The Local Oscillator

The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Tower Work Revisited

Back in April I wrote in these pages about the sad state of affairs in the broadcast tower service business. Nothing has changed since that time as far as I can tell, but now, a couple of months down the road, I can provide more evidence of the problem.

Since day one, we have had nothing but trouble with the Part 101 microwave links in our Chicago market. These links, both of which are on 18 GHz and both of which have paths of less than four miles, have not worked reliably since we installed them. Understandably, our engineering staff placed the blame on the equipment, all of which was unfamiliar to them, and they have spent (wasted) a lot of time on the issues. This is the same equipment that has been very reliable in other markets.

Last month, engineering manager Rick Sewell was working on some network issues for WYRB when he discovered that he was getting packet losses through the Trango Apex Part 101 link between the studio and the WSRB transmitter site in Lansing, Illinois. From Lansing the network makes its connection to the WYRB transmitter site in Kirkland, Illinois through a point-to-point T1. We thought we had a T1 problem but that showed to be clean; the issue was between the studio and Lansing, on our own microwave path.

Unable to get a regular tower crew out to the site, we contacted our wireless Internet tower tenant, which has its own crew, and had them climb the towers on both ends of the Hammond-to-Lansing link. What they found was heartbreaking. The weatherproof ñglandsò that are used to keep water out of the data ports of the Apex radios were not properly installed, leaving the ports open to the elements. The Ethernet surge suppressor at one end was attached to the tower with electrical tape. I can only imagine what the electrical connections are like.

Clearly we have a lot of work to do to get these links properly installed and weatherproofed, but the condition in which we found the installations should raise our awareness of the kind of slipshod work that can go on in this business. Unscrupulous tower workers figure that we will never see the work so why not cut corners? As long as whatever it is works when they leave, theyôre good, and if it gives trouble down the road, well, thatôs just more work and money for them.

Figure 1 - We found the Ethernet surge suppressor attached to the tower with electrical tape. No ground wire was used.

This is why we must *insist* on photographic evidence of the job properly done. I am putting this requirement into tower maintenance/service contracts now. No photos showing properly completed work, no pay. Period. That is now our official company policy. And if the workers tell you they forgot to bring their camera, it wasnôt working or whatever, then they get to come back with a working camera and take photos at their own expense. That is if they want to get paid.

We are still waiting on tower workers to complete the microwave link work in Birmingham. Chances are that those antennas will have been on the

towers for a full year before we get the links commissioned. We did get the Red Mountain to Tarrant link antennas fixed, replacing the mounts damaged by the tower crew with new ones (which the crew again installed upside down and had to re-do!), but the radio on the Red Mountain end won't power up. We either have a water-damaged radio or a cable problem, and we won't know which until we can get a crew up the tower again. At this point, who knows when that will be?

Every day that we wait I understand more and more why some of the big tower companies (and even some local wireless ISPs) have their own crews. They simply can't afford to wait for months on end for third-party crews, and the job has to be done right.

The Move to Terrestrial

Last month I mentioned that we are in the process of moving most of our live corporate program distribution from satellite to terrestrial distribution. The reasons for this are financial.

The equipment that we use on the CBC satellite network is early 1990s technology and some of the equipment we use dates back to then. It is no longer supported and even the modulation/encoding scheme is obsolete. We cannot get replacement equipment that will talk to our receivers. If we want to stay with satellite distribution, we will have to make a big investment at our three uplink sites to replace all the equipment there, and we will have to replace all the receivers in the company. Obviously we're talking about a big chunk of change. Add to that the not insignificant monthly space segment charges and it's clear that continued satellite distribution will be more expensive than is justified by the purpose.

As such, we are replacing the Denver and Detroit uplinks with terrestrial distribution equipment, specifically the Tieline Genie Distribution codec. These are installed and working now and we are in the process of getting the individual stations outfitted with Tieline Bridge-IT codecs. Most of the company is done as of this writing and I am working on the programming.

The Denver and Detroit hubs have the distribution codecs on dedicated high-bandwidth IP services that they don't share with any other IP loads. At the individual stations, the Bridge-IT codecs will share existing bandwidth. We will employ high-efficiency algorithms to minimize bandwidth demands at the stations, and I plan to have those connections made only when they are needed.

We will use our Wheatstone bridge routers to manage the feeds, both in terms of audio routing and codec connections. Wheatstone has a simple but very functional scheduler app that we will use to make the appropriate audio crosspoints and provide logic control of the Tieline Genie Distribution codecs to make and break connections to the stations as needed. It is an elegant way to manage the whole thing, "one-stop shopping" so to speak. In Denver, the Genie Distribution codec is being fed directly by Wheatstone via the Wheatnet IP port on the unit.

The plan is to have this all working in early July and have stations taking feeds from the codecs instead of the satellite. That will give us about a month of overlap to work out any bugs.

Part of the CBC satellite network will remain. KBRT will keep its uplink and we will keep the CBC-1 channel. We use that for STL backup to the new transmitter site and we will use it to feed KBRT programming to San Diego for the new station, KNSN. We're in the same boat in terms of equipment obsolescence with KBRT, but we can extend the life of the KBRT uplink indefinitely by using the retired Denver uplink terminal, encoder and HPA as ready spares. We will also have the pile of retired ABR202 receivers available should we need any of them.

Stations that take "The Bottom Line" (M-F 3:00-5:00 PM Pacific) from KBRT will continue to do so on CBC-1.

A New Bird

On August 24, SES Microspace will replace AMC-1 with SES-3. Since we will have by then moved most of our program distribution to terrestrial, this won't have a big effect on us. It will, however, affect KBRT and all stations that receive programs from KBRT. Those stations will have to make a 26-degree polarization change, and someone (probably me) will have to move the uplink to the new polarization. I will provide more information on this to the stations that are affected as we get closer to the August 24 date.

