The Local Oscillator

The Newsletter of Crawford Broadcasting Company Corporate Engineering

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This time of year we almost always find ourselves in a hurry-up mode, trying to wrap up the current yearôs projects well before year-end even as we hustle to work our way through the budget process for the coming year. Thatôs certainly the situation we find ourselves in now. We are currently working on the WheatNet-IP (WNIP) project in Birmingham, and weôre just about done with the same project at KBRT.

Amanda and I went to KBRT in late September to do the WNIP project there, and we went equipped with a well-orchestrated battle plan that would see the project completed in just *three days*. All the equipment was on site, the plans had been drawn up in exacting detail, and we had made all the interface cables that we would need to connect source and destination equipment to the RJ45 ports on the IP blades. We should be able to plow through the project at breakneck speed. Or so we thought.

New Wheatstone E6 control surface in KBRT Prod E. One other production room at KBRT will get an E6 as part of the WNIP project there.

Before leaving for the west coast, I had told my dear wife about the project and our plans, and then had said that the best laid battle plans always go out the window as soon as the first shot is fired. I think I only halfway believed that, despite nearly 40 years of doing studio projects in radio stations, but those words came back to me with stark clarity over the next few days.

As soon as we walked in the door at KBRT, I set up camp in an empty cubicle and went to work programming the Cisco SG300 and 2960CG switches. It didnôt take long for me to realize that we were in trouble. I had shipped a box to KBRT containing all the interface cables and a thick notebook with documentation on blades, control surfaces, drivers and just about everything else ï everything, that is, except our switch setup instructions and parameters.

Those should have been available to me in an Evernote workbook, so I opened Evernote and logged in only to find out that for some reason (that I still have not discovered), Evernote would not sync. That left me with old and incomplete data on my laptop. To make matters worse, VNC on my office PC was not connecting through the firewall in Denver (I had tested it locally on the LAN and it worked fine, but out in the field, no joy), so I could not connect to and download the documents from my office machine.

That trio of small issues cost us half a day. I did eventually get the switches programmed, but I had to do so from memory, later comparing the GUI screens (and there are a *lot* of them) one at a time with those on our switches in Denver. It was fairly late in the day by the time we had switches installed and were ready to start making connections.

Our plan called for conversion of one production room on that first day, so we started in Prod C. I connected and configured the blades while Amanda started the upgrade process on the PC in that room. My part of the project went just fine. Amandaôs part, not so much.

The project called for upgrading the production and control workstations to Windows 7, and we purchased several W7 licenses for the project. When Amanda was ready to start the upgrade process, she found that she had not brought W7 installation media. No problem, she thought, and she downloaded it and made an ISO file that she burned onto a DVD. She pulled the old hard drive from the production workstation, popped in a brand new one, put in additional RAM, installed a GB NIC and started installing Windows 7– or so she believed. It didn't take long to find out the DVD she had burned would not boot on the machine.

That sent her back to Microsoft where she did another download of a different file, one that would produce a bootable disk, but when she tried to burn that one it bombed – the download had gotten corrupted somehow. She tried a third download but it was going to take hours and the likelihood of getting a clean download was getting smaller by the minute, so we sent Todd Stickler to Micro Center to pick up a Windows 7 DVD.

With that in hand, the W7 installation went quickly, and Amanda installed Nexgen on the upgraded machine. Things were really looking up when during a reboot, we got the "blue screen of death" on the workstation. Another reboot resulted in the same thing. We'd been down this road before and knew what we were seeing. Despite the findings of Microsoft's evaluation program which indicated that the machine was W7 ready, the machine was obviously *not* W7 ready and it never would be, so we stopped wasting time on it. That machine, the one in Prod D and the one in the control room (all of which were identical) would have to be replaced, not upgraded. That shortened up our project considerably, at least for this trip.

The plan was to convert two production rooms to WNIP, and both rooms had six-year-old HP workstations running XP. The third production room is used primarily for recording clients and does not have room for a new control surface, so we planned to leave that room alone. That room, however, had a late model Dell Precision T1600 workstation running W7. It would be a simple matter to swap the PCs between that room and Prod E so that we could complete the WheatNet project in that room, so that's what we did. Since it was getting late, we pushed that off to the following day and jumped on the KBRT audio server part of the project, which had to be done after hours.

That should have been a simple project. We had purchased a new audio server PC, a Dell Precision T1700, and it was configured and ready to go on the bench. KBRT's Nexgen system in a "no-server" system and the database and audio files are stored on the hard drive of the audio server, so in preparation for this project we had RCS support move the database to an extra 1TB drive in the KNSN audio server several weeks prior. The idea there was that replacement of the KBRT audio server would then not impact the Nexgen system at all. It should be "plug and play."

