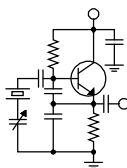


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Progress! (Which is the opposite of “Congress!”)

We made some real progress over the past month, moving one more project across the finish line and getting another close.

In Denver, the new power and control cable underground runs to towers 1 and 2 was wrapped up in mid-October. As reported last month, the electrical contractor got most of the work done in late September. We were able to complete those runs last month, and the wire and cables were pulled in. These 2-inch PVC conduit runs carry seven #8 conductors for 240-volt power for tower lights and RF contactor switching as well as an 8-conductor #16 control cable for each of the two towers. The power feeds to the two towers were working okay, but since those power feeds were in the same (old) conduits as the failing control cables, we opted to go ahead and pull in new power conductors as well. The old ones were bound to fail at some point.

Once the electricians had the conduits run and wires all pulled in, Amanda and I got to work. I did the 240-volt wiring, reworking the whole tower power distribution system in the process. Currently, the two north towers are on one 30-amp two-pole breaker, and the two south towers are on another. They were split east and west, but I changed them for a number of reasons. At some point, I plan to put each tower on its own breaker to give us more granular control.

Amanda did the inside control cable wiring while I went out to the towers to do the 240-volt and

control wiring out there. Naturally, it started raining while I was doing that, and I had water dripping right where I was working. The power was off, so no danger there, but it was still uncomfortable.



With both the AC power and control connections made, we turned the power back on and switched between day and night patterns a couple of times. It worked like a hose, thank God! I'm happy to have that project done!

In Michigan, the new tower is up and our own Mike Kernen and Munn-Reese's Rick Grzebiak have been hard at work tuning up the four-tower directional

array with the new parameters.

They had some difficulty due to one of the sample lines initially showing open and then being shorted (bad connections), but they got that fixed. The array fired up okay but not surprisingly, the match for the new tower is off by quite a bit – the impedance was significantly different than it had been with the old tower. The new tower is of the same face width and configuration, but there are apparently enough differences to change the self-impedance.

Mike and Rick made a new set of self-impedance measurements and sent them to me. I got to work on the antenna model, and it was a challenge. As I recall, it was a challenge back when I originally MoM proofed it in 2011 as well. The issue: the towers each have 21 degrees of top-loading, which by itself is no issue, but there is also a “spider web” at the top of each tower connecting the ends of the top-



You're not seeing things... the top 100 feet of the tower is leaning right.

load sections together. That required some work to model, and it definitely affected the self-impedances.

It took a couple of days, but I eventually got the model to calibrate. With that done, I was able to run the directional model along with the base region circuit models to account for the base insulator and Austin transformer capacitance and feed tubing inductance and derive a set of operating parameters. These new parameters were not terribly far off the currently licensed parameters. In fact, all but tower 4 were within the $\pm 5\% \pm 3^\circ$ wiggle room provided in the FCC rules.

With a new set of operating parameters in hand, Mike and Rick got back to work at the site, first dealing with the sample line issue at tower #3 (bad connection), then calibrating the entire sample system before firing up the array and dialing in the new parameters. Then it was a matter of going around the array with the operating impedance bridge, measuring the input impedance at each ATU and adjusting the network for a match.

Of course, each bridge insertion and each adjustment required work back at the phasor to get the parameters back to the desired numbers. And of course, each tweak at each tower affected all the other towers, so it took several trips around the array in an iterative process to get $50+j0$ ohms at each ATU input, but they nailed it. And the resulting common point sweep was sweet!

By the end of the day on Monday the 27th, WRDT was back to normal operation on its separate day and night sites. As soon as the FCC opens for business when the government shutdown ends, I'll file the notification on the existing STA and file the new proof and license application.



Secured... for now.

“Congress!” (The opposite of progress!)

In mid-October, I got a call one Saturday morning informing me that while mowing the 60-acre WDCX(AM) tower site at Clarkson, NY (near Rochester), the tractor snagged a guy wire, broke it and bent the anchor 90 degrees! Thank God the tower did not come down!

