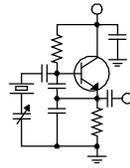


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Projects!

It's the season for projects, especially outdoor projects, and we have no shortage of them as we head into the middle of the summer. We have two FM antenna projects in the works - one in Chicago and one in Buffalo.

In Chicago, we are replacing the WPWX four-section H&V directional antenna with a new six-section half-wave CP antenna. We are also replacing the transmission line while we're at it. The existing antenna dates back to the mid-1980s, and then it was state of the art. ERI now uses the classic Roto-Tiller design for its non-panel directional antennas, and half-wave spacing provides for tight pattern control while minimizing downward radiation. The existing transmission line is Dielectric 3-1/8-inch rigid, also dating back to 1985. We have never had a failure in that line, but all those bullets have been chafing and oxidizing inside the line for the last 26 years, which is bound to increase the loss (and likelihood of an eventual burnout). We have ordered Andrew 3-inch Heliac as a replacement.

We expect this antenna to do a much better job for us in Chicago, providing for much greater penetration and fill into areas where we struggle now. We cannot get around the ERP limitation toward a short-spaced adjacent-channel station to the west, but the new antenna design, circular polarization, fresh brass and new transmission line will insure the best possible radiated signal.

The main antenna at WDCX-FM in Buffalo dates back to 1979. The tower fell in an ice storm and all the hardware had to be replaced. An ERI 12-bay Roto-Tiller was installed then with Andrew 3-inch Heliac transmission line. We modified the antenna back in 1987, taking off two bays and adding null-fill and some beam-tilt. That antenna has served us well all these years, but we do need some fresh brass in the air. Just last year, we had to replace some cracked parts on the antenna, indicators of the stresses that an

FM antenna undergoes over the years. We have ordered a new ERI SHPX-10AC. We will keep the existing transmission line. We will have ERI range test the antenna on a mockup of our tower so that we can optimize the mounting location. All this will get underway as soon as we can get a climber up the tower to map the tower for the antenna range engineers.

In addition to a new antenna, we plan to order a new transmitter for WDCX. The plan calls for a Nautel NV40, which we will operate in the FM+HD mode, improving considerably our digital coverage. WDCX-FM currently transmits its HD signal through its aux antenna, which is located some distance down the tower. We will boost our HD power to 3 kW, and with the height increase, that will make a huge difference.

Anniversary

It's hard to believe, but it's been one year this month since we made the big move into the new CBC-Denver facilities on the 12th floor of Pavilion Tower 2. A year ago this month Amanda and I were scrambling to line up all the details, planning everything down to the minute, working out microwave paths and lining up contractors.



A year later, we are still thrilled with the new space. It still looks great and it fits our operation like a glove. It feels like home, and yet it still feels new. I'm very glad that we executed a twenty-year lease. I don't want to even think about moving again!

Next month will mark one year with the new Trango 11 GHz microwave links. We have had one failure in that year, on the hottest day to date. The power-over-Ethernet (POE) inserter for the transmitter site end of the KLZ link failed on that day. It was very shortly thereafter that Trango issued a service bulletin/recall on the POEs for this very reason. We were supplied with a complete set and changed them all out. Time will tell if they fare better when the weather gets hot. As I write this, Denver is in the middle of a rare June heat wave, with afternoon temperatures climbing up close to the triple-digits. So far, so good.

Recertification

It's also hard to believe that it's been almost two years since we began licensing our AM directional sites pursuant to the moment-method rules enacted in the fall of 2008. We're fast approaching the grant date of the first of these licenses, and that will bring due the statutory biennial recertification of our sample systems.

As we prepare for that, some others around the country are already taking an early look at their sample system recertifications (I suspect that they don't realize the timeline works off the grant date and not the filing date). In the process, they are running into an issue.

Base sampled arrays must re-measure the resonant frequencies and characteristic impedances of their sample lines, and the rule says that "the frequencies measured must be the same as that used in the original proof." The issue here is twofold. What constitutes "the same"? Out to how many decimal places? And the other side of that issue is that the length of any transmission line varies with temperature. It's unavoidable, it's something we have known from the earliest days of radio, and it's why a properly installed sample system places all the sample lines in the same environment, so that all the lines expand and contract by the same amount with temperature changes.

One consulting engineer labeled this issue one of "unfortunate wording," and I agree. Instead of

requiring the resonant frequencies to be the same as they were originally measured, what we should have done was require that the electrical lengths be within the one-degree/two-ohm tolerance window specified in the model proof rule [§73.155(c)].

Fortunately, the good folks at the Media Bureau have a good grasp of the situation and are aware of the intent of the biennial recertification rule, the specific language notwithstanding. So as we go forward with our biennial recertifications, we'll know what to look for.

Sage/NexGen

In the months since we installed the new Sage Digital ENDEC EAS units in our Denver market, the decoding of tests from the local LP-2 was hit or miss. Tests and activations from the LP-1, an AM station, were solidly decoded, but those from the FM LP-2 station would work on one or two of the units one week and on one or two different decoders the next. It was very frustrating.

Amanda worked long and hard with the folks at Sage Alerting Systems, eventually sending them a file containing a captured test from the LP-2. Sage had the same issues getting ENDECs to decode that test in their plant, and some analysis evidently showed some noise and other anomalies on the audio. The Sage people decided that they needed to broaden their DSP code to make it ignore the noise and anomalies, and they did so, sending us an update. Decoding of the LP-2 tests has been solid ever since.

