The Local Oscillator

The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Albany Launch

One of the stations that CBC sold to DJR Broadcasting a few years ago has come back homeé sort of. WDCD(AM) in Albany, NY was part of our New York expansion from the mid-1990s, a 50 kW powerhouse on 1540 kHz. As I mentioned last month, CBC began a time brokerage agreement (TBA) with DJR broadcasting in July under which CBC programs the station from 6:00 AM to 10:00 PM Monday through Saturday. We are providing a God & Country format, with a lineup of syndicated conservative talk as well as the daily live Bob Dutko Show out of Detroit and Lifeline with Neil Boron out of Buffalo.

We had a time getting everything in Albany ready for this. A lot of that had to do with weather. That part of the country has had a very wet and stormy couple of months, making it very difficult to install a new satellite antenna mount and dish. As such, we got a late start and everything ran down to ï and past ï the wire. Still, we were able to get on the air on July 11.

For the most part, things have gone fairly well. We had some early bugs to work out with the hardware and NexGen, but those were no big deal. The one vexing problem that kept us going for awhile was that the feed from Buffalo, which is provided over the public Internet using a pair of Telos ZIP One codecs. That feed would drop every day right at the start of the program. The connection was up and the folks in Albany could listen to WDCX in cue all the live-long day, but right at 3:00 PM Eastern, it would drop and it would take several minutes to get it back.

At first, the Albany codec would freeze up and require a power-cycle reboot ï sometimes several ï to regain control. Telos replaced the original unit with another one and that behavior cleared up. But then we had the daily 3:00 disconnect. The good news was that once the connection was reestablished, it would hang in there just fineé until 3:00 PM the following day.

We tried everything recommended by Telos and did some sleuthing on our own as well, looking especially at the local network to see if someone or something was starting a bandwidth-hog FTP download or whatever right at that time every day, but nothing was apparent. And it seemed the problem nearly had to be on the Albany end since the feed from Buffalo to Rochester, which also uses a pair of ZIP Ones, was unaffected.

We turned tech sleuth extraordinaire Todd Dixon loose on the problem and he figured it out in short order. He upgraded the firmware versions on both ZIP One units and the problem cleared up. Go figure. Iôm still scratching my head over that one. Why wouldnôt new units from the factory already have the latest-greatest firmware version, why didnôt tech support suggest a check/upgrade of the firmware, and why did the units work all the time except at 3:00 PM? These are all questions that shall remain unanswered, but I guess I donôt really care as long as we get a clean, uninterrupted feed!

New Detroit CE

I am pleased to announce Aaron McEachern as the new chief engineer of CBC-Detroit. Aaron comes to us from a few years in a family hearing aid business and before that from Townsquare Media in Flint, Michigan. He comes with a wealth of experience in RF (AM and FM), antennas, transmitters, digital media systems, digital audio distribution and routing, and all things IT.

Joe Huk and Russ Harbaugh have done a great job of keeping the trains on the tracks during these months of transition, and I very much appreciate their good work. But there is no way that a contract engineer can, in the limited number of hours he has available to work, completely keep up with the workload at a three-station, four-site major market cluster like our Detroit operation. As a result, things

have piled up ï quite literally. Aaron will inherit a facility that is technically sound but in need of a good cleaning and organizing, and I am sure there are a lot of little projects/tasks that he will need to get out of the way early on.

Joe Huk has agreed to spend a day with Aaron on August 3, showing him the ropes, taking him around to the sites and generally providing an orientation. I very much appreciate Joeøs willingness to do this, and I also appreciate Aaron giving up a Saturday to get a head start on the new job. I plan to make a trip out the middle of the month to spend a day with Aaron and get a look at everything myself.

Please join me in welcoming Aaron. His first official day on the job is August 15.

One thing I noticed while in the market for the interview last month was that the WMUZ tower at the collocated studio/FM transmitter site will need painting next year. I tried to get some bids on painting but was unsuccessful. The tower sits right over our studio building and parking area and is adjacent to a parking area and driveway for a grocery warehouse. There is great potential for drips landing on vehicles and buildings, and I recall that the last paint job a few years ago was very difficult. Our more likely course of action will be to forget about painting and convert the tower to dual red/medium-intensity white lighting and do away with the FAA requirement to paint the tower altogether. I filed the paperwork with the FAA and await the agencyøs decision.

KBRT Update

Things have been fairly quiet over the past month at KBRT. The new facility has run just about flawlessly.

Bill Agresta has been working on some networking issues that are not related to the site itself. The studio network is a bit of a spaghetti bowl, with two relatively low-bandwidth DSL circuits feeding the office and studio/transmitter networks. We have got to clean this up, and it will start with a new high-bandwidth ISP service from Time Warner, something we hope to get this month. That will allow us to consolidate everything on a single network with the various parts firewalled off. The new Time Warner service will have plenty of uplink bandwidth, something we have been sorely lacking with the other two DSLs (where uplink bandwidth is measured in kbps, not mbps!).

