The Local Oscillator

The Newsletter of Crawford Broadcasting Company Corporate Engineering

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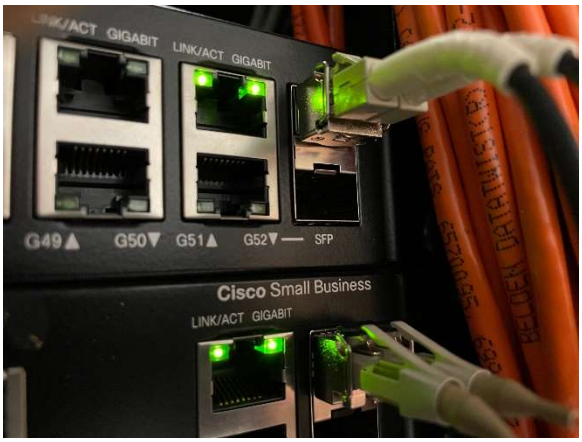
Getting Enough Fiber?

That's a good question for most of us when considering our diet, but dietary fiber is a different topic. I'm talking about fiber-optic fiber and its use around the broadcast facility.

Fiber-optic is not a new medium. It's been around for decades, but it really hasn't made much in the way of inroads with broadcast facilities. Sure, some have embraced fiber, particularly in the video world, but not so much in most radio station facilities.



Many switches have combo ports that can be either SFP or wired Ethernet.

Other than a niche use in a Continental transmitter from back in the 1980s, I had very little exposure to fiber until ten or so years ago. I needed a way to get Ethernet off the #1 tower in the (then) new KBRT 50 kW directional array – the Dragonwave microwave radio was located on top of that tower. We had for years used Ubiquiti Nanobridge and other 802.11 point-to-point links to convey Ethernet from AM tower tops to transmitter buildings, but at KBRT I was looking for a better way, a more "bulletproof" means of conveying the ones and zeros to the transmitter site network. Dragonwave, offered a fiber option, and on the recommendation of the vendor, I took a chance.

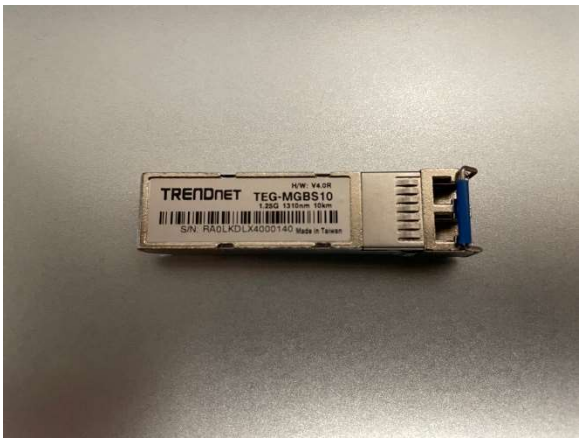
We had the construction crew pull a fiber cable through the underground conduit to the tower, and we had the tower crew pull a run through the electrical conduit to the tower top. I bought the tools and learned how to install connectors on 62.5 nm fiber, and I learned how fragile it was. I was genuinely surprised when the tower crew managed to pull that fiber with connectors installed through that conduit without damage.

That fiber infrastructure has served us very well over the past ten years. It not only got the Ethernet across the base insulator without impacting the impedance of the tower, but it also provided the connection for our FM translator's little LAN at the tower base.

The vertical part of that fiber infrastructure fell apart in early July when we replaced the microwave equipment with new Cambium millimeter-wave equipment. In the process of swapping out the antenna and radio, the outdoor portion of the fiber pretty much crumbled.

The tower crew, Wireless Infrastructure Services out of Corona, did their best to salvage the cable, installing new connectors while hanging from the top of the tower, but the 10-year-old fiber was just too brittle as a result of UV exposure and the nearly constant Santa Ana winds. So to get the link up, they temporarily ran a length of fiber up the outside of the tower.

In the shop back here, I was working on making a new run of UV-rated multimode fiber for KBRT when it occurred to me to shop around for pre-made multimode cables in various lengths. To my delight, I found a supplier that offers high-quality UV-rated multimode cables in a wide variety of lengths, so I ordered a 100-meter cable. I had actually gotten a look at these pre-made cables a few weeks



SFP fiber modules come in single and multimode versions and plug into switches and devices with SFP ports.

earlier when I ordered a 30-meter cable for use at the KBRT studio, so I knew they were of good quality and sturdy construction. I have no concerns about pulling one through a conduit to the top of the tower. And the best part is that these cable assemblies cost just a little more than the connectors themselves. It makes no sense to fuss with delicate LC connector installation when we can buy fiber with those already installed for just a few dollars more.

Fiber connectors aren't cheap, and they're not simple or easy to install!