What we found out over the next several hours is that the RCS tech had moved the database to the drive on the KNSN audio server but *he had not moved the audio files*. Those were still on the old KBRT audio server PC, which we had pulled out of service. It was no trouble to copy those over to the new KBRT audio server, but that was only the beginning. We spent hours on the phone with RCS support changing setting after setting until all the machines in the system could see the files, and even then some things were not quite right. But by late that first night, KBRT was operating on the new audio server through the WNIP system.

We got an early start the next day, and job one was getting Nexgen to control the utility mixer in the IP blade used to port the KBRT audio server to the outside world. We could not get that working the night before and tired as we were (my day had started at 4:30 AM Mountain time), we opted to look at it with fresh eyes the following morning. It was a forehead-slap moment when I discovered that we had been putting the wrong IP address – it was off by one digit – in the WheatNet UIO device configuration box in Nexgen. Once we got that right, the Nexgen-controlled source switching started working.

With that done we were able to get started in Prod E. We gutted the room, pulling out the Tascam DM-3200 digital mixer and all the old wiring. We installed the power supply, mix engine and console blade and cut in the control surface, and began wiring local sources and destinations to the console blade. By early afternoon we had that done and were ready to start testing. I found I had forgotten to make the crosspoints between the buses in the mix engine and console blades, and once I did that everything came to life.

The rest of our time at KBRT was spent cleaning up wiring in the studios and rack room, terminating and testing the remaining CAT6 cables for the project and lighting up and configuring the blades for the remaining two rooms which we will have to get to on a subsequent trip. With all the prep work done, we should be able to get those rooms done in a day and a half or so, probably later this month.

I learned some things during this project, and I found that I had forgotten some things that we had learned during the Denver WNIP project. It had been a year since we did the production rooms in that project, and Iôve slept a time or two since then. Despite our copious notes, there were a few important things that are not all that intuitive that we evidently failed to document. We are fixing that right now.

I learned to follow up on the work of others, especially contractors outside of this company. Had RCS support done what we asked them with regard to the database move, we would not have been scrambling late at night to figure out why Nexgen could not find any of its files.

And I learned to check and double-check my own ñpacking listò ï did I bring all the installation media? Did I bring all the notes, instructions and files I would need? Did I bring all the programming cables (I had to make an RJ45-to-D9 ñconsoleò cable in the field to program the Cisco 2960CG switch)?

Finally, I learned that you cannot trust the Microsoft upgrade evaluation tool.

All in all, we got through a tremendous amount of work in a very short period of time, but we didnôt finish the project. Hopefully in the November issue of these pages I will tell you that itôs all wrapped up with a ribbon on it.

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

Hello to all from Western New York! Well, the summer is over and we are officially into fall, and there are still outdoor projects left on my list to be completed. September, for the most part, was dry and cooler, which allowed me to finally get a handle on the field cutting at the WDCZ transmitter site.

Being located in the middle of a residential area, we have certain town ordinances we must follow concerning the ñgroomingò of the property. The vegetation can be no higher than 10ò or you risk a fine for un-kept property. This does not apply to the whole tower area, just in those areas adjacent to roadways and joining property lines. In those instances, grass must be kept cut to a reasonable level for a distance of 60 feet from any major street or property lines.

They are not concerned with the rest of the field, but those other specific areas are the most important to keep cut! Keeping the area around the towers groomed can be a problem, especially when you have a lot of rain in the early summer months and the water pools under the heavy grass, thus insulating the water from the sunôs evaporation. There are many holes and trenches throughout the tower field that retain water, and until evaporation occurs, you cannot get to some areas to cut.

In Rochester, I had hoped to get the tuning house doors painted and sealed before the winter winds blow, but it looks like I may run out of time. We had such a wet spring/early summer this year that we were not even able to get the mowing done for the first time this year until late July. All the moisture also kept us from beginning the road repair and drainage project until mid-August, but thankfully this did get completed to my satisfaction. No more ankle-deep water across the road at the entrance gate.

In last monthôs report I talked briefly about working on analog (tube) transmitters verses digital (solid-state) transmitters. I stated the fact that I preferred tube transmitters over solid state, only because I was more familiar with those and started my career working on them. For years, my mother used to tell me, ñBe careful what you wish for.ò Well folks, me and my big mouth got me into a pickle with the WLGZ-FM transmitter while I was on vacation last month.

I knew that the EEV 4CX15000A tube was getting weak, as it had been in service for quite a few years. In anticipation of avoiding a tube failure while I was on vacation, I ordered a new rebuild from

Econco and went to install it Sunday night the 6th of September. Even the best of intentions sometimes go sour, as this tube would not tune in the Continental 816R-2C transmitter. After several hours of trying to get the transmitter tuned with less than positive results, the third harmonic suppressor resistor blew in the PA cavity. Now I have a bad tube and bad resistor.