The contract for dismantling the towers at the old island site has been awarded to Northstar Broadcast, the maintenance division of Magnum and P&R Tower. The Northstar crew is familiar with the site because they completed the guy replacement project after the wildfire in 2007, and of course we have a great relationship with Jason Kardakus and his crew. We donøt have firm date on the dismantling yet but anticipate it to be in early September.

We have also hired a local island contractor to take down the fences around the tower bases, demolish the tuning houses and haul off the remainder of the stuff at the site (mostly junk items at this point). Once that is done and the towers are down and gone, we are done!

FCC News

The Report and Order that will establish uniform remediation across all services when towers are constructed near AM directional arrays was put on circulation at the FCC last month.

If this doesnøt mean much to you, it should. Until now, only certain services have been required to protect AM directional arrays from the effects their towers constructed near those arrays may have on their patterns. The rest can pretty much do what they want without considering nearby AM antennas. This can and often does wreck the AM stationsø directional patterns (or at least throws the stationøs monitor point fields out of tolerance), requiring a lot of work and expense on the part of the AM station to get legal again. If the MP fields go high, the AM station is required to reduce power to maintain MP field strengths below the licensed limits. This can be very costly for a station in terms of coverage, revenue and remedial expenses.

The poster child for this is our own Portland Mt. Scott site. While the cellular sites have been reasonably good about notifying us of construction /changes and making measurements and performing detuning when necessary, there are a bunch of Part 90 (Public Safety) licensees on the mountain that are not subject to the protection rules, and as a result, we are on a ñpermanent STA.ò Because of the Trimet tower, which is home to public safety communications for several counties and municipalities, we have to maintain the KJSL parameters at variance all the time to keep monitor points within the licensed limits.

Another aspect of this rulemaking is that it will employ moment-method modeling to resolve disputes between AM licensees and tower owners. That is what consulting engineers and some broadcasters (including CBC) use to evaluate the effects of nearby towers on our directional patterns, anyway, and it does provide good results.

We hope for speedy consideration and adoption by the commissioners.

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

Hello to all from Western New York! It has been quite some time since we visited here in these pages, and a lot has occurred since our last visit.

We were pleased to see Cris pay us a visit in mid-June. It had been quite some time since his last visit, and a lot had changed since. The main focal point of his visit was to look over our newest station, WDCZ, along with the WDCX-FM transmitter plant I installed three years ago, and the WDCX (AM) facility. He seemed pleased with what he saw, and it is always nice for the boss to see firsthand the condition of our stations.

In late May/early June we experienced a lot of heavy rains in Western New York, which caused quite a delay in getting the mowing done at the transmitter sites. The fields were so saturated with water that there was no way to get the tractor in there to mow without causing damage to the fields and ground systems. By the 3rd week of June, the weather had turned hot and humid, which allowed us to begin the mowing. The downside of this was that during the rains, the grass had grown unbelievingly high, some spots as much as 6 feet ! As of this writing, about seventy-five percent of the fields have been cut at least one time.

After the rains, the heat wave that most of the country experienced came in and stayed awhile. We had at least one stretch of over a week of temperatures well above 90 degrees. In our area of the country, this is quite unusual as our average summer temperature is around 84 degrees with low humidity. The heat brought on numerous problems with our air conditioning units, which in turn caused some equipment overheating in the transmitter buildings.

During one of our A/C outages, the service tech we have used for a number of years to service and maintain our air conditioners was on site at the WLGZ-FM transmitter building. The indoor temperature had risen to over 140 degrees and the A/C was completely dead. After checking numerous voltages in the system, he went to shut down the power to the unit, but mistakenly turned off the main breaker to the Continental 816-R transmitter. Realizing his mistake, he immediately switched the breaker back on and called me to report what he had done.

Naturally, we were off the air because of the loss of power, so I tried to talk him through turning the transmitter back on. The transmitter would not come back up, and he was describing some weird conditions on the control panel. The status lights were dimly lit and blinking, the filament on and plate on buttons would not operate and were not lit. Knowing that he would not be able to troubleshoot further, I jumped into the car to make the trek over to Rochester.

Once I arrived, I immediately checked the +5v and the +24v supplies on the controller, both of which showed to be in the normal range. In tracing down the problem, I found that the phase-loss detector had failed, probably due to the quick inrush of current when the service tech slammed the breaker back on. I was able to bypass the detector by shorting pins 1 and 8 together, which fooled the detector in thinking all was good. A replacement was immediately ordered and installed the next day.

The service tech was able to get the A/C back on, but it didnôt last long. In all, we had six service calls to repair this unit in a span of ten days or so. Among the problems found in the ensuing visits were a bad thermostat, shorted interlock in the fresh air economizer, bad phase monitor, compressor drawing excessive amperage and refrigeration pressures exceedingly high. He drained several pounds of refrigerant from the system, which lowered the head pressure on the compressor so it would not shut down on high temperature limits. So far, it has managed to stay on without further incident, but we should be planning on replacing this 15+ year-old unit next spring.