As I was dealing with the KBRT Cambium project and its fiber issues, it occurred to me that fiber would serve us well in Buffalo for the new Cambium microwave system there. Not only does fiber provide for excellent throughput with no (or almost no) limitations on length, but it will also keep lightning from following the data line down the tower and into our equipment rack. And at the AM site, it will provide great RFI immunity.

And so the plan is altered to use fiber instead of shielded, UV-rated CAT6 cable in Buffalo. We will use it at the studio, where it will run in a piece of EMT conduit to the 23 GHz microwave radio on the roof, at the SUNY relay tower where we will bring two runs down the tower to a small switch, at the Boston FM transmitter site where two runs from the two 6 GHz radios will connect to a new Cisco switch, and at the Hamburg AM transmitter site where we are still noodling on how to make it all work.

Of course we still have to get power to the roof- and tower-mounted radios, and we'll do that with a UV-rated 16-gauge SO cord from an Omron 48-volt switching supply in the TOC, transmitter rooms and tower base. We'll have to provide surge protection on these power supplies and vertical runs. Having the power supplies at ground level will make troubleshooting much easier when the time comes.

Some of the tools needed to install connectors on fiber. Not shown: a lighted magnifier!

So, what is involved in using fiber-optics to make a point-to-point Ethernet connection, you ask? If you're using pre-made cables and not fussing with putting on connectors, it's really very simple and easy. You need an SFP port on the device or switch that you are connecting, and an SFP module (essentially a fiber-optic transceiver) for the type of fiber you are using (single- or multi-mode). That's it.

Many switches come with "combo" ports on them, usually the last one or two ports on the switch. These can either be straight wired Ethernet or fiber. Cisco switches give fiber priority in the combo ports, i.e. if you have both a wired and a fiber connection plugged into the port, the switch will only see the fiber.

What are the advantages of fiber over wired Ethernet? We've already touched on some of them.

One is that there are practically no length restrictions on fiber. Yes, there are length restrictions, but they're generally outside the realm of anything that we might run up against. Multimode fiber running gigabit Ethernet is good for 550 meters or 1,800 feet while single-mode is good for 5,000 meters (16,400 feet). That beats the heck out of the 100-meter/328-foot limit of CAT5/6! It's pretty easy to run into a wireline distance limit when tower mounting a radio, but not with fiber.

And of course fiber is 100% RFI immune. Magnetic and electric fields have zero effect on photons traveling in a piece of fiber. That makes it ideal for use at AM sites and even on FM or TV towers with high RF power densities.

Unless the jacket is contaminated with conductive dirt of some kind, lightning energy will not follow a piece of fiber into your studio or transmitter building. That's a big advantage. At all of our studios, a lightning hit to a core Ethernet switch would be devastating. We do what we can to isolate our switches from the incoming power line, but if they have a wireline connection to a rooftop antenna, the risk is elevated exponentially. Fiber solves that problem.

So will we be making the move to fiber company-wide? Not in a wholesale way. What we will do is convert to fiber as we swap out equipment or rebuild facilities. But if you have a specific need, we can certainly consider making the move sooner.

The New York Minutes
By
Brian Cunningham, CBRE
Chief Engineer, CBC – Western New York

Hello to all from Western New York! It has been some time since we have visited here in the pages of the Local Oscillator. Last month, just as the due date came, I once again had issues with my health, prohibiting me from submitting the July edition of The New York Minutes.

Since late last summer, I have been battling severe fatigue and breathing issues. This all came to a head on March 11th when I suddenly lost consciousness in the lobby of a friend's radio station.

After seeing several doctors and undergoing numerous tests, it was determined that I was severely over-medicated on high blood pressure medicine. My cardiologist significantly reduced the medications I was taking, and for a while I was feeling much better, but this was limited to only five weeks or so.

Around the first of May, the tiredness and breathing issues returned, this time with a cough that wouldn't stop. Some days, I felt okay, while other days I could barely get my work done without gasping for air, feeling light-headed and dizzy. When these instances occurred, I would sit down in a cool area, and after some time passed, I felt okay again.

Fast forward to Friday, June 24th. I began the day performing maintenance at the WDCX-FM transmitter site. We had been experiencing some A/C issues there, and I arrived early to meet our HVAC repairman, and while waiting for him to arrive, I mowed the entire lot with the lawn tractor, trimmed the inaccessible areas with the push mower, and sprayed weed killer in all the fenced enclosures.

When the technician arrived late that afternoon, the outside temperature was near ninety degrees and the building temperature topped out at 96 degrees. It was all I could do to stay on my feet. The fatigue and dizziness returned with a vengeance.

When I got home, my wife called my doctor and made an appointment for midday the following Monday afternoon. That weekend, I attempted to perform some yard work at home, but the more I tried to do, the worse I felt, again just teetering on the verge of passing out again.