I called my friend Bill Stachowiak at Town Square Media, and he said he did have a spare resistor, and I could come back to Buffalo in the morning and get it. So, reluctantly, I re-installed the old tube, retuned and brought the transmitter back on the air. In the morning, I picked up the replacement resistor, called and ordered a replacement rebuilt tube, and headed back to make the repair.

After shutting down the transmitter, installing the swamping resistor and powering the rig back up, I noticed the transmitter was starting to fault out on a PA SCREEN overload. I would clear the fault, and precisely two minutes later, the fault would occur again. Thatôs when I noticed that the 802-B exciter was muting due to a temperature overload. That could mean only one thing: the cooling fan in the exciter had failed. After getting the station on the air with the backup BE transmitter, I headed back to Buffalo for a good nightôs rest. The next morning I returned and installed the new cooling fan I had in stock and everything was back to normal, except for the weak tube.

Later that afternoon, the replacement rebuilt tube showed up, so it was time to go back (again) to get the repair done, once and for all. Well, Murphyôs Law was in full force this night, as the replacement rebuilt tube was worse than the first! I could not get the grid tuned at all and had excessive reflected power on the IPA regardless of how the PA grid tuning was set! That meant re-installation of the old tube for the second time!

At this point, I am wondering, did I do something wrong? Have I lost my skills in maintaining Continental transmitters, skills I have had for over 30 years? I couldnôt imagine Econco sending out two bad rebuilt tubes, so it must be something I was doing. Thatôs how Satan gets us, whispering doubts in our ear when we are most vulnerable. I thought over in my mind, many times, the procedures I performed while installing both rebuilt tubes, and realized that my procedures were textbook; we simply received two crappy tubes!

Not to make it three in a row, Cris and I decided to give Richardson Electronics a call and price a new tube. They had a National Brand tube that actually costs less than a rebuild! Not having any track record of these tubes in our company, we decided to try one, verifying beforehand that Richardson would accept it back if it would not tune.

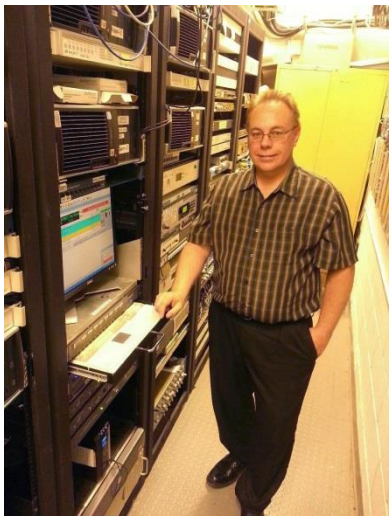
I went back on Saturday the 19th to install the National tube, and couldnôt be any happier! The installation went very smoothly, and tuning of the transmitter nearly matched those readings noted in the factory test data. Weôll see how much service we get out of the National brand tube, and might just stay with them if they perform well. So far, the readings have been rock solid, and I am waiting for the initial 200 hours to pass before dropping the filament voltage down to extend the tube life.

In all, I am certainly grateful that the tube socket in the transmitter withstood all the inserting and removal of so many tubes in such short time. Usually you end up bending or breaking several of the fingers on one or more rings in the socket. At least in this transmitter the finger stock is not submitted to as much heat as in normal operation, as the transmitter only runs at 9.6 kW output, less than half of itsô rated power.

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

The Motown Update
By
Brian Kerkan, CBTE, CBNT
Chief Engineer, CBC–Detroit

Fall is in the air at CBC-Detroit and I have been preparing our tower sites for the upcoming colder weather. I have been checking our air handlers and furnaces for proper operation before the real cold winter blast. I have also been making sure our generator is working properly, because you never know when you will need it, like during the two sunny days that Mr. Crawford was visiting. The power went out twice, and our systems stayed online like they should.



This summer provided an opportunity to look at the changes that were made in the cooling system to help keep our Nautel transmitter on WMUZ running stable. All summer the transmitter ran with no issues. Itôs nice to have it run cooler and more reliably. We have updated our HD equipment to support the HD radio alerting off of EAS.

The new Wheatstone equipment has helped our production staff by providing a complete set of dynamics tools that they have put to good use. The conversion went well, and I am glad to not have any more audio cards to deal with. The new system offered some much needed flexibility during a direct lightning strike we had a several weeks ago. Having the ability to reassign sources and program across studios allowed me to quickly put WMUZ on the air from the WRDT studio, and to use the utility mixer for WRDT to run direct, thus freeing up the console. Morning drive went off without a hitch, and I appreciate the investment the company has made in Detroit.

