The Local Oscillator

The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Summer Projects

Where has the summer gone? It seems that just a little while ago, I was wondering if it would ever get here, and now it's mostly over. I must be having fun, that's the only explanation I can think of.

We have, however, gotten a good bit done over the last couple of months. Both WDJC-FM (Birmingham) and WDCX (Buffalo) are now operating from their new transmitter buildings. We've gotten towers painted and lots of outdoor projects done.

But what I thought would be this summer's Big Project hasn't even started yet. We had hoped to get the 10 kW upgrade for KLVZ (Denver) done this summer and fall, but holdups, delays and snags at the local level have kept that from happening.

It's not unusual for AM station transmitter sites to be located in flood planes. Here in Denver, most of the local AM stations are lined up right down the South Platte River, starting well south of center city and extending northeast onto the plains downstream. Such riverside locations provide good close-in conductivity for the medium wave transmissions, and the land is often otherwise undevelopable because it is flood plane, usually making it cheaper land that higher ground.

The KLVZ site is the northernmost riverside AM site in the Denver area, and it sits right on the east bank of the South Platte. We have over the years seen some pretty spectacular floods out there, but nothing so high that it got into the elevated transmitter building or the non-elevated ATU cabinets. Clearly the place is in a flood plane, and it's that status that's been the big hangup with the county.

All we're asking for is replacement of the existing transmitter building with a new prefab building on pylons, up and out of the floodway. You wouldn't believe the amount of red tape involved in this, nor the number of agencies that have their finger in the pie. We're now on the third amendment of the Flood Hazard Development Plan (FHDP), the first two being defective for one reason or the other.

Hopefully, we'll get the approval shortly and can at least get the new transmitter building, its pylons and breakaway steel staircase installed this year. As for the directional antenna work, well, that will have to wait until 2009. There simply isn't enough time to get it done and proofed before the snow flies this year.

One advantage in waiting, however, may be the enactment of the proposed new FCC rules that will allow method of moments modeling of the directional array instead of a conventional proof of performance. We've been hearing since March that this is imminent. I've learned that in FCC-speak, "imminent" can take a long time, a lot longer than this fly-by summer season.

Algorithms

Digital just about anything is a wonderful thing. Once we get an analog signal or value into digital form, we can do all sorts of wonderful things with it, things that were difficult at best in the analog domain.

Take for example signal filtering in receivers. In my early days of ham radio, I used a really good receiver, a Hammarlund HQ-129. It had several selectable mechanical filters that I could switch in to narrow the bandwidth and eliminate nearby interfering signals. But I remember that those filters had so much loss that I really couldn't use them on weak signals. In later years, I had Yaesu and Icom HF transceivers that had 200 Hz crystal CW filters, bandpass tuning and IF shift, all for the same purpose of narrowing and focusing bandwidth while eliminating interfering signals. These things worked, but usually at the expense of readability.

Fast forward and consider today's HF

transceivers. Many of them come equipped with some kind of digital signal processing (DSP). The analog signals are converted to ones and zeroes and run through an adjustable algorithm that gives the user tremendous control of that signal. And gone are the bulky and lossy crystal and mechanical filters of days gone by. We can do a whole lot more with a whole lot less, which is another way of saying that DSP processing is efficient.

In the broadcast transmission world, the challenge has always been getting a "broadcast quality" audio feed back to the studio from a remote location. We did this in a number of ways, including dedicated 8 kHz and 15 kHz equalized telco "loops" (such circuits were unidirectional because of the amps, muxes and equalizers, so I always wondered why they were called "loops").

In the 70s and 80s, we found new ways to use the plain old dial-up phone line. Comrex came out with its ubiquitous frequency extender, essentially a heterodyne device that frequency shifted the audio spectrum up on the transmit end and down by an identical amount on the receive end, thus restoring low-end audio response through a regular phone line. This frequency extender came to be known simply as a "Comrex" in much the same way as the RPU transmitter came to be known as the "Marti."

In the mid-80s, Gentner came out with a three-line frequency extender, building on the Comrex idea by utilizing up to three dial-up lines along with frequency shifting to provide excellent remote broadcast sound. CBC employed a few such units to excellent effect in various markets. The challenge was to get three phone lines installed at a remote location in time for the remote.

Then in the 1990s, when we were getting pretty good at achieving "high-speed" data connections (14.4 kbps or better) over regular phone lines, Comrex came out with the HotLine, essentially a lossy codec that operated using a built-in modem over a regular phone line. This was an instant hit, giving broadcasters a lot of freedom in their remote broadcasts. Almost every venue had one or more regular phone lines, making zero-notice remote broadcasts a practical thing. Comrex has since replaced the HotLine with other products that work on the same principle, but with improved, less lossy algorithms.

In recent years, Telos blazed a new trail with its Zephyr, a codec that worked over ISDN lines. The Zephyr offered really low-loss algorithms, and it eliminated the modem altogether. Its audio quality was excellent, providing true "broadcast quality." Naturally, Comrex and others followed with their own ISDN codecs, and at CBC we have used a number of the different brands successfully.

The challenge with ISDN codecs has always been getting timely installation of ISDN lines at the remote venue. That got easier for awhile as ISDN service proliferated, but now it seems that the telephone companies are phasing it out, slowing the order/installation process down once again.

This year, the focus is on IP codecs, devices similar to the Zephyr that work over the public Internet and usually through a dedicated server somewhere. We purchased a set of Zephyr IP (Z/IP) codecs in Chicago recently, and I had the opportunity to play with them while in the market. The Zephyr IP offers a bunch of different algorithms, and we played with them all, listening for artifacts, aliasing and latency. The winner was the AAC-ELD (Advanced Audio Coding – Enhanced Low Delay) algorithm. While there was a perceptible delay (that would certainly vary with the Internet connection), it was short enough that remote talent could easily do a back-and-forth with studio talent.

