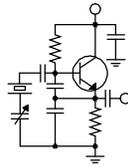


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

MARCH 2015 • VOLUME 25 • ISSUE 3 • W.C. ALEXANDER, CPBE, AMD, DRB EDITOR

Wheatnet-IP

After a successful proof of concept project in Denver last fall, we completed the conversion of our Nexgen network in Denver to Wheatnet-IP. This entailed conversion of the four remaining workstations in the control rooms, which Amanda will tell you more about later in these pages.

I had no doubt that the conversion of the remaining workstation conversion would go well. After converting all the production workstations and audio servers to work through Wheatstone IP blades,

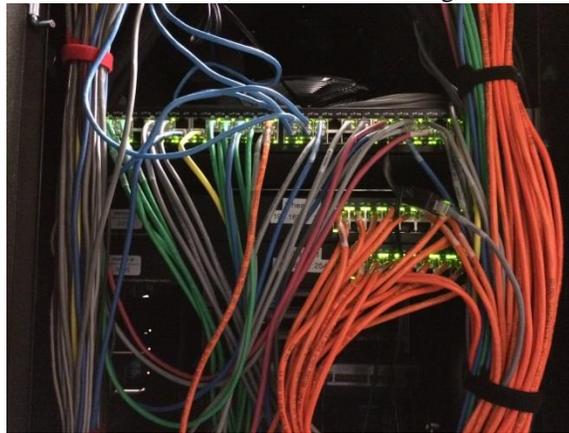
we pretty much had the process down to a relatively quick procedure. What I wanted to know was, would we have to invest in a couple of \$4,000 Cisco 2960 switches for each facility or would the much lower cost SG300 series of Cisco managed gigabit switches work? We were already using an SG300-20 for the central switch in the Denver system to good effect. What we needed to know was, would the SG300 handle the traffic for the whole network for four control rooms, four audio servers and three production rooms (26 total blades, including 4-channel PC drivers and the Tieline Genie)?

The answer is an unqualified "yes." We completed the remainder of the project in mid-February and have been operating without issue on it using a pair of SG300-20s ever since.

The Cisco SG300-series was, I am told, designed for VOIP. They are in use with office phone systems all over, and their architecture, tables, etc.

are tailored for VOIP application. This is a very similar application to AOIP. While you certainly get what you pay for in most cases with managed switches, there is definitely a point of diminishing returns. Based on our experience to date, we believe that the SG300-series hits that "sweet spot" with just the right features that we need without a bunch of stuff we don't.

I structured the network to use two 20-port switches so that if a switch went down we would still have Nexgen somewhere for each station. All the



The orange CAT6 cables are all Wheatnet-IP and connect to a pair of Cisco SG300-20 managed gigabit switches.

audio servers are on one switch and all the control room workstations are on another, and the two switches are trunked together (port 20 of each switch is configured as a trunk). If switch #1 were to go down, Nexgen could be put in ECR ("Emergency Control Room") and would continue to operate normally for a couple of days, giving us time to deal with the failed switch. If switch #2 were to go down, the audio servers would continue to operate normally. Production rooms are distributed

between the two switches so that at least some production capability would remain in the event of a switch failure.

All of the Wheatnet-IP installations will follow this general pattern. We will employ the somewhat larger SG300-28 switches in Detroit, Birmingham, Chicago and Costa Mesa. I will purchase a pair of offline backup SG300s for all but Costa Mesa and Denver where I will provide a single

offline backup. The idea there is to preprogram these switches and have them as cold spares on the shelf, ready to install on a moment's notice should there be a problem.

The schedule going forward calls for Detroit next. That equipment has been ordered and should ship this month. We'll do Birmingham and Chicago next, followed by Costa Mesa. I plan to take Amanda to Costa Mesa for a few days to do that installation ourselves and train Todd Stickler and Mike Duffy on the system. Todd already has the CAT6 cable installed to each room, so we're good to go when the time comes.

Someone recently asked me why we use orange CAT6 cable for Wheatnet-IP. It's simple. Orange cable is the only color that will work. I suppose it has something to do with the wavelength or color temperature of the VLAN packets in the Wheatnet-IP system's ahem

Parameter Drift

For the past months, the KBRT directional array has developed what appears to be a parameter drift in only the tower #2 phase. It varies with time at power, i.e. it goes high after several hours of low-power nighttime operation and then goes low after several hours of high-power daytime operation. To keep the phase within the ± 3 degree window we have to adjust it so that it's close to the lower limit daytime. It will then drift toward the upper limit in the dead of night.

In an effort to determine what might be at the root of the problem, contract engineer Fred Folmer put a small space heater in the tower #2 ATU and set it for about 80 degrees. This made absolutely no difference in the parameter drift. That surprised me. There are several mica capacitors in that ATU, and the adjustment of one shunt (resonating) coil across the ATU output is very critical. I thought that one of the capacitors was possibly drifting, or that the zigzag of excess adjustment strap on that shunt coil was expanding/contracting with power (and consequently, temperature). Evidently not.