Often times we donôt realize the broadcast history that is connected to stations we work at, or have worked at in the past. Such was the case of WEXL AM 1340. While doing some research I came across an interesting story about WEXL in the 60ôs. It had to do with a need to provide a quality interface to church sound systems broadcasting live over WEXL. The engineer at the time was a young 16 year old electronics-inspired Ed Wolfrum.

Ed decided to build his own circuit, which consisted of a project box and a high quality transformer. His creation became known as the Wolfbox, and was used in recording sessions with Motown musicians and at several other studios around the world. I was intrigued enough to see if I could find Ed, and sent him an email. He still lives in Royal Oak near the WEXL transmitter. Ed surprised me by calling back last than an hour after I sent the message.

I had a great conversation with Ed. He told me about the history of the station, transmitting facilities, and the ground system which apparently extends under the road. Ed shared his passion for quality broadcast engineering and his love of the Lord.

He mentioned that one day while working at WEXL, he was approached by a guy on a motorcycle. The man took a tour of the transmitter and had heard of Edôs work with the Wolfbox. That man was Mike Mclean, the lead recording engineer for Motown records. Ed said that Mike invited him to visit the Motown studios, and of course Ed took him up on the offer.

A young Ed Wolfrum adjusts a transmitter.

During the visit, Ed was spotted by Mary

Wells, the singer that recorded the song ñMy Guyò and several others hits. Mary knew Ed from the dances that was disc jockey at, and took him to meet Barry Gordy, and the rest is history. Ed became a recording engineer for Motown and several other recording companies over his career. He mentioned how his project box became one of the preferred direct boxes of the time in the Motown studio.

The "Wolfbox" became the direct box of choice in its day.

Ed has a PhD, is an active ham operator and still runs an audio consulting business today. I look forward to meeting with Ed in the near future. He offered to show me the studios and maybe even let me hear some of the original multitrack tapes. What an opportunity that will be!

One of the articles detailing Edôs work can be found: at http://www.soul-source.co.uk/articles/news-soul/ed-wolfrum-detroit-sound-r2445/.

So much technology has come from broadcast engineers finding solutions to problems that were not being served. From Bob Orban and Frank Foti in the audio processing field to Steve Church with his many contributions to telephone audio and compression technology that we are able to utilize on a daily basis today.

The stories go on and on about engineers that have provided a solution to a need. Engineers like Philo Farnsworth, who while plowing a field on his farm envisioned the scanning system that was used to transmit television in its early days. While plowing the field back and forth, he had a thought. Why not send television pictures in a sequence in lines. He took his idea and built a prototype CRT, with a deflection circuit. You never know where an idea could come from.

What I enjoy most about broadcast engineering is that in order to survive you have to be creative and resourceful.

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

We have had beautiful weather now for a few weeks. A little rain here and there, but the temperatures have been moderate, at least for Alabama. However, we did experience a sad event in mid-September: Toddôs father passed away in Panama City.

Our repeatedly-delayed WheatNet-IP (WNIP) system installation was once again put on hold while Todd was with his family. Jack and I set up one of the Nexgen machines, an E6 control surface and a couple of blades in a production room so that we could play with it. But we wanted Todd to be on hand for the actual project, so that he could learn along with the rest of us.

WDJC's New Shorting Stub

Iôve mentioned this previously, too. Weôve also been sidetracked by module failures in WDJCôs new Nautel GV40 main transmitter. We had another in early September. Nautel had done a forensic analysis on one of the previously-returned modules. According to Terry Crouse at Nautel, the small blocking

capacitors in the RF output stage had failed, which led them (and us) to believe that we were getting transients via the transmission line.

The big clue was that we kept losing the same module (#7). Also, we would invariably lose the sub-modules (the little PA ñbricksò) closest to the physical output of that particular module. Like most solid-state designs, the GV40 is filled with combiners ... but module #7 is electrically the closest to the output flange. Aha!

Nautel recommended a tuned shorting stub to short transient energy to ground. With older tube-style transmitters, an in-line harmonic filter helps take care this for you. This particular transmitter doesnôt have a classic-style harmonic filter, so their recommendation made sense. We ordered the T-stub post-ASAP.

Figure 1 shows the installed T-section. This is simply a grounded quarter-wave stub, carefully trimmed by Nautel to be resonant at WDJCôs frequency (93.7 MHz). This is very old and reliable technology, but I still wondered if the bandwidth would be adequate to pass our signal. Without the stub, the VSWR was 1.08. With the stub, even with dense modulation and full HD carriers, it only increased slightly to 1.09.

