would want.

The courts, on the other hand ... I will admit to you that for the first time in many years, I'm nervous. I'm worried. If the U.S. Supreme Court is packed by "woke" morons who think that they can dictate free speech, we're in deep trouble. The fact that they'd only be shooting themselves in the foot doesn't slow them for a second. They can't see it. They think they're on a roll and they're not listening to folks like me.

So once again, as I always do, I'll close with: keep praying for this nation! God is neither a Republican nor a Democrat. His plans are not ours; he is concerned with salvation, not with politics. But I also believe that He has given America its historically unprecedented freedoms to allow us to bring others to Him. So, I still pray for this nation every night. Won't you join me?

The Chicago Chronicles
by
Rick Sewell, CSRE, CBNT, AMD
Engineering Manager, CBC–Chicago

The End of T1

When I first became Engineering Manager almost seven years ago, we had four T1 lines and I believe four ISDN lines throughout our Chicago market cluster. Gradually, through attrition and improved lower cost services, we eventually came down to the two remaining T1 lines that carried redundant data to our Kirkland, Illinois, transmitter site (for our Rockford station).

About three years ago, we only had one ISDN line left. I was good with this because we did have remotes and other events for which we would occasionally use an ISDN line. We were, however, no longer using them on a daily basis or for emergency STL, but having one available for occasional use made sense with only a little over a \$100 monthly charge. However, we received notification that the monthly line charge was increasing to over \$800 a month. This told me one thing: the phone companies no longer wanted to provide ISDN services, and this was their nice way of saying "adios." We were happy to oblige since we already had alternatives in place.

Just last March, we were working with a fixed wireless Internet provider on the possibility of them using our tower in Kirkland as an access point for their customers in that area. It did not work out, but it got me to thinking about the possibilities of us moving from the redundant T1 lines that were relatively expensive and were subject to so many issues that would sometimes cause them both to be down at the same time. This was due to the fact they have some diversity in where they emanated from the

near the studio, but they eventually rode the same DS3 line and same copper near the transmitter site.

One of my first duties here was to find an Internet service backup to the T1 lines since we had so many issues with them. I did find a fixed wireless service, and that came in real handy. While that ISP has some issues, they always seemed to be solid when the T1 lines were both down. I would never want to rely on them alone as an only means to the site, however. Still, with two Internet services at the tower site and hopefully two at the studios, I saw an opportunity that we could move from the dual T1 approach to a dual Internet method.

We already had an Internet service in place at the transmitter site and our audio codecs were designed to work across redundant data services, so the possibility to move to the dual Internet service approach was certainly there. I knew we would also need a second ISP at the studio. We have

cable Internet; but due to the residential area where our studio is located, there are issues with this service where we can be down for half a day or full days, at least once a month, so this would not do the job by itself alone.

As I stated earlier, once I knew there was another fixed wireless service as a possibility, the wheels were turning. However, I was up against shifting our office staff and some studio operations to a remote work model with quarantine restrictions. This was with a transmitter install and a complete overhaul of four control rooms already on our plate. I decided that one more thing was probably going to be



too much, and I planned on waiting until late 2020 or early 2021 to get started on this switch. So, at the risk of cliché, it was put on the back burner.

In early December, someone decided to turn the heat up on that back burner, and it was not me. I got a phone call from the phone company agent that the two T1 lines to the Kirkland site were going to more than quadruple their rates soon. In fact, when I received written notification, I found out we were going from \$1,200 a month for the two T1 lines to more than \$6,200 a month. This hearkened back to a few years before when the ISDN line went up so much. The phone company was telling us “goodbye.”

Obviously, this really started the wheels moving. I was glad I already had a plan in mind. Despite that plan, we also explored other companies’ ideas on the T1 replacement, some involving 4G Internet that were not the worst ideas. However, in the long run, my idea of a dual Internet approach with two Internet services at each site was the least expensive and probably just as reliable.

At Kirkland, we added the other fixed wireless Internet provider that we had explored the

possibility of them using our tower. While that didn’t happen, the next best thing did. They ended up on the Verizon tower 100 yards away. So, with the proximity and the fact that the installation is all brand new, we should have very good service. They have fiber coming into their new installation but are backhoe proof since they have other towers they can get to in the case of “backhoe fade.”

At our Hammond studios, we added another fixed wireless Internet service. We could have gone with a second wired service, but I wanted a fixed wireless that would protect us from backhoe and strong wind events affecting both wired services.

We are also upgrading the cable Internet service to fiber. The hope is that we will not be subject to the noise of illegal tapping that seems to take place with the cable Internet service in the neighborhood. We have most of this in place, and we have already switched our audio codec on the main signal to a T1 line on one side and the Internet on the other side of the redundant codec. So, we cancelled one T1 and will do so shortly on the other one.

