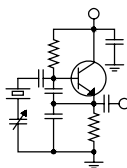


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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More Microwave

It seems like the last 5% of a project consumes maybe 25% or more of the time. That may be one of Murphy's laws – if it's not it probably should be. That's the way it has been with the Denver studio and office relocation project. The last 5% included the dedicated microwave paths to all the sites. We got the direct path to KLTT working last month and this month our attention turned to the KLVZ path.

A structural analysis of the tower on which the receive antenna is mounted revealed that the tower would be overstressed with the microwave antenna at 270 feet. The solution, according to the structural engineer, was to replace the top set of guy wires with larger diameter cables. We did that in September so we were ready to hang the antenna in October. Before I could do that, however, I had to get an STA from the FCC for parameters at variance. There is a chance that the top-loading effect of the microwave antenna will change the current distribution on the tower and thus the self-impedance of the tower. If it changes more than ± 2 ohms and $\pm 4\%$ from the model values of $29 + j6$ ohms, I'll have to redo the model to get a new set of operating parameters and then adjust the array accordingly. Obviously I am hoping that the self-Z will stay within the window.

The great news is that we got a solid path on the studio-to-KLVZ link with receive signals in the -45 dBm range. This is our longest path and was the one of greatest concern to me. I'm thrilled that we have such a good signal and broad fade margin. In the coming days we'll go out and measure the Z matrix and hopefully, with that last 5% finally done, put up the "Mission Accomplished" banner.

Test Antenna

The big project in October was the setting up of a test antenna at our new transmitter site

property in the Santa Ana Mountains for the purpose of making conductivity measurements on a single radial on which we had no such data. The site was previously used for an AM station on 830 kHz back in the 1990s and from that operation we had measured conductivity data in all the other directions of interest, but somehow that data eliminated a small wedge of azimuths to the due west where KBRT has a third-adjacent protection (KSPN on 710 kHz).

Bill Agresta and Todd Stickler did a great job of making preparations for the project, gathering most of the materials, arranging for a generator and lining up a crew of people (I think I counted twelve total people, including our neighbor up on the hill, Larry Boothe). I arranged to have a 1 kW test transmitter tuned up on 1690 kHz and shipped out from Nautel, and we shipped two 2,000-foot spools of #12 bare copper radial wire from Denver along with our recently-calibrated FIM.

The entire crew met at a restaurant in Corona, the town just east of the hogback on which the site is located. After a good lunch we all headed up and began setting up the test antenna, five 10-foot sections of 16-gauge steel 1-1/4" mast. We tried a couple of different ways to get the mast in the air without success but finally settled on assembling three sections (30 feet) and standing that vertical, then lifting that assembly up and inserting two additional 10-foot sections one at a time from below. That worked great and we soon had all fifty feet in the air. We guyed it at the top and near the middle, but it still snaked from true quite a bit. It's a good thing that MW RF doesn't care about a few wiggles in the steel!

Because the mast was so short, we had to heavily top load it. To do that I attached three 30-foot lengths of the #12 bare copper at the top and then used electrical tape to secure the wires down the nylon three guy ropes. We also had to insulate the mast at the bottom and for this Bill brought an old

porcelain pole insulator. Bill used a sawz-all to split the bottom of the mast in two directions to make it fit over the top of the insulator. That worked great and we were able to set the assembled mast on the top of the insulator. We then spooled out twelve quarter-wavelength radials on top of the ground to create an abbreviated but effective ground system.



Amanda Alexander mans one of the guy anchors as the mast is pulled vertical.

The top-loaded 50-foot mast showed a very workable self-impedance of $26.5 - j230$, so we thought it would be a snap to match it with a tee- or L-network. We started with a tee network that engineer Joel Saxburg has assembled and brought, and although we had the calculated reactances in all three legs we could not get a match to 50 ohms. We worked at it until just before dark that first night and gave up. Bill Agresta and one of the other guys from the crew (another guy named Bill) camped at the site overnight to keep the generator, mast, transmitter and all safe.

The next morning we returned to the site. Amanda, Joel, Burt Weiner, the two Bills, Todd Stickler and I were the test and measurement crew. Joel brought a vacuum variable that we put in the shunt leg of the matching network. That should have done it, but we were still having trouble getting the network to tune. Then Burt suggested that we short out the unused turns on the output inductor, which was a large coil, several hundred microhenries of which we were using only a few turns. That did the trick. The problem was that the distributed capacitance of the unused turns on the open end of that coil was swamping out the self-impedance of the mast. I should have thought about the likelihood of that given the high frequency at which we were working (1690 kHz).

With the mast tuned we connected the

transmitter and fired it up at 1 kW. Todd and Bill connected a 360 Systems Instant Replay and set it up to loop a cut that included a 1 kHz tone with a station ID every minute ("This is KBRT test station on 1690 kHz.") That tone made it easy for the folks making field intensity measurements to make sure they were tuned to the correct signal.

Burt and Joel hit the road and made the far field measurements, starting at the first public roadway to the west of the site and working their way all the way to the shoreline. Amanda, Todd and I started hiking, making the close-in measurements to establish the inverse distance field (IDF) of the antenna. We hiked as far as we could, about 1.3 km, before running into impenetrable scrub oak and dense underbrush and terrain too steep to navigate carrying



"Base Camp"

a field meter. Returning to the site I plotted the data and analyzed it to show an IDF of 120 mV/m at 1 km, not bad considering the very short radiator and abbreviated ground system we were using.

By late afternoon Joel called and reported that they were done, so we shut the transmitter off and packed up, lowering the mast, rolling up the radials and cleaning up the site completely.

Now I have to take the far field measurement data and analyze it for conductivity. Once that is done we can wrap up the allocation study, finalize the directional antenna design and get the FCC application filed.

EAS/CAP

By now you all are aware of the 180-day clock that started in early October. We got the word on that while at the NAB Radio Show in Washington. I met with the folks from SAGE and got the low-down on equipment. With much of the protocol still in flux it's hard to get a handle on what we as broadcasters will have to do.

My solution is to go with all new SAGE equipment and get rid of the troublesome and quirky TFT units that are now almost 14 years old. SAGE told me that their new equipment would be field updateable so if the standards change subsequent to manufacture, it will be a simple matter of a firmware flash to get compliant again.

That 180-day clock, if it holds (SBE has filed a petition with the FCC to stay the deadline),

would put the deadline at the end of April. I have budgeted \$2,500 per signal for the new SAGE equipment and plan to place orders in early January. Hopefully that will put us near the top of the queue.