Bill Stachowiak immediately called Northeast Towers, and they quickly got a local wireless subcontractor out to the site. They were able to bring in a big concrete block and secure the guy wire to it, stabilizing the tower.

I'm starting to see a pattern here...

It remains to be seen whether the existing anchor can be salvaged or if it will have to be excavated, removed and replaced. Whatever the case, we'll need to get it done before the site is covered with two feet of snow.

The New York Minutes
By
Bill Stachowiak
Chief Engineer, CBC – Western New York

Greetings from Crawford's Buffalo cluster!
Over the course of the month of October we have accomplished a lot...

We installed a new remote control at WLGZ in Rochester. The old remote control was a Gentner VRC 2500 that was failing and wasn't supported any longer by Burk.

Cris shipped us a surplus ARC Plus unit he had in storage in Denver. Unfortunately, it was damaged in shipping on its way to Buffalo. I contacted Burk and was told that they didn't have any parts for the ARC Plus units anymore. The rotary encoder used for the jog wheel had to be replaced.

After doing some investigation, we found an exact replacement from Digikey. After installation of the new part, we were able to reset the unit to factory defaults and create the new profile for WLGZ.

The installation went flawlessly. The only thing we had to do was test the command channels and calibrate all of the analog channels.

We installed a new Ubiquiti mesh wireless system at the WDCX studios. This replaced two old Netgear access points that didn't adequately provide wireless coverage throughout the facility. The new system consists of a gateway and three access points. We found that two access points provided more than enough signal anywhere we tested. Everyone is very pleased with the new system as it is much faster than the older system.

While inspecting the WDCX-FM transmitter, we discovered two fan failures on two PA modules. We replaced one of them and then 1 week later the second one failed. We have ordered some spare replacement fans.

We installed a new Cisco switch at the WDCX-FM transmitter site.

Before installation, I configured the switch so that ports 1-22 are on the default VLAN 1, port 24 is a trunk port not in use at this time, port 23 is on VLAN 2 which I set up as my administrative VLAN for SSH access to the switch, and port 23 is connected to the Cambium

(microwave) network where all the other ports are on the Spectrum cable network. The advantage of this is that I can move any device between networks simply by changing the VLAN from 1 to 2. Of course, I have to be careful to not cause an IP conflict when doing that. We did a similar thing at the WDCZ(AM) site.

We installed the new line/antenna pressurization manifold and repaired the dehydrator at the WDCX-FM site.

As Cris noted above, while mowing the grass at the WDCX(AM) site in Clarkson, NY, the contractor hit one of the guy wires. Luckily, we were able to get temporary repairs done to save the tower. We are working on getting a plan in place to do permanent repairs.

That's it for this month!



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

560 Tower 4 Reconstruction – Final Episode

Ah yes, autumn is here once again and neighbors of our WRDT 560AM Monroe Township Michigan transmitter site are enjoying fine bucolic vistas provided by nature's vibrant autumnal spectrum packed with reds, yellows, oranges, browns, and four complete 417-foot radio towers. Yes, tower 4 is once again reaching for the sky, thanks to an amazing crew of professionals.

The tower arrived on just one semi-truck and was unloaded and set by the side of the new access road that was recently only just soybeans. Each of its 21 pieces was indexed and easy to identify by its section number being painted clearly on the bottom flange on each one.

The assembly process went easily. First, we set the 856-pound porcelain base insulator. (I say 'we' as if I did anything other than watch and get in

the way). Then the first section of the tower and its guys were set by two small cranes owned by the tower contractor.

The next few sections were bolted together on the ground to reduce the number of crane lifts. Then each was stacked by their larger crane until we were beyond its maximum reach.

After that, it was time to rent the big crane and its crew of three. This one is about the largest crane that can drive down the road and is a thoroughly impressive piece of equipment. The twin-engine, 6-axle, 8-wheel-drive monster arrived with

two support semis, themselves each with 11 total axles to handle the immense weight of the massive solid steel counterweights needed to balance our load at such a high angle and reach. Also loaded on were two additional jib sections to extend this beast to its maximum reach of 393 feet!