Valley News
By
Steve Minshall
Chief Engineer, KCBC -- Modesto

I like to build stuff. It does not matter much what I build, be it a radio studio, a phasor, a china cabinet, or a front engine dragster... I just love to build stuff.

I have found that when working on anything, one of the most important things is vision. You need to have a vision of what you want the end result to be, but you also need the other kind of vision, being able to clearly see what you are doing with your eyes.

To this end, I have an array of eyesight enhancing devices. I have a lighted magnifier for working on circuit boards. I have a bunch of bifocal safety glasses and a magnifying lens for my welding helmet. My most cost-effective vision enhancement is one-dollar reading glasses, several pairs of various strengths from the Dollar Store.

The other essential for seeing well is lighting. I recently became frustrated with my shop lighting. I had a half dozen four-foot fluorescent lamp fixtures that were becoming troublesome. My experience has been that the fluorescent lamps sold today are not as long lasting as they were some decades ago, and they seem to get dim quite fast. I decided to get rid of all the fluorescent lamps and replace them with LED bulbs. In an attempt to maximize the light, I sprayed several gallons of gloss white paint on the ceiling and walls.

I installed a generous number of four-foot LED lamps. When I turn on the lights, the spiders run for cover. You can almost get a suntan in there, but it has made it a much better place to build stuff.

That was all well and good until I turned on the radio. Having something to listen to is almost as important as the lighting for me. The LEDs turned out to be quite aggressive RF radiators. The AM and FM bands on my shop radio were completely obliterated. For a few milliseconds, I considered going back to fluorescent lighting, but then I remembered that I am a Broadcast Engineer and that I should be able to easily fix this problem.

I added a few EMI filters to the wiring and rearranged the physical power feeds to the lamps

until the interference to the AM reception was almost completely eliminated. It was a considerable amount of work. The AM interference was radiated almost entirely from the wiring.

Next, I went to figure out the FM interference issue. The FM interference was coming directly from the lamps. I considered enclosing the lamps inside of metal shields, but that sort of defeats the purpose of having lamps, unless I were to use transparent aluminum. I could build a faraday cage

around the lamps with hardware cloth, but that would be a ridiculous amount of work. I finally realized the best way to handle this would be to put up a rooftop antenna and run some RG-6 coax to the radio.

I was not excited about all the work it would entail to get the coax to the radio. I started thinking about the route I would have to take through the attic and down the walls to get to the garage. It all seemed so strangely familiar, and then I realized that I had already done it years ago. The antenna cable for our TV already took that route to get to the living room. The cable ran by the radio receiver and was only about four feet away. I put a splitter in the cable and connected the radio. The FM reception was much better, but there was still some noise present. I snapped a couple of ferrite cores over the RG-6 and the noise was, for all practical purposes, gone.

Now that the lighting project is behind me, I can enjoy working in the shop with great lighting and a radio that now works even better than it did before. But I wonder, what about the average guy that buys these lamps and is clueless about EMI? This is just another example of the continued decline of radio listenability in homes and workplaces. I find it disheartening that there seems to be little concern from the manufacturers over this issue. I thought we had a government agency that was supposed to watch over this sort of thing. I guess I was wrong.

Speaking of radio listening, the other day I heard the song "Eve of Destruction". Considering the recent past and current events the lyrics seem to be very apropos. Pray for our country!



The Portland Report
by
John White, CBRE
Chief Engineer, CBC–Portland

It's a new year and a good time to view the successes of the last year. And there were a few in spite of it being 2020, the year that will live in infamy.

As the chair of Oregon's credentialing program for broadcast engineers, I was pleased to see the growth in the number of participants during the last year, even with the impediments presented by the COVID lockdowns. These lockdowns prevented any in-person participation and preparation. The extra workload presented to local emergency management limited any of the usual perpetration and planning sessions, including EAS.

Most evident were the wildfires near the Portland metro area. Broadcast media were limited to sometimes dated internet resources to obtain information for release to the public. With windstorm damage, power and internet outages and wildfires in the metro area, broadcasters and emergency managers were working full time to simply stay even. EAS, a useful resource, was often not used when available.

Engineers did step up to become certified, which enhanced the travel credential program in spite of the lack of in person interaction. Not

unexpectedly, the majority of the newly-credentialed engineers are from the Portland and Eugene metro areas of the state. COVID meeting and travel restrictions have limited the ability to communicate with rural broadcasters across the state. Hopefully 2021 will become a bright spot as lockdowns and restrictions are lifted allowing return to some form of normalcy.