This month we will begin some improvement projects we have budgeted for several of our sites. At the WDCX-FM transmitter, JM Enterprises will soon be installing a new asphalt driveway and walkway to the transmitter building. Very little maintenance has been performed on the driveway over the years, and over time, what little stone that was there was eventually absorbed into the ground leaving two muddy ruts into the site. Several times a year, our gas delivery trucks get stuck in the mud and have to be towed out. They will be as happy as me to see the new drive go in!

Other projects in the works are the painting of the five 245-foot free-standing towers at the WDCZ site, along with tower foundation repairs to seven of the foundation piers. Over time, large portions of the concrete piers have chipped away, mainly due to moisture entering cracks, then freezing, causing the concrete to break apart from the foundation form. The piers will not have to be replaced, just resurfaced and sealed to prevent any further damage to the structure. All of the tower ground strapping will have to be removed while the

work is done, and replaced when finished. Much of the grounding is old and has been patched many times over the years, so this is the opportune time to make permanent repairs to the ground system.

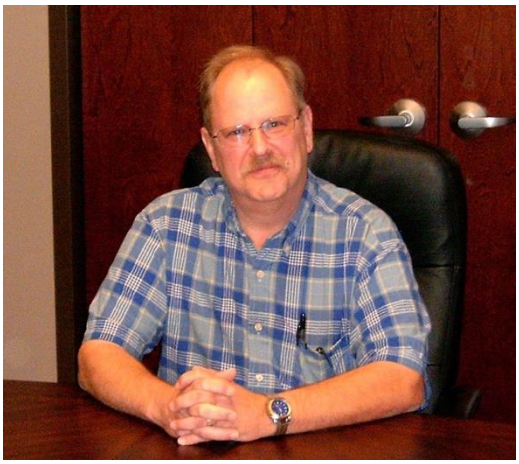
That about wraps up another month here in the great Northeast, and until we meet again here in the pages of *The Local Oscillator*, be well, and happy engineering!

News From The South

By
Stephen Poole, CBRE, CBNT, AMD
Chief Engineer, CBC–Alabama

Jimmy has been in Romania for the past week and a half on a mission trip. Romania, for those who arenôt familiar with it, is an extremely foreign country. Sort of like China, but with different food and vampires. And gymnasts.

Before he left, Jimmy was running along with the rest of us. The temperatures have eased off ever so slightly, but weôve had rain after rain, with flash floods all over the area. Right in the middle of the storms, the ATT T1 line between studios and Cullman failed again.



That thing has almost given us gray hairs. Iôve whined about it here before; the thing just wonôt fail in any logical way. The Intraplex has alarm outputs, but the T1 wonôt just die. It drops in and out. Or, we get data errors and digi-glitches in the audio. The latter is what it was doing this time: we were on air, but now and then, weôd have the old Max Headroom sound ï stuttering, glitching and dropping out.

We reported the trouble to ATT ... and waited ... and waited. Finally, the next morning, we called and the robot reported that it had been referred for repair. Thatôs the same thing that the robot had said the previous evening just before I went to bed. Todd started calling, waited forever and finally got a human. ñThe ticket on the Homewood end has been closed,ò he was told. ñYou need to open a separate ticket on the Cullman end.ò

To do that, we needed the circuit ID for the Cullman location. Todd rather plaintively asked the guy, ñYou mean to tell me that thereôs no one at ATT who knows about both ends of our T1? Itôs a single circuit!ò

ATT had never asked for that before. While

Todd merrily worked his way through that quagmire, I emailed our Personal Account Representative. To my pleasant surprise, this guy jumped right on it and by the end of the day, we had our T1 back.

As an aside, Jimmy says that the technician on the Cullman end told him that, once again, ATT had simply run the cable across the ground. It was hidden in the bushes, so we didn't see it. But whenever the rains came and the ground started flooding, that cable would start giving trouble. This technician is one of the few Good Guys with ATT: he personally saw to it that the cable was re-buried, so hopefully, we'll be able to go for more than a few months before the problems start cropping up again.

Spam And More Spam

I've also spent the past few weeks trying to fine-tune the spam filter on our corporate email server. This is very, very tricky, because the spammers are very good at duplicating legitimate-looking email. Does the spam have remote images in it? So does mail from some legit sites, including Tiger Direct and Grainger. Is it mostly HTML? Ditto and ditto.

Our server uses SpamAssassin and Amavis to detect spam and viruses, respectively. Both are open-source software and are very good. In fact, the Barracuda unit that we formerly used relied on both for its own spam firewall. In a case of turnabout being fair play, I noted that one of the things that our SpamAssassin filter checks is the Barracuda Blacklist ï i.e. a list of sites containing known spammers. It's a small world after all.

But tuning a spam filter is fun. SpamAssassin assigns a point score to each email. Each time it sees something in that message that it has seen in previous spam, it increments the score. Our server is configured to send the message to the Junk folder if the score hits 6.6.