As far as our stations are concerned, nothing need be done at the local level until the new equipment arrives. I will keep each of our engineers in the loop during the order and delivery process.

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

Hello to all from Western New York! This month's report will be shorter than usual as the month of October was relatively quiet here in Buffalo and Rochester with not too much to report on. I was hoping to have the WDCX-FM STL tower project completed by month's end. However, delays in shipping the new aluminum tower have pushed the start date back several weeks. My last conversation with the supplier revealed a ship date within the first week of November. Barring any significant weather delays, I should have this final project of the year completed by mid month.

One other project that we will be starting soon is the replacement of our NexGen file servers in both markets. Our current servers, Dell PowerEdge 2940s, have been in service since 2004. We have been extremely fortunate that these file servers have been running for the past six years with no problems at all! I am hoping that the replacement servers turn out to be as reliable as the original ones have been. Michael DeMart and I will be preparing the new servers for service and copying our entire inventory from the old server to the new one. I am grateful that we were able to substantially increase our drive size on the new servers. Several times we got dangerously close to filling up the old hard drives and had to go through and delete all unnecessary data or move it to another drive for archiving. Since then, we have instituted policies to insure that the file server is not

used as a storage facility, that only current and active inventory and projects are kept there. If not watched carefully, this is one area that can literally get out of control before you realize it!



WDCX(AM) / WLGZ-FM
– Rochester

In Rochester, we have split off the Internet usage between WLGZ-FM and WDCX(AM) due to bandwidth limitations. We already have two separate Internet feeds into the building, one providing a static IP and the other a dynamic IP. The static IP service was used for all of

our streaming computers and Zephyr/IP, which handles programming between Buffalo and Rochester, as well as all VNC connections and those computers used to download from various FTP sites. At certain times of the day we were experiencing data crashes, primarily caused by too many different applications trying to all run at the same time. In order to alleviate this, I had Time Warner install another DSL with static IP address into our building, which will handle only WLGZ-FM's Internet needs. This was the simplest and most cost effective way to go. If we had upgraded our existing service to the next level it would have more than doubled our monthly cost for Internet service.

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 have a happy Thanksgiving!

The Motown Update

By

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

Chief Engineer, CBC–Detroit

I spent much of last month working on finalizing the planning of our electrical service upgrade, continuing the maintenance work at our WRDT-AM Monroe facility, and finally realizing that you must think about the unexpected when it comes to your studio facility.

WMUZ Transmitter Facility

Over the last month or so we have been in the process of bidding out the project of upgrading the electrical service feeding our Nautel NV40 transmitter. In the process, I realized that our electrical distribution coming into our facility has many hidden details. In reviewing the electrical distribution, the electrical contractor noticed that I have a cabinet with transient suppression. In order to meet code, this network must have a disconnect incorporated into its feed. If there were a failure, the mode of failure might be a short circuit. Therefore, to restore power to the transmitter, the network would need to be removed from the feeder bus. Some of these details may not present themselves until just before the installation.

I believe it is important to select an electrical contractor who not only provides you a fair price but is thorough in determining what you need to comply with the local and national electrical codes. The contractor we selected is also very proactive in making sure that all the necessary circuits that require temporary power during the installation are taken into consideration. Mike from Progress Electric is a real team player. I believe that is one of the most important criteria in choosing a contractor.

WRDT Site Maintenance

As I continue to winterize the Antenna Tuning Unit buildings at the WRDT(AM) daytime site in Monroe, Michigan, I realized after painting and caulking the areas around the glass bowl feed though that a lot of debris is not only coming in

through that area but also under the door. So I have purchased door sweeps to help block insects, leaves, and other material. I am considering putting a sweep on the inside and outside of the door for an added degree of protection. The electronics on the inside of my plant is in generally good condition. I really want to make every effort to keep it as pristine as possible.



Trapped!

Finally, a few days ago we had a very tense and embarrassing situation happen in the WMUZ talk studio. Two of our air hosts were locked into the studio at 3 AM due to a door lock bolt failure. The door knob on the inside and out side of the door were not controlling the bolt. This door does not have a lock. Since the safety and well being of our staff is most important, I told our show talent and board operator Val Church to do whatever was necessary to get our staff out of the studio as fast as possible. The wood around the lock bolt was cracked and a screwdriver was passed through an opening so that the hinge pins could be removed to allow them to vacate the room.

This very same thing happened to me months ago at the WRDT(AM) Monroe facility. I was very lucky that my predecessor left me a screwdriver inside the building so that I could remove the hinge pins from inside the room. That day, I had no cellphone or tools on my person. Therefore, I believe the lessons learned here are to keep your cellphone on your person at all times and place some basic tools in the studios, control rooms and other buildings so that you can get yourself out of a room if you're trapped. My new motto is "be prepared!"

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.

News From The South

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

We'll just call this one the "Stephen Can Be Oblivious Edition." Nothing really major happened the past month, and we're working on a dozen or so modest projects, some of which I'll cover next time. In this edition, I'll take a break and share further evidence that my mind isn't what it used to be.

To set the tone, I left my Blackberry on the bedside table this morning. That should let you know what kind of October it has been.

Opinion: Some Thoughts on EAS

Back in the early 1980s, in addition to doing contract engineering for several radio stations, I had a "day job" – I managed some technicians at a big electronics service center in Fayetteville, NC. One evening near the end of March, I was a little late leaving work and noted that the sky was really turning dark and ugly. I decided to head straight home, even though I had been craving some good NC barbeque for dinner.

This is one of those things you'll never forget, though I had no idea what it was at the time: as I was driving along a back road, the wind began picking up. Heavy rain began to fall. Visibility dropped to near zero. Hail started peppering the windshield, so I hit the brakes and pulled off the road.

While I was waiting on the shoulder, the wind suddenly turned ferocious. I started praying. My little Chevette rocked and bucked like a wild horse. First, it lurched to the right; I was afraid it would slide into the ditch off the shoulder. Then the wind blew straight across the hood. The hailstones were striking the windshield so hard, it was deafening. I thought it was going to break, but thank God, it held. After several tense moments, my little car started rocking toward the left and I was afraid I'd be pitched back into the road. I couldn't see, so I had no idea if anyone was driving on the road behind me. I didn't want to be rear-ended.

I continued to pray, scared out of my wits while I waited it out. Finally, after what seemed like forever (though it was only a few minutes at most), the horrible winds began to subside and I saw my chance. I eased back onto the road, thanked God (once again!) for protecting me, then drove home as fast as I could. Barbeque could wait.