In the new year, the arrival of a major winter storm seems like "small potatoes" in comparison. When two snowflakes shut down Portland, the three inches of snow are a major deal. Not so much these days, as the last year has set a really strange bar for judging the "big-dealness" of any situation.

Other conditions have not changed; the Portland riots continue. The latest target added to the usual attack list has been the Oregon Democrat Party headquarters. The riots in DC and Portland appear quite organized, with encrypted radio coordination, which prompted the FCC reminder that personal radio services are not to be used for unlawful uses.

Reporting from snow alert Portland, remember that old Chinese curse: may you live in interesting times!



**Rocky Mountain Ramblings
The Denver Report**

by
**Amanda Hopp, CBRE
Chief Engineer, CBC - Denver**

Slow-paced January

Can I just say it? January was a slow month. It was a much-needed month after the crazy December I had. While I did not enjoy most days just crawling by, I did enjoy the break. I was able to get my usual year-end cleanup done in my office, purging old files and emails.

I was also able to spend some time furthering my engineering education by watching some past webinars from the Society of Broadcast Engineers. If you are an engineer and aren't a member, join! I highly recommend spending the extra money on the MemberPlus option as it gives you free access to all webinars, past and future. There are so many of them, I think the only way I could get through them in a year is to watch one every day or two, and I think I would go crazy doing that, so I like to spread them out. I have the list of what all is on the website and am crossing them off as I go through them, all the while trying to sign up for anything new upcoming.

Phone System

On January 12, I came to the office and noticed our Avaya phones were acting weird. When you would pick up to dial out, the dial tone was a bit different and the phone screen was slow to respond. I decided to do a reboot because that is always the first thing to try.

After the reboot, the phones came up and the displays on all said "Buttons Invalid." I got on my mobile with our friends at Convergence Solutions, and they quickly determined that the system had crashed. The best part was that the backup that the system is supposed to do automatically was nowhere to be found.

Convergence put their best support team on it and the rebuilding of the system began. We were down an entire day trying to get the phones back up and running. This included me having to go to each phone and seeing what extension it was showing and what it should have been. Support then went in and

changed it so each phone would have the correct extension number assigned. We then had to figure out button programming and many other things.

I think we had the phones fully functional by 3 PM that day, just in time for our afternoon talk show.

Several days later, I was informed that faxes were not coming in or going out, so I had to get support on that. They were able to fix that issue for us. We also had a few other minor issues come up, but I think we are finally at a point where we can say we are done.

I have backed up the system to the default folder, a separate folder and to a USB stick that I will keep. If for some reason the system was to ever crash again, I want to be able to have a starting point. Although they did say the backup most likely would not have helped, it does have some critical files that could have sped the recovery. The other thing I am going to do is taking a ton of screen shots of the various items within the Ayava IP Office Manager program, so that we can remember certain settings.

Backups

As engineers, we do often think about backups. What if NexGen crashes? What if the Wheatstone system crashes? What about this computer with these important programs? Or even what about my desktop or laptop that holds hundreds of critical engineering documents? Backups are essential to our survival.

I have in recent years, bought several Samsung EVO 860 1TB solid-state drives: two for my desktop, two for my laptop and two for the engineering gateway computer. One is for everyday use. Samsung provides a great migration tool that allowed me to clone my original hard drive and begin to use the new one.

Solid state drives have come a long way. No longer out of reach cost-wise, they work great. Every week or two, I run the migration tool on each of these computers with the second drive I bought.



This serves as a normal backup so if things were to fail, I can go back. I have had to use this on my laptop as a Windows feature update made it so my computer wouldn't run, and uninstalling it didn't fix it. I was able to put the new SSD in, back it up so I still have a good working copy, and then just wait until Microsoft figured things out and was able to do the update again. And yes, I did try this with the phone system crash, but I did something had corrupted the data on that SSD, so I had to use a recovery tool to look for the files we needed (which were not there anyway).

I do regular backups on our Wheatstone system. I typically will do a backup in the backup folder for the system, and then I will copy it to Dropbox or somewhere else where I can grab it and put it somewhere it should be safe. I also do a bi-weekly backup of NexGen. I go in with an external hard drive and run the backup utility from within NexGen. This backup takes upwards of five days to complete. I start it on a Monday, and if I am lucky, it finishes before I leave on Friday. Because of this, having to leave the backup hard drive at the studio while I do the backup, I keep a second hard drive and I switch them out.

So, I end up backing up each hard drive once a month. It is not ideal, but it works. I have spoken to RCS about the worst-case scenario and they assure me that if our entire system crashes, this backup should bring all of our files back exactly as they were, hopefully getting us back on air sooner.