But even this wonder of technology has a problem in the field – firewalls. We found this out rather quickly during the Z/IP's first deployment at a Chicago remote. We simply could not get through the remote venue's firewall to the server and our studio. The lesson: More lead time and communication with the remote venue's IT person is needed for a successful Z/IP remote. The additional problem is that many of the businesses where we might do remote broadcasts do not have their own IT person; instead, they use a contractor, and they are often unwilling to pay that person's hourly rate to create a firewall port for us for a one-time remote broadcast.

There is a solution to this, namely the high-speed mobile phone data network. With a Sprint (or whatever) card and account, we would then presumably have our own Internet connection completely independent of the venue's, providing us with anywhere/anytime remote broadcast capability. In theory, that is. But we all know that cellphones don't work everywhere, and neither will their wireless data cards. And as a user of such a service myself, I can attest that the term "high-speed" is only relative. I've never tried to determine what the uplink and downlink speeds of the Verizon data network are, but they are for a certainty slower than the average DSL. That will limit audio quality and increase latency. So ideally, we would still connect via the remote venue's IP connection whenever possible. Again, pre-planning and coordination are the keys.

The Z/IP was not the first broadcast IP codec. Comrex came out with its Access IP codec a

couple of years ago. This is a fine unit with several algorithm choices to suit the available throughput and latency requirements. We demoed a set of these in Denver when they first came out. I was most interested in how well the various algorithms would play with the compression algorithms used in our facility infrastructure, namely MPEG in its various forms and the HDC HD Radio coder.

To determine this, we actually put the Access in the audio chain of one of the stations, using it as an STL while several of us critically listened. The verdict: the low-delay algorithms did not play well with the HDC algorithm. The on-air analog audio sounded reasonably okay through the Access and its various coders, but listen in HD and it was a much different story. I wouldn't call it awful. It was more like a bad Internet stream.

The Z/IP's AAC-ELD algorithm seems to play okay with the FM HDC coder, but the final tally is not yet in (and we haven't tried the Z/IP through the AM HDC coder yet). We will be paying close attention to this in coming weeks and months as our Chicago crew gains experience with the unit.

All this brings me to a point that Tom Gardull will punctuate in his column: We must be careful as we employ digital coding/compression algorithms – particularly the lossier ones used by dial-up codecs – in our facilities, insuring that the algorithm that we choose sounds good not only on the analog signal but also on the digital. The last thing we want is for listeners to (correctly) perceive that our analog signals sound better than the digital during remote broadcasts.

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

Hello to all from Western New York!

It has finally happened. What I had originally thought would literally take years in the U.S. legal system has happened in a short few months. I'm referring to the unification of Sirius and XM Satellite Radio. I don't know about you, but I smell a rat in this entire merger proposal. Quoting FCC Chairman Kevin Martin, "This merger is in the public interest and will provide consumers with greater flexibility and choices," and oh, by the way, Sirius and XM will pay collectively $20 million dollars in fines for previous violations, which include unlicensed repeaters and other technical violations.

Recently, the FCC enforcement action for the Super Bowl "wardrobe malfunction" was overturned by the Third U.S. Circuit Court of Appeals. This left the FCC literally standing red-faced in the wake of the courts' decision. The court, on July 21, ruled that the FCC "…arbitrarily and capriciously departed from its prior policy…" that exempted fleeting and unexpected broadcast material from being deemed an indecency violation. WHAT?

I am left wondering who really operates and controls the Federal Communications Commission. The FCC, through the Communications Act of 1934, was created by Congress to regulate and license broadcast facilities, along with license applications, drafting of rulemaking items, enforcing rules and regulations along with formulating policy. The Commission consists of five commissioners, all appointed by the President and approved by the Senate. These five commissioners, by a vote of 3-2, approved the merger of the two satellite companies, quoting that this merger will provide consumers "more diversified" programming choices and spur innovation and advance the development of receivers capable of receiving programming from both providers.

I am hopeful that terrestrial broadcasters will band together to appeal this ruling before the U.S. Supreme Court. Under current FCC rules, the commission has the authority of enacting new rules and regulations without waiting for a court decision. As long as the ruling has been given full

consideration under the Administrative Procedures Act, the Commission can place a new ruling into law until a court rules to the contrary or orders a stay.

I do not believe that the FCC is basing its approval of this merger on what would best serve the public's interest. Let's face it; we are talking literally billions of dollars here. Sirius stated recently that this merger would save investors over $400 million in combined savings. Those that have the financial resources to invest in the satellite technology also represent a lot of financial backing for their representatives in Congress, which can heavily influence which way the congressmen will vote on specific legislation. I am anxious to read the entire FCC ruling, as initial reports from Democratic members of congress, the merger was also to include a portion of the satellite spectrum for non-commercial use as well as mandating that all satellite radios were capable of receiving HD-R as well.

But let's not stop there. Terrestrial broadcasters should also demand that equal representation be presented here. These modified receivers should also include Internet capabilities, so all stations currently streaming on the Internet could also be received along with HD-R and the satellite programming. There is only so much revenue available. Let's give everyone a fair, level playing field, and may the best programmer win. Or better yet, may the listener win!

I'll get off my soapbox now.

WDCX – Buffalo

The month of July has been an exceptionally busy one for me. Here in Buffalo, I have been trying to finish up some projects that began months ago. With the interior of the WDCX transmitter building completed, it was time to focus on getting the exterior done. One major item to complete was getting the concrete foundation back filled to keep the underlayment from washing out and causing the concrete slab to crack and shift. I ordered the new topsoil and began hand-filling the foundation using a shovel and wheelbarrow. After about a day's work, and only one side nearly done, I realized that it would take me a week to get this completed.

