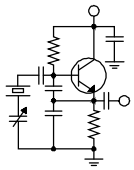
The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

JUNE 2015 • VOLUME 25 • ISSUE 6 • W.C. ALEXANDER, CPBE, AMD, DRB EDITOR

Projects

Spring and summer is always a time of projects in our technical operations, and this year that has especially been the case. We have major projects running in Detroit, Chicago, Birmingham and Costa Mesa with smaller projects underway at the same time throughout the company.

The big projects in the large markets this year are all Wheatstone AOIP conversions. We did the Denver market first so that I could get a real handle on how it works and what is required to implement it. The Denver system is humming right along without any significant issues and has been for months.

In Detroit, Brian Kerkan has had some challenges getting things to work right with the new system. The first issue was significant latency with the production surfaces. It didnôt take long to find one parameter in the Cisco gigabit managed switches that was responsible for that problem, something that I had missed in the setup/configuration instructions.

He found that several of the HP workstations that we are upgrading have motherboard issues, large electrolytic capacitors that are close to rupture (probably from heat). And for some reason some of the crosspoints keep un-making (even if locked). Weôre working with Wheatstone to track down and fix those issues, but we believe that itôs caused by the querier in the switch. To address this we have installed a Cisco 2960CG switch in one of the production rooms. It has a superior querier that can do the heavy lifting for the whole network.

The complement of Wheatstone gear and Dell workstations has arrived in Chicago and that is the next market that will be making the move to WheatNet-IP. We will get all the issues worked out in Detroit before we get too deep in the Chicago project. My experience is that a small problem that would be an irritation in other markets is a major stink-bomb in Chicago.

Birmingham is next on the list, and that will probably take place late summer. I had really hoped to get the whole of the WheatNet-IP project done by September, but as things so often happen, the urgencies of the day-to-day get in the way of the important. At this point I will be glad to wrap up by the end of the third quarter.

Amateur Radio

The engineers in this company are radio *professionals* of the highest order, but did you know that many of us are also Amateur Radio Operators (ñHamsò)? I was first licensed as an Amateur Radio Operator in 1974, and I remain active on the HF, VHF and UHF bands today.

We have a few holdouts, however, first-rate engineers who have never taken the time to get their Amateur licenses and join the rest of us on the HF and higher bands. A few months ago, Brian Cunningham told me he is working on getting his license, so weôre looking forward to hearing him on the air. Now weôve got to get Stephen Poole, Todd Dixon and a couple of the Chicago crew licensed.

Amateur Radio is great fun and a great place to talk with other engineers, try new things and learn. You can look for me on 7166 kHz ± on Saturday and Sunday mornings at 8:00 AM Mountain!

Streaming

Companywide, we are changing from Liquid Compass to Triton Digital as our streaming service provider. The observant among you may be thinking that Liquid Compass is part of Triton, so whatôs the big deal? That is an astute observation, but we are talking about two completely different platforms here. The old LC Radius Live platform and associated players will soon be gone, replaced with Tritonôs StationManager platform and ListenLive

player.

The bottom unit in this stack is the Denver streaming encoder, a Dell Precision R7910 encoding all four streams from WheatNet-IP.

We have already converted the four Denver streams. Conversion of the rest of the company is slated to start the first week in June, but I will hold that up if they donôt have the Denver issues worked out by then.

In the WheatNet-IP markets weôre doing something different, eliminating the sound cards and doing all the streams for each of those markets in a single PC. In Denver, Detroit and Birmingham we will use a Dell Precision R7910 workstation, which is a 2RU rack-mount PC with a quad NIC. This unit more than meets Tritonôs specs. We are installing WheatNet-IP four-channel drivers in these machines and mapping audio from the stations to them through the WheatNet-IP system. This allows us to take advantage of the Aura1ip audio processors in the blades so that we are delivering stream-optimized, processed audio to the encoders, all in the digital domain.

When we installed the first such unit in Denver, there was initially an irritating issue with quality, but we have that worked out now. The fix was to manually set the network adaptor port for WheatNet to 1000 full duplex. Once I did that and rebooted, the streams started sounding great.

Satellite Changes

Last month I noted that we made the change to the new XtremeSat system on our west coast satellite network. That is still working well. This month, we are looking at another change, this one in the sky. The old (1996) AMC-1 satellite is being replaced with the brand new SES-3 satellite in the same orbital slot. That operation is slated for the early hours of June 7.