How, you ask, is one to build a 417-foot tower with a 393-foot-reach crane? Well, you pick up the top section and realize you can't lift it high enough, then you set it back down and rig it again this time a bit lower, leaving a bunch to protrude past the top of the jib. Now they had just enough to clear the top of what was already placed.

Once the top section was placed, the crew started disassembling the crane and packing up. Each of the counterweights was removed and loaded on the 18 wheelers – err, 46 wheelers. Watching them leave is when I saw this crane's biggest party trick: its 12-wheel crab walk steering!

But enough about cranes. Once the tower was erected, the crew added the lighting, the lighting control box, the Austin transformer, and the feed line. They also did a good amount of work on the tower's ground system, making sure the damaged parts were repaired.

Today, as I write this, we are tuning. Since tower 4 is new, it naturally has different electrical characteristics. The ATU inside the tuning house was adjusted to make the new physical tower its most efficient electrically. Other towers are being touched up for their best fit within the array and so far, things are looking very good. I thought we'd have to make a



The 393-foot reach crane had just enough to set the top sections in place.

few improvements via the phasor tuning, and it didn't require any major adjustments to get us right on the money.

Tower 3

As my grandfather said many times in a grumpy unhappy tone, "Everything you go to do is a pain in the rear." He was a mechanic in the test labs at Ford Motor Company and would have to help disassemble cars for analysis after crash testing. Guaranteed that was a huge pain!!

I've found that just about every big project has a stubborn, balky, or downright obstinate component, whether it be a rusty bolt, a broken part that is 'unobtainium' or something that you just can't wrap your head around. With tower 3, pretty much since I started here, it's been a flaky sample line.



The outer conductor had broken right behind the nut on this N-connector at tower #3.

Shortly after taking the reins here, I hired a crew to conquer the ever-advancing legion of vegetation that had to be dealt with. Their fine parting gift was a severed sample line on tower 3 that I had to discover (thanks for not telling me), repair and recertify. Since then, I've been dogged by problems with the antenna monitor at tower #3. It works most of the time, but on rare occasions, it fails.

The slice made by my friends with the brush cutter was between the fence and the tuning house, which is a gap of about 16 inches. After finding and repairing two improperly installed N connectors on the jumper up to the sample transformer, I conceded to my foreboding, peeled back the fence and opened the layers of weatherproofing that I'd applied a few years ago. What I found was the outer corrugated cable shield was split all the way around the connector. There's your problem, lady!!

I redid both connectors just to be safe and will tie this to the main bundle so that the wind won't stress it again and cover it so that snow and ice can't get to it. I probably should have done that last time.

Test – fail. Now what?

I had been testing for shorts after each connector installation, so now it was time to check continuity. Sometimes, simple trouble can be complicated by distance. In this case our sample line crossed the field from the transmitter building to the tuning house. This super long run of ¼ superflex could be compromised in an inaccessible underground spot, which would require us to trench and run a completely new line – I didn't want to consider that!

We must have a working antenna monitor to complete the tuning of the whole array – retuning made mandatory by the reconstruction of tower 4. Fortunately, I was able to confirm a complete cable from the splice to the transmitter building, which meant the jumper coming from my splice going into the tuning house was the issue, and indeed it tested open.

We were able to locate some identical cable, likely left over from the original installation 30-40 years ago. When we pulled the faulty cable back through the building penetration, it came out in two pieces and had obviously been folded back on itself! This was lying in wait for years and must have broken completely while I was installing the new connectors.

We're back!

Finally, we have a working sample line on tower 3 and can proceed with tuning the whole array. Rick Grzebik from Munn-Reese came in for the assist here. Careful matching at each antenna tuning unit and some light retuning at the phasor yielded fantastic results.

The following day, Rick and I went on the road and rechecked 36 reference field strength measurement points established previously and used for the original Method of Moments proof done in 2011. The pattern matched predictions, and now,

after months of work, 560 AM WRDT can broadcast from its Monroe transmission facility once again.