Another development on the Sage front is that RCS has a new module developed that will allow NexGen to talk to the Digital ENDEC over the network. We have agreed to beta the new code and look forward to adding this feature. Once it is working, it will allow us to schedule EAS tests, place them in NexGen logs and then have NexGen actually run the tests, eliminating the possibility that an operator might forget to run the test. Presumably the new code will also provide for insertion of EAS RMTs and activations into programming elements within the NexGen log so that they can be forwarded without interrupting a program in progress.

Hopefully we'll have some good news for you here in a few months on this front and a NexGen update that will allow all our stations to take advantage of the new capabilities.

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

Hello to all from Western New York!
The month of June has been an extremely busy month here in Buffalo and Rochester, with a lot of ongoing projects being completed and new projects getting underway.

In recent months, I have reported about satellite dropouts we have been experiencing on our C-Band satellite receivers. To bring you up to date, I replaced the coax, splitter, power supply, LNB and had the dish peaked with a spectrum analyzer, but the problems persisted.

Thinking that the cause of the dropouts were frequency related, I had ordered and installed a Wi-Max filter between the feed horns and LNBs, but the loss generated by the filter dropped our signal level to almost nothing. Acting on a hunch, I ordered the best LNB that is available, and that finally showed marked improvement in signal reception. The Wegener Unity 4000 receivers are now steady with no alarms or EbNo warnings being displayed. We still have occasional dropouts, but nothing like we have experienced in the past. Time will tell whether this has finally put this problem to rest.

Another project finally completed this month was the installation of our new NexGen file server. Stephen Poole and Todd Dixon had generated a step-by-step instruction sheet on the procedure for building the new file server, but we could not get the NexGen workstations and the new server to play together. Todd went through both servers via VNC but could not find what was hosing the install. The database would load on the new server, but when you went to bring up the individual workstations, there was no NexGen information being loaded. The workstations mapped fine to the server; it was just the NexGen information that was missing.

After the fourth failed attempt to get the server up and running, we got RCS involved to try and figure out what was happening. After looking through our new server and comparing it with the old

one, everything matched up identically. RCS recommended saving the database file that NexGen generates when it is shut down onto a thumb drive, then reloading that database to the new server. On the first attempt following that procedure, everything

worked perfectly!

This month I will get Rochester's new server installed, and it should go much smoother, now that I know what the missing ingredient was.

On the morning of Friday, June 10th, Earl Schillinger phoned that the AM transmitter did not come up at sign-on time at 6:00 AM. I tried to bring the transmitter up via the remote control, but the transmitter

was unresponsive.

Thinking that the main transmitter breaker had tripped after a thunderstorm the night before, I asked Earl to make the trip out to the transmitter to recycle the main breaker. This has been a normal occurrence since we installed the Nautel ND-5 some 10 years ago. Once Earl arrived at the transmitter and called me, we immediately discovered that the problem was not a tripped breaker.

I made the trip over to troubleshoot the problem, and found that the exciter had failed. A reboot did not produce any results, so I switched the transmitter's exciter switch to exciter 0B0 to get us back on the air. Further investigation found that the 10 MHz signal was not being received from the exporter. I checked the 10 MHz signal with my oscilloscope and found that it was present, but not being seen by the exciter. A call into Nautel's technical support department was not able to shed any light onto how the exciter could be fixed in the field. They recommended that I ship both units to them for repair. As of now, I have not heard back from them as to what they found wrong, other than the missing 10 MHz reference signal.

The same storm that occurred Thursday night that knocked WDCX (AM) off also took down WBEB in Penfield, a BOCES station owned by New



York State. At their location, lightning had hit the main power lines to the transmitter building, causing damage to most of the equipment located inside.

Not being too familiar with the Continental 816-H solid-state transmitter, their engineer called me to help him troubleshoot what could be causing the transmitter not to come up. Having him check a few things, I determined that the high voltage rectifiers had blown, so he ordered replacements and installed them next day. The transmitter ran for almost a week, but then shut down again.

In the meantime, WBER's engineer had ruptured his Achilles tendon and was out on medical leave. Not having an engineer to get them back on the air, station management began calling around to find some help. I accepted the call, and took off to see what could have happened to the transmitter. To make a long story short, I found a bad 5-volt regulator on the controller card, but did not have one in the spare parts kit to replace it. A call to Continental revealed a startling discovery: the controller used in this transmitter is no longer supported and is considered obsolete. A local engineer picked up where I left off and replaced the bad regulator and the transmitter came back to life.

This situation is often seen after a lightning hit.. once you get back on the air for a few days, parts start breaking down due to stress from the strike. I don't think they have seen the last of these ghost problems.

Lately, we have experienced an unusual number of brownouts and total outages of the power to our studio building in Rochester. Each time we experience one of these occurrences, we have a piece of studio equipment fail. Last week, after a lengthy outage, upon restoration of power we discovered that the Zephyr IP would not boot completely. It would get to a certain point and then stop. As I was just about to go on vacation the next day, I recommended

that we utilize the ISDN backup until I can get back to Rochester to check the unit out. In the meantime, I have contacted Rochester Gas and Electric and set up an appointment with their engineer to meet me on site to discuss what can be done to improve our electrical service at the studio location. Next month I will report on our findings. Hopefully he will be able to make some changes in our service to make it more reliable and stable.

As I had mentioned at the beginning of this column, I have a new project coming up very soon. WDCX-FM is getting a new 10-bay ERI SHPX antenna to replace our existing 32-year-old antenna. We will also be receiving a new Nautel NV40 all solid-state 40 kW FM+HD transmitter.

We had originally planned to replace the auxiliary and standalone HD transmitter a couple of years ago, but as the economy began to sour, this project was put way on the back burner. Mr. Crawford has now given his blessing on this project.