The old AMC-1 had a 26-degree clockwise skew built in as part of an effort (an experiment, really) to mitigate rain fade that often occurs at Ku-band frequencies. The new SES-3 will not have that skew, so our uplink and all our downlinks will have to be rotated 26 degrees CCW.

The downlinks are all done, so now we must wait for the morning of June 7 for word that the transponders on the new bird have been activated. Todd Stickler will use an inclinometer to make the adjustment. Sometime soon thereafter we will check the cross-pol but the 26-degree rotation should get the network back up on the air.

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

Hello to all from Western New York!

It was ten years ago this month that Crawfordôs Buffalo and Rochester stations went on the air with HD Radio. We were the first in both markets, and others followed at a snails pace to get their programming on air in HD. Itôs remarkable, looking back, how little has changed, not only in the perception and

feasibility in HD Radio, but the audio quality and technical details have not greatly improved over the past 10 years.

Many of our market ñgiantsò do not give HD Radio a second thought. As long as there is audio, all is well in the HD world. Some stations have not adjusted their diversity delay in quite some time, and equalization of audio levels between the HD

Radio signal and MPS are off considerably. To the listener who is out driving, the blending between the analog and digital signals is enough to drive you insane. If you are not able to shut off either the HD or analog signal on your receiver, chances are you either turn your radio off or switch to another station without blending issues.

As the Internet comes more into play with stationsô audio chains, the proper diversity delay synchronization becomes a problem, as Ethernet timing also comes into play when setting the diversity delay. The Internet does not operate at any given speed, and data transfer speed depends on several factors, how much bandwidth you have allocated, amount of traffic on your network, and how youôre ISP handles excessive traffic on your connection. I generally check my diversity delay weekly, and find very little drifting as we still incorporate a 950 MHz STL link for audio distribution to the transmitter site. Any drift at all is generally caused by minute changes in the audio processor, and can be adjusted in a manner of seconds.

Good engineering practice require us to maintain our equipment to the best performance possible, and give our listeners the absolute best possible product we can provide. Looking after the ólittle thingsô can make a big difference in how our radio audience embraces our mission to be the best Christian Radio Station on the planet!

I spoke earlier about the problems merging the Internet with broadcasting. It amazes me at how much we rely on IP connectivity in getting our product out to the public. It seems that almost every piece of broadcast equipment nowadays have some type of network connectivity. By ñputting all of our eggs in one basket,ò what will we do when the Internet crashes? Do we have adequate backup in place to continue operations without TCP-IP connectivity?

In recent months, we here at WDCX-FM have increased considerably the amount of audio we deliver via AoIP. In doing so, we have noticed, at times that we are experiencing random dropouts, connection issues and artifacts appearing in the broadcast audio. To try and trace down the cause of the above conditions will lead you down the rabbit hole. Your first inclination is to contact your ISP. Certainly they are not providing the amount of bandwidth you pay for. A quick speed check verifies your intuition. Your download speed is down 20 percent, while your upload capabilities have been chopped in half. Are they throttling your connection?

For those of you who are not that Internet savvy, a quick explanation of Internet throttling: Throttling is when your ISP limits the rate at which it accepts data in order to avoid overloading its bandwidth capacity. The most common means of throttling an Internet connection is by employing DPI, which is Deep Packet Inspection. DPI is commonly found in routers, which collects statistics on flow sizes at line speed, then reduces the amount of bandwidth for traffic shaping. When your ISP determines you are using too much bandwidth, your connection speed is throttled down to extremely low speeds.

Another way ISPs control the amount of data you send and receive is by capping. There are two means by which your provider can ñcapò your Internet connection, first is a standard cap, which limits the bitrate or speed of data transfer on a broadband Internet connection, the second way is to lower your overall bandwidth cap so you cannot exceed a bandwidth set by your provider. In a nutshell, whether you pay for 10 MBPS or 100 MBPS, your provider can limit you at any time, and reduce your allocated speed/bandwidth at its discretion, leaving you to scratch your head and wonder, what happened?

Next month, Iôll cover the differences between cable and DSL connections. Which one is better?