Still Learning

In Denver we continue to make the transition to the AOIP world with the Wheatstone "Wheatnet IP" system. We have a host of IP "blades" already installed and on line, and in the last month we tied the bridge router to the Wheatnet IP world using a "bridge blade" (our term). We can now route between the bridge router and blades on the AOIP network and as noted above are doing this to feed the Tieline Genie Distribution codec.

Also in June, Amanda and I brought the first

of the four stationsô Nexgen audio servers into the AOIP world. KLDCôs audio server is now feeding audio via the Wheatnet IP PC driver and its I/O is being routed and switched through a blade. Amanda will talk more about this in her column.

For the moment we are extending the life of the HP workstations that we are using for audio servers by replacing the hard drives, upgrading the RAM and upgrading them to Windows 7-64. We will continue to work our way through the stack until we have all four stations done, hopefully yet this month.

If all goes well, I plan to export this technology to other stations in our company, starting with the biggest markets, in 2015. For now, Iôm still learning the system so I can help each of our markets when we do the export.

Off-Air Monitoring

Monitoring our own signals and the signals of others off air at our studios has long been a challenge, particularly for AM stations. In high-rise locations like our Denver cluster we have the advantage of height for the rooftop antenna (which is at 160 feet ±), but we also have a lot of RF and noise up on that rooftop. I have long searched for a good way to deal with the issue so that we would have solid signals from our own stations as well as EAS

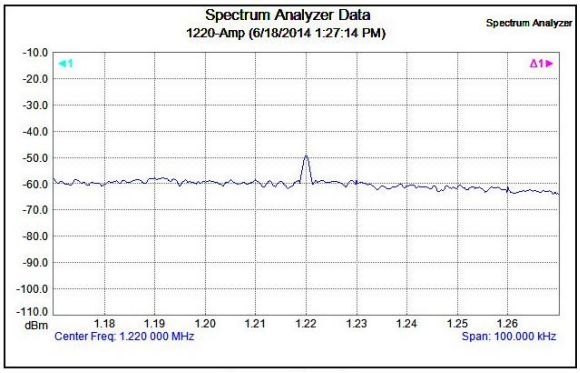


Figure 1 - Spectrum shot of the output of the amplifier. That little blip in the center is the peak of the KLDC carrier.

assignments.

When we first moved in to the Denver leasehold three years ago, I purchased a disk-cone antenna to use for off-air monitoring. Granted, this is far from an ideal AM receive antenna, but it is omnidirectional and it does a good job with FM signals, so we put it up, ran a length of RG-59/U to the engineering room and set up an 8-port splitter to send the signal to all the receivers in the system: utility tuner, FM EAS receiver, AM EAS receiver, and an HD monitor in each room. That soaked up every single port on that splitter (the utility tuner gets two ports ï one for FM and one for AM). And of course we lose about 10 dB between the input and any of the output ports (less on AM, more on FM).

Our weakest AM signal from the disk-cone is -55 dBm to peak of carrier, meaning that we have about -70 dBm at the output of the splitter and a dB or so less at each receiver. That gives us a lousy S/N ratio and that weakest signal (KLDC-1220) was always noisy and would not lock in HD. I needed a way to get that 10 dB back, so Amanda and I began searching for broadband amplifiers that we could put in front of the splitter.

Lee Edwards of Proaudio.com put us onto a distributor in Denver called InLogis. They have a wide range of RF distribution products, including a dandy 12 dB 0.5 ï 2400 MHz amplifier. We bought

Figure 2 - Amplifier and pair of band splitters with a 20 dB attenuator between the FM ports.

the amp and put it in front of the splitter and everything was great! Well, maybe not so much. In fact, the amp made things *worse*! We couldnôt even hear KLDC once the amp was installed, and the other stations were noisy. It was as if the amp was attenuating instead of amplifying.

I connected the Anritsu spectrum analyzer and took a look first at the antenna itself and then at the output of the amp. With the amp connected and powered, the noise floor came up from -95 dBm to -60 dBm. The KLDC carrier was visible as a little blip sticking up out of the noise, and all the sideband energy was in the noise (see Figure 1 above). When I removed the antenna lead from the amp, the noise floor dropped down below -110 dBm. So something was probably overloading the amplifier.

A full sweep of the spectrum from 0.5 to 2400 MHz revealed a pair of FM signals in the high end of the FM band that were in the -10 to -15 dBm range. Thatôs a lot of signal, and a search of the FCC database showed that these were likely a pair of 20 kW FM booster stations for a couple of eastern plains rim-shots, and the site where they are located is just a few blocks northwest of our building.

I did some experimentation with fixed attenuators, observing the amplifier output as I inserted different values of attenuation between the antenna and amplifier. Even 6 dB made a huge difference, but I found that 20 dB seemed to produce the optimum effect and best S/N ratio for KLDC (which again is our weakest signal).

The final solution was to use a pair of signal bandpass splitters back-to-back. These splitters filter MW AM signals only to one port and VHF FM signals only to the other. I connected the AM port of one to the AM port of the other and the FM port of one to the FM port of the other, but through a 20 dB attenuator. The combined output was then fed to the amplifier.