Our main objective is to increase our signal reception in southern Ontario, which has deteriorated in recent years due to the Canadian government approving several stations to broadcast on the WDCX-FM frequency southeast and southwest of Toronto. By optimizing our new antenna and making sure that maximum signal is directed toward that area, we are hoping to recover some lost territory and gain back several thousand listeners we lost when the Canadian stations went on the air up there two years ago. I pray that the Lord will bless this project and that we are able to reconnect to those lost listeners in the Kitchener and surrounding communities in Canada.

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

**Joseph M. Huk, Jr.,
P.E., CPBE, CBNT**

Chief Engineer, CBC–Detroit

Last month, we had the opportunity to use our Zephyr IP for the first time in connection with two live remotes. It was a great learning experience with generally good results.

Our first remote was at Gordon Chevrolet in Garden City, Michigan. The remote celebrates our annual American Red Cross Blood Drive. Last year, I found that this remote necessitated using wireless microphones and overcoming some of the reflections and bad reception characteristics within the dealership's environment. Knowing this, I made sure that the wireless microphone receivers were positioned so that one was closer to one part of the building than the other. This way, depending on the direction the talent wanted to go, we could mitigate the best reception conditions possible. I went to the dealership about a week in advance to do a dry run of the setup and observe the quality of the Internet connection.

On my first visit, we just listened to the audio going back to the station, which sounded really good. It sounded just as good as being in studio. The Internet connection the dealership is a cable business class Comcast connection. At that point I felt pretty confident that the remote would work well.

The next day I went to do a dry run at the law office where we do our annual Law Day event.

The law office uses a DSL connection. I felt that the DSL connection would not be as fast as the cable Internet connection. Again, we auditioned the audio making its way back to the station and everything sounded great.

The day before the Blood Drive, at the dealership, I was setting up the microphones, Zephyr IP and other associated equipment. At that time, the dealership office was in full swing. Many of the sales staff was using the Internet. At that time I noticed that the back feed was clipping out, so I checked the upload and download speeds of the Internet connection. The upload speed on the Comcast connection was on the order of 5 mbps. The download speed was only

about 50-100 kbps. At that point, I knew I needed to use a separate codec and/or bit rate for the talkback feed. The firmware in the Telos allows you to set the outgoing feed at one data speed separately from the incoming feed. I reduced the bit rate on the incoming audio feed (IFB) which in turn made the backfeed workable. The audio making it way back to the station was perfect.

The Law day event location had the opposite set of circumstances. The download data rate was about 5 mbps and the upload was about 150 kbps. In this case we had no issue with running the codec



settings on the Zephyr at higher quality settings. Both the transmit and received audio quality was great.

So in conclusion, I learned that you need to take your laptop and test the Internet connection with a test web site like DSL SPEED/ SPEAKEASY in addition to making your audio quality checks. Also, perform the test during the time when most folks are using the connection. This way, you will have worst

case data to indicate how you should set your CODEC settings accordingly. It will save you a lot of time and give you a clear direction on how to get your remote broadcast working the very best it can under the current internet environment.

Until next time, be safe, and if all goes well, we will be reporting to you from the pages of *The Local Oscillator* next month. Best regards.

News From The South

By

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

Short and sweet this time. But to start with, once again last month, a severe tornadic event hit right after I finished my *Local Oscillator* column. Let me start by saying that my thoughts and prayers are with the folks in Joplin, MO and elsewhere who have suffered from the severe weather of the past few months.

The Price Ain't Right

Todd, Jimmy and I continue to find evidence that we're in the wrong line of work. Just as I started writing this, one of the magnetic strikes for our keycard door entry system seized up. Todd priced a replacement. The original part is over \$500. The best deal he could find was still about \$200 on eBay.

For a door strike ó an electromagnet and some metal. Fits in the palm of your hand.

Fortunately, Todd was able to repair the old strike, saving Mr. Crawford a bit of money. But having priced spare parts, service and other odds and ends lately (including gasoline, of course), I can only conclude that prices have officially become outrageous. Adding insult to injury is the certain fact that the majority of the stuff that we buy nowadays is actually manufactured overseas by people who only make a fraction of what we do. Most of the great names in American manufacturing, especially in consumer electronics, are nothing more than glorified importers. They buy the stuff for pennies on the dollar from some Chinese manufacturer, slap their name on it, and then sell it at 1000-2000% profit.

Ta Ta, Ando!

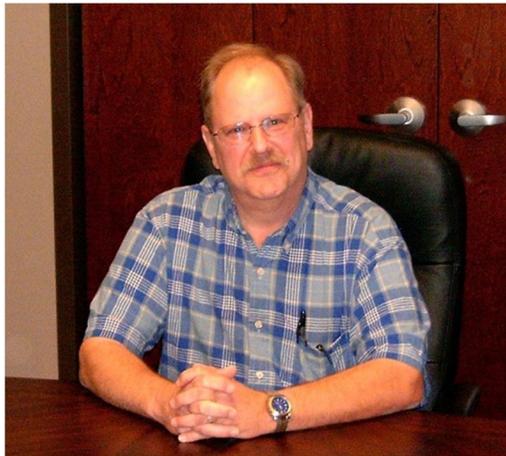
Early last month, we started having trouble with the streaming PCs for WDJC-FM and WYDE-FM. The latter, in particular, started rebooting over and over. We thought that maybe it was a thermal issue, so Todd cleaned it thoroughly, but the problem remained. After some discussion with Cris, we

decided to replace the two PCs entirely. That's when the real fun started.

Time flies when you're having a ball; do you realize that Windows XP is now 10 years old? There are still plenty of people using it (including yours truly) and Microsoft is still providing updates for it, so I'm not knocking it. But Redmon's flagship OS has now gone through two new iterations: Vista, then Windows 7.