Figure 1 - Not very high tech, but highly effective!

But the best news is that, not long after we installed that stub section, yet still another bad storm blew through ... and the transmitter chugged right along. No module failures. Success!

Nexgen: The Big Hammer

Iôve mentioned this previously: we have had random hangs of WDJCôs Nexgen audio server for most of this past year. Todd and I have checked everything that we know to check, and of course, Todd has burned up the phone lines with RCS Support ¿ all to no avail. The hangs have kept happening at seeming random, at anywhere from three-day (at the worst) to, lately, one-week intervals.

At first, the only clue that we had was in the Nexgen event log for that ASERV: it said that we were getting a ñDatabase Error 10060.ò RCS Support said that this means that the database is not responding at that moment, which points to a network connection issue. WDJC is our 24/7 music station with a good inventory of advertising, so it stays busy. It strokes those database servers many, many times more than any of our other stations.

Todd and I replaced the network cables. We even swapped WDJCôs audio server with a known good machine. The hangs kept occurring. We looked at the database servers and carefully went over the configuration. The hangs kept occurring.

We called in RCS Support; they sent a field tech named Brian who looked at everything. He couldnôt find anything obviously wrong, but on his recommendation, we made a few changes. We purchased One Big 48-port network switch, replacing several smaller switches that were trunked together. Because the database servers had Gigabit cards in them, we plugged them directly into the two ñextraò Gigabit ports on the new Big Switch.

I thought we had it. We went for several days without a hang on WDJC ¬ but then it happened again. This time, though, the event log didnôt show anything useful. It had grown to 20 MB size in a matter of seconds, all with a failed ñassertion.ò This is a programming thing, usually inserted for debugging. We would restart the ASERV, though, and the problem would clear up.

Finally, we had a really bad hang, just like the ones that we were getting before the RCS techôs visit. This time, the server required a hard, physical reboot before it would come back. I checked the event log and ... aha! We had gotten the old ñdatabase error 10060.ò

We discovered that one of our two database servers had set its network card back to ñAutoò instead of ñ1 Gigabit Full Duplex.ò While Todd was out for the funeral, Jack and I periodically checked to ensure that the database server hadnôt changed that setting. We had no more hangs ... until this morning, October 1st, as I write this.

This time, we had a bunch of weirdness. Once again, WDJCôs event log had the 20 MBôs worth of ñAssert()ò statements, and nothing else. Better yet, some of WDJCôs errors showed up in WYDE-FMôs event log (and WYDEôs ASERV hung up as well this time). Todd is currently on the phone with RCS support again, but it looks like we will have to resort to the Big Hammer.

Simply put, weôre gonna have to rebuild our Nexgen system. Anticipating this, I gave everyone on the staff a heads up a couple of weeks ago to clear all old audio from the file servers, and to make backups of any critical material. I have given them a few weeks to do this; at the end of that time, weôre going to essentially start from scratch and rebuild everything. Weôre not looking forward to it, but Todd, Jack and I (and the rest of the staff!) are profoundly tired of these hangs.

Incidentally ... I donôt understand all I know about Nexgen, and Todd and I know quite a bit now, having wrestled with it for years. Theoretically, the purpose of the Secondary Database is to immediately take over if the Primary has a problem. But we have had at least one hang where the *Secondary* had lost connectivity. This isnôt supposed to happen. Weôve had a couple of incidents where the emergency control room (ñECRò) in WDJC wouldnôt even start, which also isnôt supposed to happen.

Ergo, our only recourse now is the Giant Hammer. Hopefully, Iôll be able to report success next time.

The Great Blade Project

Now for the repeatedly-delayed WNIP project. Not surprisingly, our poor co-workers here in Birmingham ñespecially those on WDJC ñwere a bit frayed because of the issues weôd been having with Nexgen. These hangs have been happening at any time, at seeming random, including the middle of the day or even during Drive Time. (Whimper.)

As an engineer, you know as well as I that your goal is to stay on the air. Glitches and drops should be kept to a minimum. Given how worried the staff is here, weôre having to be especially careful about downtime while we bring the WNIP network active. If it was a simple matter of installing and connecting stuff, weôd be golden. But we have to do it while working around staff and while minimizing disruptions.

With that in mind, we are indeed following the procedure that Cris recommended in his

Figure 2 - The blades for the Audio Servers mounted and ready to go.

instructions: production rooms first, then audio servers, and finally, control rooms. All of the equipment is in place and the wiring is run (see figure 2). Weôve tested and played with a couple of systems and think weôre ready to go. But I have to admit, thereôs more than some trepidation over this ñnot because we donôt trust Wheatstone, or ourselves, or Cris and Amandaôs instructions, or anything like that.