I had a brainstorm: the .us, .me and .biz domains aren't heavily used right now. In fact, they seem to be inhabited primarily by spammers! So, I went into the configuration and gave them relatively high scores. I told SpamAssassin to add three points to any email with a URL containing a .me, .us or .biz address.

Heh. If only it were that simple. Apparently, a number of legitimate sites (including the aforementioned Tiger Direct) use .me and .us domains, not necessarily for primary links, but for "click here for more info" type stuff in the email. I had no choice but to reduce the score from 3 to 1 on these domains.

One of the most effective ways to block spam that is coming from a compromised computer is to do an rDNS (reverse DNS) on it. I've discussed this here before: if you look up mail.crawfordbroadcasting.com in DNS, you'll get the IP address of our mail server. If you then take that IP address and do a "reverse" lookup, it should return "mail.crawfordbroadcasting.com." If not, many mail servers assume that it's spam from a computer that has been taken over by malware.

Alas again. There are plenty of quite legitimate mail servers out there that don't have the DNS records configured correctly. We'd be blocking them, too.

I've posted images from the old Barracuda Spam filter in the past. Here's a similar graphic from Zimbra, our new mail server (figure 1). Note that things will be quiet for a while, then suddenly take off. At present, our spam-to-ham (i.e., junk-to-legitimate email) ratio is about 10% ï we get one spam for every 10 messages. As you can see from the graphic, we have hit peaks of over 300,000 messages in a single day. Not surprisingly, when looking at the 30- and 60-day stats, we hit these peaks around the 1st and 15th of the month.

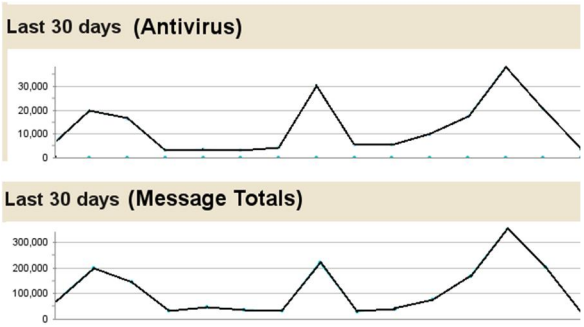


Figure 1 - Comparison of Spam/Virus (top) messages vs. total messages (bottom).

If we could only talk the spammers into leaving us alone on these heavy mail days, it would be a beautiful thing.

Operator Training

From time to time, we have operator training here in Birmingham ï usually after we've had problems or have missed paid programming. This time, it wasn't so much that people were making mistakes. We had made a bunch of new hires and figured it would be a great idea to get everyone on the same page.

One problem that we've had ever since installing the Wheatstone system back in 2006 is varying levels. Call me a dinosaur, but there's something to be said for the old VU meter. You could

tell at a glance (or even in your peripheral vision) if the levels were right. Iôm certainly not opposed to LED meters, and the Wheatstone meters are quite accurate. But I think that the operator has to actually look at the LED, instead of just watch it out of the corner of his/her eye.

At any rate, part of the training was reminding everyone what a correct level looked like on the G6 metering. The next part, as led by John Centala, one of our companyôs production wizards, was to explain how to ensure that creative has the correct levels. Weôve had problems in the past with some beds being too loud, and others being too soft. Jon showed them how to mix things properly, whether using a suite like Adobe Audition or the Wizard Editor thatôs built into NexGen.

All in all, it was a good meeting and I even got a chance to tell an Old Timerôs Story. I (very politely and in good humor) reminded everyone that engineering should only be called after hours for a true emergency. This is defined as (a), off air, (b), at variance with the Rules and Regulations or (c) an imminent loss of revenue that canôt be made good later. To underscore the point, I shared this one with them.

Years ago, an engineer friend of mine in Fayetteville, NC, was doing the contract work for one of the top-rated AMs in the market. They had six cart machines arranged with auto-start; Iôm sure youôre familiar with it. When one cart stops playing, the tones would fire the next cart machine. My friend says that the guy who was doing overnights called him about 3AM. ñHey, one of the cart machines isnôt working.ò

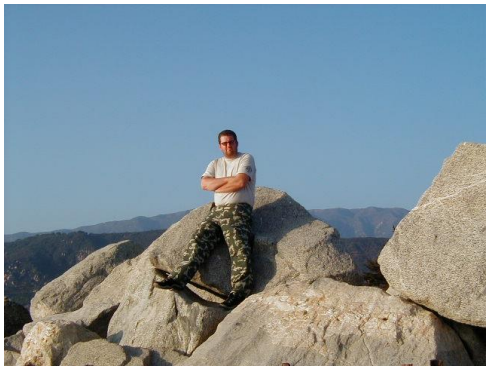
My friend didnôt read him the riot act. He got out of bed, had a leisurely breakfast, then headed to the studios and repaired the cart machine. He then waited until he was sure that the overnight guy was fast asleep, about 10-11 AM.