In the phasor itself, all the T2 capacitors are vacuums. I've never heard of one of them drifting. The shunt leg of the phase shift network uses three parallel vacuum capacitors. It would take a big shift in one of those to make a 5-6 degree phase change.

While at the site for the biennial sample

system recertification in January, I spent some time looking over the system for the cause of this problem. I could find nothing. Everything was perfect. Even the ATU looked pristine ó not even any tarnish on the coils, tubing or strap. Everything was good and tight.

This one really has me scratching my head. I believe the facts that it affects just the phase and not the ratio, that it only affects tower #2 and that it has no measurable effect on the common point impedance are key. Could it be the channel on the antenna monitor? Perhaps so. I wish I had taken the time to swap the T2 sample with another channel to see if the problem moved or stayed with the monitor channel.

At some point in the coming weeks I am going to have to make another trip to the west coast and spend a night working on this issue.

New Website

Crawford Broadcasting Company has a new look. With the new look is a new logo and a new website at www.crawfordbroadcasting.com. If you haven't taken a look yet, plan to do so soon. We're still polishing things up, so if you notice something that's not quite right, let us know so we can fix it.

Heel-Nippers

It seems that I spend an inordinate amount of time these days dealing with "heel-nippers" ó translators and LPFMs that are on the same or adjacent channels to our FM stations. In just the last month, several second-adjacent LPFMs on both sides of WDJC-FM have been granted in Birmingham. These may well poke some holes in our digital coverage in the areas between their sites. We'll be watching closely for this, ready to take action if we see even a hint of a problem. In Chicago, a 250-watt translator on the same frequency as WSRB has come on the air northwest of downtown, giving us a tremendous amount of grief.

Any interference to existing full-power signals by these heel-nippers is impermissible, but it's a good bit of work for us to produce and file a showing with the FCC. It also seems like the climate right now favors the heel-nippers, the rules and the official policy of the FCC notwithstanding.

Whatever the case, we're prepared to go to the mat on each of these to protect our signals, our coverage areas and listeners.

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

Hello to all from snowy Western New York! This winter will go down in the record books as the coldest February ever, since record keeping began back in the late 1890s. The average temperature for the month calculated out to be 10.4 degrees, fifteen degrees below normal for this time of year. Snow, blustery, frigid winds and more snow have been the topic of talk from almost all Western New Yorkers. Wind chills have dipped dangerously into the minus 30s for days on end, and the area has been pelted with one winter storm after another, causing the snowpack totals to rise on a daily basis. Certainly, large snowfall amounts are nothing new to this region, and we are equipped to handle just about everything Old Man Winter throws at us, but a constant barrage tends to wear you down. I don't think I'll ever complain about the summer heat and humidity while mowing the transmitter sites again! Forecasters predict some relief in sight in early March, with temperatures rising to near 40 degrees.

All of this cold and snow has not had any measurable effect on our broadcast facilities. For the most part, we experienced the worst weather imaginable and have come through without any weather-related problems. Power to the region has managed to stay on, despite the high winds during the month. This is good because at the moment, we are unable to access our standby generators at the transmitter sites. The snowpack is so deep and dense, the gates around the generator enclosures are frozen to the ground and no amount of snow shoveling will clear the gates to where they can be opened. Once the temperatures rise and the sun hits those areas, they will clear quickly, but until then, we wait with our fingers crossed.

Other than our normal weekly maintenance

items, there is not a lot to report on from the Buffalo and Rochester markets. We were experiencing an issue with the Nautel NV40 transmitter recently,



which would generate dozens of alarms that the 10 MHz is missing and would switch to the backup 6B exciter. This fault would not show on the 6B exciter, only the main 6A exciter. It was puzzling at first, as both exciters receive their 10 MHz reference from the same point. Still, the 6A exciter was the only one affected. The transmitter's AUI (user interface)

would show the current status green, then rotate between amber and red, then back to green.

The cause of the faults was found to be a defective RJ45 plug on the router end of the network. A simple re-crimp of the connector did the trick, and so far, no more faults and alarms. Sometimes it's the simple solutions that drive you wacky.

Hopefully I will have more to report on next month, as I plan on beginning to install some upgrades in our Rochester production room for WDCX(AM). The current Tascam DM-8200 has croaked (again!), so we will be replacing this troublesome mixer with a new Audioarts D-75 digital console, only a smaller 12-channel version than we currently use in our air studios. As this room also acts as a back-up air studio, we decided that an air-worthy console should be installed instead of a pure production mixer, such as the Mackie we have previously used.

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

The Motown Update

By

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

Greetings from CBC Detroit!