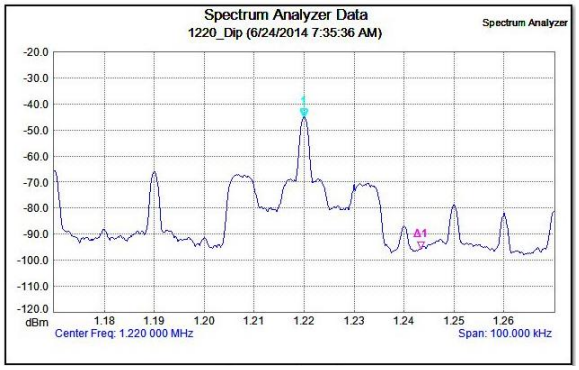


Figure 3 - The same spectrum as shown in Figure 1 after attenuating the FM band by 20 dB going into the amp.

The result: a beautiful spectrum with a low noise floor (see Figure 3 above). KLDCôs carrier is at -45 dBm, the HD carriers are in the clear, the noise floor is in the mid-90s, and all the stations we are monitoring (including the FM) have great signals at the receivers.

The best news is that all this did not cost an arm and a leg. If any of you are struggling with broadband off-air signal amplification and distribution, keep InLogis in mind.
www.inlogisinc.com

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

Hello to all from Western New York! This year in the Northeast we have literally migrated from winter directly into summer, bypassing the cool rainy spring days we normally experience. We went directly from snow to 80 plus high humidity days seemingly overnight. The early summer has allowed us to begin our summer projects weeks ahead of normal.

The first project we accomplished was to replace all of the side markers on towers 3, 4 and 5 at the WDCZ transmitter site. Winter winds had knocked out all of the lights on these three towers and the decision was made to replace the incandescent fixtures with LED lamps. The previous owner had begun the replacement several years ago by replacing the markers on towers 1 and 2 with all LED fixtures, but it never completed the remaining towers. Don Boye of Western Antenna and Tower were called in to replace the old lamps with new Dialight LED fixtures. In the future, we will likely replace the three remaining beacons with LEDs as they fail. With the rising costs of labor from tower workers, it only makes sense to replace the incandescent bulbs with LEDs as their life expectancy is years ahead of standard lamps, saving us money in the long run as the lamps do not have to be changed out as often.

Another project recently completed was the replacement of the A/C unit at the WLGZ-FM transmitter site. All last summer we experienced failure after failure of the air conditioning unit, causing excessive heat buildup in the building which in turn produced overheating in much of our broadcast equipment, causing either a shutdown due to excessive heat or fold-back of power levels. Our HVAC contractor was hoping he could extend the life of our A/C unit by replacing the compressor, but after further investigation he found that there were more components that needed to be replaced than originally thought, making the repair of the 15-year-old unit impractical. The new 4-ton Bard unit is working well, and with the additional roof-mounted attic ventilation I added earlier this year, the A/C unit should not have to work as hard as it used to, hopefully adding years to its life expectancy.

As of this writing, I am on vacation, and when I return to work the 1st of July I will be installing two new Burk ARC Plus Touch remote control systems for both Buffalo stations. We received the new systems late in May, but due to problems with units purchased at the same time for our Chicago cluster, Cris had us to hold off on the installation until Burk solved the problem. Once they found and rectified the issue, we sent our units back to the factory for repair. We received the remotes back in late June week, so first on my agenda after returning will to complete the installations.

Another project that is on the slate is the completion of the Tieline codecs for receiving CBC programming. The units have been installed, but I was unable to complete the installation due to restrictions in port forwarding in our routers. We have been using older LinkSys routers for both the Buffalo and Rochester markets, but once we realized that the port forwarding on these units were maxed out, we had to look for a suitable replacement that would handle the additional ports. We purchased two Cisco RVO16 routers, which will handle forwarding up to 50 ports. These should be in house when I return from vacation, so I can get these units programmed and in service soon.

We have for some time been experiencing numerous problems with our local area network. The most serious problem was with latency on the service ï Internet speeds would slow to a crawl. After mapping out our network, I found the culprit was a conflict with IP addresses on the network. Once I rectified this, the network has been running with no problems.

In the past, we had sent our PAD data from NexGen to the transmitter site via the LANLink 900.

There were no problems in getting and receiving ódata only ô through the STL link, however when we added the Internet service, because of bandwidth limitations of the LANLink, throughput slowed to a crawl. With the addition of the ARC Plus Touch remote control, we decided that we needed to install an independent Internet service at the WDCX-FM transmitter site. After reviewing our options, we decided on Time Warner cable Internet for the transmitter. Now we will be able to remote directly into the remote control and the Nautel NV-40ôs remote interface for monitoring and maintenance.

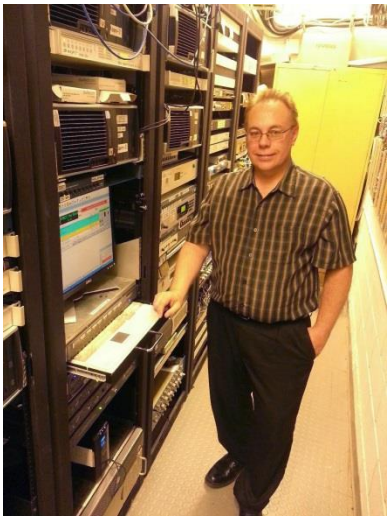
That about wraps up another month here in the Northeast. Until we meet again here in the pages of *The Local Oscillator*, be well, and happy engineering!

The Motown Update

By
Brian Kerkan, CBTE, CBNT
Chief Engineer, CBC–Detroit

It has been a busy month here in Detroit. Several projects are ongoing: new LED tower lights, the new Tieline codec equipment, and time to assess several items outdoors.

With summer here, itôs important to check your grounding. Differences in grounding potential can cost you in replacement cost, and downtime. While at this yearôs NAB convention, I had the opportunity to attend a seminar on grounding. There were several items that caught my attention. One area of interest was proper testing of your ground to see if itôs doing what it should. There were several examples of grounding systems that were above the acceptable NEC requirements for grounding.