Now, on to other mattersé

The new studio build in Rochester went very well last month. I installed a new Audioarts D-76 console in the WDCX (AM) production room, which replaced a failing Tascam DM-3200 console. The Tascam was a problem since day one. The biggest concern was teaching the on-air and production people how to properly use it. Aside from the learning curve, the operating system seemed to have a mind of its own and would delete or change settings at random. Even those settings saved to the SIM card would turn out to be corrupt when a saved setting was recalled. No-one cried when this beast was removed from service. In fact we generated some excellent ideas for what the old console could be used for after retirement. I think the winning idea was to strap in on the front of my Jeep and use it for a snowplow next winter. Now, that ought to clear the way to the transmitter in style!

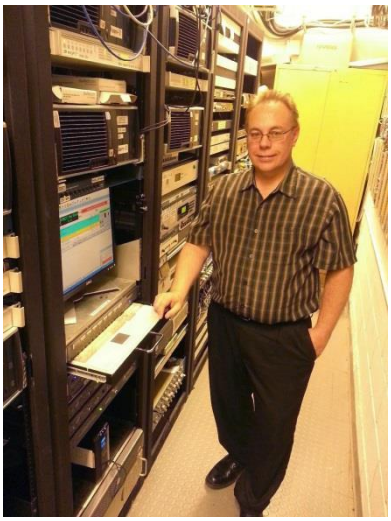
The fence repairs at the WDCX (AM) transmitter site have been temporally put on hold until the field dries up a little. I attempted to make the repairs the 3rd week of May, but the water around tower #1 was ankle deep. Not too bright to work with electrical tools while your feet are submerged in several inches of water!

With that said, we are thankful that spring has finally arrived in Western New York! This past winter has been the longest and snowiest winter that most can remember. Everyone is looking forward to summer-like temperatures, and with that comes the mowing season. I think this year we will have a weekend ñstaff partyò at one of the transmitter sites, and everyone can bring their lawn mower! Prizes awarded for the widest cut, quickest cut, and the most tricked out mower!

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

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

Spring is in full bloom here in Michigan, and there is a whole lot of Wheatstone going on in Detroit this month. My focus has been installing the four production rooms, and converting the automation systems. We installed the surfaces by cutting them into the studio furniture for a finished look.



Our production staff likes the flexibility of the control surfaces, and we have been working through integrating the PC blades on the automation machines. They like having the dynamics tools available on each input without having to use an external processor, and setting up the programmable buttons to automate functions instead of having to go through multiple menus.

Last month, Mike Erickson from Wheatstone stopped by to help install the Belar FMHD-1 with auto HD diversity correction. Our HD delay was already very close, but I was impressed with the ability of the AirAura to track and correct the diversity delay in real time when paired with the Belar FMHD-1. Both units are connected together on the network, and audio can be sent directly from a Wheatstone blade to the processor across the WheatNet network.

Once the units were setup and activated, we were able to watch the front panel, and observe the Wheatstone/Belar combination take the delay down to 0, then continue to correct within 1 sample.

The Belar monitor has an impressive front panel with a bright active matrix display showing HD signal quality, and HD PSD information.

Once the AirAura / Belar pair was in the air chain, it was great to hear consistency across many HD receivers when blending. The result is a much better listening experience.

The new AirAura processor code sounds nice and bold, but open. I was impressed with the improvement over prior releases. Mike and I spent some time in several cars setting the audio up with the remote software. The AirAura is a powerful box, and when set correctly makes the source material sound more natural due to its 31-band architecture.

One of the other areas that I have had to address lately is the HVAC systems. With it getting warmer outside issues with older systems will become apparent. Items such as contactors that havenôt been energized in several months, valves that have developed leaks from the extreme cold weather, sealed systems that are low on refrigerant, or talent that will turn the heat on during a hot day ☺ .

The bottom line is, it is a good idea to get units regularly serviced and maintained. We have 10 of them at the studio alone.

I recently had a fan fail in one of WMUZôs Nautel NV40 RF modules, and replaced it with a new model. The new fans run faster than the old ones. Our transmitter is serial number #3, so we are starting to see fan failures more often. I am going to plan on changing them as a proactive PM measure in the upcoming months.

The FCC is accepting preliminary comments on the proposal from REC networks to increase the power of LPFMs from 100 to 250 watts. I hope that this proposal does not end up paving the way for more interference. The FM band already has issues. Why should a hobby / community broadcast service be given additional coverage? The band should be protected to prevent additional interference. I am concerned about the potential second- and third-adjacent channel interference generated from all of

these new allocations.