When I arrived at my primary health giver on Monday, they checked my vitals, and told me to go directly to the hospital. My heart rate was at 28 bpm, and oxygen levels were drastically low.

I arrived within minutes at Mercy Hospital's emergency room, and they took me in immediately. By this time my heart rate was down to 23 bpm and

my kidneys, liver and other organs were shutting down.

While in the emergency room, my heart stopped three times, and the best heart rate they could get was 20 bpm. I was told that I was experiencing heart failure; the medical term is bradycardia. A cardiologist was brought in, and he determined that a pacemaker was needed to get my heart rhythm up to at least 60 bpm. The following morning, June 28th (the day of Nora's and my 47th wedding anniversary), they implanted a pacemaker in my chest.

So far, I have not experienced any dizziness, shortness of breath or severe fatigue, and frequent checks daily show my heart rate to be steadily around 60 bpm. The cardiologist recommended no work for six weeks, no lifting anything above 10 pounds, and no raising my arms above my head. This is to ensure that the electrical leads attached to the upper and lower portions of my heart are not dislodged. I have been working daily, but nothing that would cause harm to my implant, mostly light duty stuff.

I tend to tire easily, but seem to improve a little each day. It is no doubt that God's hand orchestrated the events of June 27th, placing me at the right places with the right doctor there to determine what I needed. I was told that I was only minutes away from death when I arrived at the emergency room, and if I had not gone to the doctor when I did, you would not be reading this right now. That kind of puts everything in a completely different perspective, and I am so thankful for all that the doctors and medical assistants did to ensure that my episode had a positive turnout!

About the only technical item I can report on was the failure of one of our RF switches at tower #1 at the WDCX(AM) tower site in Rochester. Apparently, a snake had entered the tuning house and made his way up into the network. I have seen this happen several times over the years, and this time, like all the others, he ended his life by being fried from the RF. It oozed into one of the solenoids, causing it to short out and burn.

I ordered a retrofit kit from Kintronics, and on Wednesday July 20th, Earl Schillinger and I pulled the switch and rebuilt it with the retro-kit. I had Earl assist, as I was unable to lift the switch in and out of the mounting position in the tuning house.

Also, I was not certain as to how much the tower's RF radiation was going to affect my pacemaker and wanted someone around in case there was a problem. I spoke earlier with the technical team at Biotronics, the company that manufactured the pacemaker, about what to expect working around AM towers. I was told that at 1500 watts, a safe distance was 70 feet away from the towers. I brought my heart monitor with me and measured my heart rate while the array was at full power, and again when it was at reduced (night) power and when off. I found that the RF at full power increased my heart rate from 60 bpm to 84 bpm. This means that in the future I will need to limit my exposure time while working around live AM towers, FM sites do not appear to affect the pacemaker's operation.

The buildout for the new WDCX-FM studios are in full swing now, with the framing, electrical and drywall work nearly completed. We have been dealing with numerous issues that the contractor overlooked, or didn't understand, but all in all, I am pleased with the work that has been done to date.

The last week of July, they were finishing the drywall, and soon thereafter, the ceiling grid will go up and the fire sprinkler system will be installed. Hopefully I will be able to include some pictures of our new facility in next month's report.

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

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

New FM 103.5 Talk Studio

The talk studio for WMUZ-FM had seen continuous use for at least two shows a day for decades. Tired, full of junk, dated, and worn, it needed a total redo. Unfortunately, getting anything done in a short time is all but impossible these days.

Of all the things a studio needs, one would think carpet would NOT be the long lead-time item. It was, though, driving the timeline of everything else. Once we had a delivery date for it, we could schedule the carpet-covered walls to be stripped, new drywall hung, and paint applied.

Custom furniture arrived and was installed in late January. We installed new outlets, switches, and lighting, too. A few mics, headphone jacks, and a couple of computers will round out the room.

The Art of Site Maintenance

Like any complex system, broadcast facilities must be well understood to be well maintained. Understood meaning "to be aware." Knowledge and skill are useless without open ears and eyes.

I've caught many things misbehaving before they became a 'real' problem by simply paying attention. To illustrate: Before leaving one site recently, I noticed all the antenna monitor meters in the red (story below). Alarms setup for those would have started blowing up my phone on my way home, and I would have had to return.

I've found backup transmitters that had no audio feeding them, AC units cycling too rapidly, a generator's block heater not functioning, backup STL paths disconnected, to list only a few. Recently I noticed a desk chair inadvertently bumped 'maintenance mode' on our site remote control system, effectively cutting off my ability to command anything at the site. If I'd not seen it before leaving…

Not everything tells you about its condition without query, but lots of things do, so wherever possible, I connect status outputs to our site remote controls.