Other Musings and Goings On

Naturally, attrition never stops, rust never sleeps, and users always click “print” over and over when the printer is out of paper. While we were working on the aforementioned cable, I commented to Steve that we could not have asked for better weather, especially this deep into fall. 20 minutes later, we were scrambling to put away our tools and cover the open connections. That cold front brought with it the last strong wind that the fence at tower 1 could endure, blowing it partially over and leaving a large gap at the gate. When I noticed it, I of course thought “Copper theft!” Fortunately, it was only that the fence posts had rusted through at ground level.

Speaking of copper theft, I plan to paint the newly installed copper strap at the base of tower 4 with gray paint so it doesn't look like a fresh tasty carrot to ne'er-do-wells seeking out a copper fueled payday.

Last but certainly not least, we need to get the new tower light controller to cooperate with our existing tower light monitor. I suspect this will be a simple matter of relocating the photovoltaic cell. Also, I we have a few porcelain standoff insulators to replace in the tuning houses, and I have to restart the macros that automate the day-night site changeover and adjust the tower phase and ratio alarms in our remote-control system to reflect the new parameters dictated by the models of the new array.

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

Windows, that's all you have to say...

With the Windows 10 end of life (October 14th) in the rear view mirror, I thought I'd spend a moment talking about what it means for everyone that is still on the operating system and just Windows update anomalies in general.

It is estimated that 40% of PCs still run Windows 10 and those users are going to have to go somewhere in order to keep their computers running up-to-date security patches and licensing. So far, Apple has seen a 14% increase year to year in their sales, and Linux, which in most cases is not sold by a company but is more user community driven, is seeing a real uptick in usage as people are looking for alternatives.

The problem, as I see it, is that Microsoft has pivoted their default login to their operating system as needing their cloud services and internet. I'm sure all of you have seen this while setting up the latest Windows 11 systems for your markets. You cannot easily create a local administrative account or a limited account without really jumping through some hoops to do it. During the initial install, you basically have to have no internet available to the machine and do some command line work in order to

have the system skip their Out of the Box Experience™ (OOBE, for short) to be able to create an account that is local to the computer.



Computer geeks have understood for a long time that the Microsoft Windows End User License Agreement (EULA) basically says that even though you paid nearly \$200 for the license, you don't “officially” own the software. This is what allows them to push security updates (and other unnecessary ones) to your computer without your permission. It's also why after each of those updates you have to go back into the installed apps and remove Xbox, Skype, Teams, and yet another Office

installer (which is about 300 MB of space) if you don't use or want them even if you had removed them previously.

I've been known to say that one way that I know Satan really does exist is the fact that Microsoft Windows has a stranglehold on the PC operating system market. Of course, they aren't the only software company that employs this type of behavior. Adobe went to a licensing structure several years ago instead of allowing users to buy their product outright and use it until it didn't serve your needs any longer.

It's been a trend for a while that you rent a service from companies and don't really own anything. I think Stephen is writing about Amazon's 15-hour DNS issue that happened earlier in the month, but the overall problem is that when we put our logins, data and services in the cloud, what happens when the company that is "too big to fail" actually does? Maybe the failure won't be financial (although it could be), but it could well be an infrastructure failure as Stephen details regarding Amazon, or the cloud company sends out a notice that says that a cost-benefit analysis indicates that the service a company requires to run their business is no longer going to be supported.

I've seen a general trend in trade articles and people I follow that indicate that a number of companies are being more strategic about what they do and don't push to their cloud providers.

Interestingly, the price for hard drive storage has plummeted. A quick look at Newegg, an online computer hardware store, shows that a 28 TB enterprise hard drive is currently priced at \$529. That is a little under \$19 per terabyte of storage. Yet, paying for and using that same online storage has increased. You would think that the two lines would track together. I'm not saying that there should be a 1:1 ratio or that there isn't value in what the cloud service companies provide with all of their hardware and support staff, but I am saying that the 8 to 12 percent increase year over year for equivalent service is forcing a number of companies to evaluate just how useful the cloud is to their organizations.