I attended the Dayton Hamvention last month. Itôs always a great time, and I ran into a lot of broadcast engineers. Itôs amazing how many of us are Amateur Radio operators.

There is a lot of broadcast equipment there. I was able to pickup a Symetrix 528 voice processor on the ñEverything is $2ò table and look forward to using it with my Flexradio. The best part about it is that it works and only needs cleaning up a little. There are many groups on the ham bands running wideband, professional, broadcast-quality audio.

We will be working on putting in a new streaming server with Wheatstone IP blade connectivity next month. More and more of our devices no longer have a sound card.

I plan on finishing our VPN connections to the WRDT and WEXL transmitter sites in June. I will have a fully-redundant path through the IP connection. POTS service will be delivered via VOIP.

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

Looking back through my records and old *Local Oscillator* articles from this time of year, thereôs usually not much to write about. The constant rains that we get in April and May mean that we donôt do a great deal of tower work. Itôs a time for studio maintenance, inside work at transmitter buildings and other projects that have been on the back burner.

To briefly update a few things that have been mentioned previously, weôre still waiting on tower crews for WYDE AM and FM. 1260ôs Trango data link stopped working a few weeks after we repaired it; we need a crew to climb the tower to see whatôs wrong. 101.1 FM has been under a NOTAM for a while with a defective flash tube that needs to be replaced.

The good news is that 850 AM, WXJC, is much more stable now with the repaired antenna monitor. Iôll repeat what I said last time: I wonder how much fretting, adjusting and tweaking weôve done over the years because of a drifting antenna monitor?

Rebooting a *Tower*

I mentioned previously that weôve been having trouble with some of our Worldcast Horizon Nexgen units just hanging at random. We decided to try the TieLine Bridge-IT codecs. Six of them arrived in April and we installed them. In Figure 1, the middle unit is dark because of the aforementioned data link issue with 1260. But so far, so good.

The only fun that weôve had with 850ôs STL has been occasional hangs on the data link. If we power down the Dragonwave and the NanoBridge on tower #2, the link will reboot and come right back up. The long term solution will be to replace the NanoBridge(s) with newer units. Keith Bergstrom at 3db Networks said that theyôve had this problem with some of the older ones.

For now, some Certified Real EngineeringÊ will keep us on air: if the data link dies, the remote control is able to switch off the power to #2, then back on. This resets and reboots the data links. That doesnôt sound high tech enough, though, so I tell

Figure 1 - The TieLines in STL service.

everyone that weôre *rebooting the tower.* (Heh.)

[We've had this capability in Denver for a couple of years now. Occasionally a lightning strike on or near the KLTT tower that supports the Trango and NanoBridge will cause a lockup and a power-cycle reboot is required to fix it. We have a NC 30-amp two-pole contactor in series with the 240-volt feed to the tower. A command channel on the Burk ARCPlus causes this contactor to open for a few seconds, also "rebooting the tower." (Heh indeed.) – Ed.]

A New Phone System

WDJC has been living with an older Telos 1x6 for many years now. Some of the keys had stopped working, so we taped them up and moved lines around. We finally decided that it was time for an upgrade, so we budgeted for a new Telos system for WYDE; their existing system would be moved into WDJC.

The new Hx6 arrived, Todd installed it... and we had problems. To start with, Telos normally provides excellent documentation; this time it was... lacking. We had to scratch our heads for a bit before we finally figured out how to get the program on hold *and* the feed to the caller working.

Then the new, fancy call screening software didnôt work. We solved that problem by moving back to the older software that had been used with the 2x12. But finally, the bugs were worked out, it sounded great and we moved that old 2x12 into WDJC. More problems ensued.

WDJC has had the same request line, 741-WDJC, for many decades now. When WDJC moved from the old studio location at 19th Place to the other old studio location at Goodwin Crest, that number moved with it. When we moved all five stations from Goodwin Crest to our beautiful ñnewò facility at Summit Parkway, that number moved with us. That last move was in 2006, and that request line has worked fine for many, many years.