Windows 8 is even in the pipeline for a release sometime in 2012 or 2013. It's very difficult to find a PC with Windows XP on it nowadays; the official "rollback" as of this writing, if you want an older OS, is Windows Vista.

Many manufacturers are no longer making drivers for Windows XP: their newest hardware is only supported on Vista, Windows 7 and Windows Server 2008. The bottom line is that you aren't likely to find Windows XP on a new machine from the factory, and if you try to install it from your old XP disc, you're very likely to run into driver issues. So, quite naturally and not surprisingly, and without a great deal of concern or forethought, we ordered two new PCs with Windows 7 on them. (Hold that



thought.)

This is the scenario in which we found ourselves when it came time to get the Ando Media (Triton Digital) software installed on the new streaming PCs. I have to be honest: we're not huge fans of Ando to start with. To me, their software has the feel of something that was thrown together from components. For example, and speaking as a programmer, I can't think of a good reason to require two sound cards for what they're doing -- but they do. And to call their interface obyzantineö maligns ancient Constantinople. It's the unlikely union of complexity in setup and TMI (too much information), in my never-humble opinion.

Then there's Ando's support. When we had problems, it usually took *days* for Ando to respond to a request for service. In this specific case, we were given a "questionnaire" to fill out, in which we clearly indicated that our new machines had come installed with Windows 7. (Hold that thought, too.) Ando told us that it would be several days before they could get to us; so, we went for another week without streams.

The day arrived for Ando to remote into the machines ... and then we received a perplexing email: Ando only support Windows XP(!!!). After looking at the machine and seeing Windows 7 on it, we would have to contact them after we found a machine that they could support. (!!! again.) This after waiting a week and after clearly indicating on the questionnaire that we were using Windows 7. Suffice to say, we were a tad ... annoyed.

Todd fired off what can only be described as a "love letter" to Ando (if you want an idea, he began his missive with, "This is crap"). A couple of email exchanges later, Ando allowed, with the air of someone granting a concession, that they would try to install under Windows 7, but that it wouldn't be supported. That's when I crafted my own love letter; again, I'll briefly summarize: "You present yourselves as a cutting-edge technology company, but you only support a 10 year old operating system?"

(I have since learned that, in fact, there are Ando installations all over the country on Windows 7, but that's an aside. Why they told us that, I have no idea. Or have they told everyone across the country that their installs aren't supported? Hey, that's a nice way to run a technology company -- you take their monies and lets them take their chances, too!)

Naturally, we weren't the least bit interested in an "unsupported" installation. Been there and done

it. In every other case, what invariably happened was, we'd have a problem, only to be told, "well, your OS (or hardware or whatever) isn't *officially* supported, but we'll see what we can do. When we get time. Later. Maybe." Now, Ando didn't exactly say this, but still. The fact that they went out of their way to point out several times that *Microsoft's default Windows operating system wasn't officially supported(!)* was enough to scare us off.

The good news is, our friends at Liquid Compass, with whom we've enjoyed a relationship for several years now, have got us in beta for their ad insertion software. We're just going to let the Ando/Triton Media contract run out. Frankly, I'd be glad to see them go; they've been nothing but an aggravation from the beginning (when, once again, we had to purchase and install a second sound card).

And A Rant About Satellites

I mentioned in a previous issue that the new XDS, iPump and MAX satellite receivers are puzzling. I can understand having to be authorized before you can air a program, but they're taking it to ridiculous extremes now. We pay for the receiver; we need the programming; but we have to wait on the provider to make even the most minor changes.

The most recent example came when we decided to use the store-for-later-playback feature of our iPump receiver on some of our Talk Radio Network (TRN) programming. Apparently, we have to get Dial Global to set that up for us, even though the interface is quite easy to navigate (unlike Ando's, but we're done with that topic, aren't we?). It's actually a neat feature, because you can set up the playback the same as the original, "live" satellite feed, down to the timing and relay closures. It's nice.

But why in the world don't they trust us to set that up? It's baffling.

Work At Tarrant

Okay, enough ranting. I'll finish this time with the obligatory picture: this is of one of the finished sample loops just prior to being mounted on a tower at the 850 AM site in Tarrant. You can see where we brazed the aluminum, added a copper conductor for the type-N connector and added a UHMW-PE brace to keep it from flexing. Not as obvious in the photo would be the clear coat that Jimmy sprayed on to prevent corrosion, or the putty that we put over the connector to keep water out.



WXJC sample loop ready to go up the tower

We're also replacing the top beacons on the five towers at Tarrant with LED units. These things are little itty bitty rascals! The old units were the standard 1300 watt, 3-foot-tall monsters with thick glass, Fresnel lenses and a red filter inside over the two 650 watt mogul-based bulbs. The news ones are little UFO-shaped things that draw less than 4 amperes. They're about a foot tall and weigh a fraction of what the originals did.

Thus ensues the hilarity: they're so short, and the beams are so tightly focused on the horizon, that you can't see them from the ground! We have to drive up the road a ways and use binoculars! I get tickled every time I think about it, but seriously: when you're looking up at the tower from the ground, you can't even see the top beacons now!

Until next time!

The Chicago Chronicles

By

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

A Tale of Twelve Towers (and Two AM stations)

I'm not going to identify the two stations involved in this story, but I'm talking about this to make a point: Method of Moments for AM stations is not only vital, in some cases it's the only way to make an AM station work legally.

Take a look at the photo below. That is an AM transmitter site and then some, originally for one station, now for two.

Actually, it's for a whole bunch of stations, if you count the cell towers in the place. The site is located in suburban Chicago, and I have a vested interest in it. Thirty years ago, I helped build it. No, not all of it. Read on.