Thatôs enough for this time. Weôre working on budget requests, same as everyone else, plus watching a funky Nexgen system and finishing up our WNIP project. Busy, but fun!

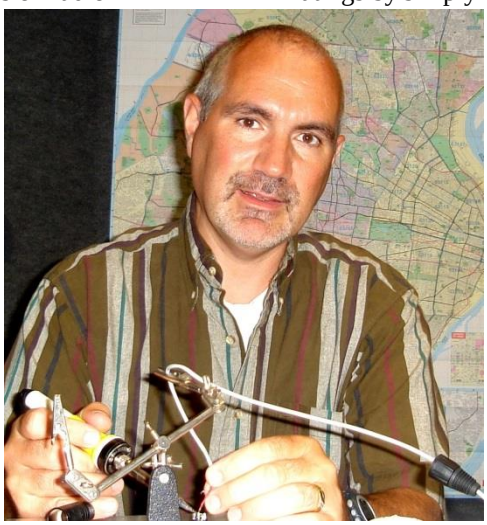
Until next time, pray for this nation like you never have before!

The Chicago Chronicles

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

PPM Encoding

Thereôs been a lot of discussion over the past year about the resiliency of PPM encoding. If you had a meter with trending topics on radio broadcasting websites, it would certainly be near the top. From the PPM encoder, through the stationôs processing and transmitter equipment, out to the listenerôs receiver where it finally reaches the PPM meter, there is obvious trepidation by engineers, programming, sales, management and owners about the ability of the system to accurately represent a stationôs audience.



We have a situation in our local facility that has certainly allowed a little doubt to creep in for me. We PPM encode our Internet streams. Since we donôt have a computer constantly monitoring the streams, the decision was made to put the PPM monitor directly in line after the PPM encoder then into the streaming encoder. So there is nothing between the PPM encoder and the PPM monitor. You would think that this would be an ideal situation for the Monitor, and you would never have a red light as long as you had audio running.

However, this is not the case. We regularly get the red light on the monitor of all four of our streams. One solution was to put audio processors inline feeding the PPM encoders. This certainly helped, but we still see times where we get the red lights. If the PPM encoding has trouble making it through in what would seem to be an ideal situation, how is it working in the not-so-ideal real world?

When there is so much at stake, such as the very competitive PPM-rated market our local cluster is part of, every station is looking for every advantage it can get. Just one PPM meter registering a stationôs encoding can not only make a big difference in ratings but the stationôs bottom line as well. When you have meters ending up in very noisy environments, no wonder there was an eager market for a device that promises to enhance the PPM encoding for a station.

This is where the Voltair came in. Itôs been about a year since stations have begun to implement the Voltair in their air chains. The promise of better ratings by simply inserting a device into your air chain is something that is hard to resist for most programming personnel in a competitive situation. Our programming staffs work very hard and sweat a lot of details, from how long the jocks talk, to ñWill this song keep more listeners tuned in than tune out?ò

As engineers, we look at the scientific part of this. Does this masked audio actually make it to the PPM meter? Arbitron (now Nielsen Audio) provided us with a tool for checking with the PPM encoding monitor. Most of us by now are familiar with the glow of the little green light giving us confidence that we have PPM Encoding present on air. We do our best to avoid the blinking red light letting us know there is a problem somewhere along the line. After all, itôs been said many times in this competitive PPM environment, that ñIf you donôt have PPM encoding you might as well be off the air.ò While no one would actually turn off a transmitter because they have a PPM issue, that phrase does sum up that the PPM encoding is just as important as our transmitters, STLs and other vital equipment.

I for one have always thought the PPM encoding monitors are a useful tool in a general way; however they donôt really give you the whole story. Most of us have our PPM monitors set up in the most ideal receiving and listening environments. They usually get their audio directly attached to expensive receivers which in turn are attached to expensive antennas. No wonder we have green lights. Good signals and no background noise to compete with the masked audio.

So, with the green light on the PPM monitor, the job for us engineering the station is done in regards to PPM. After all, youôre only as good as the tools you have on hand. I would like to see Nielsen provide engineering and programming better and

more accurate tools for determining what is actually happening with our PPM encoding in the real world.

What I propose is not more hardware. The hardware is already in the hands of engineers and programmers. We use it every day. The smart phone with an app designed to decode PPM would greatly enhance our ability to determine whether we are getting our encoding out in the real world.

It would not have to be something elaborate or require a phone with an FM chip. It would actually be more accurate if it simply uses the phoneôs microphone to pick up the audio along with the ambient noise present at that locale.