February has been a busy month here in Detroit. I have been preparing for the new Wheatstone surfaces and blades with new cabling, switches, and general housekeeping to get ready for the new equipment to ship. I have been removing old equipment from the racks to allow for a nice clean layout.

It will be nice to eliminate the old switches and distribution amplifiers, and eliminate some of the wiring that will no longer be needed.

Detroit has had some record low temperatures this year. The harsh weather put a real strain on our older furnaces. The ARC Plus Touch remote control system was nice to have in place for those times that temperatures dipped down below the set threshold. The ARC Plus Touch called me, allowing enough time to investigate the problem. The temperatures got so low that the heating oil was getting too thick causing the interlock to trip.

It was announced that FEMA will be conducting a regional EAS test on March 18th using the NPT code. The test will be conducted in Michigan, Ohio, Kentucky and Tennessee.

The Michigan Association of Broadcasters provided some good information on how to set this up in most EAS encoders. I have provided the link for reference

<http://www.michmab.com/EASFCC/EmergencyAlertSystemEAS/InstructionsHowtoAddNPTEventtoEASUnit>

I verified and checked our units for the current revision, and that the NPT filter was added to the EAS encoder. It is also a good idea to check that your EAS unit is polling the CAP server. On the Sage Endec you can find that information under the tools button. You have the ability to view the current status of your CAP connection, and the units lists the polling counts.

Last month I had an issue with WEXL with no program audio. One of our telecom vendors providing our T1 and ISDN services for WEXL had a problem with a card in the central office. There was no connectivity available through landline connections. I was able to verify that the circuit was

completely down, and called to check the estimated time to restore. They did not have an answer.

So what did I do? I jumped into my car with my smartphone, a stereo 1/8" to XLR adapter with a matchbox that I keep handy for these types of situations and went to the transmitter site. I opened up the web browser on my phone, and pulled up the WEXL web stream. The phone was connected to a

matchbox and then into the Omnia. I had to switch to the analog input, and setup a preset that made the best of the audio coming out of my phone. Even with the amount of compression and the lower bit rate of the codec, the audio sounded fine.

There are settings that I discovered that can be very helpful when you need to use your phone for real time applications that are data only and cannot be interrupted. The settings are located in the mobile network settings section of Android. By changing the mobile network setting on my phone to EVDO only, it will force it into data-only mode.

This will prevent the streaming audio from being interrupted by an incoming call, and any calls that are dialed to my phone will go directly to voice mail.

The circuit was down for over an hour and a half. With the preset I created, the audio sounded pretty good, and it kept the station on the air and generating revenue.

It is nice to have broadband connectivity available virtually anywhere. I remember showing up for a morning show remote at 4:00 AM after a preliminary check was done on the ISDN connection the day before. It checked out fine. When I started setting up everything up, the ISDN line was dead. At that time of the morning it was next to impossible to get anyone at the phone company that could address the issue. I ended up having to use my phone for a four-hour live broadcast in a rated market during morning drive. Not only did my phone provide the bi-directional audio for the program feed and talkback, it also provided Internet for the hosts to get their show prep and traffic reports. I have found it to be a life saver in certain situations.

I have been checking out a low cost network analyzer that can be purchased for \$500.00. It is the



SARK110, and it has some amazing features for a device of its cost and size.



This device can provide many useful measurements including Scalar Chart, Smith Chart, Single Frequency, Cable Test (TDR), field, multi-band, and has a signal generator. The SARK 110 was tested against the Agilent4291B and the results were good. The SARK was designed for Amateur Radio use, but has a wide frequency range from 0.1 to 230MHZ. I have used it for antenna design at home for building my 160 meter antenna. Figure 1 shows an example of a Smith chart plot from the device.

I recently had a nice visit from Mike Erickson from Wheatstone. We listened to some of the processing in the Detroit market. Most is heavily processed, clipped, and some is distorted. We were using a real-time analyzer to look at some of the sound signatures.

Wheatstone will soon be providing one of their AirAura processors for us to demo. I look forward to trying some of the new features, and using the 192 kHz sampled Baseband192 direct to exciter

output, and having the ability to send my RBDS input through one connection to the transmitter.

Omnia is taking a different approach, generating the RBDS internally rather than sampling and mixing an externally-generated subcarrier in the processor.

Our current Omnia.11 processor is set up using an AES composite output. There is a clear advantage using an all-digital input to the exciter. There is no overshoot, and I think it provides a cleaner overall signal.

I am looking forward to the next few weeks installing and configuring the new Wheatstone equipment. Each of our production rooms will get a new G-6 console, and we will have new blades to bridge to our existing system.