That had wrung me out. I had been so tense that I was physically exhausted, so I inhaled a sandwich and went straight to bed. For a good part of that evening, wind gusts and other spooky noises kept

waking me. Finally, the storms subsided and I managed to get a little sleep, but got up early. I decided just to get a shower and head on into work.

As I drove toward the service center, I could see that we had suffered from a severe storm. There were trees down all over the place and some areas were obviously without power. When I arrived at work, I said offhandedly to an old-timer technician, "Boy, that was some weather last night, huh?"

He looked at me like I was a specter from another realm. "Man, a hundred people died last night! Didn't you know?"

Actually, I didn't. I hadn't turned on the news because I had gone straight to bed. Further (this is important – hold this thought), the radio station that I had listened to on the way home had never let me know that there might have been a problem. Drive time had ended and they'd apparently switched to automated programming. I'd never had any idea that I was driving into a tornado!

Now, I pause here to insert a "personal responsibility" disclaimer: as soon as I saw that angry sky, I probably should have headed back into the workplace and checked the weather. But hey, I was listening to the radio, right? Surely they'd warn me if something was really wrong, wouldn't they?

This would eventually be known as the Carolinas Tornado Outbreak of March 28, 1984. My



tech friend had exaggerated a little, but to be fair, at the time, the death toll wasn't certain. Eventually we would know that 57 people had died in those storms and that over 1,200 had been injured. It was worse than we'd experienced in recent hurricanes, probably because so many people had been caught unawares. Many people had been killed while sitting at their dinner tables, or while watching TV in the living room.

Over the following months, I had a chance to see the damage firsthand as I drove around, heading to various stations to do a little work. Bennettsville, SC, had been devastated, as had Red Springs, NC. In all, there had been over two dozen tornadoes, including several F4s.

Speaking as someone who lived through it, this event represented another massive failure of the Emergency Broadcast System, as it was known at the time, and of radio in general. In rural areas, people often listen to radio or view TV stations many, many miles away. What if the management of that station decides that they're not concerned with severe weather in a city that's 50 miles away? Even if the listener is tuned to a local station, it is as likely as not to be automated or airing a satellite-delivered format, especially after hours. The station may be completely unattended. Many local stations sign off entirely in the evenings.

Nowadays, it's arguably even worse because many people get their news and entertainment from satellite radio, the Internet and even from recorded Podcasts. I've often wondered: what will they do if another Great Outbreak strikes their area? How will they be warned?

For ourselves, we should remember that EAS isn't simply something that we do to avoid a fine. We're performing an important public service. All of our stations here in Birmingham are set to automatically interrupt normal programming on any EAS activation. (This includes our streams, by the way; are yours wired to warn the public?) This is not required by the rules (only RWTs and EANs are required to be forwarded), so I'd be willing to bet you that there are plenty of stations out there, especially in smaller markets, that are not so equipped.

But we should go beyond EAS. As far as I'm concerned, the government has never gotten it right – and never will. Some of this is just my general Conservative belief that, at a mere touch, the government could turn gold into useless mud without even trying. In fact, the harder that Big Government tries, the more likely you are, in my opinion, to end up with goo. Government will always make it ridiculously and needlessly complicated and

inflexible; it's the nature of the beast.

It remains to be seen whether the New EAS™ (and capitalized out of reverence) will actually perform better than the old one. Frankly, I doubt it. But the truth is, the EBS/EAS system(s) were originally developed to allow the President to address the nation in the event of a national crisis. We have expanded it to include local and regional emergencies, but at the end of the day, there is no rule (or Rule) that says that we can't warn people ourselves.

If we know that a natural disaster is approaching our listeners, regardless of where they might actually be, we should warn them. We might literally be saving lives.

A Little Vacation

Sandy and I took a few days off in October to visit one of our favorite places, the mountains of eastern Tennessee and western North Carolina. We never got a chance to make it into NC, but it was absolutely beautiful in the Sevierville, TN area. The trees had turned color, the skies were blue and sunny and we thoroughly enjoyed ourselves.

But if you need further proof that I can sometimes be oblivious to the world around me (I just found out about that Titanic mishap a few years ago), consider this: I had a surprisingly difficult time booking a room in the Knoxville, TN area. For some reason, the rates were much higher and many of the motels and hotels were full. I finally just relented and stayed at one of our favorites, the Holiday Inn Express in Kodak, TN, even though we had to pay about 50% more than we usually did.

While I was up there, I noted a bunch of cars driving around with Alabama flags fluttering from the side windows. At breakfast that Saturday morning, the dining area at the Holiday Inn was a sea of crimson. Acting on a hunch, I checked online and sure enough, I had managed to schedule our little trip for the same day on which Alabama would be playing at the University of Tennessee! Duh.

Being from NC, my sport (such as it is) would be ACC Basketball. "March Madness" is my happy time in collegiate athletics; I follow that from the first tip to the final basket. I've never been able to get worked up about college football, though, which strikes many of our friends here as... odd.

One of the first things an Alabaman will usually ask, once they get to know you, is, "Who do you pull for?" The first time this happened to me, I asked if they thought I was a mule or a tow truck. After a moment of complete bafflement, they clarified: "Alabama or Auburn? Who do you pull

for?" When I responded, "neither," they were truly nonplussed.

But as you can imagine (and as I've written here in the past), football is a religion here. Auburn is currently undefeated and Alabama has only lost one game, so it's entirely possible that the annual Auburn-Alabama game – affectionately referred to as the "Iron Bowl" here – will help determine who plays in the BCS title game in January.

At any normal time, Alabama shuts down during Iron Bowl week. Literally. The legislature will usually pass a resolution giving state employees that Friday off and many businesses will actually close. I tremble with anticipation at what this year will be like, given the stakes.

Maybe one day I'll understand how people can get so worked up over a ballgame. After all, my Duke Blue Devils did win the NCAA basketball tournament last time, which made me happy. But I still don't even own a Duke t-shirt.

Odds And Ends

That's about it for this time. If I were to give a play-by-play of the past month, there would be a lot of wire stripping, labeling and punching, interspersed with the usual storms. Back on the subject of tornadoes, Alabama actually has *two* tornado seasons:

one in Spring and another in Fall. We're currently in that latter one... and in fact, as I write this, we had a tornado cut a swath through the woods a few miles south of our home on Tuesday night.