Knowing about erroneous conditions when you can't be there is vital. You can't test everything every day, and you can't be everywhere. Let the equipment tell you.

SNMP is super handy and especially prevalent in IT gear. SNMP can be monitored by lots of popular site remote control systems now, too. I like using built-in email capabilities in devices such as UPSs to send texts to alert me of problems. I especially like that I can use these messages to link other problems. For example, maybe there was a short power blip at that exact same time… hmmm… Keeps one from goose chasing.

Can you dig it? Yes, I can!

The new Kubota tractor is becoming a theme in my summer *Local Oscillator* writings. I think it does so rightfully because it changes so much, especially after having used what amounts to a deluxe residential lawn tractor in the past. So, the Kubota is a game changer! Not only is it 65% more powerful than our John Deere, but it's also much larger, heavier, and has a nifty front-end loader. Oh, and it has a learning curve, too.

One of the first times I used it, I utilized the front-end loader to leverage out a stump left by a shrub that was cut down years ago. The loader pried it out with nominal effort. Finally, this stump that I was forever banging the brush hog on is now rotting away in the woods.

Next on my list was dispensing with a giant sand pile that my gopher buddy insists on creating directly in front of the gate to tower 2 at the Monroe site. No problem, that's just what the loader is designed for – scoop it, move it, no more gopher pile. Well, as a loader operator I still have my learner's permit and I scooped too deep, catching an antenna monitor line about 4 inches down and severing it. Thankfully I was able to repair the line, only inconveniencing a bunch of electrons.

News from the South
by
Todd Dixon, CBRE
Chief Engineer, CBC–Alabama

No need to change the format of this column...

There is a reason why weather seems to be a central focus of *News from the South*.

Early in my time in Alabama, we received a visit during the summer from my in-laws from New Jersey. My father-in-law had a nice Toyota Tacoma with a security system in it – and it was summer.

The sweltering heat and humidity one evening during their visit produced a "classic Alabama thunderstorm." The first thunderclap shook his vehicle, and the alarm went off.

He rushed to the window thinking someone was trying to break into his truck. The second one happened, and a third...well, you get the picture. I told him he better just turn off his security system before he wore down his battery. He looked at me with disbelief and asked me how often storms like this happen. I told him it was July, so probably twice a week!

It's been a July for sure, and so far, we've lost a Ubiquiti link at our Red Mountain site (which got replaced on the 16th) followed immediately by a storm the next week that somehow disabled our licensed 18 GHz Cambium link to Red Mountain. Even though the link is only 3.5 miles and with adaptive modulation in place in the radios, our link got washed out and the winds turned the dish on our studio roof about 45 degrees off axis. Then the Cambium 820S radio on the Red Mountain tower wouldn't respond to my attempts to get in, either.

Once the rain died down, I went to the site to see what was going on. Again, it's our closest site, and I still saw no less than 15 sustained (over 1 second) lightning strikes that found their way to the earth on the way there.

Between Stephen, Jack and myself, we got everybody on our 900 MHz backup link until we could get a tower crew there on the following Saturday to put our spare Cambium radio in place.

Everything is now getting back to normal, including moving the 18 GHz dish on the roof of the studio to a much more secure mount.

The other big issues this month have revolved around email. Email and its prevalent use as a communications tool in our modern society is truly all the proof I need that God allowed Satan to set up his temporary kingdom here on Earth. It is especially more difficult when the email address that gets spoofed is from a respected employee across the entire company or another who are in financial positions in the company.

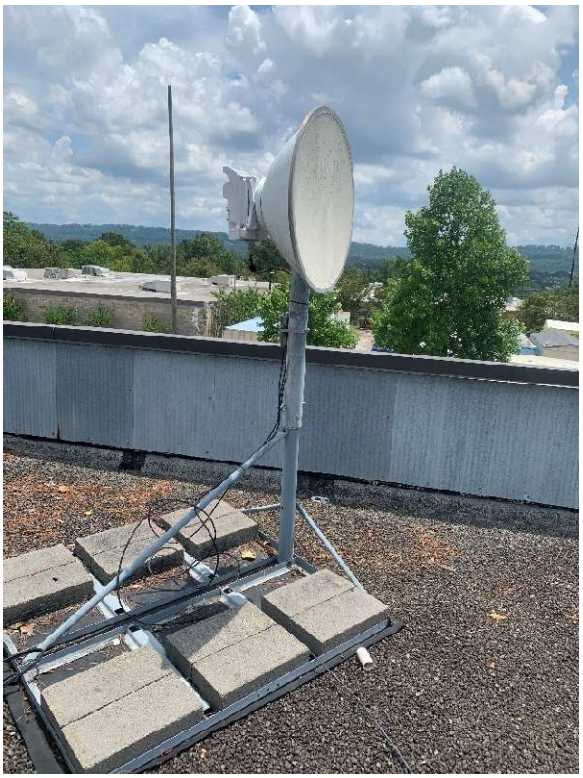
It probably doesn't get said often enough, but thanks to all of you for helping those around you with tech issues just like these. I'll also say that I would much rather respond to emails asking, "Is this a phishing scam?" or "This is bogus, right?" than trying to run down how a server in India is flooding our email server with thousands of emails.