The transmitter site is located at the intersection of a major Chicago area expressway and a heavily-traveled four-lane surface street. The station's transmitter was not in that exact spot originally, but rather across the street. Back in the day, and I mean *way back*, the array was a six tower

job with top-hats on the towers and 5 kW. Both the original array and the new four-tower one were designed by the late Robert A. Jones, who at the time was working for the great Walter Keane before he went solo. After some twenty years of operation on that six-tower monster, the then-owner commissioned Jones to design a new four-tower array. Jones did so, but then then the station owner died and the station subsequently went dark for over 15 months. New owners took over, but here's the rub: it turns out that the station didn't own

the land on which the original six-tower array was built, and the new station owners didn't want to pay what the landlords were demanding. The site owners wanted to make a killing developing the site as residential, and they got it. The new station owners had no choice but to build the new four-tower array across the road. And here's the joker in the deck: they didn't have enough land on which to do it right.



Around the time the new station was being constructed, I had the opportunity to actually sit at the feet of Robert Jones in order to learn more about the art of the care and feeding of AM DAs. I was a full-time CE at an AM DA station myself, that station's

ownership had put me on loan for this project, but I felt the need to improve my knowledge of the subject. So I sat at the feet of Robert A. Jones, one of the most approachable consulting engineers I've ever known. During the course of that visit I told him

about the new DA going up for this station I was building. He asked for particulars. I told him that the we had only about 40% of the land needed in which to put a full ground system. I'd remember his response forever: "You've got to stop them. The array was specifically designed to actually go into the land area occupied by the six-tower array. It needs a full ground system to work. You'd never bring the pattern in otherwise."

Jones was right. When construction of the four original towers and that truncated ground system was completed, we had to do handstands to put as much ground system in as possible. We even ran radials right up to the edge of the expressway, and up the hill for the overpass of the four-lane road to the south. But because the array was not actually built as designed, it took too far longer than it should have to get the designated pattern brought in to something the Commission would accept. And the augmentations? Wow. After the consultants left and program transmission began, I had to keep tinkering with the phasor adjustments in order to keep the pattern in adjustment. It was a weekly battle, depending in great measure on how much moisture was in the ground (for just one factor). The costs were also causing battles with management.

I stayed on as contract engineer there for two years, then moved on to a new job which was a bunch of miles away. The station was sold, and then

sold again. I lost touch with the operation for years. During the 1990s, I became a full-time contract engineer, but the station already had one.

However, some things were going on with the station which were really bizarre. First, the new

owners of the station decided they could make even more money by allowing the cell phone companies to build towers on the land. Never mind that those original four cell towers, installed as they were some *fifty feet* behind the array, without regard for protection for the station



antenna system, would throw the pattern for a loop, to the point where the FCC's field office crew ended up busting the station owners and their wallets to the tune of about \$13,000. It hurts even thinking of it. I guess the station took steps at that point to clean up its act, though they couldn't possibly bring back the array to where it had been before all of the modifications. So, that's where things sat for a number of years.

The story gets better. Two more cell towers were subsequently added to the mix (the ones on the right of the picture, if you're keeping score). Then the Illinois State Toll Highway authority got into the act by installing noise barrier walls at the edge of their right-of-way, which had the unintentional effect of cutting the west side of the station's ground system by something like a third. Little did the folks at the Toll Road Authority know that, for all these years, the station had actually buried its ground system right up to the road edge. Well, not any more.

And, as if that wasn't enough, the station owners acquired another station from the next town up the road, then made the decision to move its transmitter site to you-know-where. In order to do that, two more towers were added to the original four-tower array. You can see the newbies in the middle of the photo. That meant, by the way, completely rebuilding and retuning the skirts on the six cell towers sitting behind the array. They did that

by putting each station in the non-DA mode, each on a different tower. They then detuned the six cell towers in turn on each frequency, jockeying adjustments back and forth until all the mutual coupling had been compensated for, on both frequencies. I'm told that that was a chore. I believe it.

The two stations have similar daytime patterns, and separate ways of getting them. The original station, operating at 5 kW, uses the original four towers in the array to beam almost all of its RF to the east. The other station does the same with 1 kW but uses all six towers. At night the patterns couldn't be more different. Both stations operate in the 100 watt range. The day 5 kW station pattern puts most of the RF southeast and southwest. The 1 kW station uses a two lobe-pattern, one lobe going straight north and one straight west. Both stations use all six towers.

Here's the point: How *are* you going to keep track of the performance of that array, in all of its modes? The answer is, you can't, *unless* the array is set up for method of moments, in both of the frequencies of operation, in both day and night modes. And yes, that's taking a long time, over a year, and I dare say quite a bit of money to do it right. But it sure beats the cost of lots of FCC fines for not doing it now, doesn't it?

My thanks to Dave Dybas, one of the engineers on the project, and a Crawford Broadcasting Engineering alum, for information for this report.

Review: Little Red Radio II

Anyone who follows my column knows what a maven I am on HD Radio, on both AM and FM. While I am mindful of the criticisms of Ibiquery which have been leveled by the level-headed (and *only* them), it's the only game in town right now (until DRM find its place in the marketplace for AM, maybe) and its performance is as good as one would want, especially on FM-multicasting.

As a part of my obsession with HD, I have by now listened to, and/or owned, *and* given as gifts, more than my share of HD radios, for car, home and genuinely portable use. The latest of the latter comes to us from the same folks at Radio Ink, who brought us the Little Red Radio (also marketed in black by Best Buy). It is called, appropriately enough, the Little Red Radio II. I'm not sure if it's being marketed anywhere else, but if you run across one in any event, I'd pass it by, at least for now. The second generation LRR is long on aesthetic appeal, but otherwise falls short.