Todd is currently working on transferring all of our data from one set of NexGen file servers to a new set. This is complicated by the fact that (as far as I know, anyway) we're the only station cluster in the company that still uses Novell Netware. When we call RCS for support now, they have to hunt down the few people who are Novell-literate to help us. I'll let you know how it went next time.

I leave you with this thought. 2 Chronicles 7:14 is a verse that's quite well-known among conservative Christians: "If my people, who are called by my name, will humble themselves and pray and seek my face and turn from their wicked ways, then will I hear from heaven and will forgive their sin and will heal their land." (NIV)

That's never been more important to us as a nation. Stop worrying about what's happening and pray. God is the only one who can save this nation, let's ask Him to do it (because He'll do it right!).

But remember, too, your responsibility as an American citizen to vote. I can't recall when a more important election has occurred in my lifetime. Remember to VOTE!

Catalina Tales

By

Bill Agresta

Chief Engineer, KBRT

Greetings from Santa Catalina Island! This was a great month as I was able to do some work at our new mainland transmitter site in Black Star Canyon. With the help of a crew of some very able and talented people – something very hard to find on the island – we ran conductivity measurements on one radial. The work here was not so much in running the radial but in constructing a temporary antenna, antenna tuning unit, transmitter and providing the needed power to run the system and then to keep it operational during the high winds that frequent this undeveloped site.

The antenna structure was constructed of a top-loaded Rohn 1¼-inch mast sitting on a ceramic

power-pole insulator and guyed with nylon rope. It was certainly a trick to get this structure vertical without buckling it and was even more fun to keep it there overnight as high, gusty winds began to blow. I slept at the site... well, I *stayed* there overnight but really did not sleep much. Most of the night was spent watching and adjusting the guys and praying that those big angels God sent to protect us up there would also hold that temporary antenna structure up in the air in one piece. I stayed in a 5'x7' cargo trailer that night with several halogen lights aimed up the antenna structure and guys so I could easily watch how it behaved in the wind.

Now remember, all this was done to



measure just one simple 270-degree radial as we already had measurements from the AM station that previously operated at the site. I will let Cris fill you in on the details of walking the radial and the resulting measurements, and I am sure that Amanda will have lots to write about regarding this as well. I had a great time working with them both. It's nice to see a father and daughter working together. Cris, you are truly blessed.



"Black Star Bill" solders ground radials to the ring at the antenna base.

Joel Saxburg and Burt Wiener constructed a very nice ATU and measured the far end of the radial while Cris, Amanda and Todd Stickler (KBRT Operations Manager) did the walk-in measurements

in the Cleveland National Forest.

We enjoyed working with a very talented crew consisting of "Bill The Phone Man" (who spent the night at the site with me), Kyle Warner (long time friend and audio engineer), Johnny Soliz (my brother-in-law) and Mike Agresta (my dad) to construct and raise the antenna structure. Also a very special thanks to Tom Bazer for renting and delivering the generator to us then sticking around to give us a hand and to our Black Star neighbor Larry Boothe for being such a good neighbor and offering so much help – we couldn't have done it without you.

After watching quite a bit of traffic drive past our site late that night as I was in tower watch mode, Larry and I decided to spend the night at the site the following Friday, just before Halloween, to evaluate our security issues and again, he was a major help and a great neighbor and friend to us. Thank you for your friendship Larry!

Though it was a cold and windy night up at our new site the night we stayed after erecting the antenna structure, I enjoyed the awesome view and hope to be able to move our transmitter operations to this site very soon and with little issue.

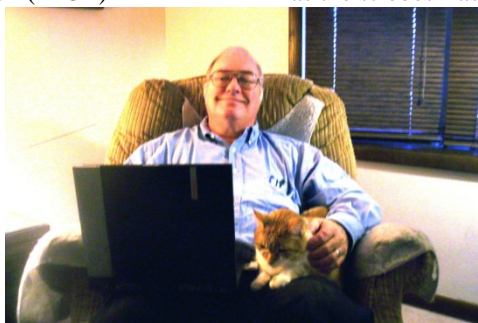
Until next month, the Lord bless you and keep you; the Lord make his face shine upon you and be gracious to you; the Lord turn his face toward you and give you peace.

The Chicago Chronicles

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

Project Sheherazade

Our question for last month: We recently got a call from the Director of Communications for the Illinois Department of Transportation (IDOT) informing us that the new cameras on his tower, located near our Lansing facility, was looking at our tower, and he noticed that our daytime strobe lights were not flashing all the time. He said that they were working only intermittently. Mack and I checked them and found them to be working just fine. Now, what was going on here. Why the discrepancy between what the IDOT DOC saw, and what we saw?



Answer: Analog video system, vertical interval. Many of the flashes were occurring because the cameras were blanking out for vertical reset just as the strobes flashed. But, you say, the flashes go on long enough to be seen all the way through the vertical interval. Oh, no they don't. Your eyes see the flashes, but actually for much longer than the actual flash. It's called visual persistence, and it enables you eye to see 24 pictures happening in front of you each second without it appearing jerky. It's called a film.

Now, this month's question: Is this next sentence true or false? "There is nothing in the FCC

Rules regarding the amount of limiting and compression of signals to maintain modulation levels.” Go ahead. Figure out an answer.

IP Remote Issues

This month’s column has gone through a couple of re-writes, only because the situation is so fluid that the information changed that much across the two months I was working on it.

After almost two years of success in originating our remote broadcasts through the Zephyr IP (“ZIP”) system, we suddenly began experiencing some problems with making and keeping connections through our Sprint 3G wireless device. In fact, one of our biggest remotes of the year, the Chicago “Bud Billikin” parade, was overshadowed by connectivity problems throughout the broadcast, which didn’t show in the original connection check just two days before.

The reason is simple. The original line check is done in an environment which is invariably “clean” because of the lack of 3G activity in the area at the time. Fast forward to race day, with the place just crawling with little teeny-boppers and others, all of them texting and yakking and chewing up valuable bandwidth on the local 3G site and the result is inevitable. This situation isn’t just an issue with us here in Chicago – Telos has found the issue to be so generally pandemic that they don’t recommend the use of 3G wireless connectivity with the Zephyr IP at all. So there.