No Such thing as free, well almost…

One of the things I've enjoyed doing for a long time and part of what working for Crawford Broadcasting has allowed for is finding new or interesting computer technologies that might help all of us to do things better, more securely, and hopefully cheaper than we have been doing them.

In that vein, I guess because I have some suspicion about cloud server technologies, I didn't know that a lot of companies have what are called "free tier" services. Companies like Amazon, Google, IBM, Oracle and Microsoft offer certain cloud services for free to users. The premise is apparently that you may not think you need the multitude of services they offer, but if you're willing to try it, you may find them to be more necessary than you originally thought. Also, what better way to test out their new technologies, to stretch their network capabilities, to assess vulnerabilities in their network or provide a training ground for their employees than to offer a limited, free tier to potential customers?

I chose to try out Oracle's free tier cloud platform. The great thing about cloud computing is that after the initial registration and exchanging information, you can spin up a Linux server in about five minutes. Within their free tier, I get a server



The 18 GHz antenna on the studio roof is now on a much more secure mount.

with 4 Ampere (ARM) processors, 24 GB of RAM and 200 GB of storage.

What I have done with that server (at least for now) is create a Dropbox equivalent server called Nextcloud. Instead of paying for cloud storage from Dropbox, Google or iCloud, I have 200 GB of storage capacity that I can get to from any device with either an app on my phone or a web browser on any computer.

Obviously, I know a little bit about Linux and I had some real server hardware (via the company) to try stuff out on, but what if you had a free server available to you that allowed you to learn without the risk of blowing anything up? Literally, if you make a mistake on the cloud server you're working with, you delete the instance and start again. Five minutes later, a "fresh" install of a server is there with a static IP address so that you can get into it and correct your mistake.

So far, I've used it for work once and gave one of our people a login and shared that login with a client as well so they could transfer their bumpers and audio to us. Within 15 minutes, the client and our employee had done the transfer from them to us.

I've also used it personally as I took over 65 photos and video recently at a grandchild's birthday party. I then uploaded and shared the files via a shared link to my daughter and wife, all in about four minutes.

There is so much more to do with this, and I have only cracked the surface of some of the services I want to create to make things more accessible for me.

If you'd like an account on my server to see what Nextcloud looks like or to try cloud computing for yourself, I'm more than willing to lend you a hand.

Until next time, in Alabama, "It's hotter than Satan's house cat!" Stay cool!

Tales From Cousin IT
by
Stephen Poole, CBRE, AMD
CBC Corporate IT Specialist

Thanks to all of you who expressed sympathy and who promised prayer support after I lost my wife, Sandy, on July 1st. Ironically, this was the day before I was scheduled to "semi-retire" and switch to part time work just so that I could look after her.

She had been sick for years. One key reason why I talked to Cris about possibly cutting back on my hours was because I was afraid to leave Sandy for extended periods of time. She had gotten to the point that she was falling once or twice a week. She was in almost constant pain, in spite of everything the doctors could do for her. Our merciful Lord decided to grant the ultimate healing and just took her home. She's no longer in pain and I know, beyond any doubt, that she's happy now.

I loved her and I miss her, but God loved her to death (and died to prove it!). Sandy was a Believer who had accepted Christ as her Savior many years ago, so this isn't goodbye; it's, "we'll meet again someday." (And we will.)

Storms

Yes, I'm officially the "IT" guy now, and Todd is officially the Chief Engineer for Alabama. With Jack's assistance, he's more than capable of doing the job. But I do pitch in when things get rough, and the weather this year has been something else. Between working on various programming and software projects for the company, I've been helping out by checking on our more remote sites, particularly101.1 in Cullman, AL and 92.5 in Pumpkin Center, AL. Besides, it gives me an excuse to get out of the house.

The weather in July has mostly stayed away from these two stations, but it has been hammering Birmingham. The storm shown in Figure 1 put WDJC-FM on generator for several hours. Even worse, the most important Cambium link, the one between our studios and WDJC-FM's transmitter site on Red Mountain, failed as well. The tower lights remain under a NOTAM as I write this; Todd has supervised the tower crew, who had to replace a run of SO cable to the top beacon.

I chatted with Cris a few days after all the madness and told him that it was Todd's baptism by fire – and that he'd come through with flying colors. I know that engineering is in good hands with him and Jack looking after things. As I write this, everything is back on air and doing fine, albeit on backups in some cases.