A couple of months ago, it just stopped working. Anyone who dialed it got the, ñWeôre sorry, this number is no longer in serviceé ò recording. We had to wrangle and finagle with ATT. Their records showed that it had never been moved (!! ï and yet, we had been using it for years here at the new studios!!). We finally got that resolved, but there was another problem: it kept dropping callers. ATT said there was nothing wrong with the line.

Now, note that I said weôd be moving WYDEôs older 2x12 into WDJC. We had done so. Naturally, we wondered: was the dropped line problem in the Telos, or was it ATT? Was it Windstream (our T1/PRI provider)? We finally resolved that problem by changing that historic request line to a new number, one ñownedò by Windstream. What a pain, and our show hosts definitely get free cake and ice cream for being so patient. It took *months* to get this straightened out!

Figure 3 - The new Telos Hx6 in WYDE FM's control room.

The Scary Mixer™

Before I let Todd close us out this month, Iôll share this with you. As you know, we routinely upgrade our production mixers. Itôs just a standard budget item: in service for so many years, time to plan for a replacement.

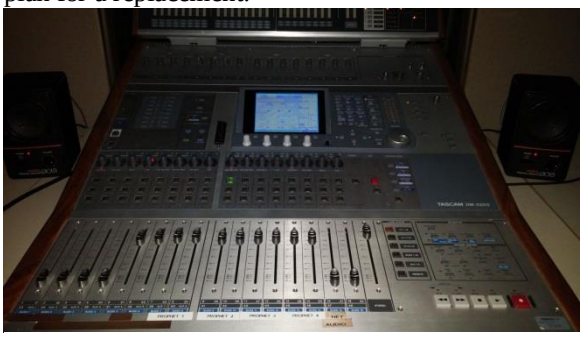


Figure 2 - This thing is POSSESSED!

Several years ago, we decided to try a Tascam DM-3200 automated digital mixer (see Figure 3). This is real, motor-driven automation, too: you can program the faders to ñlearnò a mixdown and theyôll move up and down on their own. You can take snapshots, build presets, all sorts of happy and fancy stuff.

This thing absolutely terrified our production staff. We moved it into the least used production room, where it still sits, mostly unused. Itôs just too much. It scares them. The first time one of our production people saw the faders moving on their own, he screamed and muttered about unclean spirits and stuff.

Itôs a good thing that weôre upgrading to Wheatstone Blades and control surfaces in the next month or two. We really do need to replace some of our older Mackies, but the new stuff will be easy to use and will *not* be scary.

Until next time, keep praying for this nation!

Low Priced Computers
Todd Dixon, CBRE

I havenôt added anything to the pages of *The Local Oscillator* in a while, but I thought I might share with all of you some information about some of the more interesting computers that have to come to market within the last couple of years. Most notably, the Raspberry Pi, the Beaglebone Black, and ñthe Chipò have come out with extremely low price, low power usage and very small form factor. So Iôll spend a couple of minutes telling you about them.

The Raspberry Pi was created in England a couple of years ago by the Raspberry Pi foundation in an effort bring a low cost computer to the market that would encourage children and adults to begin programming and to get computer-creative. Its credit card size and $35 price tag were appealing to old and young alike and they soon were having trouble keeping up with demand. They have kept their original price point and have steadily increased the power of each generation of computer. They use ARM processors and are powered by standard micro-USB ñwall-wartò type supplies (5V/~1A). They also have a number of additional I/O boards, cameras and interfaces to various other platforms, like Arduino. Previously, you had to run versions of Linux that supported ARM processors. The latest iteration has an ARM quad-core 900 MHz processor with 1 GB of RAM, and Windows 10 is going to support the ARM platform.

The Beaglebone Black is similar to the Pi but was born and bred in Richardson, Texas. With similar credit card size and power requirements, it runs at 1 GHz and has only 512 MB of RAM. At $49, it can operate with Ubuntu, Android and embedded Windows. The add-on boards for it are called ñcapes.ò The nice thing about the Beaglebone is that it is completely open source; the company provides a parts list and enterprising people can build them from scratch.