For some time we’ve been trying to get first Telos, then another member of the Crawford Broadcasting Engineering staff, to write a driver for another 3G or 4G interface box, so that it could be used with the Zephyr IP. This is an issue because the operating system of choice in the Zephyr (and in most microprocessor-managed equipment made for broadcast use) is Linux, not Windows. Most wireless-phone-company-supplied over-the-air interfaces come with drivers for Windows or Mac applications, not for Linux. Only the Sprint 3G interface device has a Linux driver available, and that’s because the driver is designed and installed into that device by Telos. It’s a frustrating issue for those of us who find wireless IP operation so very preferable to wired IP, what with its issues of client resistance to the ‘invasion’ of *their* computer network, firewall hassles, so forth.

I had originally written here that two recent developments had almost simultaneously occurred which had given promise that this impasse may have been broken. It came in the form of a new USB thumb drive Wi-Fi module. The problem is that each

succeeding module came from the supplier with an upgraded chip set (or so we’re told), and the Linux driver, so carefully crafted for the module in the previous shipment, wouldn’t work! Alvin Toffler (remember *Future Shock*?) must be just giggling his head off over his predictions again coming true. It’s to the point now where one simply can’t keep up with the changes and improvements being made in the name of ‘state of the art’! The situation is enough to drive the R&D folks at Telos crackers, and I don’t blame them. I suspect that all the other manufacturers are running into the same situation as well, though I haven’t asked.

One way or the other, I don’t doubt that their R&D department will ultimately solve this problem, if only by changing vendors. Once they do, the situation should be a much saner one, and the *second* reason for optimism is why. There is now a new device becoming available which will allow the use of 3G *and* 4G service going into the Zephyr IP, through a Wi-Fi interface.

I don’t know if this device is yet available nationwide, but here in Chicago there is a company called Clear, which is, to the best of my knowledge, a collaboration with Sprint, and maybe others, for all I know. Motorola makes some of their devices. Clear provides the actual 4G service, and hands off to Sprint for their 3G coverage in case the 4G is dead or missing in action. My assistant James Kelly has one of their devices, called the Clear-Spot 4G+ Personal Hot Spot. It’s a box about three inches square and maybe half an inch thick. It costs about \$50 per month to lease. I’ve personally witnessed this box in action, and it works very well. A recent trip from Hammond to our Rockford facility was a real eye-opener. Here was James, with the company laptop, sitting in the passenger seat of my mini, using the laptop Wi-Fi and the 3G or 4G connection box, while riding along at maybe 70 MPH on the Reagan Toll Road, accessing the station gateway to get into the NexGen automation system to adjust something at the request of someone in programming, then into Kirkland’s transmitter site audio processor to tweak the station sound while he’s able to listen to it on the mini’s HD radio. No wonder he doesn’t like to drive on these trips. Absolute nirvana.

The implication is evident. These new devices, when they are all finally available, will give the remote broadcast engineer the ability to utilize most of the means by which traffic moves through the Internet, picking the one which provides the best mode of operation at the time, even allowing for mode switching, if need be. Nirvana, squared.

There will be more to this story as events

unfold. Stay tuned.

4CX20000 Tube Situation

A week or so before this issue went to press, we ran into a situation regarding the 4CX20000A tube in FM service. Seems that more than the usual number of them have been failing when being sent back for rebuild. Stephen Poole told me about it. The original word I got was that the ceramic ring between the external anode and screen connections was failing. A call to our tube rebuilder, Freeland Products, confirmed that that's what they were experiencing, but the reason was equally interesting. The folks at Freeland tell me that, with the cost of a brand new '20000A hitting \$5,500 these days, many more stations are opting to turn their duds in for rebuild/replacement. Over and over again. As that happens, the lip at the bottom of the anode, which connects it with the ceramic ring, gets a little more worn away with each rebuild until there just isn't enough left of it to form a good seal. The dud is then dead.

I also talked with the folks at Econco about this. They, too, are seeing the phenomenon, except that when they encounter it, they merely braise a new anode seal lip ring to the bottom of the anode and call it a day. (By the way, for those of you who get your tubes rebuilt by sending them to Richardson Electronics, RE just sends them out to Econco as well, which is fair since both are owned by CPI, which also owns Eimac). Now, Econco has some but not robust stock in 4CX20000A rebuilt tubes, but they are still not plentiful.

Whether your dud will work when you send it back is determined, at least in part, on how many rebuilds it has undergone. At least in the case of the 4CX20000A, the experience indicates that the tube is being rebuilt more than the normal number of times, so that seems to be its most-likely failure mode. Having that particular tube rebuilt by Richardson may be an advantage if you're willing to pay about 20% more to have it done. It still beats the cost of a new tube by a large margin. However, it is not inconceivable that Freeland might still be able to resurrect one dud of many rebuilds, *if* it can get those anode lip rings from CPI. Which shouldn't really be a problem, right, fellows?

More inside info on tube rebuilds: Anyone use a 4CX3000A tube? Rebuilding those may be a pain due to what can only be considered to be a design flaw (at least out here in user-land). Seems that the construction of the filament in that tube is rather planar, and also is not thoriated tungsten but rather, an oxide. The result is that, as the tube ages,

the tube filament material migrates over to the inside of the insulating ring around the filament area, which becomes in time an unwanted part of the RF circuit. That in turn causes excessive heating of the ceramic ring closest to the filament, and eventually total failure of the ceramic. That's why more than the usual number of those tubes can't be rebuilt.

As broadcasters and manufacturers of broadcast transmitters continue migrating away from tube technology and more toward solid state, the question arises as to whether such entities as tube rebuilders can survive. Well, let not your heart be troubled. Broadcasters comprise less and less of the tube market, but the tube makers have long since discovered that the demand for tubes will continue to be strong in the industrial, non-radio/TV-RF market for a long time. Tubes for industrial use are not the same as those for broadcasters, for tubes for broadcasters may die out, but CPI, EEV, Svetlana (if you dare) and other tube manufacturers will have a ready market for industrial tube types, and with them, the rebuilders as well. So weep not for them. They'll be fine. Just thought you should know.

HD Radios: Room for Improvement

Even geeks have 'Duh!' moments. (Why didn't I think of that?)

I had one of those recently regarding HD Radio receivers. I really should have known about this, and it was Jeff Welton of Nautel who showed me the light, during a talk at the recent Indiana Broadcasters Association Engineering Workshop held in Indianapolis.

As many of you know, I have a JVC HD radio in my car which was a gift from my late wife on the occasion of our last anniversary together. Yes, I'm loath to get rid of it, how'd you know? However, after almost three years of faithful service in my Ford Windstar, I sold it, and bought a pre-owned 2007 Ford Freestar. The Windstar had 314,002 miles on it, but I take more than my share of trips out of town; the fellow I sold it to really needed a car (and loves the Windstar because it runs so well) and he only drives it locally. As part of the transition, I of course took the HD radio out and re-installed the original factory radio. Then, because I had to get a new mount and cable kit for the HD, I stayed with the Ford factory radio for a couple of weeks.