The NEC references a maximum resistance of 25 ohms at the grounding electrode. Under §250-54 of the 1999 Code, if resistance is higher than 25 ohms, a second electrode must be driven; however, no further resistance measurements must be made. Thatôs not good enough.

When is the last time you have actually tested your grounds to see what they are actually reading? Based on the examples shown in the seminar, we all should. Most systems were reading more than 100k ohms. It was recommended that the ground system should read less than 5 ohms.

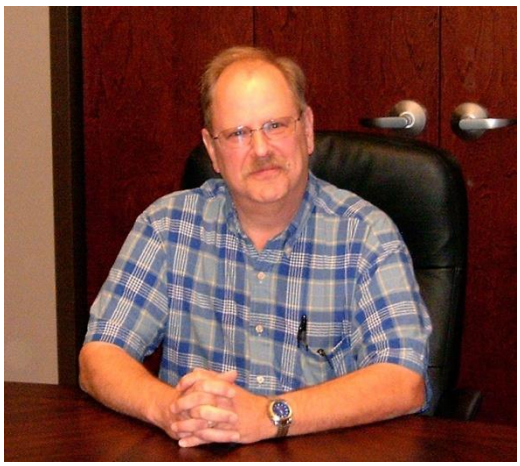
To achieve this may require additional ground rods, or installing them deeper into the soil or a well. Once the ground rods are checked, itôs important to make sure that all your equipment is at the same potential. All racks and equipment must be bonded, the tower should also be bonded to the grounding grid.

There are some great examples and case studies available at www.copper.org. Several are in Florida, and the differences between an average ground that meets NEC requirements, and a proper ground utilizing good grounding practices. The following case study is a good read:

http://www.copper.org/applications/electrical/pq/casestudy/a6137/a6137.html

News From The South
By
Stephen Poole, CBRE, CBNT, AMD
Chief Engineer, CBC–Alabama

My condolences and prayers go to my assistant, Todd Dixon, and to his wife, Kim. Her mother became very ill in mid-June and went to be with our Lord around 10:20 PM on June 25th. Todd had been forced to use most of his vacation time to help look after her.



Since Jimmy Parker has moved on to other pastures and with Todd gone, Iôve been running like a one-legged wallpaper hanger. Weôre still way behind on several key tower projects, including the relamping of WYDE-FM in Cullman and the microwave data links, discussed in previous issues.

We have hired a new assistant. Iôd like for everyone to welcome Michael ñJackò Bonds, who started on Monday, June 30th. I have already warned him that he will need to hit the ground running. (And screaming fearlessly.)

The Stand

Most of you know that The Stand commentaries are available online, both in text and audio formats. Iôve downloaded the most recent series, entitled, ñWho Are They?ò I might just frame it and put it on the wall of my office.

I have to say that Mr. Crawford has outdone himself this time. He discusses the fact that entrenched politicians arrogantly ignore what the American people want. As Mr. Crawford correctly points out, though, WE are the problem. You and I keep re-electing these people.

Term limits are the most workable solution. Some would argue, ñBut my Congressman has been there for 20 years and has a powerful position on a committee!ò But folks, that ainôt how itôs supposed to work. Why canôt people see this? Why should Iowa, or Ohio, or Alabama, or any other state, get special privileges and pork just because their representatives have been there forever?

Others have argued that term limits would effectively make the members of Congress into lame ducks, unaccountable to the people. (As if theyôre accountable now ï again, see Mr. Crawfordôs commentaries.) Heh. No, it wouldnôt, because as part of the constitutional amendment limiting terms, we could simply include the following: at the END of a representativeôs time in office, he or she would face one MORE vote ï a vote of confidence, if you will, on how well they served. That would determine if they should get a pension. If the vote was below 25% approval, Iôd say we should put them in prison. Thatôs just me. (Heh again.)

The point is, we can fix this... if we want to. Stop thinking Democrat vs. Republican, too, because youôre just playing the game the way they want it to be played. For the truly bored, I write about this at some length at my blog/Website: go to www.nuffzedd.com and click on ñThe Political Circus.ò

You might argue that your area will only vote for one party. There are some counties that only vote Democratic; others only support Republicans. So? *Become active in the primaries.* Sandy and I live in Alabama House District #6, and weôre supporting Gary Palmer, who is an outstanding conservative and Christian leader. For the first time in my life, Iôve put signs in my yard and Iôm actively trying to win over my neighbors. Itôs not that hard, folks. Get involved!

Be prepared for a world-class fight, though. The establishment politicians who actually run the Democratic and Republican parties couldnôt care less about you and me. Itôs all power (and money). Itôs important committee appointments and other perks. (And money.) From their point of view, a guy or gal who will toe the party line gets the support (and money). They will do everything in their power to sabotage anyone who wants to rock the boat. (i.e., anyone who might threaten the gravy train.)

You want an example? Poll after poll has shown that Americans do not want the Affordable Care Act, a.k.a. ñObamacare.ò They want it repealed. You would think that the Republicans would make this a central issue in the upcoming elections, so why havenôt they?

Itôs simple: they donôt want to be associated with the Tea Party, or with Ted Cruz or other politicians who identify with the Tea Party. Theyôre outspoken against Obamacare, so the Democrats might run negative ads this fall saying, ñThe Republican candidate is a *Tea Party guy* (ewwww)!ò For some reason, this terrifies establishment Republicans. Thereôs your answer, and yes, itôs that simple.

As I write this, there is evidence that the *Republican Party itself* actively worked to defeat Tea Party candidate Chris McDaniel in Mississippi. The establishment made no secret of the fact that they wanted Thad Cochran, the incumbent. No doubt this story will play out in its own time, but after the election, McDaniel was dismayed. He said that heôd been a loyal Republican all of his life... and that they had stabbed him in the back.