I know a lot of you are probably thinking, "Wow, I knew Todd was a little crazy and that he is also an open source guy, but I didn't know that he harbored this much resentment toward the computer establishment." The genesis of this month's article stemmed from something really basic. Beyond being a computer guy at work, my friends and family also hit me up on occasion because they're having issues with their computers.

In the past month, I've had several people at work and around me ask me to take a look at their computers because the keyboard was acting weird and they couldn't do anything meaningful because it was acting so erratically. It turns out that in every case the settings for the delay in repeating characters on their keyboards had had been maxed out on the sliders that control those rates. What?

Obviously, if they had done it, they would have known where to go look to fix it, but they hadn't done it; they had received an update on their computers.

It doesn't help that Microsoft has been making it harder and harder to get to their Control Panel to handle settings like this. All of them were at

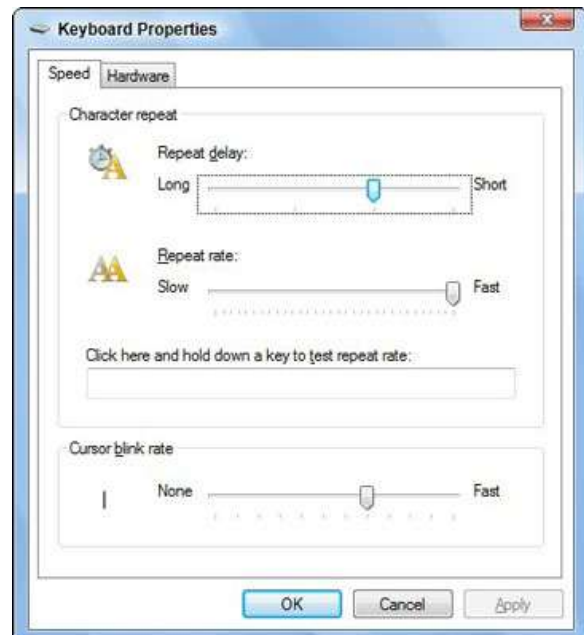


Figure 1 - Both keyboard rate control sliders had been maxed out after an update.

the point of thinking their laptops were broken, but it turned out to be a setting that had been changed during an update. If it happened to three people in my limited sphere of influence, how many other people did it happen to?

This isn't a call to circle the wagons. At the end of the day, I know the reality of the computer world we live in, and we all have to make friends with Microsoft and other companies and get along in order to make our markets work. Microsoft is moving slowly toward heat death and Apple is continually upgrading their software and that forces their hardware into obsolescence. The only operating system that I've ever worked with that gives me some peace in all these areas is Linux.

Do you have an older computer around that Windows has passed by? Linux will work on it. Do you need a Network Attached Storage service on your local network? There are several Linux options that are easy to manage and will work on older hardware. I've basically been using Fedora Linux for 20 years, and it has never broken on me whether by update or the file system itself. It just works. I could probably set it up for my 80-year-old mother and she'd have no issues navigating it.

In fact, as soon as I wrote those words about

Linux, my blood pressure started to go back down and everything in my computer world seems more normal again.

Blessings to all of you in this month of Thanksgiving and may God bless the work of your hands.

Tales From Cousin IT

by

**Stephen Poole, CBRE, AMD
CBC Corporate IT Specialist**

Many are the churches that I've visited over the years. All different flavors and denominations, pastors ranging from good to bad, you name it. This started when I was singing and playing with various ministries and groups and continued when I moved into radio full time. Lots of memories there.

One that came to my mind was an elderly pastor speaking at a funeral in a little church (about the size of a garage). Brother Man had a speech impediment. In his mouth, our Savior's name was "JEE-thus." He repeatedly used the word "Reth-urr-REC-shun" as well, but he refused to say whether the dearly departed was bound for Glory or a warmer clime.

This good brother used an ancient King James Version that still had the old English oddities of spelling and pronunciation. What he lacked in education (and diction) he more than made up for with enthusiasm – except for granting the dead guy the benefit of the doubt on his eternal destination, but hey. Good times, good times.