That's when I got my teachable moment. In general, the modern factory-installed automobile radio is indeed the gold standard of the receivers, period. The sensitivity of this box is incredible, putting the HD aftermarket to shame. I took two trips to Northern Michigan recently, and I couldn't believe

how far I could hear the big Chicago stations, day and night. All but one of the big 50 kW stations could be heard as far as Menominee, Michigan, some 300 miles to the north, day and night. And that one 50 kW, on 1160 kHz, couldn't be heard up north in the daytime because its directional pattern, which has been on-line since the late forties, nulls that way, although the two first adjacent stations it had protected are both long gone, one having moved a couple of channels south and gone to 50 kW itself and the second one is now dark. At night, *all* the Chicago stations, save the little class Cs, could be heard well past Milwaukee. That includes the 5 kW blow torches on 560, 950 and 1390 kHz. The radio's performance on FM is of roughly the same caliber. The HD radio would never do nearly as well. It still doesn't.

But I haven't mentioned why the teachable moment. HD radios are *computers*. Analog signals coming into their front ends first get digitized, then the bit stream is processed to create the HD sound that you hear. That's why, when you listen to the same station on both an analog and an HD radio simultaneously, the HD radio's sound is delayed about 75 milliseconds. The thing is, all computers, to a greater or lesser degree, generate *noise*, digital noise which, at the present state of the art, interferes with the radio's ability to do its job: receive. That's where the 'duh' factor comes in. It's not that I'd forgotten. It's that I had incorrectly assumed that the designers of my radio, and aftermarket radios in general, had considered and had designed their products to account for that, to separate the analog inputs from the bit makers sufficiently to suppress digital interference, and thus give the radios a fighting chance to exhibit decent sensitivity. How naive can I get?

It will be most interesting to find out if the automobile manufacturers (read that, "Ford," starting with their 2011 models, out now; GM and Chrysler, being government-owned, are being grotesquely Neanderthal on this issue, choosing to concentrate on equally Neanderthal 'satellite' audio) can deliver the kind of performance in their HD receivers as they have with their past analog offerings. I'll bet they can. After all, the isolation of the computer noise from the radio's front end should not really be rocket science. I learned the value and methods of such isolation as a young Ham Radio operator almost 50 years ago. As to Ford's reputation for never being

able to properly suppress the ignition noise in their engines, I'm happy to report that my Freestar seems to have conquered that little problem in the 2007 model, at least. I can detect very little of that problem anymore. My older Windstar did have the issue. For the sake of radio, I'm quite gratified that this problem, at least, is much less of an issue.

Now, if we can just get improved performance out of HD car radios, maybe we can move on and help make radio viable. But don't we still need some help on that front from the promotions and programming folks?

Marketing Genius on the Loose

I attended the Indiana Broadcasters Association Engineering Workshop in Indianapolis recently and had a very good and edifying experience there. Gwen Piening does such a marvelous job of putting this event together every year, and more folks who do broadcasters engineering in the Hoosier State should take advantage of the opportunity which is provided to keep up with the state of the art. The exam and the workshop took place at the Marriott North Hotel near the Keystone exit of I-865, as has happened for years.

However, I discovered one thing while there which I have to pass along. The first day (accompanying James Kelly to take his CBNT exam), I took my laptop and attempted to connect to the Internet to check my email. The connection didn't happen because I had to register in the house Wi-Fi system. Okay, so I got into the connection registration page and had a look.

The hotel wanted \$750 for a Wi-Fi connection. For twelve hours. That's right. \$750 for twelve hours. Note the decimal point is *not* missing. Who were they trying to kid? Sounds like a marketing genius to me – you, too?

I hot-footed it over to the IBA folks and told them the situation. They were as appalled as I was. Later, one of the hotel concierges came to me and handed me an authorization code for the Wi-Fi system. It didn't work. It's what I get for not paying their \$750.

The next day when I showed up, Gwen told me that the IBA had paid the Wi-Fi connection fee and I could use my laptop. I'd left it at home in disgust. You know why. Grrr.

That should do it for this month. Until next month, blessings!

The Portland Report

By
John White, CBRE
Chief Engineer, CBC–Portland

A wise guy once said if you want to know what Oregon weather will be tomorrow, look at a forecast and pick something different. If you don't like the weather you get then just wait ten minutes – it will be different. Both points of view are a natural cynical view of any perceived ability to predict random events. Nevertheless, meteorologists persist while improving their 24-hour forecasting ability.

So what if someone told you they could predict the coming winter months in advance? I can see the reaction now. Hooo, heee, haaa, read the prediction and pick anything else! Yet again this year the "What Will the Winter be Like" weather forecast meeting was held to do just that. I can see the snickering now, and yet these projections have been remarkably accurate over the years.

About now you may be wondering why the subject of weather forecasting matters. For me, that answer is simple. KKPZ access is dependent upon winter weather. So yes, planning ahead matters.

I found one comment in the media coverage of the meeting amusing. As reported in the Portland Tribune, "The presentations began with a humorous notice that some controversial topics were off limits. They included global warming, UFOs and government conspiracy theories, including the idea that unknown chemicals have been spread through the atmosphere by airplane contrails."

Now that seems like a really comprehensive list. Except wait, there is one lunatic idea that seems to be missing from the list. I recall that when I was growing up, there were two common explanations for any random kooky, fringe, or silly idea. Of course almost anything can be blamed on the full moon, which brings out the crazy ideas. The phases of the moon was second only to blaming strange things upon sunspots. Anything strange, fill in the blank, could be blamed on sunspots.

This year at the 18th annual "What Will the Winter be Like" conference, a great deal of attention focused on a moderate to strong La Niña cycle under

way. That cycle, coupled with the current Pacific decadal oscillation, cold phase both suggest cold and wet northwest weather. "Wet, wild and windy weather is in store for the coming winter," predicted George Taylor, retired Oregon State Climatologist.

Back when I was in the 6th grade I discovered the public library. I soon devoured the "children's" section then ventured up stairs to the "adult" section. There I wandered the stacks, stumbling upon a strange and wondrous book called the

Radio Amateurs Handbook. Therein I discovered that ordinary people could build their own radios. Not only that, they could build radios that talked all around the world. And even better, the government let them do it. I checked out that book and every other book in that section. I learned how tubes work, about resistors, condensers and coils. That was like a whole new horizon opening up.