Pressurization

I havenôt even mentioned the weather yet. (This might be a record.) Not surprisingly, it has been hot and humid, with constant storms. Not only has that pushed us behind on tower work, it has required extra maintenance on the air pressurization at our tower sites.

You know Iôve written about this before. In fact, Steve Minshall and I swapped some emails about it a while back. Steve warned me about compressors that require oil. I knew it was a problem, but I had no idea how big a deal it was. Even with two oil/water separators in my air line, the desiccant chamber still ended up smelling like machine oil after a few weeks. There was an oily goo in the lines from the compressor to the separators, too.

A lightning storm a few weeks ago knocked out the compressor at the WYDE-FM site in Cullman. I took that opportunity to replace it with a big oilless unit from Lowes. The system runs much cleaner now. The oil smell and the greasy goo are gone. Iôve learned a good lesson.

The dedicated dehydrator units from companies like Cablewave and Andrew generally work as shown in Figure 1. This has the advantage of simplicity: the pressure switch samples the air into the coax, so the compressor only runs when the line drops below the set point (typically 3-6 psig). If the line is punctured, the compressor will run harder, trying to keep air in the line. This will foul the desiccant very quickly, of course, but at least your lines donôt run without pressure.

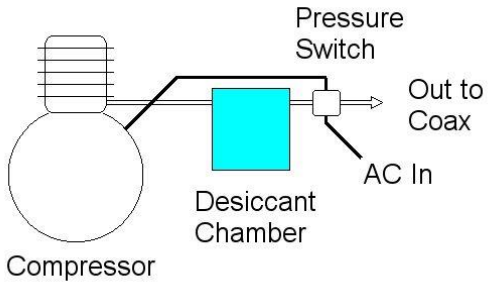


Figure 1 - A typical dehydrator system.

One big disadvantage is that, depending on how much restriction there is to the air flow into the coax, a high pressure can build in the desiccant chamber. Higher air pressure means a higher dew point. You can find phase diagrams that cover all of the permutations online; letôs just say that your transmitter buildingôs air is at 70 degrees with a dew point of 40 degrees (pretty typical). The dew point at 40 psig will be about 68 degrees. At 100 psig, the dewpoint will be well over 90 degrees. Moisture will be condensing all inside the system.

Not long after I took the job with our company, we had one of those standard, low-cost APD-10-style dehydrators at the WDJC-FM transmitter site. I once found it running wide open, non-stop. The desiccant in the chamber was soaked and had turned to greasy mud. I had to actually break open the hard line at the base of the tower and swab out the water! So much for a dry line.

The approach Iôm using at the WYDE-FM site in Cullman is shown in Figure 2.

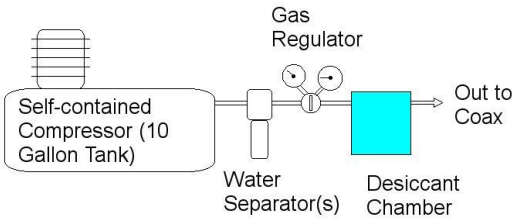


Figure 2 - The pressurization system at WYDE-FM in Cullman.

The disadvantage is complexity. The advantages, though, are enormous. First, most of these components can be found at your local Lowes

or Home Depot. I just use the standard 1/4ò push-click connectors that come on the compressors. The only real expenses are the water separators (we use two) and the regulator ï about $200-300. This compares very well with commercially-available dehydrators.

We could add an air cooler between the compressor and the air tank, but Iôve found that if the building is kept cool enough (and ours is), most of the moisture condenses in the tank, anyway. The tank is maintained between 125 and 150 psig, which keeps the dew point well above room temperature. As part of routine PM, I crack open the drain valve and empty it once a week. As I get time, I might add an automatic drain, but thatôs not a screaming priority.

Another advantage is that even in the event of a line puncture, the compressor doesnôt run constantly. If you buy a good gas regulator, it will permit enough flow to keep the line pressurized as well as a dedicated dehydrator unit from Cablewave or Andrew.

Since weôre removing most of the moisture before it ever hits the desiccant, it stays dryer much longer. Since the pressure in the desiccant chamber never exceeds 3-6 psig, the dew point doesnôt rise much on the desiccant, either. Before doing this, we had to ñcookò (i.e., regenerate) the desiccant every 1-2 weeks. Since changing to this arrangement, it lasts for a month or longer.

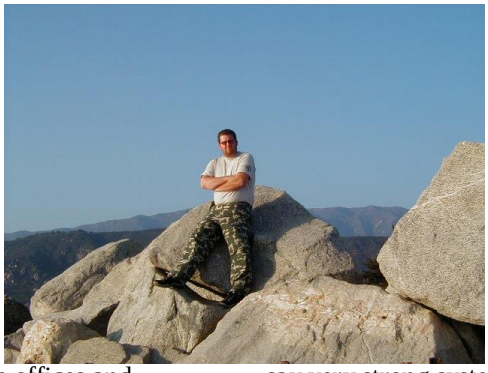
We may try some other things as I get time. One thing Minshall suggested was actually using a portable refrigerator or chest freezer to really cool the air before it gets to the air tank. Some commercial applications that require really dry air do just that. But for now, placing the compressor so that the cool air from our HVAC unit plays over the tank seems to do the trick.

Until next time, keep praying for this nation!!!

Mainland Memoirs

By
Bill Agresta
Chief Engineer, KBRT

Greetings from Oak Flat! Another month has passed and we continue to move forward with much work on the horizon here at KBRT.



June was quite a diverse one in regards to the projects I completed, have in progress or those being prepped for the near future. With the acquisition of KNSN in San Diego, my workload is ramping up once again and hopefully will become more exciting as we move forward.