Amazon Melts Down (Again)

I'm not going to repeat my usual warning about depending on cloud services. But I'll cover this because it has been all over the news. The big cloud companies rely heavily on automated systems nowadays to keep labor costs down. The problem with automated monitoring is that if something comes up that it's not programmed to detect, well ... you could have what happened to Amazon Web Services (AWS) on October 20th.

The official explanation from Amazon is that a problem with their internal Domain Name Services (DNS) in their US-East-1 center caused cascading failures that knocked a bunch of stuff offline. This included Reddit (a popular social media site for geeks), Bank of America, Lyft, Disney+ and a host of others, including Amazon itself.

I hope I've correctly parsed Amazon's chaotic failure report, anyway. The Register (theregister.com) called it a "stream of consciousness

... written before the Red Bull wore off." (Heh.) As I type this on Wednesday October 29th, AWS has reportedly experienced another meltdown, also reportedly in the US-East-1 center. This time, however, Amazon is vehemently denying it, in spite of the fact that Down Detector (downdetector.com) has recorded a bunch of complaints from end users.

This matters because many of our websites are hosted through AWS now. But I have my own anecdotal evidence for this one: McDonald's app is AWS-based. I order in advance, give my code at the drive through and violá! I can haz my cheeseburger. Not this time. I carefully entered the details (including "NO ONIONS") ... and a sad-looking orange box popped up that said, "Sorry, try again later."

After repeated tries, I ended up uninstalling and re-installing the McDonald's app – something I've had to do several times now – and had to go through the entire order again. Eventually, it worked, about the same time that Down Detector said that AWS appeared to be straightening things out. Surely that's just a coincidence.

... And Microsoft 365

Our managers and other key partners use Microsoft 365 email and collaboration. M365 also had a bunch of complaints on Down Detector as well around lunchtime today. These centered on the M365 Admin Panel, Azure, and general complaints of being unable to log in. To Microsoft's credit, they owned up to it, even posting a quick message on X.

As I've already said, these big cloud providers are leaning heavily into automated systems and AI to keep an eye on things. While this will lower their labor costs, one wonders how profitable they'll be if they start losing customers by the wagon



load. Clients like McDonalds and Chick-Fil-A, Snapchat and other big names, depend on these apps. They cannot accept customers being unable to place orders.

But that brings up another thing, and I'm speaking from personal experience. Sites like Google's Cloud Services, Microsoft's Azure and Amazon's AWS make it very easy to create a website and matching apps. No argument there. But the tie-in is significant, and many of these folks who are currently hosting with them may discover the same headaches that I did when migrating back to an in-house system.

The Mail System!

A quick reminder that this new system is NOT for Crawford Media Group email addresses. It's for older Crawford Broadcasting and station-specific ones; ex., "harry@wmuz.com" or "dave@wxjradio.com."

The biggest problem with the old Zimbra mail system (and Scalix before that) was that many, many years' worth of added-but-never-deleted email accounts have pushed our user count up over 450. The new iRedMail stuff is essentially ready to go, but with the assistance of each of our market email folks (typically the engineers), I've been doing some final trimming on these older email addresses.

Figure 1 shows the master "Admin" login for each of our market mail gurus. You'll note that I've added a "show password" clicky-thing, which is especially important in this case given that the new passwords are considerably longer and more complex than the ones we used with Zimbra. I need to add that to the POR system (in fact, I have several things that need to be added to that, including an archive and a search function).

The plan is to get the new mail server up and running sometime the second week of November. This assumes that no meteor strikes or alien invasions will interfere. This past summer has been amazing, what with towers falling and antennas catching on fire and buried control cables going bad for no apparent reason. But that's why we're called "engineers."