He called the guy and said, ñI fixed your cart machine,ò then hung up. Heh.

Until next time, keep praying for this nation!

The Black Star Bill Report
by
Bill Agresta
Chief Engineer, KBRT

Greetings from Oak Flat! The work continues here though things have shifted gears several times, the work has not slowed much. After the trailer loads of stuff we moved off the island, now we find ourselves having to sort it and figure out where each piece goes. That was hard to do until just recently because much of it was stored at my shop and it was packed so full of stuff I could not move to get at it. With the help of some friends, we tackled that obstacle the last weekend in July and now we are realizing the scope of the task ahead. There is still some hard work ahead, but we have been tackling tough tasks over the past few years and things here are only getting better.



With our new transmitter plant now in operation, all shiny and new, my attention is now focused on the engineering room at our Costa Mesa studios. I have begun to clean up the network, upgrade security and do whatever I can to bring the studio up to the same shine as our new transmitter plant.

Now our studios have always been nice, but now is time to bring them up to the next level. While we transmitted from Catalina Island, our operations manager, Todd Stickler, literally worked two jobs at the studios. Since I was on island, all the studio tech stuff fell into his lap. He has worked in this overwhelming situation for many years, always having to prioritize his time to keep the most important of things moving forward.

This has left me with many projects, all of what will make our operations here in Costa Mesa much smoother and more efficient.

One of the things Iôm learning here is how to tackle these tasks in an efficient manner. Since I am still working on projects at our transmitter site while these other projects are underway, getting the parts needed in good time and creating a flow with the logistics is a major deal when working like this. It is very easy to waste an entire day if I do not plan each step out entirely. A trip to the transmitter without a part will eat up half a day that was scheduled to be spent on a project at the studios.

The Oak Flat transmitter plant continues to operate beyond expectations; it is truly an awesome place to work. I am so glad that Cris and crew were able to spend the time and resources necessary to build it in such a way that it projects excellence to all who see it.

I still have one large project on the island, our last thing to do to complete our move off Catalina Island: the removal of the three AM towers. We are still working with the tower crew on logistics and hope to have this done soon. Iôm sure we will get some very good pictures of this final phase of our move and I will be sure to share them with you.

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
Art Reis, CPBE, CBNT, AMD
Chief Engineer, CBC–Chicago

Fixing a Coaxial "Owie"

Next month, Iôm going to devote more space to the auto parts store as a broadcast engineerôs friend, but for this month, Iôll just give a hint with this article.

Iôm not outing the staff person to whom this happened, but it involved the removal of a coaxial patch bay U-patch, used to connect from one port to another ï and, in this case, it was a 3-1/8ò line section. The poor fellow was attempting to pull the patch out of the bay, lost his balance, and accidentally dropped it about six feet to the floor, and the result is in Figure 1.

Ugh.

This was no small deal. The U-patch was only a year or two old, and because it was custom (this particular patch bay had been out of print for several years) the replacement cost was well over $600. This was not a throwaway. To my mind, it had to be repaired, but how?

I hung onto it for awhile, trying to figure out a solution. I then hit upon the idea of using a cylinder hone like the ones used for repairing car engines. My next door neighbor is really into restoring cars, particularly the muscle cars of the 60s and 70s, so I dropped over and showed him the situation. ñI see your problemò, he said, ñbut I have a better idea. Go to the auto parts store (and he named it) and rent a tail pipe expander tool.ò

Iôd never heard of one, so I went over and looked. The folks at this place were so nice, and if I returned the tool in the same pristine condition in which I found it, my rental fee would be fully refunded.

I donôt turn deals like that, so I rented it. Figure 2 shows the expander. These things come in two sizes, the other, smaller one is ideal for working with 1-5/8ò coax. What it is, is a tubular wedge, with the outer diameter adjustable by a wedge-shaped donut with threaded rod going through it. A good look at it in person will reveal how it works. Very clever those tool and die folks!

Besides the expander, you will need the following items: large crescent wrench, a ratchet wrench with 9/16ò socket and extender, a flat blade screwdriver, a ball peen hammer, a 3-1/8ò mating flange, a tape measure, and a piece of stiff wire.

Even though the basic repair operation is easy to figure out, mastering the fine points of the job is not. In this case, I had to start by using a large crescent wrench and the screwdriver to open up the outer conductor enough to actually get the expander in. See Figure 3. Be *very* careful during this operation. You *don't* want to over-bend or literally rip the copper outer conductor.

Once youôve gotten the outer conductor just close enough to shape to get the center conductors removed at both ends, use the 9/16ò socket on the ratchet to do so. See Figure 4. Remove the bolt holding them in place. Use the screwdriver blade to help remove the Teflon insulators with the inner conductors and bolts. You may have to get creative with your technique on the damaged side. Donôt be surprised if the Teflon insulator is out of round. You may have to replace it, though I didnôt. Set all those parts aside.