This month included some of the same, those pesky computers, some still running XP but slowly being replaced as we work through the offices and studios. We ran into sort of an embarrassing issue in this project. As we were setting up networks to move audio from some of our computers to our studios and into the NexGen system, we had one set of machines that simply refused to talk to each other.

I got the RCS support folks into both machines and they just could not figure it out. Then I began working with John Yazel at KCBC, since he had recently done what we were trying to do on the machines at KCBC. We figured it was an issue going between a Win7 machine and an old XP machine, but a day later, headaches and all, all we were able to make the machines look at each other and send data in one direction.

I was exhausted and out of ideas, so as our Operations Manager, Todd Stickler, became available, he got involved with both John as well as the RCS support people. Finally, on day three, we made a very embarrassing discovery. The new and may I say very strong systems maintenance software I had installed did not get set up properly as thought on one of our machines, and it was blocking access for all incoming connections to that machine.

Iôm glad to see this software works so well, but it runs so light and almost completely stealthy that we had no idea until we began to prod around in it that it became evident it was the issue. Another three days, four people and one lesson learnedé

That new dummy load we received and I

wrote about in last monthôs *Local Oscillator* is now mounted onto a concrete pad. The electrical is wired and weôre all ready to run the transmission line. Cris Alexander will be out to work with me on that project in early July and hopefully without further issues, that will be one more project done up at the transmitter site.

Another project that we have been prepping for a while now is the rewiring of our Costa Mesa KBRT studios. The actual wire pulling of this project should begin soon. Then it will be on to San Diego to prep the transmitter facility of our soon-to-be-acquired station there, then to El Cajon to set up the KNSN studio. I look forward to getting that site on air with our programming, and I think that station will do us very well there, its coverage being much better than I had expected. Of course I will keep you all updated as I am sure that Cris will as our work at KNSN progresses.

Until next month, the Lord bless you and keep you; the Lord make his face shine upon you and be gracious to you; the Lord turn his face toward you and give you peace.

The Chicago Chronicles

By
Rick Sewell, CSRE, CBNT, AMD
Engineering Manager, CBC–Chicago

I am just about to finish my second month here in Chicago. I am hoping that after two months I have a good idea of where the challenges lie that face the department. Obviously, Cris and others had let me know about many of the issues I would face before I walked in the door here, but you can never really get a full understanding of a situation until youôre on the ground and bullets are being fired.

The one thing that I figured out very quickly was that I had a very good crew working for me. Brian Bonds, James Kelly and Mack Friday have been great assets to my transition into the department. I have learned to lean on each of them for the skill set they bring to the various tasks.

Now, I have certainly had to push myself out of my comfort zone in order to uproot my family and take on the challenge a position like this brings, so in turn I expect them to be pushed out of their comfort zones as well. I have been doing just that. My expectation is to build on what they are already good at doing and push them to the next level.

This has meant that at times they will have another member of the team learning what they already know and vice versa (i.e. ñcross trainingò). I believe this will greatly increase the diversity of the department and allow each of them to learn and become better engineers.

My goal is to find out the strengths of each of them and to use them to their highest capacity, what Cris calls their ñhighest, best use.ò However, I never want to make it a situation where they only work in one area and not know how to do something in an area which may be the strength of another engineer. I want well-rounded engineers that adjust to any task that the department faces. I believe the team we have here is very capable of that. Each just needs the opportunity to continue the growth they have already demonstrated. I very much look forward to seeing this all unfold.

ARC Plus Touch

One of the early challenges that I looked forward to being a part of was the installation of the new remote controls. The Burk ARC Plus Touch was selected as the new remote control for the transmitter sites here. They would be replacing ARC-16 remote controls that had been in place at the transmitter sites for many years.

Since this was an upgrade and Burk built special adaptors to interface with their legacy wiring panels, the installation of the units required no rewiring just programming them to each transmitter siteôs specifications for metering, status, alarming and notification. In theory, this should not require a lot of time. Of course my not being familiar with the ins and outs of the individual transmitter sites would

add that learning-curve time to the project.

The remote controls arrived a few weeks before my first day on the job, so several of them were already in the process of being programmed. In fact, the first one that was to be installed under the previous plan was to go out to our transmitter site that is almost 100 miles away at Kirkland, Illinois (near Rockford).

That actually occurred on my first week on the job. Hindsight is 20-20 is the famous cliché, and that certainly applied here. Had we known that we were going to have network issues with the unit that would cause it to lock up and we would end up losing touch with it, we wouldn't have picked a transmitter site that was 100 miles away to be our first installation of this new remote control!

It's not a good feeling to know that you have a site that far away and you don't have a remote control for it, but that's exactly what happened on the first installation. It was running nicely for a few hours until we got into the web page for remote control, and thereafter we could no longer even get it to answer the phone!

While one of us ran out to the site to rescue the situation, I decided we needed to investigate if this was something that was just a problem with the one unit or was it a problem on all four of them. So, we quickly got another unit ready to be tested on our network.

Previously we had been doing only the programming for the remote controls on a five-port router with the computer and the remote control's adaptor panel, so we had not subjected it to the full network until it was actually installed at that very remote transmitter site.

We quickly found that when any of new ARCs were on our network, they began to have the same symptoms. If we tried using the web server a few times they would lock up and actually lose their network settings temporarily and also not answer any calls. This lasted until they were rebooted.

Obviously this was not something we felt we could install at any of our transmitter sites, no matter how close they were located, until the problem was resolved. We of course got Burk support involved and they were very helpful in that they took a lot of time to try and help us get them to work on our network.