Supply Chain Joys

What's frustrating is that 92.5 and 1260, the "WYDEs," both went off air overnight because our backup link between the studios and Red Mountain was unable to handle the load. Cris ordered some new Moseley Starlink systems many months ago (we had specifically budgeted for this), but it kept being put on backorder.

Well, as I write this, Jack tells me that he and Todd have (finally!) received a shipment notification. They'll be installing that as soon as it arrives. These are Starlink units that will allow us to support all of our key signals in full stereo. Todd and Jack will also replace the ancient Moseley PCL/DSP system that currently feeds 92.5. Happy day!

Scams, Spams and Woe-bots

You have to (very grudgingly) give the scammers credit: they continue to improve their techniques to figure out ways into your system, and/or to steal your personal information. In the past week, we've had several "phishing" emails that asked for our partners to log in to a website that looked fairly legitimate.

A few days ago, one of employees was apparently compromised. Our only choice, if it's a serious attack, is to delete the account, restart the mail server, and then recreate the account. That

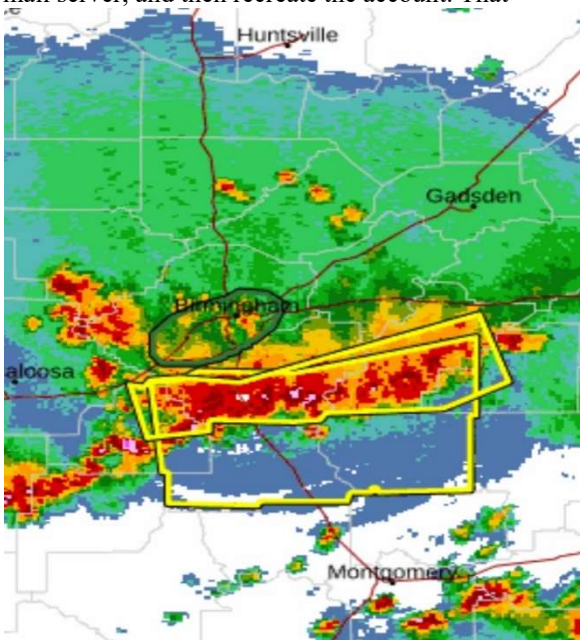


Figure 1 - This screenshot was taken about an hour after the storms passed over the Birmingham metro.

seems drastic, but (speaking from experience) just changing the password won't do it. If the scammer already has access to your system, the connection is established and he'll just keep cranking out spam in your name. Even worse, if any of the email had a virus or trojan attached, do we really want that to stay on our system (or being copied into our backups)? No.

In this case, fortunately, Barracuda and Zimbra both did their jobs. We not only scan all outgoing mail, both Zimbra and Barracuda have aggressive rate limiting – simply put, there's a sharp limit on the number of email messages that a given user can send within a period of time. Most spammers know that they'll have to spit out as much junk email as possible before they're discovered, so

they'll flood a mail server with one message after another. The rate limiting is quite helpful.

Very little of the spam made it out of our system. Amanda Hopp noticed it, sent Todd a text, and then he called me. I pitched in on the server side of things while Todd worked with the compromised employee to restore the account. Another bullet dodged!

Projects, We Gots Projects

In September, Cris will pull me out to Denver to help with some stuff that he and Amanda have cooking out there. Sometime afterwards, I'll be headed to other markets to help out. I actually love to travel, so I'm looking forward to it.

In the "IT" department, I'm still working on the POR stuff. The system has become wildly popular, which just blows me away. It's up and running, complete with full backups every night at 2AM. I'm still seeing the odd bug here and there, and I've had several "feature" requests that are being worked on. Special thanks go to Cris, Amanda, and Mike Kernen in Detroit for several extremely useful suggestions and bug reports.

Without false modesty, I can honestly say that I'm a pretty good programmer. I'm methodical, and I try to write safe and secure code from the "git-go" (as we say in the South). I started out many years ago writing actual machine code for the Z80 processor; I then graduated to C, C++, and have had to learn Python, a bit of Perl, BASH programming and of course, PHP and Javascript.

This doesn't mean that I haven't created a bug here or there, far from it! Even the best programmer will miss something now and then. One early iteration of the POR stuff would display everything that could possibly go into a POR, whether it was valid data or not. As a stop gap, I tossed in a simple check: "If the data is less than 5 characters, skip it."

Ahhh. Here's today's bonus question: how many characters are in a typical station's call letters? Yep, you guessed it. Someone would enter a POR, including the call letters – KLZ, WMUZ, whatever. If it hit that stop gap code, unless it happened to be more than five characters (example, "WMUZ-FM"), it would be blanked out when the edited POR was saved back to disk. Fixed!