Now, you may move the vertical portion of the center conductor down and out of the way. Donôt even try to remove it from the assembly.

Next, insert the completely collapsed exhaust expansion tool into the damaged outer conductor, as far as it will go. Use the crescent wrench to *slowly* expand the outer conductor back into shape. See Figure 5. Take your time; if youôre doing it right it will take a while, maybe a half hour or even longer. You will need to occasionally stop and contract the expander to re-position its segments. There is a tendency for all of the segments to move to one side of the tool as it expands, so youôll have to work at keeping the segments at something close to equidistant from each other.

Use the mating flange to see how close you are to the proper circularity and diameter. Use the tape measure to make certain that the finished repairs makes the two vertical portions of the patch are the proper distance from each other (this distance depends on the design of your patch bay); use the ball peen hammer to *very gently* smooth out the circularity of the edge of the outer conductor from the creases which the use of the crescent wrench did to it earlier. Do this while the expander tool is in place and with a full wedge-face pushed up against the crease(s).

The only way to determine whether your efforts paid off is on the patch bay itself, so check it out. The fit may not be perfect, but the final result should be close to workable. It was in my case.

They donôt make tools specifically for this kind of work; thereôs little call for it in this day and age. But at least there are ways to improvise using tools designed for other applications. All it takes is a little imagination, and some friends in the right places.

Arbitron: How's that again?

Weôve used Arbitron for ratings for a dozen years, and have been involved in the People Meter Method for maybe four of them. Weôve had a lot of experience with them and, for the most part, the system has been reliable and transparent. As part of its outreach, Arbitron recently launched a teaching website for those who are now getting involved, the things folks need to know to make Arbitron work for them. One of their recent lessons (dated 6/27/13) is on the subject of PPM encoding best practices. James Kelly and I read through it and found rather sizable problem with what we saw. There are ten bullet points in the lesson, the fourth of which reads: ñInstall the encoder into the stationôs air chain *after* all audio processing equipment.ò [Emphasis mine.]

What? Howôs that again? First of all, it was Arbitron itself told us at the outset that it was entirely permissible to install their encoders ahead of our processing. We felt we had to. Suffice to say that we have ñsoundò reasons. The transmittersô analog and digital inputs are just fed separately, the analog with coax/baseband stereo, the digital in AES.

Realizing the problems which that Arbitron bullet point could create, I started my rant on the subject, then called a temporary cease fire, and called Arbitron. Here is what they had to say:

ñYes, we realize that we have not stated that bullet point quite right. What we should have said is that the data encoder should be inserted *after* any compression or leveling circuit. It is entirely permissible to insert the encoder ahead of final processing, particularly in light of the fact that the encoding process adds approximately .4 dB to the already existing program audio.ò

My contact at Arbitron also suggested that the document in question ñmay be one geared more toward programmers and GMs. There is a different one for engineers.ò While I certainly agree that writing on anything technical should be written for the best understanding of the audience for which it is intended, which will mean different styles for each, the differences should certainly be ones of improving understanding; in no way should the facts be altered in either case. But thatôs what happened here. While not intentional, that kind of writing tends to promote needless disagreements between management and technical types in a broadcast operation that no one needs.

Well, what this all tells me that they should have vetted that rather important point before it was published. The solution was to change the word ñprocessingò to ñpre-processing.ò I should have asked how many *other* calls and e-mails they got on this issue, but on that one I think that discretion is the better part of valor.

In any event, if the bullet point really *did* reflect a new reality of Arbitron encoding, it would have required that a lot of stations would have had to have a second set of encoders to, in order to cover both analog and digital transmissions. And I still donôt know if Arbitron makes an encoder for analog stereo baseband. I asked. My contact couldnôt tell me.

Like my old CE buddy from WPRO in Providence, Rhode Island, once told me, ñCommunications is our business. It is not necessarily our policy.ò Yeah, no kidding.

Next month, Iôll share a thing or two about tower climbers. Until then, many blessings to you all!

Figure 1 - Damaged 3-1/8" U-patch

Figure 2 - Tailpipe Expander tool

Figure 3 - Opening up the damaged U-patch

Figure 4 - Removing the center conductor

Figure 5 - Restoring the U-patch to round

The Portland Report

By
John White, CBRE
Chief Engineer, CBC–Portland

Itôs nice to receive reader feedback on one of my *Local Oscillator* columns. The feedback helps us to improve our column each month.

Last month, Jack Sellmeyer, a well-known and respected P.E. in Texas, dropped me a note regarding my comments about using a current probe as a tool to adjust detuning on a tower near our transmitter. Jack gave me some detail on an experience he had in dealing with a very complex detune job he had worked on.

Most AM stations receive notification of new towers or work on existing towers on a fairly regularly basis. Fortunately, most towers are not significant vis-à-vis the nearby directional array and detuning isnôt required.