Network guru Todd Dixon in Birmingham got involved to look at the situation to see if he could improve what we were doing with our firewall. We wanted to make sure there wasn't anything that our particular setup might be doing to cause these machines to mess up. Denver's Amanda Hopp also helped out because she had a lot of experience with the prior model: the ARC Plus (non-touch). I am so thankful we have this kind of expertise in our company that we can enlist to help when we're facing a baffling problem.

Of course, when you have this kind of problem with a new product there is always the question of whether it is the product that is the problem or the environment that you are using the product in that is causing the issue. In this case it was probably both.

We eventually had to send one unit back after we decided to take it to factory default to give a fresh installation of its programming in the hopes it would be more stable. After we did that, we couldn't get back in touch with it using the programming software. So we had to send it back to Burk for them to repair it.

This turned out to actually be the turning point in getting the problem resolved. When that unit was back at their shop, the folks at Burk found that a couple of diodes in the network interfaces needed to be changed to a different type. So we had to return the other three units back to them to make these changes.

My guess is that under very low network volume situations, these remote controls have worked fine without any issues. Our network here is just one subnet combining all of our automation and transmitter sites together. This has made us examine our network much more closely to see if we can improve what we are doing. The answer is decided yes, and we are taking steps to change things around in the next month.

When we got the ARC Plus Touch remote controls back from Burk, we put our programming back into them and proceeded to test them thoroughly for days before we finally installed them to make sure the we could log in to the web server of the remote control and not have them lock up. After we were satisfied that they were stable, we began installing them one at a time so that we could continue to evaluate them before we installed the next one.

We now have three of them installed and they are operating as we expected when they were purchased. The board operators love the fact that they can log into the web page of the remote control and see all their readings and status on one page. There is a much shorter learning curve to use these remote controls as opposed to ARC 16 studio box or using the telephone to get readings.

I like the touch interface that the boxes have at the transmitter sites. It allows the engineers to get to things quickly without having to use a computer at

the transmitter site interface with the remote control. Despite our initial problems I am quickly becoming a fan.

I haven't had time yet to advance much beyond the basics of these new remote controls, but I plan on writing macros to expand what we can do with them. Perhaps I will be sharing them with you in the upcoming months. I believe once we got beyond the early problems of the network issues we will find these to be great remote controls that we will be using for years to come.

The Portland Report

By
John White, CBRE
Chief Engineer, CBC–Portland

Ordinarily, an over-the-fence gossip session over the back fence with a neighbor wouldn't be worth space in a technical newsletter. In this case, two different conversations do make this month's column.

In the first instance, I was checking the field mowing at the KKPZ transmitter site when our neighbor directly across came over to say hi. As we were talking, I learned that she had grown up as a neighbor of KALE (at the time and later KPOJ). Her mother, now in her 90s, had planted the two fir trees at the front of the KKPZ building. Now nearly 6o years old and some 70 feet in height, both trees are a visible landmark. That conversation filled in a lot of information about the station.

I hadn't thought much about that chat until nearly two weeks later. Another neighbor happened by and also talked about growing up in the neighborhood. Although I didn't learn a lot of new information, I did notice her interest in the station from her personal experience. She did say it was nice to see that we had moved the studio operations back to the building. She thought it was nice to see the building occupied again on a regular basis.

I was thinking later that both conversations were unusual. The conventional wisdom is that any business, let alone a radio station with ï gaspï a tower, is unwelcome anywhere, let alone near a residential neighborhood. That both neighbors had talked about spending time with the operators at station years ago was remarkable.

In this modern high speed Twitter-driven environment, it's easy to be distracted by many things more important than gossip with a neighbor across the back fence. Over the years, I have made an effort to establish good relations with the neighborhood. Taking the time to actually talk to neighbors will pay off with a better working relationship.

And, next winter, if we have more bad weather, I will spend a few minutes and check in with her mother just to know she is okay.

A while back, I mentioned a high failure rate with florescent ballasts at the station. The older four-tube 40-watt (160 W total) fixtures are nearing thirty years of age and end of life. One factor with the replacement is the energy situation in Oregon.

The Northwest has a great deal of hydropower generation. These generators both large and small generate power at a low cost. As demand had grown, new generation came from nuclear and coal generation.

To complicate the situation State government got involved with the legislature requiring clean, renewable energy. They simply passed a law years ago requiring a large percentage of power generation to be renewable power, where hydropower is defined by the law as non-renewable.

The most recent event was the upgrades to the Boardman coal-fired power plant followed by the order that the plant be closed after the upgrades were completed. In that energy environment, the local power companies have looked hard at alternatives. One of those alternatives is to buy down consumer demand with upgraded efficiency. Simply put, the power company will pay customers to buy less power.

Replacing the old 160-watt florescent lights with 30-watt LED upgrades is clearly a winï win for the local power company. A rebate on part the

capital cost of fixture upgrades ought to be a no brainieré at least until the government-sponsored program administrators decide to restructure the program. Stay tuned ï we may get an answer some time in the future. But donôt hold your breath.

The Tieline Bridge-IT IP codecs are in as KKPZ begins the transition to digital codecs for reception of programming from satellite to landline Internet media. The initial installation on my test bench didnôt go well.

First, the quick start sheet packed with the codec didnôt work. The instructions to push a series of buttons did work until part way down the list, when the menu on the unit failed to match the instructions.

I later learned the quick start sheet was irrelevant as in the Crawford application, the receiving unit will adapt to the sender configuration.

That said, there were some configuration changes required. Although the setup sheet didnôt directly say, it did note that the test number requires a fixed IP. Cris confirmed that we do need fixed public IPs to implement the connections. On the LAN side, the Codecs default to DHCP. That also needs to change to a fixed LAN IP.