The Little Red Radio's Touch Screen

As any good reviewer should, I bought and paid for this radio myself. I saw the RI ad and bit on it immediately, even though the \$70 price tag on LRR II is half again as much as the original, plus a little more. When it arrived and I turned it on, my first impression was that this was, and is, a beautiful piece of work. Unlike the LRR I, the display covers most of the front of the radio, and it is a superb piece of eye-candy, in full color with beautiful graphics.

But, and here's the big but, I really wish I could like it more. The radio leaves quite a bit to be desired in performance. First of all, the earbud headphones supplied with the unit do sound good as headphones go. However, they are made with a very stiff type of rubber. Which means that, every time the cord touches *anything*, the contact noise travels right up the cord and into your ears. In that, the sound is kind of like a stethoscope hitting your arm or the tube slapping into your chest as you run.

Second, the radio leaves a *lot* to be desired in the sensitivity department. With LRR I, I could get HD radio reception in my living room near Joliet, over 40 miles from most of the downtown FM transmitter sites. Not so with this radio.

As an even more telling test, I took LRR II with me to a visit to one of my doctors on the north side of Chicago. His office has a window looking south toward the Loop. Near the Windows, HD reception was fine, but as I moved away from the windows, HD reception dropped off. Going into an interior room in the same office suite, the HD signal dropped out completely. And that's four miles from the Sears, er, Willis Tower, and a little over 2¾ from the Hancock Center!

Third, and this might be related, the radio is not, in my view, designed properly to reject its own internal digital noise. At home, relaxing in the easy chair, I hear a lot of 'chiff-chiff-chiff' noise from the radio's internal digital gizzards. Not good.

As noted earlier, the readout on this thing is great, and a touch screen to boot. With it, you may tune the radio, add presets and control the sound and certain other properties of the radio. The screen has two modes, and you can go back and forth between programming and tuning modes if you know how, but it's not intuitive, that is, it's not easy to figure out. The secret is that you have to touch the readout with *two* fingers, to toggle back forth until you get what you want. It can be figured out if you don't have the instruction sheet, but who's got that kind of

time these days?

In short, if you can find a first generation Little Red Radio (and they are available on the Internet), get one of those instead. For my part, I'm waiting for the folks who make these things to make one which includes AM on it. AM band broadcasts in HD sound soooo much better. Don't take my word for it. Put a person who's new to HD radio in front of a radio and show them. Makes a big difference.

Until next month, blessings!

Rocky Mountain Ramblings
The Denver Report
by
Amanda Alexander, CBT
Chief Engineer, CBC - Denver

AP 2010

It seems the AutoPilot issues continue with the 2010 version. Since we purchased the product late last year, we have had issue after issue. There are many things I love about AutoPilot 2010, but as I dig more and more into it, I am beginning to find a strong dislike for it.

The people at Burk Technology have been great in providing support for me on the various issues; however these are issues that should not be happening. I spent several hours getting the Jet flowcharts (which replace the VB scripting in prior releases) ready to go, only to have them not work. I can get them to work manually; however, using the scheduler, some (like the ones that change power/pattern) do not work. I have found that the interval Jet charts work; it is the calendar and specific time charts that do not work.

Many thanks go to Jon Burk and Dan Roche for their many hours of time spent helping me try to troubleshoot the issues. We have bought a new computer as the current one is seven years old, in hopes that maybe this will fix some of the issues with this resource-intensive application. Even if it doesn't, it will provide us with a more reliable computer.

Transmission Line Trouble

On Wednesday, June 8th, we had some dry

thunderstorms move through the area. Around 4:15 in the afternoon, KLTT did its job and went to low power due to the lightning. From what I can gather, at around 5:30, the site did what AutoPilot told it to do and raised the power after 10 minutes. As soon as it came up, we got hit by lightning. This took us completely off the air. This went unnoticed until power change when the ops manager

tuned in to make sure KLTT changed pattern. He heard silence, turned the station back on and immediately called me. I opened up Autopilot from my computer and noticed the tower readings were off. I immediately called my dad because I hadn't seen this problem before. He knew exactly what it was and told me to come pick him up.

We headed out to KLTT and he explained to me that when the tower readings go the way they were, it was most likely a fault in a transmission line. He had recognized that the issue was at tower 2 and that is the tower we've always had trouble with. We began tracing down where the damage was. A quick peek with an ohmmeter showed a dead short across the tower 2 line. We went to the tower and in the ATU, everything was normal. No smell, nothing charred. We went back into the transmitter building and looked around, but still nothing was apparent.





Dad cutting the tower 2 line at the site of the burnout

We finally found the burn in the underground vault behind the building where the excess sample line lengths are housed. The transmission lines pass through this vault, actually a septic tank, on their way out to the towers. No, there was nothing disgusting in there, just a little water in the bottom.

We took apart a splice in the tower 2 line and found it burned up. We then began cutting the line toward the point of egress from the vault. We cut several feet off and everything was still charred with soot in the lines. We changed the site to the non-directional mode so we could get back on the air at least at very low power. We called Keith and all decided to meet at KLTT the following morning. This gave us a little bit of time to sleep in from the late night before as well as for it to get light outside.



Keith "in the hole" splicing the transmission line

We figured we'd have to dig because from what we could tell the line was bad all the way out of the vault and into the dirt. Dad began digging with

not much luck. The ground was rock hard. Each strike with a pick yielded about a tablespoon of loose dirt.

So, getting nowhere fast, he decided to jump back down into the vault and make another cut about a foot from where the tower 2 line exited into the dirt. It was untouched! No black, no soot, just clean, shiny copper! Maybe we could make a temporary repair and get the station back up to full power before the day ended.