I called our snowplow guy, who just happens to have an attachment for his tractor that would do the job in a matter of hours. My dad always told me to work smarter not harder, but sometimes I let my stubbornness get in the way of rational thinking and have to learn things the hard way.

After that, I ordered a construction dumpster and cleaned up the entire grounds of the tower site. We had a lot of debris that had collected over the years, and there was too much to be hauled off in my Jeep. We are currently negotiating with a possible tenant for our old transmitter building, so everything needed to be cleaned out and what was not needed had to be discarded. The site is looking better than it has in years, and with minimal maintenance, it should remain that way for some time to come.

Back in June, WDCX began airing the Dave Ramsey show. We received the program over the Wegener Unity 4000 receiver on channel CB1. Since day one, we have experienced random digital dropouts during the show. These dropouts were driving us crazy, as there was no logical explanation for this occurrence. I changed out the receiver, LNB, and thoroughly went through the programming on the receiver. Intertech Satellite came out and hooked up a spectrum analyzer on the dish but could not find anything wrong. The signal was clean with no interference, but we were continuing to experience the dropouts on both our studio dish and at the transmitter site. I did find an abnormality with the coax on the transmitter site dish, and after running a new coax, the dropouts were greatly reduced, but not entirely gone. At this point, we still have not resolved this issue. If any of you have any suggestions, please let me know. I would like to get this problem resolved.

Our satellite changeover to the new AMB-OS system went rather smoothly. There were a few programs that we forgot to get authorized, but all in all the change went smoothly. We opted to send the audio files in real time to the DRR instead of digitally, which only a few changes were necessary in the DRR clock to get up and running. At some point we will change over to digital delivery of our satellite programs into NexGen.

WRCI / WLGZ – Rochester

Because of the numerous activities going on in Buffalo this past month, I have not had much time to spend in Rochester lately. I need to take a good week (or two) to get caught up on several things that need attention at the Rochester studios and transmitter sites.

One pressing item to be addressed is the installation of our new Potomac 1901 digital antenna monitor. While our day/night array was within tolerance, the patterns needed to be nailed (exact licensed parameters) before installing the new digital monitor. The daytime four-tower pattern was easy, but the night six-tower tuning was giving me fits. You know how it goes, you adjust one tower's phase/loop and it affects another. I just couldn't

obtain the proper licensed readings, and to top it off, while making adjustments, I broke one of the ceramic couplers on the power control for tower one. I did not have a replacement at the transmitter site, so I had to order a couple from Kintronics. While in the middle of this, the satellite problems began acting up again, so I will have to revisit the nighttime adjustment soon.

I still have numerous outdoor items to complete in Rochester this summer, including the painting of all six towers at the WRCI site. Western Tower Service will be doing the tower painting while I attend to some maintenance on each tower's tuning house. It is hopeful that the rain will hold off for at least a week so we can get the painting done in short order and not stretch it out over several weeks.

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

The Motown Update

By
Tom Gardull, CBRE
Chief Engineer, CBC–Detroit

July was a tough month for me. I had never been admitted to a hospital before. A case of food poisoning over one weekend late in the month aggravated my diabetes which led to my internal systems getting out of balance. I was very sick. My doctor sent me to an ER and they admitted me. I was discharged five days later, a little wobbly and a little weak, but getting better. I received the benefits of many prayers, and I am grateful.

Back to work means to be careful with my strength. I am avoiding heavy lifting and anything too strenuous. For that reason, I had to ask our Operations Director to set up several remote broadcasts. There was no way I could carry the equipment across a parking lot. I stayed at the studio and did the coordination for the Comrex setup.

We had some problems with our Comrex setup in part because the remote venue kept moving our location and lines around. We finally established a connection five minutes before air time, worrying about the table and display later.

Since I normally do the setup for our remote broadcasts, whether we use Marti or Comrex, I am usually at the site during the broadcast. I do not get to listen to our actual over-the-air sound during remotes. I have to deal with trying to keep a real-time feed for headphones and speakers. The over-the-air sound is not a problem for the remote site. Because of the delay, we just do not use it.

With me back at the studio during this remote, I heard a different perspective. Our Comrex remote audio sounded good but not great at the studio console. Certainly it was air worthy, and we went with it. Our broadcast was okay. We had an hour go with our broadcast when I got into my car to drive home. I listened carefully to the first live break and it sounded awful. Audio was distorted and very compressed. This was not what I had been listening to all afternoon in the office.

Then I remembered that I was not now listening to FM radio. Rather, I was listening to HD. My car radio is an HD radio. Our HD transmission was not kind to this Comrex origination. I do not know yet where we were losing the quality. Is the Comrex algorithm unfriendly with our Wheatstone system or with the IBOC equipment? There also would have been at least four A-to-D/D-to-A conversions involved before audio got to a HD listener. Could the less-than-great telephone be a limiting factor?

This was not the first time I had heard this phenomenon. Another local station had been doing traffic reports and sports reports from remote locations. I could hear their audio deteriorate as my car radio transitioned from AM to HD, and improve as I drove under a bridge and reacquired AM. I do not know whether they were using Comrex-like devices. But it was a problem affecting their HD audio, and now something similar was affecting WMUZ.

Our Comrex Hotline and Matrix will be moving to our new digital telephone lines soon. My hope is for an improvement in transmission quality as we move off copper lines. One of our first tests has to be how the Comrex devices will react. This is not quite the same situation that Comrex Corp warns about, namely not to go through a PBX nor electronic phone system. This is an extension of the phone company switch to our location. In our case, the last mile is not analog. Only the last five feet are analog. If the transmission quality stays superior, we can hope the Comrex data will remain robust forward to the HD transmissions.

This audio quality problem bears future experimenting, probably needing multiple radios and multiple ears listening during a live broadcast.

News From The South

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

The News From Cullman ...