The second codec I received also had a second sheet with notations regarding port assignment used by the codecs. The port forwarding configurations at the cable modem solved that need.

Overall, getting the codecs working isnôt difficult, but is time consuming to deal with each and every detail that must be exact. The Comcast public IP is one of those details as the paperwork and actual IP are different.

All the effort was worthwhile as I was able to get a solid connection. The audio quality seemed very good and hopefully will be the norm. I still have a few other details to resolve, but the results have been good.

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

Wheatstone Upgrade Continued

As my dad mentioned above, we are still transitioning to the AOIP world. The last part of this transition, for now, is moving our audio servers to Wheatnet IP. First on the list was KLDC. This is the most simple of the four stations to move because there is no satellite switching and not much live programming. If something were to go horribly wrong, we could remain in ñEmergency Control Roomò (ECR) for a while longer without interrupting live programming.

In order to upgrade the audio server, I actually had to replace it. I took a spare NexGen Workstation, which is a 2008-vintage HP, and installed new RAM, a gigabit NIC and a new hard drive. Then I proceeded to install a new Windows 7 license. Next I installed all the Wheatnet drivers and made sure that was working before I moved it to the rack to replace the KLDC audio server.

For the most part, this went smoothly. What we did not see or understand was there was no audio on the blade itself. We would see it on the Wheatnet Navigator program but not the blade itself. After several minutes of troubleshooting and a phone call to Wheatstone we realized it was a mistake I had made. I grabbed the first blade in the stack of four on the bench and installed it, thinking we were working with the top blade in the stack (mainly because it had the cables plugged in to it). Wrong. So we took that blade out and put the right blade in and everything has been working perfectly since.

Mowing

We had to finally give in and take the Kubota tractor to the KLTT transmitter site to start mowing. After a routine trip to the site I found the thistle had grown up exponentially. We have horses at the site and they generally keep it grazed down, but they wonôt eat thistle and goldenrod. Thankfully,

unlike Weld County where the KLVZ day site is located, Adams County does not pay much attention to us so we are hoping to not get a letter about it. But just in case they did notice (and to protect the farmers in the area from noxious thistle), we began mowing it down.

The plan was to be out there most of the day and get quite a bit done. We mowed the front area by the main road and got some of the area a little further back and behind the building where the thistle was thick. As I was on the tractor, I noticed the sky getting dark to the west and began driving like Jeff Gordon on the tractor. Okay, not anywhere near that fast, but I was trying to hurry and get as much done as possible because we are unable to leave the tractor at the site due to the universal key issue that Kubota thought would be a great idea. We had to quickly load and finish our day a couple hours sooner than we had hoped. I am sure we will have to plan another trip out to finish up, hopefully a cooler day with no severe weather.

As we were loading the tractor up in the morning, we noticed the paint is being worn off where the hood hinges when opening and closing. Also a spring broke that works with the hood prop. We are not happy about this obviously and I will have to make a call to the place we bought this from. This tractor is just a few months old and we just canôt have this.

KLZ Rewiring

On one of our mowing trips to the KLZ site, we also began the process of finally rewiring the racks. This has been on the list for well over a year and we finally had the time to start on it. While one of us (myself or my dad) were mowing, the other was inside working on the rack wiring. It is amazing how much wiring is there ï satellite feeds, audio, network, remote control and more. We were able to get a lot of it done. A few of the racks are looking great. If a problem comes up, tracing the wire wonôt be as difficult, especially since every wire is now labeled. Itôs nice to look in the back of the rack and not see a birdôs nest. We still have a lot to do, mainly with transmitter wiring. We hope to get to that in the next month or so.

Next Time

July is already upon us. There is still so much to do, as there always is. I am hoping to get a project finally finished up at KLTT this month. It all depends on weather and when Iôll be out of town. I am also hoping to get the rest of the audio servers switched over to Wheatnet IP. I am still waiting for the new hard drives to come in, but they should be in soon and I can start working on that again. Then there is the spring maintenance, or should I say summer maintenance of the sites. Keith has been doing a great job at keeping all of the sites clean. We just need to go to the ATUs and make sure they are cleaned up. So that about covers it for this month. So until next timeé thatôs all folks!!!

KBRT • Costa Mesa - Los Angeles, CA
740 kHz, 50 kW-D/0.2 kW-N, DA-1
KCBC • Manteca - San Francisco, CA
770 kHz, 50 kW-D/4.3 kW-N, DA-2
KKPZ • Portland, OR
1330 kHz, 5 kW-U, DA-1
KLZ • Denver, CO
560 kHz, 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, 50 kW-D/1.4 kW-N, DA-2
KLVZ • Denver, CO
810 kHz, 2.2 kW-D/430 W-N, DA-2
WDCX • Rochester, NY
990 kHz, 5 kW-D/2.5 kW-N, DA-2
WDCX • Buffalo, NY
99.5 MHz, 110 kW/195m AAT
WDCZ • Buffalo, NY
950 kHz, 5 kW-U, DA-1
WDJC-FM • Birmingham, AL
93.7 MHz, 100 kW/307m AAT
WEXL • Royal Oak - Detroit, MI
1340 kHz, 1 kW-U, DA-D
WRDT • Monroe - Detroit, MI
560 kHz, 500 W-D/14 W-N, DA-D
WMUZ • Detroit, MI
103.5 MHz, 50 kW/150m AAT
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, 5 kW-D/41W-N, ND
WYDE-FM • Cullman - Birmingham, AL
101.1 MHz, 100 kW/410m AAT
WXJC • Birmingham, AL
850 kHz, 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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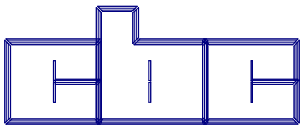

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