We could simply open the app, let it listen and then give us a green or red indication that it is able to decode PPM audio. It could be that simple. A call sign indication would be useful as well. It would go a long way in demonstrating that the present system is working or if it really needs to be improved.

Nielsen has announced that they are already taking steps to improve the ñdensityò of the PPM encoding. It would be great if we have an app, like the one I proposed, that would allow us to do before and after comparisons in the actual field. It might give many of us some confidence that we donôt need to purchase some encoding enhancement device; that our encoding is doing just fine.

The Portland Report

By
John White, CBRE
Chief Engineer, CBC–Portland

HD EAS

EAS is in the industry news and at long last may become the system many of us wanted early on. In those earliest days of EAS, as we worked to implement this new alerting creature in Oregon, I saw an opportunity for background or silent alerting delivered by local broadcasters. The key service would be when an alert would sound even when the radio or TV was ñturned off.ò

Even under the older EBS, the two tone signaling could have been used as a silent monitor to alert listeners when an emergency occurred. That capability was never implemented in listener broadcast radios, although some weather receivers had a similar capability.

With the advent of EAS, I had hoped that user radios would soon appear with silent alerting capability. Even in tornado country that didnôt happen. An integrated system that allows broadcast emergency alerts can and will save lives.

Now, finally, we are seeing that vision taking shape in an unexpected form as an addition to the feature set of HD Radio. In this form the EAS equipment at each station will pass information to the HD system to signal an alert in progress and activate the listenerôs radio. To my knowledge a similar service is not yet available for TV receivers.

The SPARC portable HD radio.

A word about the SPARC portable radio is in order here. Early on, the AM HD radios were generally poor performers when receiving AM HD signals. The SPARC portable is much better and at a reasonable price. Its inclusion of silent EAS monitoring is a selling feature.

Updating the HD exporter was a convoluted and interesting process. Interesting of the Chinese curse type of interest.

Detuning (or the Lack Thereof)

There is an old rock song that comes to mind. That song by Hermanôs Hermits, ñI'm Henry

VIII I Amò had simple lyrics and began with ñsecond verse same as the firstò as the opening line of the second verse. That line serves as the introduction to this monthôs column.

The undetuned tower across the street still isnôt detuned. Second verse same as the first. Meanwhile, KKPZ continues to file repeated STA renewals. For those not up to speed with terminology, the T in ñtemporaryò apparently stands for ñpermanent.ò In our case it should be an ñSPA.ò

A brief recap is in order. Some years ago a 70 foot Rohn 25 tower was replaced with a much higher and larger footprint tower without notifying the nearby AM station. That and other towers were discovered to be the source of distortion of the KKPZ pattern. All the towers were eventually detuned except the one which claimed the rule did not apply to Part 90 licensees.

Fast forward as the FCC adopted rules covering all towers last year. That tower was to be detuned this spring, then summer. Stay tuned as this works through the process. Needless to say we have yet another special temporary authorization.

Another aspect of tower detuning is gaining visibility. A major standard for communications tower grounding is the Motorola R56 standard. Interpretations of the standard has have sometimes come into conflict with the grounding needed to obtain proper detuning operation.

Early this summer, I took a tower grounding class and learned a great deal about safety and environmental grounding. One welcome revelation is that the R56 standard is under renovation and will include modifications to support tower detuning.

Engineer Credentials

I have an update on the progress of the engineer credential program which will allows engineers in Oregon access to broadcast facilities during a disaster to maintain broadcast signals on the air and serving the public. At press time we have completed the review of the draft procedures document and are ready to begin discussions with Oregon Emergency Management.

We believe the draft addresses most if not all of the concerns that OEM may have. I hope to report soon that the credential system is in place and operational.

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

KLTT Off Air

We had a most interesting thing happen the evening of the first of September. I had invited my parents over for dinner. I had already started dinner and it was nearly ready when my husband got home from work and my parents arrived. Then it happened. I noticed KLTT was off air (carrier but no audio) at 5:45 in the evening. This is not normal, obviously.

I tried connecting ISDN and could not get that to work. So I tried calling up the Burk to ñreboot the towerò manually (reset the microwave and receiver on the tower). No joy. It was as if the power had gone out at the site. So since my dad was over, he and I loaded up and headed to the site while Jordon and my mom ate dinner.

Thankfully, where I live now the drive to the KLTT site isnôt that long because I live a few minutes from the toll road which heads out that direction. We arrived and everything looked okay, equipment-wise. Everything had power lights. We reset the ISDN and went in the back room and reset the tower.

Every once in a while we have to basically turn the power off to the tower to reset our Trango link, the Ubiquiti NanoBridge or the Ethernet switch connecting them. This was one of those times. There had been a very electrical storm that had tons of lightning that passed right over the site, so we were obviously worried about lightning

damage. Thankfully all it did was scramble a few things and the power resets worked. We were home about 45 minutes later and were able to eat a delicious dinner.