Backups are easy to forget. If you don't put it on your calendar, you typically remember when it's too late. I cannot tell you how many times this has happened to me. Because of it, I have been trying to make it more of a habit with reminders in my phone.

The other thing I do as a "backup" for our newer Nautel transmitters is to take screen shots of all the settings, or just write them down and put them into a document. When an exporter or AM-IBOC exciter dies, I have the settings saved in a document as well as posted at the transmitter site. This helps me with setting up a different one.

Every engineer needs to learn to document and back up everything. Get crazy about it like I

have. Have multiple copies in various location, especially one off-site. You will never hear someone say how they regret creating that backup.

95.1-FM Antenna

With the Wheatstone project done in December and finally catching our breath in January, transmitter visits were not a priority. I know Keith goes out and makes sure things look good in the building, but he forgets to look up sometimes. I needed to run out to the KLTT transmitter site to do some quick work, and the first thing I noticed driving up to the site was that one of the FM antennas was facing the wrong direction. This has been a constant battle since installing them a few years ago. In fact, we had the tower crew our late last year to fix the issue. Clearly, whatever they did did not work. We are working to get them back out to hopefully fix the issue once and for all.

Coming Up

February is already upon us. Where does the time go? We don't have any big projects in the works for 2021, so my time will be spent cleaning up and maintaining. I will use the time I am at the transmitter site for KLTT while the tower crew is there to look over everything.

I will begin to make trips to each site to do the same and see what items might be needed at each site. My goal is to make it so that if I am out with my husband and my tools are left at home when I get the call, I can go to the site and not have to worry about having this or that available. Yes, I have everything I could possibly need in my tools, but since we drive a truck, I am not going to leave them in the back of the truck; I only load them up when I know I will need them.

I have no doubt February will be another slow month. It is taking me some time to adjust to the slower pace after the fast-paced December I had.

That about covers it for this edition. I pray you all stay safe and well, and while you're thinking about it, go ahead and get those backups done!

The Local Oscillator
February 2021

KBRT • Costa Mesa - Los Angeles, CA
740 kHz/100.7 MHz, 50 kW-D/0.2 kW-N, DA-1

KNSN • San Diego, CA
1240 kHz/103.3 MHz, 550W-U

KCBC • Manteca - San Francisco, CA
770 kHz/94.7 MHz, 50 kW-D/4.3 kW-N, DA-2

KKPZ • Portland, OR
1330 kHz/97.5 MHz, 5 kW-U, DA-1

KLZ • Denver, CO
560 kHz/100.3 MHz, 5 kW-U, DA-1

KLDC • Brighton - Denver, CO
1220 kHz, 660 W-D/11 W-N, ND

KLTT • Commerce City - Denver, CO
670 kHz/95.1 MHz, 50 kW-D/1.4 kW-N, DA-2

KLVZ • Denver, CO
810 kHz/94.3 MHz/95.3 MHz, 2.2 kW-D/430 W-N, DA-2

WDCX • Rochester, NY
990 kHz/107.1 MHz, 5 kW-D/2.5 kW-N, DA-2

WDCX-FM • Buffalo, NY
99.5 MHz, 110 kW/195m AAT

WDCZ • Buffalo, NY
950 kHz/94.1 MHz, 5 kW-U, DA-1

WDJC-FM • Birmingham, AL
93.7 MHz, 100 kW/307m AAT

WCHB • Royal Oak - Detroit, MI
1340 kHz/96.7 MHz, 1 kW-U, DA-D

WRDT • Monroe - Detroit, MI
560 kHz/107.1 MHz, 500 W-D/14 W-N, DA-D

WMUZ-FM • Detroit, MI
103.5 MHz, 50 kW/150m AAT

WMUZ • Taylor - Detroit, MI
1200 kHz, 50 kW-D/15 kW-N, DA-2

WPWX • Hammond - Chicago, IL
92.3 MHz, 50 kW/150m AAT

WSRB • Lansing - Chicago, IL
106.3 MHz, 4.1 kW/120m AAT

WYRB • Genoa - Rockford, IL
106.3 MHz, 3.8 kW/126m AAT

WYCA • Crete - Chicago, IL
102.3 MHz, 1.05 kW/150m AAT

WYDE • Birmingham, AL
1260 kHz/95.3 MHz, 5 kW-D/41W-N, ND

WYDE-FM • Cullman - Birmingham, AL
101.1 MHz, 100 kW/410m AAT

WXJC • Birmingham, AL
850 kHz/96.9 MHz, 50 kW-D/1 kW-N, DA-2

WXJC-FM • Cordova-Birmingham, AL
92.5 MHz, 2.2 kW/167m AAT



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