The normal weather pattern in the South is hot, humid weather punctuated by showers and thunderstorms in the afternoon and evening. We've had some real doozies over the past two months that have spawned gusty winds and have knocked out power over large areas of Alabama.

After many years of working through dozens of these thunderstorms, a near-miss by an F2 tornado and several hurricanes, WYDE-FM in Cullman finally decided that it had had enough. In mid-July, we noticed a slow pressure leak and high VSWR on the main line. We called in Southern Broadcast Services to look for damage. They found that the top bay of the antenna had been burned out by lightning; they also discovered that many of the hanger brackets on the auxiliary line had been snapped by gusting winds.

While they were on the tower, more excitement came when a severe storm rolled through. I always keep an eye on the weather radar when anyone is on my towers, but this was one of those storms that suddenly "brewed up" with almost no warning. The crew was at 1,100' and there was no way they could climb down in time. Fortunately, Southern Broadcast Services relentlessly drills and trains their personnel, so the crew knew what to do. They tied themselves off inside the tower and came through the storm fine (if a little wet and frightened!), in spite of lightning strikes. In retrospect, it's really amazing that we haven't had more trouble than we do up there. Cullman, Alabama is almost 50 miles north of Birmingham in a different region, so the weather is different as well. I've noticed over the years that Cullman does seem to be hit more frequently by storms. We purchased WYDE-FM in 2002, and as I recall, we had to dodge storms almost every afternoon while we were rebuilding the thing.

As you read this, a replacement bay is on its way from ERI. Ironically, the low-tech hanger brackets are proving more of a challenge than the antenna. Apparently, they're no longer being manufactured. Don Jones at RF Specialties is sending one that he thinks will work; we're going to try it with fingers crossed.

This isn't going to be a one-day job. The tower crew found soot and debris in the tuning section of the antenna, meaning that it'll need a complete cleaning before we can reapply high power. We can't simply replace the hanger brackets, either; the crew will have to re-tension all of the springs to properly support (and more importantly, to distribute the load on) that 4-1/16" line. But hey, what's a summer without at least one job where Todd, Jimmy and I get to sweat off about 10 pounds a day? Last year, it was WXJC in Tarrant; this year, it looks like it's gonna be Cullman!

Nearing the top...

Telcos

I've been preparing a little article for the SBE that examines the current state of program delivery via telco lines – where we're at now and what might be coming in the future. A few thoughts resulting from my research follow.

Many years ago, everything was analog. Radio stations routinely used equalized lines to deliver audio from studio to transmitter, or would lease a temporary non-EQed loop for a remote. Most any Friday night in the fall, you could tune across the AM band and hear one nasally, distorted-sounding football game after another. For this reason, many engineers referred to these as "ballgame loops," regardless of the purpose for which they were actually used. They were part of the sound of AM at the time.

Nowadays, of course, many stations use a digital codec for game delivery. A Comrex Blue Box or Matrix unit can work miracles with that POTS (Plain Old Telephone Service) line, making a remote broadcast sound much better.

Here's the interesting part: unless your audio is traveling a very short distance, it's transported as digital, anyway. This is true whether you're talking into a standard POTS handset or using a "ballgame loop" for a remote. The real irony is that, if you use a dial-up to transfer data over a POTS line, here's what actually happens:

- The digital data is converted to audible tones for the telephone line.
- The Telco converts those analog tones to digital for transmit.
- At the receive end, the Telco converts the digital back to analog tones.
- The modem at the receive end converts the tones back to digital data.

You're going through at least two needless additional conversions. ISDN makes a lot more sense for remote audio because it allows you direct access to the Telco's digital transport. As long as you format the data so that the Telco can accept it, you never have to leave the digital domain.

Discoloration on the outside of this antenna element tells of damage on the inside.

Telos Corporation has encouraged broadcasters for years to use ISDN whenever possible. Their Zephyr products have essentially become the standard for high-fidelity remote audio transport. Many of their on-air phone systems support ISDN as well. So, here's the first suggestion, if you're still using POTS codecs and hybrids: when it comes time to upgrade, look into ISDN. If your phone service comes in via a PRI T1, you may be "breaking out" the lines as analog because that's what your current equipment supports. But look into the cost of switching to ISDN. It may be as simple as swapping a few cards.

I'll have more to say about this in a later issue, but next, here's a teaser: as already alluded to, the telcos are virtually all-digital now. SONET (Synchronous Optical Networking) transports huge volumes of data over fiber between cities. At the local level for the transition back to copper, HDSL (and variants) are used. When you lease a T1, it could actually be delivered to your premises as HDSL2 or HDSL4. The Network Interface Unit (NIU, more commonly called a "Smart Jack") will convert that into the familiar DS-1 for your equipment.

Many of us have tried and have dismissed the Internet for audio delivery because of unreliability, so standard DSL is out. But through sheer inertia, we have a tendency to think that this leaves T1 as the only real choice. In fact, alternatives

are becoming available. Here's my little "teaser" of a point: with bandwidth to spare, the telcos are introducing new services all the time, including point-to-point Ethernet. These could prove quite viable for us in the future.

(A technical point: do not confuse "Ethernet" with "TCP/IP;" Ethernet is a transport mechanism that can ferry any number of protocols, of which TCP/IP is simply the most common. Some protocols can be made quite secure and reliable.)

Why have the Bells done this? For one thing, they're master multiplexers; they've been figuring out ways to cram many connections onto a single wire or wireless link since the 1930s. This is just the next logical step. But having created these vast pipelines with terabits of synchronously-framed, reliable data streaming all over the place, they're beginning to offer combined deals on local phone service, long distance, Internet... and *cable television*.