What I love about broadcasting engineering is that every day is new and no two are really the

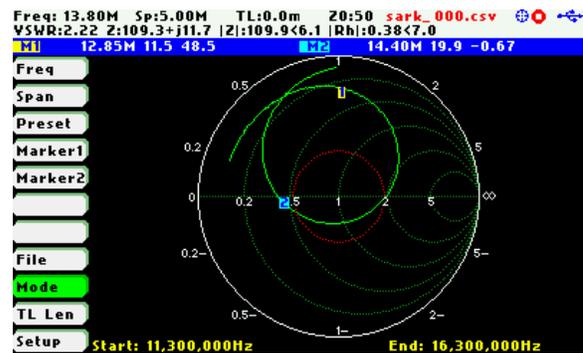


Figure 1 – SARK110 Smith chart display same!

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

Man, I am happy and wow, we've been busy! But this has been the best month in a while for Birmingham. I can't decide which is the biggest news, so I'll just do this in chronological order. Lots and lots of pictures this time.

In previous issues, I've complained several times about some outstanding tower projects. Just before Valentine's Day, Robbie Hulett with Tower



Maintenance Corporation called and said he could give us a crew for three days over the weekend. Todd, Jack and I went into a huddle and quickly agreed. We wanted the work done. (Todd's wife Kim and my own dear Sandy were very understanding about our need to work on Valentine's Day. We owe them both one.)

WYDE(AM)

The first thing we did

was repair the damage (also mentioned previously) at 1260 AM. The loose skirt wire was secured and new CAT5 cables were run up the tower. Careful grounding and a new power injector brought that Trango link back up. We had been using WDJC HD-3 and WYDE FM HD-2 to provide audio to stay on the air since December 30.

The link didn't have the same RSL level as before; it was down to about -50db and we had numbers in the low 40s before. But given that we had exactly three days in which to get everything done, we decided to move on to the WXJC(AM) data link. We figured that if 850s link fell into place quickly enough, we could have the crew do a bit more tweaking at 1260.

WXJC(AM)

This was the big one. In April, it will be *two years* since we started this project. In previous issues of *The Local Oscillator* we've discussed the shoddy work done by the original installer, including missing grounds and weatherproofing, stripped bolts and improperly-mounted dishes. It was time to gitterdone.

Robbie had warned us that Tower Maintenance didn't focus on microwave links in their business, but we were determined. Todd, Jack and I were all available, floating from site to site, while the work was being done. One end is at about 400 feet on WDJC-FM's tower; the other is on tower #2 at the WXJC(AM) site in Tarrant, AL.

On Saturday, we concentrated on getting the NanoBridge links to work at both ends. At WDJC-FM, the problem is simply the height, which is really too much for a reliable CAT5 run (especially with POE). We powered the dishes separately with heavy SO cable and used NanoBridges to ferry the data up to the Dragonwave on WDJC's tower.

At Tarrant, the problem was RF from the 50 kW daytime array. The run to the Dragonwave on that end was only about 100 feet, but a NanoBridge at the tower base simply would not work. Tower Maintenance had already hung a NEMA box on a previous visit. That way, the CAT5 run would only be about 3-4 feet long. All we had to do was make it work and align the dishes.

To make a long story short, we were very, very happy on Sunday when the link finally locked

up. I was so excited, I sent Cris a text (and received a ðhoo-ah!ö in reply). Over the next few hours, we carefully tweaked for the best RSL and called it good. Figure 1 shows the link in operation; I know it's not a terribly exciting picture, but when Todd emailed it to us, he called it the ðprettiest JPG I've ever sent.ö I have to agree.

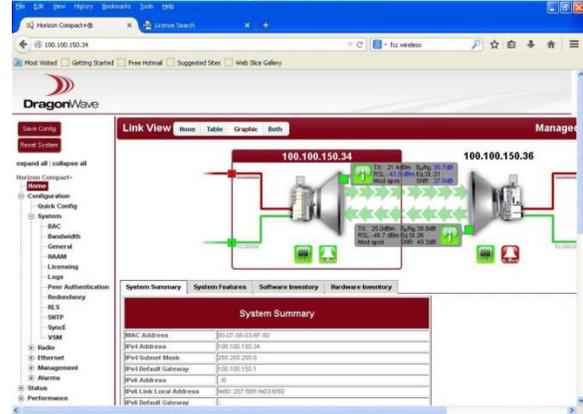


Figure 1 - Finally! A working microwave link for WXJC(AM)!

That link has been weather-tested: it never dropped even during the heaviest snow and rain (more on that in a moment). It's a wonderful and beautiful thing.

Snow and Ice

This is important because, as I'll discuss next, we had a new Nautel GV40 on the way for WDJC-FM. The severe winter weather up north had delayed shipping from Maine, and then, the weather moved down to hit us just as the transmitter was supposed to arrive. Of course.