KLTT Power Module Fault

That night, or should I say early the next morning (like 2AM early), we got a power module fault alarm from the NX50 at the KLTT transmitter site. This was the first fault we had since having Joey Kloss and Javad from Nautel out at the site to look over things. Javad is the engineer and he had decided to change out a bunch of cables and other small things in hopes of fixing the power module fault issues. I immediately contacted Joey who contacted Javad and decided Joey needed to head to the site. Thankfully Joey is local here in Denver and didn't have a long drive.

I spent the better part of a morning at the site with him. We decided that I shouldn't pull the power module until he was out there so he would see the issue in situ. It turned out the issue this time around was different than our other power module faults. We had blown the PA MOSFET. Thankfully we were able to fix the issue with no problem.

While he was at the site we also updated the exgine of the NX50. Ever since installing it we have had "exgine not responding" errors flooding the logs. This made it very difficult to find trouble spots when they happened because we'd have to dig through hundreds of messages about the exgine not responding. We were apparently the first AM HD station to do the update because what we found when the transmitter came up was that although we had selected to have the HD turned on, nothing would happen. It was analog only. Joey immediately got on the phone with one of the writers of the firmware. He fixed the issue and hopefully fixed it for everyone else so they would not have this issue too. Thankfully the firmware update fixed the exgine not responding error messages.

Frequency Change

I learned how fun it is to change the frequency on a solid-state transmitter. It was a fun experience, for me at least. We finally sold the old ND 2.5 that was previously the auxiliary transmitter at the KLTT site. The buyer asked Cris to change the frequency, and that's just what he did. In today's world, with everything being controlled by computers, can't you just put in the frequency you want? I honestly don't know, maybe, but this old transmitter needed parts in the exciter, output filter and combiner to be replaced and adjusted. After running into problems, speaking to someone who could help us figure out what went wrong we were able to get the frequency changed and now we are waiting for them to come pick it up so we can get it out of our building.

Denver Issues

It seemed the California trip was full of problems and so was Denver while I was away. For the last several years, when I have gone out of town, be it on vacation or business, there were no issues. Things have run smoothly. I always prepare Keith and make sure to have some backup locally if he needs help. Thankfully, we have a good bunch of engineers in Denver who will step in if he needs the help.

The first issue came the morning we left. I found KLTT was off the air (carrier, no audio) at 6AM. After further inspection I found Nexgen had stopped playing at midnight. Somehow, two midnight hours got copied into the logs and it confused things and caused the issue. This happened two nights in a row. Thankfully, Keith was watching things and immediately got things playing and got the local board op to call RCS to figure out what was causing the issue.

I also received notification that the KLTT transmitter building was hotter than normal, as in 93 degrees hot, not 72 degrees cool like it normally is. Keith went and inspected things and could not fix the issue himself, so he called our HVAC contractor to take a look. Unfortunately, the compressor in the 10-ton unit at the site had failed. I have no doubt the bill will be huge, but considering we've had that unit for several years with no major issues I'll take it.

Then the DRR machine finally bit the dust. Thankfully, when we upgraded our computers for WheatNet, I kept one as is (Windows XP and sound card). I knew the DRR machine was old and the sound card was not compatible with Windows 7. So thank goodness all Keith had to do was swap them out, change an IP address and have RCS make sure everything was good. We are going to get a newer soundcard from KBRT so if this one fails, we will at least have a Win7 compatible sound card to use.

Keith did a great job with dealing with issues. While I always hate it when things go wrong, I am grateful I was at a place where I could help out and walk him through some things. My fear is always that I will be on vacation, out of cell range and something horrible will happen and he won't know what to do. We all know how it is – unless you deal with it often enough, you don't always remember what to do. This last week was a good

crash course for Keith, and I have even more confidence that he can figure issues out on his own going forward.

Up Next

October is here. Many stores are already putting out Christmas decorations. I never look forward to Christmas, mainly because the mainstream media makes it a several-month event as opposed to one day. But, maybe I can get a good deal on lights since I have a house now and would like to do a little bit of decoration. October should bring one last trip to KBRT to finish the WNIP project there. It also will involve me working on finding ways of bettering my work. Todd Stickler makes me look bad. I know he takes care of one office space and one transmitter site, but dang! I have never seen two places so clean. I need to work on a schedule so I can clean once a month and keep things looking as good as his studios and transmitter site! Maybe October will crawl along, but somehow I have a feeling November will be here too soon.

That about covers it for this edition, so until next timeé thatôs all folks!!!

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

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