Yes, cable – delivered by the telco! They've seen the future and it's data and more data. Whether the data happens to be a conversation with your Aunt Enis or the latest Spiderman™ movie viewed in real time from a pay-per-view service, is irrelevant to them. But the same abundance of bandwidth and these new delivery methods are proving useful for us as well. It explains why fractional T1 (i.e., leasing part of a T1 instead of all 24 channels) is available. It explains why prices on T1s have dropped in general. Finally, it also explains why some local service providers are indeed offering guaranteed-service, guaranteed bandwidth point to point Ethernet "drops" as well.

We've checked in our area: it's cheaper than T1 on a per-megabit basis, but we don't need the minimum bandwidth provided at present (6 megabits). Therefore, it's not a good fit for us (yet!). But if you have an application that needs, say, 5 to 10 megabits of throughput, call your telco and ask about point-to-point Ethernet. See what other alternatives they might offer. You could save our company some real money this way. And of course, even if it's not cost-effective now, we should keep an eye out for alternatives such as these. Who knows what the future might hold?

Until next time!

Gateway Adventures
By
Rick Sewell, CBRE
Chief Engineer, CBC–St. Louis

A-to-D/D-to-A Converter in a Pinch

There is an old adage that says that necessity is the mother of invention. I have found that to be true many times in working in the broadcast engineering industry. I had one of those occasions just recently.

In St. Louis, we are beginning to convert to all-digital audio chains using AES digital audio. Although, the stations audio chains are not all digital at this time, they will be soon after we install new control boards in the coming weeks. We were anticipating that shift we when we ordered APT Worldcast Horizon Ethernet encoders earlier this spring to be our backup STL. We went with the digital versions of these transports to be ready for the future.

This left me scrambling around to convert our existing analog audio to digital and vice versa. For the studio audio, we replaced our analog audio switchers with the new Broadcast Tools ADMS 44.22 switches. This was very handy because it has four analog inputs and four digital inputs and then puts out both digital and analog audio formats. This worked well for the studio conversion of our main audio and backup paths.

Getting a backup feed of our satellite audio from the transmitter sites was another story. I came up with a solution – a temporary one, but it works. I used a retired DAT machine that had lots of mechanical problems but still had audio boards that worked correctly. In this case, I had an old Sony DAT machine on hand that worked very simply for what I needed it to do. I connected an analog audio feed from the satellite switcher to the analog input of the DAT machine. I then set the input of the DAT machine to analog.

The Sony DAT machines have a neat function in that if you hold down the record button when no tape is present for about two seconds, the input will be fed to the output of the machine to both the analog and digital outputs. We've used this function to make an additional headphone feed at the studio when we needed one. With this method, we now have a digital output from the DAT machine of the satellite switcher. I then connected this to the input of the Worldcast Horizon Ethernet encoder at the transmitter site to send the satellite feeds from the transmitter site through this backup pathway.

Then at the studio, I took the output of the studio Horizon and connected that to one of the digital inputs of the new Broadcast Tools switchers. Now we are now ready to put our backup feed of satellite content on the air should anything happen to our main audio path.

The caveat here is that if the DAT machine loses power, the input being routed to the output will have to be reset, so it is a good idea to power the DAT machine from a UPS. Another negative to this method is that a DAT machine takes up a lot more rack space in comparison to purchasing an A/D converter. For the long run, the best thing is to purchase an A/D or D/A converter.

This method will also work in reverse. You can feed the digital input to analog output making it a digital to analog converter. I have used this as a method to test the digital output of machines. It makes for a bulky tester, but again, it works in a pinch.

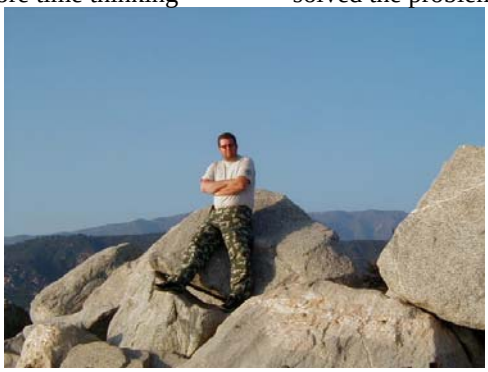
Now necessity is driving me to find a way to have my Jeep get 50 miles to the gallon… I'll get back to you on that one later.

Catalina Tales

By
Bill Agresta
Chief Engineer, KBRT

Greetings from Santa Catalina Island!

Last month, I purposely did not write about the latest satellite Internet frustration, simply because I was too frustrated to spend any more time thinking about the subject. Since some of you inquired as to the outcome of that situation, here is another piece of my frustration for you all.



After troubleshooting the system, we found that the modem was not sending adequate power to the HPA out at the dish and thus the power amp was not functioning, so we had almost no transmit signal. Seems like an easy fix, huh? Simply send me a new modem and we are good to go! No way, not with these guys! They continued to argue that we had a bad dish, even though the receive side of things was working perfectly. I even went out and double checked circularity and found conclusively that the dish was not bent!

The company's tech person decided that we didn't have a clue and refused to send out another modem. Cris got involved again, only to be added to the list of me, our local satellite dish installer and a few other radio friends who this tech guy decides to now get downright rude with. Instead of simply sending out a replacement modem to see if that solved the problem, they insisted we freight back the old dish for a new one.

Having followed my articles over the years wherein I told you how tough some things are to deal with here, you can probably imagine the headache of freighting something like a large satellite dish over to the mainland. Well, I was frustrated to no end with these guys and very soon thereafter, Cris decided that we were done dealing with this madness! We decided that if we were going to go though the hassle of sending that dish back for nothing, we did not want to see another one, so Cris asked the company for our money back.

I've got to say, I was very surprised when they paid the local satellite installer (as was he). We both figured that he would get stiffed since the system was being returned for a full refund. But now the hassle of returning that dish begins!