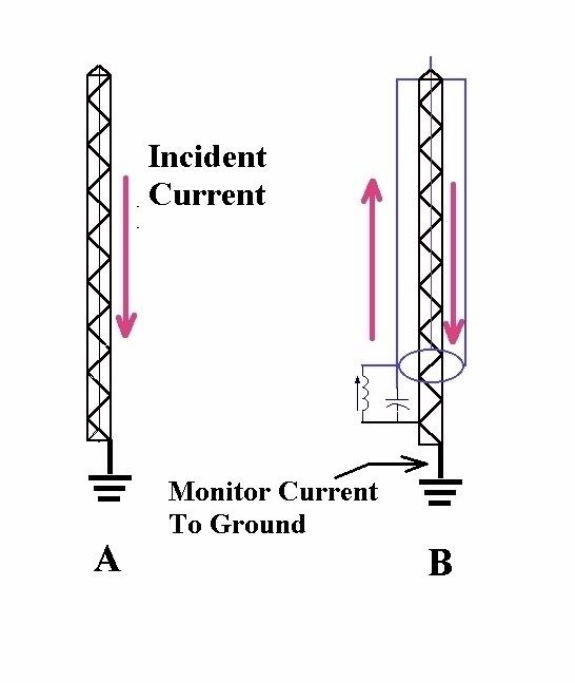


Figure 1 - Skirted and un-skirted towers

In discussions here locally, I was surprised that few engineers are familiar with how detuning works, or what the purpose of detuning is. I have gathered from long time engineers that the conventional wisdom is detuning is only necessary to protect the monitor points. Not true. The FCC requirements for evaluation of towers near an AM station is to protect the stationôs pattern and coverage. Otherwise there would be no requirement to protect non-directional stations.

So, what is involved?

The most typical tower is going to be a cellular /PCS tower of around 90 degrees electrical length and frequently shorter. This is also the easiest to detune. The figure at A illustrates a typical shorter tower. The tower itself will intercept some of the plane wave from the AM station, inducing an incident current flow in the tower. A shorter tower will act very much like our broadcast towers. The induced current will flow into the non-broadcast towerôs safety/lightning ground.

The figure at B shows a typical shorter tower detuning installation. A three-or four-wire skirt has been added which is terminated in a commoning ring and tuning apparatus. One way to view the skirt is as though it were a quarter wavelength transmission line (this will be important in later discussion). The short circuit at the top of the tower will then reflect as a high impedance at the commoning ring. The tuning components at the commoning ring serve to adjust for the skirt to appear as a quarter-wavelength on the AM stationôs frequency.

This brings up a caution. Since the lower part of the skirt is effectively a high impedance, significantly high RF voltages can be present. Appropriate warning signs and safety procedures should be used to prevent contact burns.

Another way to view the operation of the skirt to consider the currents flowing in the system. As we saw in the original un-skirted tower, an RF current is induced in the tower. Once the skirt is added, the detuning network is adjusted so that an equal and opposite current flows in the skirt. As a

result, the two currents cancel each other, resulting in no reradiation.

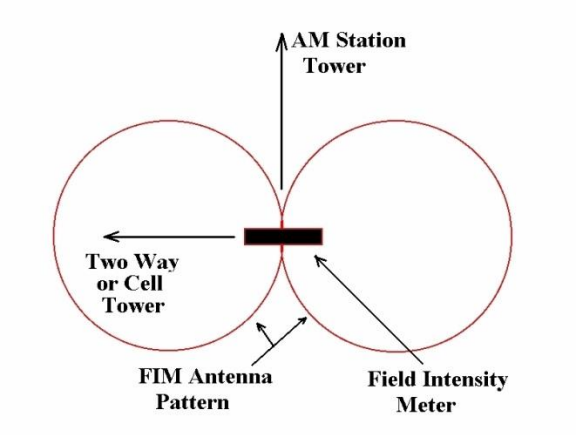


Figure 2 – FIM orientation for reradiation measurement

So now that we have a functioning detuning skirt installed, how is it adjusted? The classic method is a Field Intensity Meter (FIM) placed close to the tower that needs adjustment. The meter is oriented to pick up the reradiated signal while notching out or ignoring the direct AM signal from the broadcast tower. That orientation is shown in Figure 2. Once oriented, the FIM indication will be the reradiated signal. The detuning is adjusted for minimum indication on the FIM. With careful adjustment of the FIM orientation, a reradiated signal reduction of 10 to 20 dB is possible. Accuracy with this measurement is highly dependent upon the proper FIM orientation.

So far I have discussed the ñtypicalò or ñusualò situation. As Murphy ôs Law holds, most situations won ôt be typical or normal. In my case it ôs the *number* of closely spaced towers that make measuring a single tower in isolation difficult. As I learned from Jack Sellmeyer, this isn ôt the only circumstance where unambiguous measurement is difficult. More about those circumstances next month.