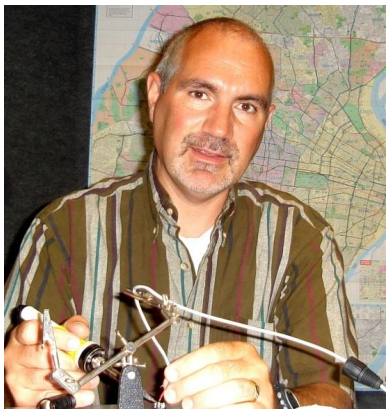
The ñChipò is a new project that is attempting to be crowd funded so I thought I would include it. They were originally trying to raise $50,000, but with eight days to go in the campaign (as of this writing), they have raised 1.7 million. Theyôre attempting to buy in high enough quantity that the price point for the computer will be $9. Yep, that is the right price. With a 1 GHz processor, 512 MB of RAM and 4 GB of storage on board, the ñChipò is no bigger than a standard size SD card!

I have 2 Raspberry Pi computers at home. The projects that are available are nearly endless. I have a network-connected media center running on one of them and an instance of Owncloud (article coming to Radio World soon) on my home network. The things people do with these small computers are astounding. For the small investment, it may be worth it to you to get a coupleô or ten.

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

Blade Project

This month here at the Crawford Broadcasting Chicago engineering department, we are enthusiastic to get started on the WheatNet-IP Blade project. Weôre a little behind some of the other Crawford markets, but thatôs okay because we get to learn from othersô trial and errors doing the very same thing. At the time of this writing the shipment of blades and control surfaces just arrived.



I know that our production department is excited that we are getting rid of the noisy analog mixers they have been using for quite a while now. Since they also use their rooms as their offices they are really thrilled about the much smaller footprint of the Wheatstone eight-fader control surfaces.

Most of the users have told me they seldom use more than four or five faders of the current 24 most of them have. They primarily do their work on the Mac computers and then dub into their Nexgen automation

workstation with the finished product. With most CDs ripped into the computers for editing, the need for all those channels is just not necessary. The multi-track editing is done in the Mac with no need for multi-faders on the mixer or in this case the control surfaces.

I am very glad that we will also be able to move away from the external mic processors. They tend to have troubles after a few years and always seem to have noise issues in their analog circuits. The console blades have built in preamps and the mix engine blades have built-in processing. One of the goals we have with this move is to have the mics sounding the same from room to room. This has been a challenge with different rooms having different processors and mixers with easy access to EQ.

I hope by the time I am writing next monthôs article to have all the production rooms finished and be well into the process of changing our Nexgen automation workstations from ASI sound cards to the new blades.

Phone Issues

This past month we had several phone issues plague the Hammond facilities. First off, we had a strange issue where we couldnôt dial local calls in the Hammond area. We would get a message that ñall circuits are busyò to certain local exchanges. This also included our own local direct numbers and the main Hammond office phone number. When you called them from other phones you would get the same message.

You hate to think about how many phone calls were missed because of this. We went about checking our local systems first. The Smart Jacks on the VOIP trunks feeding the phone system were not showing any errors and the Avaya Phone System was also not showing any errors. We decided to give it a reboot for good measure anyway but that apparently wasnôt the problem.

So, it appeared that it wasnôt anything at our facility causing the issue. My next thought was the local carriers were having problems, perhaps AT&T had some switches that were not working. The next step we took was to call our long distance and service provider Windstream. They had told us they had some problems with some Indiana exchanges earlier in the day but thought they were all resolved. At that time it was already into the evening so we let them investigate further.

The good thing was by the next day they had the problem resolved and we were able to make and receive local calls. Because of their quick action we only had a few hours actual business time when the lines were affected by this issue, so the damage was probably minimal.

The next week, as I was returning from our transmitter site in Kirkland, Illinois, I received a text from our chief engineer, Brian Bonds, that we lost one of our analog modules in the Avaya Phone system. This particular unit has 30 analog ports, so we were seriously hampered with this many lines down. This caused almost all of the studio lines in three of the four control rooms to stop working, along with all of fax lines.

Fortunately, we had purchased a 16-port analog module to expand our capabilities the year before. We actually had ten of those ports unused at the moment. Brian, with the assistance of our IT engineer, Jaren White, quickly started moving the most crucial lines to this module. This took a little reconfiguring of the system to move the lines from one port to the other and setup new hunt groups for studio lines.

They took nine of the ports and divided them equally among the three control rooms that had none, so each room could at least have three lines. They got them back up and in business for contests and interviews very quickly.