First, I wrapped up and boxed the modem and small parts and sent them back UPS, relatively

painlessly. Now I have to remove the dish and mount from the pole up on the hill. The pole itself was quite a deal to get manufactured and installed. I really hope we find another use for it because we've got quite a bit of time and money invested in that thing!

Back during the installation, I got the dish on the pole by myself – barely. There was no way I was going to be able to remove it by myself without getting hurt, so I began to try to get help. After many cancellations, several weeks later, someone finally showed up, thanks to Ralph Morrow, our local cable system operator. Kenny (his technician) and I removed the dish and got it to the crate I had built for the ride back to the supplier. The crate would not fit into our truck, so we had to rig it to a flatbed trailer to get it to the barge. Once at the barge, I had to coordinate a mainland freight carrier to pick it up and truck it back to the company. Soon (hopefully) we will see our refund, less the many weeks of labor, cost for the pole, cement and the frustration of dealing with these guys in the first place!

On the more positive side of things, I re-roofed over our shop and generator area about a year ago and am pretty impressed with the results. The end of our building near the tower field has an A-frame roof, but the far end is flat and was not insulated well (if at all) when it was build back in the 1950s. I covered it with Henry's Aluma-Seal, a product made for aluminum roofs like those on trailers and such. The main quality I was after that caused to me use the Aluma-Seal, even though our roof is not aluminum, was that it looked like a good insulator. Well, it certainly is beyond my wildest expectations. That old roof used to make the inside of the building so hot that our air-conditioner would run non-stop this time of the year. So far this year, I have only needed to turn on the A/C twice! The room now stays cool by itself, since the Aluma-Seal is reflecting most of the heat. Since we are always looking for ways to run a more efficient ship here at Crawford Broadcasting, consider this when a roof repair is needed, especially if the ceiling is not adequately insulated.

The fire danger on the island has reached a point where we are now on constant alert. I can hardly believe how fast the weeds have grown here after the fire last year. That fire must have fertilized the ground with turbo-seed because these things grow faster than I can cut them down! I have, however, maintained a very aggressive firebreak around our entire property and we continued to stay prepared in case we are faced with another fire situation. I guess in a place like this, another fire is bound to happen again sooner than later. We had several fires on the island last year (before the big one that burned our field), but they were contained before reaching our transmitter plant. I can only hope that with all the added fire clearance and fire fighting equipment, the next one will not be as tough to live though as the last one was.

We finally got the "B" exciter installed into our main Nautel XL12 transmitter. This was a bit of a deal since someone at Nautel accidentally sent it out as spare parts instead of a kit. With no instructions or hardware, we began the installation only to find that the synthesizer board was bad. It had a couple of very hot transistors that did not like life a whole lot. We returned the board to Nautel and got back one that worked. After some tech time over the phone, we got it in and running.

The "island factor" came into play here as Joel Saxburg made the trip to work with me on the installation only to find the bad synthesizer board. So, we did a few other things before he took the boat home and I did the installation myself when the new board arrived. Just another example of how one little thing can ruin the whole boat ride…

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

First off, a visit to the "Devotion to Accuracy" Department regarding a note made in last month's column regarding Ibiquity's licensing fees. Tom Walker from Ibiquity Digital dropped me a note which informed me that the Ibiquity fee is a one time payment. The license is then the station's forever. That's the good news. The bad news is that by the time you read this, the rate, one time, mind you, is a mere $25,000. That'll entice the smaller markets to get on board, yessiree!!

My first point on this subject, written in last month's issue, still stands. Enough said.

Promoting HD Radio

I still don't think that HD Radio is being promoted enough. There's a lot of good stuff happening on HD-2, stuff which is good enough to attract a goodly bunch of listeners, if only they knew it was out there.

There are exceptions to this. Oddly, public radio seems to be doing the best job of getting HD message to the masses. Tops on my list of HD promoters, in my limited experience, happens to be a station located not in Chicago, but in Philadelphia, with scads of satellite stations all over the Delaware Valley and beyond. WRTI, the broadcast service of Temple University, operates in HD with HD-2 service. Now granted, as a public radio station, WRTI does a lot of block programming and supports both classical and jazz formats. The two formats alternate between main FM/HD-1 and HD-2 streams. It streams both formats online as jazz and classical services, maintaining an unbroken stream of each. However, classical, which holds forth on FM and HD-1 during the day, switches to HD-2 at night. Jazz stays on HD-2 during the day, then takes over on FM and HD-1 after 6 PM. Since WRTI is the only classical outlet in Philadelphia, those listeners who are classical music mavens now are an automatic market for getting new HD radios for both home and car. In addition, station programming constantly promotes programs broadcast on HD-2, during the day or at night.

That's one way of doing it. However, if an HD-2 service is broadcasting a monolithic music format, such as "Loop Loud!" (on WLUP-HD2 in Chicago), I feel that a major effort to promote that programming on the main FM/HD-1 format should be a mandatory station policy. I would also suggest that a sampling of that format should be given a time slot on the main FM/HD-1 format. An hour or so per week on, say, a Sunday afternoon or Saturday evening, would be ideal. I don't subscribe to the belief, held by one major broadcast group, that HD-2 serves best as a lab for new format development. That's fine as far as it goes, and that happened a lot on FM fifty years ago or so, but how can you gauge the popularity of any format when it hasn't been promoted enough to attract enough listeners to determine its success?

Ironically, I'm finding that the greatest amount of HD-2 promotion going on these days in Chicago is for AM stations being retransmitted on the HD-2 channels of co-owned FM stations. While I'm not sure that such programming decisions are the greatest use of an HD-2 (although to me, it would make more sense on a lower bit-rate HD-3), such promotions for listeners in downtown high-rise office environments are very good.