I learned about sun spots and that sun spots did cause things to happen on earth. How particles from sun spots caused the northern lights and helped long distance radio communication. Sun spots were real and really did cause things to happen.

It turns out that early experience is relevant today. This last September's *Science* magazine published an article by Phil Berardelli: "Say Goodbye to Sunspots?" The opening paragraph of that article reads: "Scientists studying sunspots for the past two decades have concluded that the magnetic field that triggers their formation has been steadily declining. If the current trend continues, by 2016 the sun's face may become spotless and remain that way for decades — a phenomenon that in the 17th century coincided with a prolonged period of cooling on Earth."

The article goes on to describe work done by solar astronomers Matthew Penn and William Livingston of the National Solar Observatory in Tucson, Arizona. They have been studying the magnetic strength of sunspots using a measurement called Zeeman splitting. After examining the Zeeman



splitting of 1,500 sunspots, Penn and Livingston conclude that the average magnetic field strength of sunspots has declined from about 2700 gauss — the average strength of Earth's field is less than 1 gauss — to about 2,000 gauss. The reasons for the decrease are not clearly understood, but if the trend continues, sunspot field strength will drop to 1,500 gauss by as early as 2016. Because 1,500 gauss is the minimum required to produce sunspots, Livingston says, at that level they would no longer be possible.

The Penn and Livingston study coupled with the approximately 200-year known solar cycle suggest the Penn and Livingston speculation may be quite real.

Imagine no sunspots for a while. The more we learn about God's world, the less we seem to know. For me, I take the lesson that forewarned is forearmed. I am checking all UPS batteries before the coming winter.

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

People say that as you get older, time seems to go by faster and faster. I'm almost 25, but let me tell you, I have no idea where October went! Maybe this is telling me that in the future I won't know what happened to the year because it will be warp speed in my mind.

I spent last month getting the little things, the "last 5%," done around the studio. We have had a list going since we moved in. The things to get done first were the basics, make sure everything works and we were on the air. Mic booms got lost or put in a different studio in the confusion of the move. So, one studio that had mic booms before had none after — only desk stands instead. Clients did not like this, nor did the board ops as the clients were used to sitting up straight while doing their shows. Now they had to lean forward to get their voices into the microphones. Even then, the levels were not great.

After a month of waiting on the new mic booms and risers to arrive, I was able to pre-wire them and then get into the talk studios and install them. Art Reis was a big help in this process. During the move, he informed us that if we would wire the mic booms with AES cable, the cable would last longer. You see, clients, board ops, anyone who uses the microphones will twist them on the stand. This wraps the wire around and eventually causes

wires to become exposed and makes for a tough fix. The AES cable and its jacket is thicker and much harder to destroy. So KLVZ and KLDC now have purple wires for their microphones.

At long last we have been able to get the second half of the KLVZ microwave link up and running. This happened in fits and starts and not as one contiguous project due to contractor scheduling. We ended up postponing our California trip once, which opened up a week for us but our contractor filled

his schedule the second we told them we'd be out of town. This was the final thing we needed to get done before saying we are finally finished with our move.

One project we would like to get finished in November is getting "Dr. Asa Live" on 100% live. Currently we have to use the FTP site to get the show on. We have not had the room on the KLZ Intraplex to bring the show back live every day. With the new microwave links in place, we were able to salvage a PT/PR250 codec pair from KLTT's Intraplex. With this, we will be able to add another channel at KLZ to bring the show back live. Dr. Asa has wanted us to do something like this for a while now, and it will be nice to finally have that done. There is nothing better than a live show that can actually take callers from our station.



I have been able to hook up the audio effects processors in the three production rooms. They were not hooked up when we first moved because the goal was to get the studios up and running and I simply didn't have time. Thankfully, running the wires and getting it all set up normally only took a half hour. I will admit, we did have some fun testing the sound



KLVS clients and guests love the talk studio with new mic booms and risers.

effects once we finished. I am beginning to like these sound effects processors. A local station in Denver uses one for their morning show and I must say, it is entertaining the stuff they do with it.

I was finally able to have a good vacation time. Our normal August vacation was tainted with worry since it came so soon after the move. We decided to take my mom back to Lake City, a tiny mining town high in the San Juan Mountains of southwest Colorado, for her birthday. We wanted to see the color at a place we have only seen in the



Fall colors in Lake City, Colorado

summer. I must say, a lot had changed in the two months since we'd been there. The rivers were significantly lower, it was colder, and the aspens at the higher altitudes were already leafless. The town itself was beautiful, though. It was very quiet as the tourists were all gone and most of the stores had closed along with many of the restaurants. All in all, it ended up being a short but very relaxing vacation, one that was much needed!

We had to hire a company to go out to the KLTT site and exterminate prairie dogs. The prairie dog population had gotten out of hand with no way of controlling it with lead. They were digging up right under our building. The contractor that dealt with this left his equipment, including a 2005 Polaris ATV, behind our building. I received a phone call the morning of the 24th from the contractor who went out to check on the site and to check on his equipment. Upon arrival, he found that his ATV had been stolen. Sometime during the previous night, someone cut a section of our barbed-wire fence, threw his equipment off the trailer, pulled the ATV off and rolled it off our property. Thankfully where the cut was made, the horses do not go. When I first heard of the cut in the fence, my first thought was, "Oh no, the horses got out!" I was glad to hear where the cut was made. Thankfully the guy had full coverage on his ATV. Nothing that belonged to CBC, other than that small section of fence, was damaged.

I am hoping for a quiet November – a month I can focus on getting the transmitter sites back to looking A+ for the winter, a month to focus on staying caught up. I also hope to make it a month to finally get through the study guide for becoming a General Class licensed Amateur Radio operator. Rumor has it that Stephen Poole and his wife Sandy are studying for their Technician class licenses. It's about time, Stephen! For those of you who call yourselves radio engineers and still have no license for Amateur Radio, it is time you get some study material. You can get it at www.arrl.org, www.qrz.com and www.hamradio.com.

We had a good trip to California for the KBRT mainland test antenna project. It was my first business trip as well as my first time to California and my first time seeing the ocean. It was definitely a learning experience as we manufactured a 50-foot top-loaded antenna, tried hoisting it in to the air several times and failing and then finally figuring out an easier way.



The test antenna was anything but true and plumb in the high winds!