We looked around the transmitter site and found the connectors we needed. Ed Dulaney, bless his heart, had at some point ordered some spare EIA flange gas-pass connectors for the Andrew 7/8-inch line, and there was a supply of new line at the site as well.



Dad and Keith discuss the procedure for splicing around the burnout

We then had Keith go down in the tank and he began working to splice in a new section of line to replace the burned out section. We had everything done before 11AM.

We spent the next several days babysitting the site. I have made several trips throughout the month of June to make sure everything is still okay. The first storm that passed over after the fix had me a nervous wreck, but so far so good.

Module Down!

Nearing the end of the month, I noticed that the power at KLTT was a little lower than normal, sitting right at 95%. The common point current was a mere 31 amps as opposed to its usual 33. I had my suspicions that a module was down. It had been a couple of years since the last time we had an issue of that sort.

I quickly saw the problem upon arriving at KLTT with my dad. The breaker for cube 0C0 in the right PA cabinet was tripped. Resetting it brought up all but the 0E0 module in the cube, so we proceeded to remove the power cube. We took the 0E0 module out and again, the problem was apparent. A bug or something got in there, frying itself between the incoming B- buss and the extrusion of the module. The resulting arc actually melted a small part of the bus bar. The modulators were physically blown, and I figured that so most likely was the driving IC.

We began digging through the spare parts stock and found what we needed. We replaced them and tested the board and found the modulator output bus (PA B- bus) was still shorted out. We found that the metal plate that the modulators mount to got so hot that the insulating material they put between it and the extrusion melted, causing the short.

We didn't have any to replace it, so we ordered some. Two days later, the parts came in and we installed them. Everything after this point tested fine, so we put the cube back in the transmitter and it's working great now. It wasn't until after the fact that I thought we should've taken a picture because it was an issue that even Jeff Welton of Nautel hadn't seen in all his years with that company.

Leaky Line Fixed

After years of having the KLTT tower 2 line leak like a sieve, it took the lightning strike for us to figure out why. It seems the connector going into the phasor was the wrong connector - a gas-pass rather than a gas-block connector. We figure Ed used what he had on hand to repair the line when it last failed, which was a good temporary fix, but it was most likely forgotten and therefore never replaced with the correct connector. I am sure this has never happened to anyone else (wink-wink), so you probably are

wondering how this could have happened. It's simple: we are all busy, we get flooded at times with problems, so things are forgotten.

After the line damage early in the month, we ordered the correct (gas-block) connector along with another set of spare connectors and replaced it when it came in. We have a spare dehydrator, and hooked it up directly to the tower 2 line and let it run for a day. The next day we went out there and it was holding pressure just fine. We hooked it back up to the manifold with the other lines, and so far, so good - all the lines are holding pressure just fine at 4 p.s.i. I have never seen the line pressure above 1 p.s.i. in the ten years I've worked at CBC.

Cleaning

It seems that KLTT is the featured site this month. A few years ago when we finished the building at KLVZ, we had the managers and board ops out to see their new facility. We find that it is helpful for the station employees to see where the signal comes from. I think it also helps with selling air time on the station. I decided then I was going to do the same for the other three stations. It isn't until now that I am finally able to do this.

Keith and I have spent several hours working at the KLTT transmitter site, getting everything shipshape. Keith has mowed inside the tower base fences and around the building several times trying to keep the growth down. He has also replaced door sweeps and built a screen to go over the emergency air intake where the miller moths get in. I have worked to get the transmitter itself cleaned up as well as the workbench and desk. The site is finally looking better than ever, and we have been working on getting a trip scheduled for the employees to come out to view it.

Next will be KLZ, and that will be a project within itself. That site gets really dirty because of the swamp cooler used to cool the site. It pulls in mostly unfiltered outside air. Plus we have a lot of *stuff* to move to the barn from the garage. I do look forward to getting it done and looking better than ever, too.

Well, that about does it for this edition, so until next time! - that's all folks!!!

Digital Diary
by
Larry Foltran
Corporate Website & Information Technology Coordinator

Attack of the Hidden Files – Part II

During the past month I have received notes from several folks who benefited from my short narrative relating to a malware infection that struck our station, causing files and directories to become hidden. It most certainly makes me happy when people can reduce the time they spend troubleshooting by gleaning information from my frustrations. Along those lines, the harvest from our latest bug attack should be bountiful.

I received a frantic call from one of our account execs early on a Saturday morning. She said her laptop wouldn't boot up and that the hard drive had crashed. After a brief question and answer period, I had collected a list of symptoms and they in fact pointed to a potentially dead hard drive. She promised to have it at my desk first thing Monday morning and I promised to re-prioritize my planned items for that day to accommodate this repair.

Shortly after arriving at the office Monday morning, the laptop was dropped off at my office. I tried to power it up and confirmed our original determination that it was a hard drive gone bad. Prior to driving over to the computer store for a replacement drive, I grabbed the external SATA controller and plugged the drive into my PC. In this type of situation, I know the computer's user is generally on pins and needles waiting to find out whether or not I will be able to salvage the data on the drive. So I typically like to check the drive as quickly as possible to provide some relief when the data can be saved or some closure when everything is in fact gone. After connecting the drive, I was mildly surprised to see files and directories. What really surprised me was that the icons were all transparent denoting that they were hidden. Following the same process as I described in last month's article, I changed the file and directory properties to unhide them. As I sifted through the drive, I found that everything appeared to be there. Something wasn't adding up, so I decided to check in with the account exec again. In the words of Sherlock Holmes, *It is a capital mistake to theorize before one has data.*

Insensibly one begins to twist facts to suit theories, instead of theories to suit facts.