Now, promoting AM-HD is a whole different issue in itself, since the main attraction there is the much better fidelity and stereo capabilities which AM-HD provides, a fact lost on anyone who doesn't have HD Radio already. The promotion of an HD AM signal might be better done on a co-owned FM station, if there is one, stressing the fact that the AM HD signal sounds just like the FM which the listeners are hearing at that moment. Outside of that, heavy promotion of HD for AM on that station would have to be the only way to go.

And, while we're on the subject, is there *any* station out there giving away HD radios to deserving

listeners these days? I don't know of any. Will those of you stations who *are* doing that let me know? I'd appreciate it. And let me know with what vendors you're working.

Something else which is needed is a conference on promoting HD radio, and Ibiquity should sponsor it. Forums would allow cross-pollination of ideas for spreading the medium. Put the conference on the Internet. I'd love to see it, myself.

HD Radio has everything to gain by promotion. Period. Let's hop to it.

Digital Phone Line Blues

Hardly news: We've had more than our share of phone line issues lately. Hardly a revelation. Both ISDN and T-1 lines have been affected. Yes, it's been the result of major electrical storms, but it's the scope of the damage which has me shaking my head.

We lost not one but *two* T-1 lines in mid-July, one of them our Soul 106-3 main program feed from Lansing to Kirkland. Fortunately, we have a backup feed available on our other T-1 from Hammond, but it's not synced up and worse, it's in mono. Still, once we got the workaround worked around, we were back on the air and waited for the main T-1 to get fixed..... which took *two days!*

The other T-1 failure was between two COs, Hammond and Harvey, Illinois, and this one was worse in that it took out all of our listener call-in lines for our big station, WPWX. That line was also down for two days. That's two days without listener phone calls on our station, a most important component of what we do there.

One would think that repair service on a T-1 or on any digital phone service would be faster and generally more competent than that, but it is our experience here in Chicago that, with few exceptions, the repair folks who are left at the telcos (and we work with two of those companies) don't know or understand the equipment they have to maintain, or are lacking in a positive work attitude. And that's not just my opinion. I'm hearing this from the "few exceptions" in telco with whom I deal. I've said in these pages in the past that when the Baby Bells reconsolidated, one of their first moves was to find the most expensive talent they had, and put them out to early retirement with great monetary severance packages. The resulting brain drain has proved to be a disaster for the industry, as those who were left could barely provide the kind of customer service which the phone companies had promised to their subscribers. You can guess the rest.

And the problems extend to ISDN as well, but here we the consumers have a little more control. We almost lost a broadcast recently because we couldn't get the ISDN boxes to work. Turns out that not one but two of our ISDN boxes had gone comatose, refusing to answer the line on one entire unit, and on one line on the second. On the other line, the box would answer but the audio wouldn't lock or come across at all. In desperation, I shut down both boxes, in effect rebooting them, and up they came. In talking to the customer service rep at Telos the next day, he explained that more than likely, the ISDN line is as much or more at fault in such a situation as is the ISDN box. Instead of rebooting the box, he said, why not try pulling the line out of the back of the unit, waiting 30 seconds or so, then plugging it back in? By doing that, you are sending a signal to the telco central office that the software for your line needs a reboot, which it will do by the time you plug your line back in again. While that works a lot of the time, there are still times when it won't. If your ISDN box doesn't respond to the line, it may have gone deaf. The only way to figure that one out is with another ISDN unit plugged in to the same line. We found that out the hard way, too. Repair of that unit cost over $500!

In a way, we're better off now than we were some years ago in the ISDN service when, if you had the wrong SPID number on the ISDN box, the *telco* software would freeze up, and it would take a telco technician as much as a couple of days to get out to the CO and reset the line manually. Thankfully, those days are now long gone.

That raises an interesting point. ISDN, in my experience, is the only telco service in which a remedy or repair outside of the user's equipment can be affected by the consumer without having to call in a telco repairman to deal with it. Anyone know of any other? Would that all such telco services could be that way.

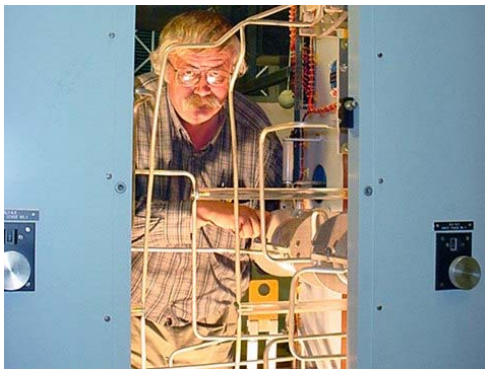
And, for this month, enough already. See you in September!

The Portland Report

By
John White, CBRE
Chief Engineer, CBC–Portland

Nine hundred twenty feet. As I heard those words three weeks ago, I got the feeling of deja vu all over again. Rewind about 18 hours.

Thumps and bumps in the on air program audio, again. Swarms of Code Violations in the T1 statistics confirmed the problem is located in the T1 at the Mt. Scott tail circuit. Call to Telco. Been there done that, again. And yes Telco Test does see the alarm history and it was bad but good now. What can we do now?



We were now on our emergency backup plan using our Hotline remote dial-up equipment. Another swarm and this time Telco is willing to dispatch. By now, it's quite late and looking like it will be a long, dark night.

To make a long story short, the problem was isolated to the tail circuit near the Mt Scott transmitter building. The important information was an offhand comment from the telco field tech. "The problem is 920 feet away."

Now that is a number I have heard before. At least twice before. My guess is there is a problem in the cable at that location that contaminates all the pairs in the circuit. But late at night, with no other resources, the field tech is forced to scramble to look for some clean pairs. About a dozen trips between ends later, he did finally find two "clean" pairs.