Figure 2 - I ain't got no 'D' key!

The Missing D!

I've beat my poor laptop to death doing all this new work (Figure 2). It doesn't help that the cats like to sneak onto my keyboard at night, but I can't really blame this on them. Do you have any idea how many words, including special programming keywords, have the letter "D" in them? Hey, let's start with our company's name – Crawford Broadcasting." There's two Ds for you right there! If you're a Linux power user, you also use "CTRL-D" to log out of a SSH session. The list is endless.

I ordered a new keyboard but haven't had time to install it yet. There's always the chance that I ordered the wrong one, too, so we'll see.

But again: thanks for the prayers and support after Sandy passed away. It made a very bad time bearable for me. God bless each and all of you. Until next time, keep praying for this nation!

Sandra Michelle Daley Poole, Dec. 30, 1963 - July 1, 2022.

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

As we roll through the summer, we are at the point where we are beginning to push to get our budgeted equipment installed for the year. Several of these have dragged out due to parts availability and, in the case of anything to do with a tower climb, taking forever to get a crew scheduled.

Last week we did get a tower crew scheduled for some long-awaited work on installing the Cambium 18 GHz Part 101 radios to replace the Dragonwave versions on the link between our Hammond studios to the Burnham transmitter site.

Now some of you may remember that we did the same thing with the Cambium system for our 18 GHz link to our Lansing transmitter site. That worked out so well that we eventually used it as an exclusive link for our Wheatnet network. We put a Wheatnet digital blade at the site and having been using it as a full-time STL ever since. This greatly improved the sound for the station on the air because we were no longer using a codec with compressed audio.

So, we are quite excited about the possibility of getting the same results at our Burnham site. The installation of the Cambium system seemed to go fairly smoothly, and this included changing out the antennas as well. The day after, we took out a Wheatnet blade and tested the audio by listening with headphones. At the time of this writing, we are ready to move forward with the next step, testing it on the air.

Another project that got put in a holding pattern is the replacement of our Vox Pro computers and controllers in the four control rooms. We already finished with two rooms, and we had some difficulty in both rooms with audio freezing up or some kind of digital skipping. We have been working with Wheatstone, who furnishes both the Vox Pro and Wheatnet systems. They believe the problem lies in the fact that we are not at the latest updated version of the Wheatnet drivers and blades, so before we do another room, we will have to get to every blade on the system and do the updates. I am hoping this will eliminate the problem.

Another project that got put on hold was the installation of a new generator at the Burnham transmitter site. The older unit was not exactly holding the load under some difficult circumstances when it had to bear the brunt of the normal load of the transmitter site and charge the flywheel UPS back up after an outage. We needed to upgrade the generator to 150 kW. The next step would be to take the old 100 kW generator to our Lansing site because we now have a Nautel GV20 transmitter at that site as an offsite aux site transmitter for WPWX. When we installed the GV20 there two years ago, we had to put it on a different circuit so it was not on the current 30 kW generator at that site because it would severely overload that unit.

The new equipment was ordered back in January, and they originally talked about an April installation. However, that rather quickly turned to July, followed by an email a few months ago that stated the new generator wouldn't be here until late January of 2023. No doubt this is all due to the chip shortage that is plaguing the automotive industry (and more).

We have, however, enough to keep us busy for a while as we did get our shipment from Nautel of importer/exporters and LVDS exciter adaptors. Most of the backup HD equipment at our sites is no longer working due to age of the BE exporters. We are going to install the new Nautel HD importer/exporters on our main transmitters and then use the importers and exporters from the main transmitters on the backup HD transmitters. This makes sense to me as we will deploy our best assets together. The hope will be that hand-me-down approach will keep us in business for a while with the backup HD operations.

Another project that has been the approved list for years and yet still doesn't seem to get done for lack of finding a proper and willing contractor is replacement of the fascia boards on our Beecher

transmitter building. I could see them starting to rot a few years ago and put in a budget request to have them replaced and covered with aluminum.

The hard part was finding a contractor/vendor. That was before the pandemic economy we all are experiencing now. We have literally made hundreds of calls to potential companies, most of the time not receiving a call back. What I have found is that the job is probably not big enough for larger companies, and the smaller companies usually don't have the means to provide a certificate of liability insurance. So, once we get a quote and ask for that, they usually begin ghosting us. This is, I guess, the era we live and work in.

Rocky Mountain Ramblings
The Denver Report
by
Amanda Hopp, CBRE
Chief Engineer, CBC - Denver

Where did summer go?

Can you believe summer is already almost over? We are gearing up to go on our family vacation to Lake City, Colorado. It's something we do every year, my parents and my husband and I. It's a fun trip and one we always look forward to. But with this trip comes a sense that summer is nearly over. I enjoy going to our cabin in Grand Lake each weekend and then to Lake City for a full week, but it ends just as quickly as it began.