We had one port left and a lot of other lines that didnôt have a new home. This included four different fax machines. We put one fax line on the open port and then using the software for the Avaya system we forwarded all calls to the one fax machine with the line. This at least got us back in business with faxes, which I found out still had a very important role to play in our facilities.

This left us with a credit card machine, postage meter, studio hotlines and our Comrex Hotlines still not having a home. They would have to wait until we got a replacement for the down analog module, which we received the next week. However, even though we had used the same model number when ordering we received a 16-port replacement instead of a 30-port module.

Our vendor wanted to sell us another 16-port module, assuring us that two 16-ports would cost less than one 30-port analog module and give us more lines and greater redundancy.

I opted to go with repairing the original 30-port module and keeping the 16-port module that we had already received. In the end, it would cost less and we would still have a 16-port module on the shelf should we lose another one. With just getting the second 16-port module in place were able to get all of our studios fully functional and only missing a few other lines that we could live without until the 30-port unit returns from repair.

The Portland Report

By
John White, CBRE
Chief Engineer, CBC–Portland

Like a military operation, Project Satellite Replacement continues apace with phase 3, tweak the dish feed rotation. This operation which was expected to be mundane, possibly even boring, began with a C/N of 15 and RF IN of -38.

I started by placing a ladder against the antenna on somewhat uneven ground, affording access to the previously-mentioned satellite dish feed. Upon removal of the cover I was chased away by a swarm of angry wasps! Cover mounting screws dropped to the ground while I quickly retreated. Liberal application of some high-power wasp spray took care of the problem. The ensuing mop up removed the imbedded wasp nest, allowing access to the polarization adjustments.

At the conclusion of phase 3, the resulting measurements indicated a C/N of 15 and RF IN of -38 ï essentially no change. Itôs worth mentioning that the peak of the favored polarization is quite broad with the result that received signal level should not change rapidly at the peak setting. The null of the disfavored polarization is sharper and proper adjustment will be seen most as a rejection of the unwanted signal.

Last month I had an opportunity to attend a presentation by Brian Zvaigzne and Patrick Sherman on small unmanned aircraft systems (sUAS), popularly referred to as ñdronesò. Following an engagement at this years NAB convention, this pair is well known nationally to the drone community. In addition to NAB, they have done webinars for the Academy of Model Aeronautics and given presentations at national RC expos.

Zvaigzne and Sherman have an abiding interest in how drone technology can potentially benefit public safety and first responders. Their experience and knowledge covers a broad range. They have given testimony on drones at the state capital and have demonstrated the use of drones to various government agencies.

There is a common interest on the technical side between drones and broadcasters. Drones involve the use of transmitters, receivers, telemetry and video. Brian and Patrick build and pilot small drone aircraft and use live video feeds of what the model is seeing. That video application provides a perspective as seen from the aircraft, which is known as First Person Video or FPV in RC parlance.

A public safety benefit of sUAS is the ability to do damage assessment following a disaster such as earthquake or flood. These assessments are necessary to allow proper allocation of limited resources and aid the declaration of disasters necessary to obtain state and federal assistance.

Brian and Patrick have experience with sUAS as hobbyists and they use their drones to demonstrate the potential usefulness of the technology to firefighters and other first responders. Drones can be used for search and rescue, wildland firefighting, disaster assessment and the list goes on.

For the broadcaster, the sUAS platform will allow quick inspection of antennas, feed lines, and other equipment mounted on tall towers. Broadcast television has potential access to a resource which can provide a birdôs-eye view and informing the public.

One of the largest applications is expected to be agriculture. The use of sUAS equipment allows scanning fields to detect proper water and pesticide application and thus produce greatly increased harvest while at the same time reducing resource expenditures.

Currently, none of that is available and all commercial applications are illegal (without FAA waiver) in the United States. Heavy-handed regulations which treat a childôs toy, a farmers tool, and a jumbo jet with the same detailed regulatory requirements have placed the technology on hold while Chinese development continues at a fast pace.