As I have indicated in previous *Local Oscillator* articles, as an alternate adjustment indicator I monitor the current to ground from the tower. The current is a good but not perfect proxy of reradiated signal. Ideally the TOTAL current to ground should be minimized. In a four-legged tower, that would be the sum of the ground currents for each of the four legs. The current is any one leg can be used as an indicator when it ôs a close approximation of the current in all legs.

So the question is, how good is adjustment using current in a single leg? I have concluded it ôs a pretty good approximation, and I will talk more about that next month.

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

KLTT Relay

Wow, where does the time go? August is already upon us. It feels like just a few days ago I was up at Grand Lake celebrating the Fourth of July with my husband and my parents.

Last month we were finally able to install a power interrupt relay for KLTT for tower four. It seemed any time there was a storm with enough lightning, the induced field would cause the 11 GHz microwave radio on the tower to shut down. This would then kill the audio and IP remote control to the station. I would have to put it on the backup ISDN and either go out myself or have Keith go out and cycle the breaker for that tower to shut down the microwave, and then turn it back on. Last month was monsoon season in Colorado. This means afternoon and evening storms. We were having to reset the tower nearly every day.

Back in June, we ordered a contactor with 30A NC contacts and a 24 VAC coil. This was enough to handle the 30A 240 VAC to the tower, and the 24 VAC was easily switchable by the Burk Arc Plus to allow us remote access to reset the tower.

Installation was fairly easy. We mounted a NEMA enclosure on the wall adjacent to

the box containing the tower light sample transformers, nippled through to that box and connected the contactorôs two NO contacts in series with the two sides of the 240 VAC circuit to the tower. The coil wire was fished through the floor troughs to the rack where it was connected to a 24-volt transformer and an open channel on the ARC Plus.

Now, I can call the Arc Plus unit at the site, go to the channel and press raise. That turns the power off to the tower for ten seconds, then turns it back on. After just a few minutes, the Trango microwave radio reboots and the connection is restored.

We are still trying to determine why the microwave radio goes down. I vaguely remember having a local engineer/climber replace the power supply on the unit, and his records show he did as well. We can still see the NanoBridge on the tower when the microwave radio goes down, so that tells us the switch up on the tower is still working. The issue is with the Trango radio. I am hoping to get a new radio early next year. When we do, we can replace the one on the tower and see what happens. If the issue goes away, I think thatôll solve our problems and we can get the other radio repaired. Only time will tell.

SBE Lookout Mountain BBQ and & K-Love Engineer's Luncheon

We had another good year for the SBE-SMPTE 48 BBQ up at Lookout Mountain. It is always so enjoyable to be able to eat Bennettôs BBQ and get to see many other engineers from around town. We also had a luncheon with the folks at EMF Broadcasting. Our good friend, Jack Roland, is chief engineer for this area and then some. They had all their western region engineers in for a conference, so it was a good crowd. Itôs always nice to have some good fellowship with other Christians in the business and also to have some good food.

KLZ Network Issue

Several now in recent days, KLZ has flipped out on us. Starting at 4 AM or thereabouts, the network starts acting up. We lose connection to the transmitter site numerous times and we lose our satellite feed. However, we are still able to get the relays/tones for local breaks. Whatôs up with that? Both times it seems the issue has resolved itself, leaving no evidence really other than the network alarms. I go through and check all the readings. The Intraplex, where we receive the satellite shows, is showing normal, with only minimal packets lost, the Trango and NanoBridges have good readings and the WorldCast NextGen Horizons are showing no alarms.

Finally, the problem occurred again and it stayed around long enough for me to do some troubleshooting. I found that when the problem was in evidence, from the studio I could see the Trango microwave radio, the Nanobridge on the tower and the Nanobridge on the roof of the building ï but I could see nothing beyond that, nothing in the transmitter building itself. The only things between the Nanobridge and everything else at the site is a piece of shielded CAT5 cable and a Hawking managed switch.

My dad and I went to the site and, of course, everything was working again when we got there. But based on what I saw from the studio, we replaced the CAT5 cable to the rooftop Nanobridge with a new piece (the old piece did have some UV damage. Reconnecting the Nanobridge, we found that the original problem was back ï the rooftop Nanobridge was connected to the unit on the tower and we could see both using a VNC to the studio on my iPad, but at the transmitter site we could not talk to the rooftop Nanobridge. That narrowed things down considerable.

We replaced the rooftop Nanobridge with a spare and everything came up fine. So far, so good. I hope that was the problem, but the evidence seems to indicate that it was.

Well, that about does it for this edition. So until next timeé thatôs all folks!!!

KBRT • Avalon - 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
KJSL • St. Louis, MO
630 kHz, 5 kW-U, 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
KSTL • St. Louis, MO
690 kHz, 1 kW-D/18 W-N, ND
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
WLGZ-FM • Webster - Rochester, NY
102.7 MHz, 6 kW/100m AAT
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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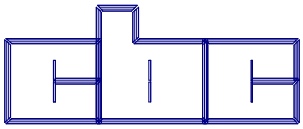

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