Air Conditioner Woes

July started off hot in Colorado. We just couldn't get a break. And with those warm temps came the A/C alarms at two of my sites, KLTT and KLVZ-day. Thankfully, both have backup units, so we weren't completely dead in the water.

At KLVZ we are still awaiting someone to get to the site, but from what we have been told, chances are the condenser coils need to be cleaned. This is the site that the building and A/C units are up in the air, due to the flood plain in the area. It makes servicing the units difficult.

KLTT automatically switched to the backup unit when the temperature began to climb after the main unit couldn't keep up, but with the way the system is, there are switches on a box that open dampers to allow a specific unit through. We had a few trips to deal with this. The backup unit was also having trouble keeping up. I have them both set to 74 degrees, and it was barely able to keep it at 80 degrees. It got us by though until an HVAC company was able to come out.

It turns out it the problem with the main was also the condenser coils. We had looked but what we failed to think about was there was a hail guard over them, and while that cover was clear, beneath that was a ton of cottonwood clogging the fins on the coil. The HVAC tech cleaned it up and got the unit to work. Then he was able to diagnose that the second stage was not coming on as it should. It is currently jumpered so when stage one comes on, the second comes on as well. It has been cooling properly for a week now. We are waiting for the HVAC service company to go back out to both sites to do cleaning and repairs.

J1000

The J1000 main transmitter at the KLDC Ruby Hill site is still giving us grief. Any time a storm rolls through, the tower gets hit with lightning and it gets to the transmitter, despite ball gaps, horn gaps and the Nautel interface protection unit, all strapped securely to the station ground.

We have repaired the A and B power modules, something we haven't had to do together before. We also had to repair just the B module after the last failure. Having the tallest metal structure for miles around is just bad.

When both modules failed, the odd thing was it was the same exact components that were damaged on each one. We did get them repaired and working again only to have module B go out again after another storm several days later. Clearly something has changed at the site that is allowing this to happen after nearly every storm. It's not our site, though, so who knows how good that "ground" really is? All we can do is baby things along until we move to the new site in September.

Exporter Trouble

Earlier in July, at pattern change, when the KLVZ-day site should have come on, it didn't. I began getting alarms and almost immediately found the transmitter unresponsive, unable to put out power. Thankfully, with having a secondary location for the night pattern, I was able to turn that one back on for a little while, long enough to allow me to get to the site and diagnose the issue.

The "old man" repairing a J1000 power module in primitive conditions at the Ruby Hill site.

At the site, I quickly found the Exporter Plus for the station dead. It would not turn on for more than a few seconds before shutting itself off. I pulled it from the rack, put the station in analog which required a couple wires and jumpers to be changed, ran out to the KLZ site which isn't too far away, grabbed our spare Exporter Plus and took it back out to KLVZ to get the station back on in digital. KLVZ (Legends 95.3/810) airs a 60s-70s oldies format, and we have a lot of folks listening to the AM in HD.

We benched the dead Exporter Plus and found two electrolytic capacitors bulging and replaced them, but that didn't fix the problem. I ended up having to send it back to Nautel for repair. They worked fairly quickly and got it back to us the middle of the month, and we put it back in its rightful place at the KLVZ site and all is well. The problem? A bad stick of RAM in the SBC. Go figure.

The Best Laid Plans

I have said numerous times over the last few months my plans for doing this or that. Mainly maintenance at each site, cleaning and whatnot. I still want to do that. It's still in my plans but it may not happen until the fall sometime. Things at the office have picked up tremendously. Between the issues at each site, the KLDC move project, and office work, I'm finding it hard to find the time to get things done. I am very grateful that, despite the moisture, the grass and weed growth at KLZ, KLTT and KLVZ is virtually nonexistent. Don't get me wrong, there is growth, but it's not as bad as in years past and I don't think I will need to take our Kubota tractor to KLTT or KLVZ anytime soon.

August will be a crunch. I have my weeklong vacation the second full week of the month and when I get back, we have a tower crew scheduled to install equipment on the tower at the new site. From here we will need to begin to really prep and move what we can to the new location. The goal is to get as much done as we possibly can before the actual move date. We need to keep down time for our station and the station at the new site to a minimum.

I am looking forward to the challenge of moving a station from one location to another, something I have not really been a part of (although I was around working as a board op when KLVZ moved into the KLZ site).

That about covers it for this month. I pray you all stay safe and well!

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
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 • Cordova-Birmingham, AL
92.5 MHz, 2.2 kW/167m AAT
WXJC • Birmingham, AL
850 kHz/96.9 MHz, 50 kW-D/1 kW-N, DA-2
WXJC-FM • Cullman - Birmingham, AL
101.1 MHz, 100 kW/410m AAT

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