It never fails: Nautel told the shipping folks to give us at least 24 hours notice before delivery. I had spoken with the shipper, ONE Express, and had told them the same thing myself. I also gave them my Verizon number for contact. But sure enough, the transmitter arrived and I received an email: ðWe'd like to deliver it this morning (Tuesday).ö I told them we needed 24 hours notice, primarily to get Danny Dalton in place with a forklift and trailer. They agreed to wait until Thursday.



Figure 2 - And we had a transmitter to install!

Then Wednesday, the storm came in. Figure 2 is what I saw from my driveway on Thursday morning as I prepared to go to Red Mountain for the delivery. Alabama doesn't often get snow like this, and as I've said many times here in the past, we simply ain't wired for it. Our standard snow plan here is to simply close the roads and to tell everyone to stay home.

WDJC-FM: A New Transmitter

Fortunately, the weather from Birmingham southwards hadn't been as bad, so the delivery was still on for Thursday. I waited until about 10 AM for the roads around my home (north of Birmingham) to thaw, then headed to Red Mountain. The first order of business was to remove WDJC-FM's current main transmitter, a BE FM-30T. To do that, I planned to run on the old Continental 816-R4 aux while we put the Nautel into service.

Then we hit our next snag: the Continental simply wouldn't stay on the air. It would run for a while, then shut down without any alarms. It acted as though someone was pressing the "plate off" button. The most I ever saw was a brief flicker in the interlock and status LEDs. I wondered if the phase loss detector had gone bad, so I bypassed it. That did no good. Then I bypassed (hard-wired around) the remote control interface entirely; it still popped off.

This was especially frustrating, because I had tested that transmitter previously, precisely because I knew that we'd want it while the Nautel

was being put in place. All I can figure is that the cold, moist air (the building was very cold with the door open) made it even more temperamental than normal.

Enough time had been wasted; the new transmitter had arrived and we had to get moving. I had no choice but to put our BE HD transmitter on air in FM-only mode. That kept us in service while we broke down the big BE and moved it into the old building. It will head to WYDE-FM in Cullman to serve as an auxiliary. Figure 3 shows the power supply cabinet headed out the door.

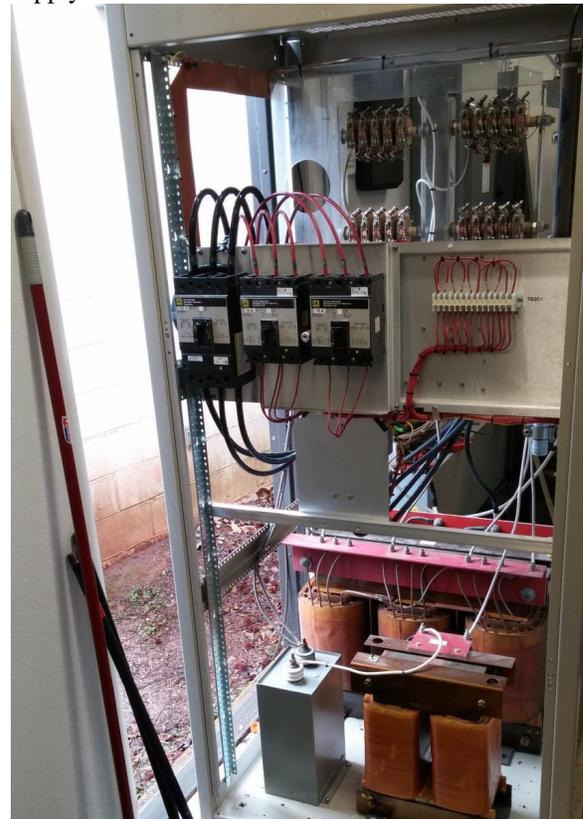


Figure 3 - Moving the BE FM-30T to make room.

The New GV40

While I was inside growling at that balky Continental, the new transmitter arrived. Danny pulled it off the truck with a forklift attached to his Ford tractor (Figure 4). The ground at Red Mountain was slushy mud; the snow was slowly melting off. I don't think we could have moved that thing with anything other than what Danny used. We had to remove part of the fencing around the compound so that he could access the building, but hey; as all you all know, you have to get it done.

Next, of course, we had to break open the

packing and admire our new transmitter. As is typical of a Nautel shipment, the spares, ancillary parts and manuals were in a smaller box; the transmitter was in a separate, much larger, crate. It had shipped with all modules and power supplies in place, which (I assumed) would allow us to put it on air very quickly. See Figure 4.



Figure 4 - Two Dangerous Guys™ for the price of one: Danny Dalton driving the forklift, Jack Bonds ready to help with the offload.

Then came the task of getting it into the building. Danny had to approach the door at an angle because of the spacing between the old building and new. We had been able to get the BE moved out with roller pipes and some sweat, but that GV40 was something else. To start with, the GV40 is just over 33 inches wide with the filter panels in place. Our door has a clearance of 35 inches. That was tighter than we liked, so we sliced a hole in the plastic and removed the rear filters. See Figure 5.