Let me briefly explain how email over the Internet works, especially given that we have many new partners since the last time I did so. The primary part of an email address is the domain name: crawfordbroadcasting.com, wmuz.com, and so on. When someone sends an email to you, their email program ("client") will first look up the domain name after the "@" to get the Mail Exchange (MX) record

from DNS. Using "harry@wmuz.com" as an example in a Linux terminal, first look up the primary domain:

```
host wmuz.com:
wmuz.com has address 54.91.202.253
wmuz.com mail is handled by
10 mail.crawfordbroadcasting.com
```

The first IP address is for the main wmuz.com website, and that is indeed an Amazon IP address. But since we're doing email, we need to look up the IP address of the MX handler:

```
host mail.crawfordbroadcasting.com:
mail.crawfordbroadcasting.com
has address 12.33.50.158
```

Figure 1 - Admin Login to the new mail system.

That IP address goes to our mail server in Birmingham. THIS is where the email will be sent. Our mail server receives it, scans for viruses and then places it in your mail folder. When you log in to check your mail, you'll be notified of the new message.

The same process happens in reverse when you send a reply. Your email client (ex., Outlook) will pull the DNS records for the primary domain name (ex., gmail.com or whatever.com), get the MX record for that domain name, and finally, pull the IP address for the MX handler.

This explains why our old web server in Denver has a do-nothing website called "wpwxsales.com" on it. You can't have a mail server that isn't associated with a domain, even if it's different (in this case, the site is wpwxsales.com and the MX record is, of course, mail.crawfordbroadcasting.com; same for wmuz.com, wdjradio.com, and so on). And just to complete this roundup, really large mail systems (such as Gmail) can have multiple MX handlers.

gmail.com mail is handled by ...
5 gmail-smtp-in.l.google.com.
10 alt1.gmail-smtp-in.l.google.com.
20 alt2.gmail-smtp-in.l.google.com.
30 alt3.gmail-smtp-in.l.google.com.

These are all different servers. The "5, 10, etc." numbers off to the left indicate the priority. The

lowest number will be tried first ("5" in this case); if it's busy, 10 is tried, and so on. We only have the single email server, so we just use the default "10" priority level. But in each case, a second DNS query will be made to get the actual IP address of the MX handler.

Okay, that's enough for this time! Until next time, keep praying for this nation! God's got this and we need to let Him use us to do it!

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

We continue to work on our replacement generator project at the Lansing transmitter site. Back in April, before we got busy with a lot of other projects, we installed the new transfer switch inside the building.

Currently, we are working on getting ready to construct a concrete pad for the generator. So, after getting verification from the utility companies that we had no pipes or electrical lines that were in our path, we began digging the hole.

This antenna yard is covered with anywhere from 6 to 8 inches of large size rocks, not gravel. The rocks are bigger than a golf ball but smaller than a baseball. This was pretty much impossible to dig by hand.

We rented a Bobcat with a shovel with teeth. Our maintenance man, Larry, got to have all the fun operating the

Bobcat. I don't really have that kind of experience, so I'm not a good option. Larry had plenty of experience doing this kind of work, so he jumped into the cab. I

definitely didn't want this to be my first time, as we were working under a self-supporting tower with a lot of angle iron nearby.

With those types of rocks to get through, even the shovel on the Bobcat had trouble penetrating that first level. But once he did, the rest of the dig went rather quickly and we had the hole dug in about two hours.

At the time of this writing, Larry is working on the forms and getting rebar in place for the concrete pour. We will also need to get the conduit for the electrical runs in place so that the wires will run from underground up and into the generator cabinet when it's in place.



Larry used this Bobcat to remove the rock and dig the hole.



Almost ready for concrete. We still need to run the conduit.

**Rocky Mountain Ramblings
The Denver Report**

by
Amanda Hopp, CBRE
Chief Engineer, CBC - Denver

October was a slow month for Denver, and I am grateful. It started off with a trip to our Lookout Mountain site to finally get our main/aux switch installation for the 95.3 FM station fixed. It was a matter of wiring up a DB connector. On our last visit, we had the wrong sex of connector (you can't always believe what the manual tells you!).

On this visit we noticed some higher-than-normal reflected power on our 100.7 transmitter. I had also been getting high PA temperature alarms from that same transmitter.

We found that one of the class A TV stations had installed a new transmitter and antenna at the site. This transmitter is sitting on top of a rack with the fans blowing all the hot air directly onto the HVAC thermostat.