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

Progress

By the time you read this, June will be upon us and nothing will have gotten done that I wanted. Colorado has had a very wet spring, and that has made getting things done at the transmitter sites difficult. It has also caused the weeds and grass to grow like crazy. Hopefully once we get into June weôll find conditions drier. I donôt mind some rain showers here and there, but I do mind the all-day rain. As many people in Colorado have said, ñAre we living in Seattle and just donôt realize it?ò

Streaming Computer

One thing that did get done was replacing our two streaming encoder computers with a single new one. We originally bought a Dell PowerEdge R410 server for this and were going to install Windows 7 Pro. We had done this with other R-series servers with no issues. This time, however, it was a no-go. After troubleshooting for a couple days, we concluded that Dell had set up the BIOS to prevent anything but a server OS (and a pretty short list of possibilities) from being installed on the R410. We ended up returning the server and purchased a different one, a Precision R7910, with Windows 7 Pro already installed.

This computer will allow us to keep all four Denver streams on it. It also allows us to save some rack space because this one computer takes up 2 rack spaces rather than four or five. One downfall I can see to having all four streams on one computer is when something goes wrong, all four streams will go down. But, since itôs a new computer, hopefully we wonôt have that issue for a long while. Since itôs essentially a server platform and not a PC, it should be reliable for many years.

Power Failures

We had a wet snow in the middle of May and with it brought a mess. Part of that mess was power failures at 670 KLTT and 560 KLZ. Thankfully, KLZ has a generator. I only wish KLTT had a generator.

Fortunately, everything came back up normally at KLTT after the outage. We did have a few other power outages, mostly overnights and a couple during paid programs. Those days we had some storms. Iôm not sure if something got damaged when it snowed and they just havenôt quite figured out where the issue is or what. But having these power outages during important times like that makes me wish all the more that we did have a generator. We will see how KLTT does the rest of the spring. Hopefully things will remain working properly and no more power failures.

Growth

All this moisture has caused the vegetation at the transmitter sites to shoot up at an unprecedented rate. The worst part is we still canôt get out there to do anything. With the daily rain it has been difficult to get out and mow. The tractor would just sink into the mud (and tear up the ground system), and a lawn mower/weed eater will only do so much of the work (we have 115 acres to deal with!). Keith is trying his best to keep the tower base areas clear. We are hoping in the next week or so to get out with the tractoré that is, if it quits raining.

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

KBRT • Costa Mesa - Los Angeles, CA
740 kHz, 50 kW-D/0.2 kW-N, DA-1
KNSN • San Diego, CA
1240 kHz, 550W-U
KCBC • Manteca - San Francisco, CA
770 kHz, 50 kW-D/4.3 kW-N, DA-2
KKPZ • Portland, OR
1330 kHz, 5 kW-U, DA-1
KLZ • Denver, CO
560 kHz, 5 kW-U, DA-1
KLDC • Brighton - Denver, CO
1220 kHz, 660 W-D/11 W-N, ND
KLTT • Commerce City - Denver, CO
670 kHz, 50 kW-D/1.4 kW-N, DA-2
KLVZ • Denver, CO
810 kHz, 2.2 kW-D/430 W-N, DA-2
WDCX • Rochester, NY
990 kHz, 5 kW-D/2.5 kW-N, DA-2
WDCX-FM • Buffalo, NY
99.5 MHz, 110 kW/195m AAT
WDCZ • Buffalo, NY
950 kHz, 5 kW-U, DA-1
WDJC-FM • Birmingham, AL
93.7 MHz, 100 kW/307m AAT
WEXL • Royal Oak - Detroit, MI
1340 kHz, 1 kW-U, DA-D
WRDT • Monroe - Detroit, MI
560 kHz, 500 W-D/14 W-N, DA-D
WMUZ • Detroit, MI
103.5 MHz, 50 kW/150m AAT
WPWX • Hammond - Chicago, IL
92.3 MHz, 50 kW/150m AAT
WSRB • Lansing - Chicago, IL
106.3 MHz, 4.1 kW/120m AAT
WYRB • Genoa - Rockford, IL
106.3 MHz, 3.8 kW/126m AAT
WYCA • Crete - Chicago, IL
102.3 MHz, 1.05 kW/150m AAT
WYDE • Birmingham, AL
1260 kHz, 5 kW-D/41W-N, ND
WYDE-FM • Cullman - Birmingham, AL
101.1 MHz, 100 kW/410m AAT
WXJC • Birmingham, AL
850 kHz, 50 kW-D/1 kW-N, DA-2
WXJC-FM • Cordova-Birmingham, AL
92.5 MHz, 2.2 kW/167m AAT

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Corporate Engineering

2821 S. Parker Road • Suite 1205

Aurora, CO 80014