The next problem was the fact that the pallet was covered with rubber-like cushions. The transmitter had bitten down into this stuff and simply wouldn't budge. So: there we were, transmitter on the pallet, pallet on the forks, hanging in air, and we had to pry it up off of that rubbery stuff. We managed to get a couple of roller pipes under it, but I was sweating the whole time. Finally, it popped through the door and moved right into place. We were home free ... or so I thought. (Again.) See Figure 6.

Putting It On the Air

We had gotten off to a late start, first thanks to the weather, and then to the Continental refusing to run. But we were excited and determined to get started and ran into another snag.

Anytime I do a project like this, I want the manuals well in advance. I will read them carefully and make sure that I'm prepared. This time, however, I missed something rather important: if you order a GV-series unit with the UPS option, *the transmitter is*

not ready to go on air unless and until you power that interface. It needs separate wiring, too.



Figure 5 - The filter panels were removed for more clearance.

Nautel's otherwise-excellent manuals didn't make this clear enough for me. (They need to put that in big, bold red letters in the pre-installation manual for folks like me.) First, I didn't realize that the UPS interface would already be installed; I assumed that it would be supplied in a separate package and that I would install it myself. Second, I assumed that there was that word again that the transmitter would operate without the UPS in line. I figured there would be an easy way to bypass that UPS interface.

At any rate, it was already mid-afternoon, so I scooted to a nearby Lowes for some wire and other parts. I ran AC to both of the UPS inputs (which, in turn, feed the low-voltage supplies for the controller and exciters). Finally, by late afternoon, success! The transmitter came up and made power. See Figure 7.

That's enough for this time. I didn't even mention that (of course) WYDE-FM popped off air while we were working on the installation, meaning that Todd had to run up to Cullman to put it back on. As I write this, there's more to do: We've still got to get the HD working, we need to install actual UPS units on that UPS interface and tweak the processing.

Weøve also got to move that FM-30T up to Cullman, then make permanent repairs to the fencing. Iøve also got to figure out why that Continental doesnø love me anymore, and we have a NexGen and Wheatstone project coming up!



Figure 6 - The new GV40 in the building!

But Iøn a happy man and Iøn blessed beyond measure. Until next time, keep praying for this nation!



Figure 7 - The first full-power test, FM only.

The Chicago Chronicles

By

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

We had one of those weird situations arise last month. Our Chief Engineer, Brian Bonds, noticed that the RDS wasnø working properly on WPWX. The only thing that was popping up on the display was the default message programmed on the RDS encoder. He figured it was just a communication issue between the NexGen automation system and the Inovonics encoder. It was a reasonable guess that a reboot of the RDS encoder would take care of the problem.

While at the transmitter site he noticed that the RDS encoder kept acting as if it was going through a firmware update. He did try a reboot but it didnø make a difference. The RDS encoder just kept asking for a firmware update on its display about every 30 seconds. That was why the artist and title information was not showing up on the display and subsequently the RDS display on radios.

Now when he told me about this, my first thought was there was something wrong with the RDS encoder. Perhaps a firmware update was

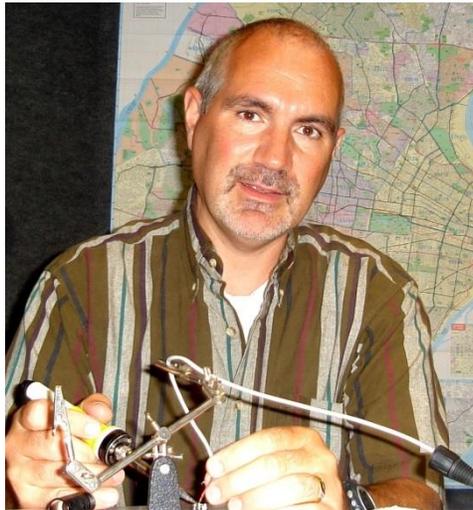
actually needed to get it working properly. My next thought was, if that didnø fix the problem, which sister station was going to lose their RDS encoder

while we shipped the defective one back to the manufacturer? WPWX is our highest rated station and biggest biller, so keeping the station at full operation at all times was the first priority.

That was jumping ahead a bit since we hadnø even talked to the manufacturer about the problem. Brian called them and they told him it was a rare situation but they had seen it before. They informed him them it was something else on the network triggering the RDS encoder to search for a firmware

update.

Now you might think we had a witch hunt to begin with, but it immediately occurred to me that we had made a recent addition to the network at the transmitter site the week before. We had installed a new security DVR that would allow us to expand the number of cameras at the site because of security



concerns there.

Sure enough, as soon as we pulled the network cable out of the DVR, the RDS encoder started acting normally again. Put the cable back in and we're looking at a display that's asking for a firmware update. Wow, this was really odd. Talk about your engineering cliché "not playing nice together"!