The first question I had for her was how she knew that the hard drive was dead. Now please note



that my intent was not to undermine the person's intelligence or tech savvy. I was simply on a follow-up fact-finding mission. She described how a window had popped up while she was doing research online and, along with a quickly increasing progress bar, there was a message that showed the hard drive was crashing. Of

course this message also prompted to immediately click on a specified link to purchase recovery software. This was followed by a NOD32 window noting that it had detected a virus. With these new facts, the story was beginning to make more sense. Apparently the computer picked up a Trojan and NOD32 was attempting to block the infection. For one reason or another, NOD32 wasn't able to block it and the infection simulated a hard drive crash by hiding all of the data on the drive. When she tried to boot up the computer, the OS could not be found and would obviously not boot the computer.

Well, my trip to the computer store for a new hard disk drive was promptly cancelled and I went into bug killing mode using my bag of tools and tricks. After a series of scans, I was able to clean 13 separate infections while utilizing the external SATA controller. After reinstalling the hard drive into the laptop, subsequent scans discovered and cleaned another 10 infections although the desktop icons were still gone. Every attempt to click on the desktop to access the properties menu was unsuccessful. Some sort of bug still remained. After a series of safe mode scans and registry item deletions, the desktop shortcuts reappeared. Based on my research and the data collected during the scans, I believe this computer may have been infected with the PUM.hiddendesktop Trojan variant. Definitely one of the most interesting examples of malicious infections I've encountered.

The good news was that the data was intact, the computer was clean of infections, and the user

was one happy camper. The bad news was that I didn't get to go to the computer store. This little adventure did provide a significant learning experience. To quote Mr. Holmes again, "Education never ends Watson. It is a series of lessons with the greatest for the last."

Do We Have Too Much Personal Technology? – Follow Up

As another follow up to last month's Digital Diary, I ran across an article recently related to the inundation of technology and its effects on us. As you may recall, last month I gave a short account of a fellow Disney visitor spending more time checking in on his friends back home via Facebook rather than taking in the experience with his family standing next to him.

The article I read recounts a high-tech company employee's first hand experience where he was asked to give his young daughter a bath, but spent that time replying to emails and other tasks on his Smartphone rather than enjoying that time with her. The article also quoted a counselor who added that "We can't just sit quietly and wait for a bus." I agree with her wholeheartedly and have seen it first hand – literally – at a bus stop.

The author uses the term *Popcorn Brain* to describe this new condition. According to the article, it is essentially the brain's need for different and unexpected stimuli, easily provided by technology such as email and social media as opposed to predictable situations such as waiting whether it's at a bus stop or in line for the Buzz Lightyear ride. Quite honestly, I find myself there as well in certain instances. I have a difficult time sitting down to watch TV without doing something on my laptop.

So is this simply a normal transition based on technological advances or is this a dangerous and potential harmful trend? The article I've been referencing did note a recent study (published in the June issue of the PLoS ONE online journal) that discovered a series of negative physical changes to the brain as a result of constant stimulation.

In my opinion, it's ultimately up to the person to determine how much technology to utilize during their day-to-day activities and find an acceptable balance just like other aspects such as exercise and diet. Perhaps someday, smartphones and other mobile devices will be required to have a warning prominently printed on each one. I suppose it only takes one lawsuit to propel mobile devices in the same direction as an average hot cup of coffee from the golden arches.

Internet Myth #1 – Blogs Are Dead

In more than one instance recently, I've heard a reference to blogs being dead and obsolete in our quickly expanding world of social media. Even a popular TV program quipped about the demise of the blog. But is the blog really obsolete? In my opinion – no. But I decided to do what I typically do in this type of situation and that is to prove my stance with some in-depth research.

Surprisingly, I found numerous online articles and blog posts related to this. Predecessor to the explosion of social media tools available to us today such as Twitter and Facebook, blogs provided an easy way for people to express their views on essentially any topic. Some articles, including a rather long-winded one from the New York Times, convey the belief that Facebook and Twitter rendered the blog obsolete. In my opinion, I believe all three are still in the same boat and are simply using different paddles to move the boat in the same direction.

Based on the statistics that I found, the user demographic for blogs has actually shifted dramatically to the over-35 crowd. Once a medium for socially active college or high school students, the blog is now used as a tool for businesses and professionals. While the younger crowd has migrated to Facebook or Twitter where they can quickly share their views of the world to their friends, the older portion of the demographic is using the blog as a method to share in-depth experience, advice, and other information more closely related to business. Granted, there are some blogs out there that fall very short from being considered professional, but a quick search engine search using terms such as "marketing" or "business success" will show that blogs are alive and well – and are quite useful!

I think deciding what social media tool to use ultimately comes down to the type of information the user is trying to convey. A quick note about an upcoming product release can be better suited for Twitter or Facebook. An in-depth article relating to the benefits of said product, would benefit a great deal more if posted within a blog. Get more bang for your buck and post the product announcement on both Twitter and Facebook with a link to your blog. The tools are readily available, but you need to know how to use them. Don't believe me? Give me a wood chisel and have me cut a dovetail joint. It may be entertaining to watch, but would not be pretty.

So is the blog dead? I'm quite confident it isn't. But rather, it has simply matured.

– until next month!

The Local Oscillator
July 2011

KBRT • Avalon - Los Angeles, CA
740 kHz, 10 kW-D, DA

KCBC • Manteca - San Francisco, CA
770 kHz, 50 kW-D/1 kW-N, DA-1

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

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

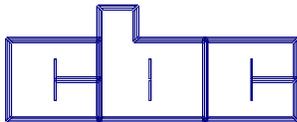
WYDE • Birmingham, AL
1260 kHz, 5 kW-D/41W-N, ND

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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