Then we spent quite a bit of time trying to get the antenna straight instead of in the “S” shape it was in. Then trying to do the walk-in measurements was “fun.” The terrain was unforgiving. The easiest areas to get the measurements ended up being very close to our antenna site. The further out we got, the worse the terrain. There were drop-offs that were hard to see at times and brush so thick there was just no way through. Thankfully we were able to get a sufficient number of close-in measurements done.

It took us a day to get all the measurements, then that night, we cleaned up, untied the tower and brought it down. This gave me a half day to spend with my dad. He took me to Newport Pier to see the

ocean which was pretty spectacular. From there I saw Catalina Island, the home of KBRT for now. I would like to go out to the island some time to see the transmitter site. I also had the opportunity to see



Unforgiving terrain and brush made close-in measurements a challenge. Todd Stickler, my dad and I hiked through this "stuff" as far as we could go.

the KBRT office and studio site. I really liked the setup of the place. While I would have liked to stay an extra day or two to do some more sightseeing, I am glad to be home. I very much enjoyed working with Bill Agresta, Todd Stickler and the many others who made this project possible. It took every person who came to get this thing going.

Until next time, that's all folks!

Digital Diary
by
Larry Foltran
Corporate Website & Information Technology Coordinator

Nothing is free...or is it?

It's extremely rare that a week passes when I don't search the Internet for one piece of free software or another. Although you can find just about every major commercial software title on the web available for free illegal download, open source developers have their competing versions readily available, free and completely legal. In many cases, the old adage, "you get what you pay for," is no longer applicable. I tend to install these free applications on quite a few personal computers for friends and family, often followed by them asking how the software developers can give away these applications for free. Well I hope those folks are reading, because I'm about to answer that question.

You may have heard the terms "Open Source" or even the acronym FOSS (Free, Open Source Software) in the past. Although Open Source is the most common, the terms tend to be used interchangeably in the tech community. These terms essentially give the user the legal right to freely use and modify the software's source code, hopefully resulting in a better piece of software for the entire community to enjoy. One happy community of users/developers making their free software better, sticking it to the large commercial developers, all while singing Kumbaya around their virtual campfire.

In some cases, open source developers work on the software during their free time as a type of hobby. Other developers provide the base tool for free, but make their income developing the applications in which that tool will be used in. In other words if you know how to utilize and implement a specific open source feature, you are free to do so. If you need help, you'll need to send them a check. There are other developers that charge for user support of their software and others who simply request donations in return for using their software.

There are also applications coined as freeware and others as free software. Although both terms may sound the same, in many cases they have very different meanings. Generally, freeware

software provides the user with unlimited use at no cost at all. Free software allows the user to download and install the software at no cost, but will only run

as a full-feature version for a set amount of time or requires the user to pay to convert to the full-feature version of the software. In some cases, the software can be free for personal use in a limited or unlimited edition, but not so for commercial use as in the case with AVG Free Anti-virus. AVG's EULA (End User License Agreement) states that

their free anti-virus software can only be used on non-commercial computers. The best bet is to always double check the EULA.

Some of the most commonly known, and probably most widely used, open-source software available are the Linux and Ubuntu operating systems. Although it can be argued that Ubuntu is based on the Linux platform and it and Linux are one in the same, my understanding is that it has morphed enough in recent years to be considered its own entity. Let's leave that argument for a different day. For those who are apprehensive about working with Linux, I would strongly suggest that you try loading Ubuntu and take it for a test drive. It truly is impressive and you may never look back, especially when you can keep the \$200 you would have spent on Windows 7.

So can these open source developers actually compete? You betcha! In a commercial software world ruled by names such as Microsoft and Adobe, their open source competitors can provide average users with all of the functionality they need without shelling out the big bucks. The first example is Open Office, a direct competitor to Microsoft Office and a platform that we use widely in this company. Open Office has been around for about ten years now and allows both commercial and non-commercial use of their suite. Considering that Microsoft Office Home and Business 2010 edition retails for \$279.99, Open Office is a great deal. I'll admit that there is a slight learning curve and users need to accept the fact that their documents will need to be saved in the .doc file format to ensure others



using MS Office can open them, but those are minor issues in my opinion.

What about software for those artistic users in the group? GIMP, an acronym for GNU Image Manipulation Program, is an option for those who don't want to spend \$187 for Adobe Photoshop CS5. GIMP definitely doesn't have the entire feature or tool set that users enjoy with Photoshop, but for the user who probably will never use some of the more advance features, it's a perfect alternative. Quite honestly, I've seen some extremely impressive work done with GIMP, so I'm sure Adobe is keeping their eye on this piece of software.

Are the major commercial developers truly concerned about these open source editions or are they simply laughing off these attempts? I think Microsoft showed a crack in the armor recently when it released a video featuring alleged user criticism from 15 customers who had switched from Open Office to MS Office. The 2.5 minute, well-produced video essentially features a series of quickly scrolling comments describing why they feel MS Office is better than Open Office. The justifications mentioned for switching range from their users being unfamiliar with the layout of Open Office to the lack of support available. Apparently these users have never used MS Office 2010 or have never tried calling Microsoft for support. One comment even went so far as to say that using Open Office for school work could affect your grades. After seeing this video, my opinion is

that Microsoft is beginning to feel the pinch from users moving to the open source alternative.

As I mentioned at the start of this article, I have used and currently use a number of freeware, free, and open source software titles. In some cases, I've ended up purchasing the software because I find it so useful or to use it beyond the limited trial period. In other cases, the software is completely freeware but I have donated some cash to support the developer's further development and enhancement of the application. Either way, there are extremely talented developers out there that have decided to go against the grain of normal thinking and have come up with some great software.

Am I the type of person who avoids purchasing Microsoft or Adobe products? Absolutely not. You'll find several of my computers running Windows and I use MS Office and Photoshop on a daily basis. What I most certainly do is always keep my eyes open for comparable for better software than what I'm using, regardless of the name on the box. If it works for me and I can save some money at the same time, I most certainly will try it. Whether or not the majority of computers users will make the jump to open source software is yet to be seen. But it does seem that enough users have made the move, causing the major commercial developers to check their six because the open source drive gaining momentum.

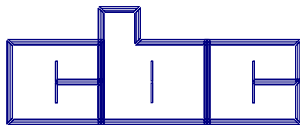
...until next month.

The Local Oscillator
November 2010

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
KLXZ □ 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-FM □ 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, 6 kW/65m 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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