Our first attempt to solve the problem was to see if there was some setting in the DVR that had it looking for an update and maybe that traffic was causing the encoder to do the same. Seemed like a stretch but it was worth a try. We couldn't find any such setting and all the device settings were set properly.

The next attempt was to use subnet masks to try to isolate the DVR from seeing the encoder and vice versa. My thought was to give the DVR a subnet mask of 255.255.255.248. This should cause the DVR to be able to communicate with only the first five IP addresses above the gateway IP address. We then gave the DVR an IP address just one above the gateway. In theory this should still allow us to reach the DVR over the network but with the RDS encoder 150 IP addresses away, it should keep the two devices from communicating. I said "in theory" because it still was repeating the firmware update problem with this scenario.

I finally gave up and went with the idea to give the DVR its own separate subnet. We purchased an inexpensive, off-the-shelf router. We gave the router's external IP address the previous IP address that the DVR was using on the transmitter site

subnet. We then used the router's local class C IP address scheme for the isolated "local" network that only had the DVR on it. We then set up the port forwarding on the router to direct the HTTP port 80 traffic intended for the DVR to its IP address.

That was just part of the equation. We also had to go back to the main firewall/router back at the studios and port forward all the port 80 traffic intended for the DVR to the IP address of the router just installed at the transmitter site. With that done we were able to get to the login page and then subsequently the home page of the DVR. However, we were not able to see either the live camera feeds or videos recorded on the DVR.

I figured that we had another port that had to be "double-port-forwarded" from firewall to router to make the video show up across the network and Internet. It turned out that the missing port was the RTSP port which is used for video and audio streams. Once this was set up in both the firewall and the router we had full use of the DVR.

Now the question remained: would we still have the issue with the RDS encoder? My fear was the router was now sending and receiving the same network traffic that the DVR was using when it was directly on the transmitter site subnet. Would it now cause the problem to flare up on the RDS encoder? Fortunately, the isolation worked. Everybody was now getting along with each other. It kind of reminded me of when I was a kid and the teacher had to move the trouble makers to desks across the room from each other. Once they were separated the whole classroom dynamic changed.

The Portland Report

By
John White, CBRE
Chief Engineer, CBC-Portland

At press time last month I intended only a small update on emergency planning for this month. Instead, circumstances stepped in as Broadcasterø Day in Salem dawned to the resignation of Governor John Kitzhaber (pronounced Kitz-hopper).

It was interesting observing "national" media attempts coverage of the scandal. From them we learned that a governor from some unknown political party was "under a cloud." Those national media that did notice the governor had a name referred to Cat-hob-or, Kots-har-bir, and Kit-sab-her. None of whom were governor of Oregon. Thatø not Ori-gone by the way.

This may sound like a petty criticism, but any serious commentator should care about accuracy, including pronunciation of simple names. Especially national network news organizations that have access to local reporters as a resource.

Meanwhile Oregon's largest newspaper was reduced to running headlines reporting yesterdayø news.

The surpassing winners were local broadcast radio and television along with a Portland weekly known for back-page alternative classified ads. Nigel Jaquist of the Willamette Week reported investigative and breaking news which may well earn another Pulitzer award. (Willamette is pronounced Wil-lahm-et, and not Wil-a-meet, Wal-o-mot, or Wal-mot)

That we are local and live in our communities is the strength of local broadcasting. A recent local boil-water order released by reverse 911 required a good portion of the day to complete notification of nearly 400,000 residents. Meanwhile, local broadcasters alerted the public of this important public safety warning within minutes of the warning announcement. KKPZ passed along the warning to our listeners within minutes.

Satellite radio and satellite telephones may continue to work, and if the public needs to know the temperature in down town New York City, satellite radio might even be useful. Will our family, friends,

and neighbors insist on watching a satellite rerun of House, or will they look to local broadcasters for help?



Will emergency responders call Chicago to release emergency information? I am firmly convinced that itø you and I, the local broadcasters, that our listeners, viewers, and emergency responders will depend on to distribute life-saving information. Okay, okay, I will put the soap box away for this month.

So letø move on and play a game of spot the offending tower. See the photo below.

Somewhere in that photo is a tower that has



not been detuned. Although we see a possibility of a light on the end of the oncoming train, we have now filed for the latest and hopefully last STA renewal for KKPZ. The latest word is the detuning skirt and network installation of the last tower in that tower farm will be done in an additional six monthsøtime.

By the way, rumor has it that Johnny Towerseed stopped one day for lunch to admire the view. As he picked up his sack after lunch, it snagged on an Oregon blackberry bush, resulting in an unexpected release of tower seeds. Even Johnny's cousin, John Appleseed was embarrassed that day.