This new TV installation is the cause of our reflected power issue. We turned off the RF on our 100.7 transmitter and still had about half the reflected power that was showing when it was on. Tracing the transmission line from the TV transmitter through the building and then outside and up the tower next to the one our 100.7 antenna is on, we found that the TV antenna is just a few feet from and directly in the aperture of our 100.7 PSI antenna. The TPO on the channel 4 TV transmitter is 1 kW (ERP 3 kW according to LMS), so a good portion of that power is being coupled into our antenna and coming back down our transmission line and into our transmitter.

We didn't have a spectrum analyzer with us when we were up there, but we're guessing, based on the reflected power indication on our transmitter that increases when we turn the 100.7 RF on, that a strong IM product is being generated and our antenna doesn't like it. Usually the reflected power on our antenna is zero.

We have plans to go to the site to investigate further. We were hoping to find some contact info for the TV station, but with the FCC shutdown, we have had no luck. We may have to leave a note in hopes someone visits the site regularly. They need to

provide us with a pass/reject filter. We're hoping the site owner will help before the FCC gets involved.



KLTT Project

We finally finished the big project at KLTT. In September, the electricians trenched and laid conduit to towers one and two. We got the power and control cable in and got them run to the towers. We just needed to finish the last part, which was getting it to the building. This took some planning, and we found one day

available to do the work.

We went out to the site, did a ton of digging by hand, and decided to go ahead and do the electricians' work of laying the last of the conduit to the building. I won't go into the reasons why we did this, but it worked in our favor.

The following Monday, when we had the electricians out to finish the work, it turned out had we waited to do this part of the work, we would've just had to go home. The Lord works in mysterious ways, and he got us to do the work the Friday before.

So, that Monday, the electricians were able to go ahead and pull the remaining wire into the building. We spent the next couple of hours getting it all wired up. I am happy to say that so far, all is going well. The day/night switching has been working flawlessly, which is a huge relief.

Zetta Issues Continue

As I write this, I continue to deal with occasional issues within Zetta. The system will slow down to a crawl, and it will begin booting out long form programs. This has plagued us since the installation with no resolution. We have an open ticket with RCS, and each time I get a report of a show getting booted early, I get the info and send it on for RCS to investigate. They have moved the ticket up the chain, and it is now with development.

The next step is to upgrade Zetta. I was hoping to put it off to get the latest and greatest, but unfortunately, we need to get the update done sooner.

This will be my first Zetta upgrade. The hope is that there was a bug fix that will make this issue go away.

I have been highly unimpressed with support, at least with the person I've been dealing with in regard to this ticket. The communication isn't there. Rarely did I get a response when I updated a ticket. Was it even getting looked at?

I am going to work to get Windows updated on all our machines in preparation for this. With NexGen, we never had to worry about Windows updates or rebooting computers periodically. With Zetta (and Microsoft), it is good to do these updates every so often. I am shooting for every quarter. I can easily Hot Spare remotely, so I can work in the comfort of my own home, after hours, and get this all done, without disrupting anyone's work.

Coming Up

Winter is quickly approaching as is the holiday season. This time of year, transmitter work tends to slow down for me.

It is good to have some help in the engineering department again. I recruited a gentleman named Daniel from our local SBE chapter. He had been helping another engineer friend, so he had some radio experience. He seems eager to help me with the "dirty" work I don't necessarily want to do, and I am grateful. He lives close by a few of our sites, so I can call on him if there is an issue. I hope I can begin getting Daniel trained up since we need more radio engineers. It will be good to have a second pair of hands to help me keep things running in Denver.

I have no major projects on the horizon. I have the Zetta upgrade, which will either happen before this comes out or on November 3rd. I look forward to having more time to get caught up on some SBE webinars as well as rewatching the five-part Wheatstone masterclass that they put on for us.

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

The Local Oscillator
November 2025

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/100.7 MHz, 5 kW-U, DA-1

KLDC • Denver, CO
1220 kHz, 1 kW-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 • Brighton-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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