So, aside from another six-month delay, I suspect the ongoing battle will be in keeping the detuning properly adjusted on all those towers. In one case an additional ice bridge was added to one of the detuned towers. These kinds of changes have great potential to disrupt proper tower detuning.

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

Wheatstone

We've finally finished the Denver portion of upgrading to the new Wheatstone Blade AOIP system. We got the four control rooms done in a matter of days. It all went fairly smoothly.

After I took out the old Nexgen computer in each room I was able to take out the wiring for the AudioScience soundcard, and that allowed me to clean up some wiring. We all know how it is as you add or remove equipment, oftentimes old wiring is left in place. The situation is no different for us. I was able to remove all the old wiring in each studio and get it neatened up.

I was very happy with how smoothly things went for this. So much so, the only thing anyone noticed was their computers were running Windows 7, which comes with a whole new set of issues.

Windows 7

Before we installed Windows 7 on these older HP machines, I ran the Microsoft Upgrade Advisor to be sure we were okay. All these computers are Vista compatible, so we figured we'd be okay, and according to Microsoft, we were. We went ahead and upgraded the RAM, hard drives and added a second NIC, installed Windows, did all the updates and installed everything that would be needed to allow us to operate normally. Nothing installed is old, including the new software drivers for Windows 7.

After noticing some significant differences between the speed of XP and W7, I wonder if there is anything I can do or if that is normal. I guess with the change, we all become overly sensitive to issues and find things that bug us everywhere, even when there's nothing really there.

The biggest concern was when one of our control rooms blue-screened. I have no idea what happened, just that the board op was in Firefox and NexGen and bam! Blue screen of death!

One thing I did not think to do with the

upgrade was remove the processor fan and clean it off along with the processor and reapply new heat sink compound. I may go ahead and do that soon.

That thermal compound dries out and becomes ineffective over time, which allows the microprocessor to overheat and do ugly things.

My next project for this is to hopefully find a new Intel motherboard that is very similar to what's already in the HP workstations. I'd like to basically completely rebuild the computer. In the end, if I did the math correctly for what we

spent, it is still quite a bit cheaper for us to do this than to buy a brand new computer. And if I can get this to work well enough, it could prolong the life of these computers even longer. The only thing left to replace would be the power supply, and that's easy enough to do. I hope my project proves successful and not as difficult as I anticipate.



KLDC

The middle of last month I began getting complaints from an employee who listens in on KLDC in the mornings on her way in to work. She came in and told me it was off the air. I ran into our engineering room and listened on a receiver there and it was fine. I figured it was her location. Unfortunately, at only 660 watts, KLDC can easily get lost in the noise when around other towers, buildings, power lines or most anything else. Nothing in our system showed it wasn't working. It worked fine all the rest of the day.

The next morning I tuned in to check and noticed the issue! After doing my own troubleshooting, we finally determined someone had probably set up on the frequency we were using for the 5.7 GHz Motorola Canopy backhaul link to the site.

My dad and I went out to the transmitter site and turned the Spectrum Analyzer feature on in the Canopy unit there and searched for a clear frequency. We found one, switched to it and noticed the RSSI

The Local Oscillator
February 2015

was not quite where we expected it to be. We made our way to the snowy roof where we made adjustments on the antenna and got a really good RSSI.

We also changed the payload to 75% downlink and 25% uplink, providing more bandwidth on the outbound path where we need it. At least part of the problem was that broadcast packets from Nexgen and other systems on the transmitter network were gobbling up the very limited bandwidth (7 mbps aggregate) on that link. With the payload distribution changed we now have 5.25 mbps outbound and 1.75 mbps on the return. Thankfully, we haven't had an issue since.

At some point (in warmer weather!) we will most likely look to install our Motorola PTP-400 on that link. The last time it was used was at the KLZ transmitter site from the old studio building. The PTP uses higher-gain antennas, dual polarization and

frequency hopping. We hope it will provide us a more robust path so that the elements won't affect us, and it would give us more chance of surviving if someone were to get on our frequency.

While troubleshooting the Canopy issue, we noticed the backup transmitter, an old Nautel AMPFET P400, was giving us fits again. At this time we were broadcasting on the backup and the power output and modulation were jumping all over the place. The front panel indicators showed that the interlock was open (it wasn't) but the transmitter was still on and putting out power. A tap on the DIP interlock relay cured the problem for the moment. This next go-around we will have to figure out a way to replace that little DIP relay with something more substantial and reliable.

That about covers it for this month, so until next time that's all folks!!!

The Local Oscillator
February 2015

KBRT • Costa Mesa - Los Angeles, CA
740 kHz, 50 kW-D/0.2 kW-N, DA-1
KNSN • San Diego, CA
1240 kHz, 550W-U
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-FM • 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



Crawford Broadcasting Company
Corporate Engineering
2821 S. Parker Road • Suite 1205
Aurora, CO 80014

email address: crisa@crawfordbroadcasting.com