Now, just three weeks later, the problem is back. This time I hope to address the problem differently. It's clear that the telco facilities people need to repair or replace a section of the cable about 920 feet away. That's my approach this time around. I really don't want to keep searching out a "currently clean" pair in a bad cable. I hope the historic information will be helpful to ultimately resolving this problem.

The weather here is back in the news, this time in the form of a lightning storm, something quite unusual in this part of Oregon. My original introduction to lightning storms goes back to KFXD in Nampa/Boise, Idaho. One evening at about 11:30, a storm came through and by 2:00 AM, the four towers had taken quite a few hits. Wisely, I chose to retreat and look things over in the morning.

And in the morning there was a problem at tower 2. As I opened the door to the 4' x 6' tuning house, I didn't know quite what to expect. Frankly I didn't expect the snow storm I saw, white particles of mica and porcelain floating in the air. Tower 2 had a 0.01uF type 293 cap in series with the connection to the tower. This was the older potted porcelain type, and when I looked that direction, I saw the two end plates with nothing between them, just a pile of debris and a coating of dust everywhere. That was the day I came to respect lightning.

The recent storm here was spectacular. The news video of trees, power lines and other things hit was very graphic and a testament to the power of nature. The storm itself was also spectacular. The lightning strike counter maintained to monitor for lightning-caused forest fires tallied around 700 strikes. I guess I can no longer say the Willamette Valley doesn't get large lightning storms.

Here in Portland, I have been having an odd problem that I haven't been able to nail down, so I thought I would throw it out to for any thoughts.

The Mt Scott site houses two diplexed stations, one non-directional on 1640 and our 1330 as a DA. Also at the building we have a communications tower which is detuned on both frequencies. I happen to know that the comm tower is very significant. A few times when the comm tower detuning failed, I saw a phase shift of five or six degrees for in the 1330 directional parameters and huge reflected power for the 1640 station. To complicate matters, I also have five other detuned structures and one non-detuned tower on the hill nearby.

Now here is the problem. I am seeing

random changes in reflected power for the 1640 station, as much as ten times normal reflected power. In the past, reflected power has been dead bang constant, unchanged week after week, year after year. And now it's wandering around like a drunken sailor.

So far as I can tell, the parameters of the 1330 directional antenna, which do drift some with temperature, are not similarly being affected.

Obviously, I have several different possible potential culprits. One of the other towers could be changing and causing the tower base impedance to change. It could be something changing in the ATU or transmission line. Unfortunately, the change isnt huge enough to be easy to identify, and that really is the problem.

How do I identify the culprit or at least eliminate some of the possibilities? Is there any way to monitor for small changes in tower impedance on the fly? I would appreciate any thoughts you all might have.

Rocky Mountain "Hi"
The Denver Report
by
Ed Dulaney, CSRE, CBNT, AMD
Chief Engineer, CBC - Denver

Poison Ivy!

Back when I first started working for KLZ as a contract engineer, I noticed some peculiar plants behind the transmitter building. However, since it was the late autumn, the plants did not have green leaves, but dark red ones. So I really didn't give them much thought. I tromped through them quite a few times in order to get to the side of the building. I also never developed any rash or anything, which would have tipped me off to their "sinister" purpose!

I guess that I never expected to see poison ivy around these parts, especially considering that the soil at KLZ is a very low-density clay. That's not the sort of soil in which poison ivy is usually found.

But a few years later, I was tromping through it again working at the back of the building. A day later I had a minor rash on parts of my arms. That was when I started putting two and two together! I gave the plant a close examination and noticed the three things that tipped me off to what sort of plant I was dealing with: a) three leaves, each shaped somewhat oval; b) light green berries; and, c) vine-like branches that were slightly "hairy."

What confused me was that the leaves weren't shiny, but just a dull dark green. In Pennsylvania where I grew up, poison ivy leaves were always very shiny. I'm guessing that the plants here, lacking the moisture, just don't develop the shiny leaves that I saw as a young boy. I reckon that was why I had never thought that I was tromping through a dense growth of poison ivy.

After a couple of years of applying Round-Up and other weed killers, we've eradicated 99% of it from the area around the building. Poison ivy has to be one of the most difficult plants to kill. You can't mow it, unless you want to spray the oils all over the place! And you certainly can't burn it out (ask Bill Agresta about how much fun it is to breath in the smoke from poison ivy and poison oak!). So the only means to control it is using weed killers.

Now, however, I see that there are some new groves of poison ivy growing along the canal that borders the west side of the KLZ property. But I don't plan on eradicating that at all! Talk about an effective deterrent against trespassers! Instead, I plan on letting that grow all along the canal, and even encouraging it to grow along the rest of the property line. Who needs a fence when you have six feet of

poison ivy!

I just need to remember that it's there! Thankfully, I don't have a bad reaction to the oils. Still, even a small rash is an unpleasant thing to think about!

NE-IBOC Woes

The past couple of months we have seen three of our five NE-IBOC units fail. Two were in active service and the third one is a backup unit that Nautel provided for us.

One of the failures is attributed to the A/C unit at KLVZ failing. The building temperature reached 93 degrees and the NE-IBOC simply refused to work in that heat. I would expect a failure under those sorts of conditions.

But the other two units had no reason to fail. One was at KLZ. It just quit working. There was no rhyme or reason to the failure. Originally I had thought it was simply something that went wrong in the configuration, so Amanda and I reinstalled the Ibiquity system. That didn't bring it back to life. So it, along with the backup unit, was shipped to Nautel for repair.

The KLZ unit came back repaired. It had a bad SIC card. But the second unit stayed there for quite some time. Finally even Nautel gave up and sent us a "new" unit to use. The unit itself wasn't new, but they rebuilt one from parts that they had in stock.

When we received it, the unit was DOA. It gave us a failure reading the DUC CPUID. This is a problem we've seen with other units in the past, and usually the problem is that a card wasn't seated properly. But after reseating the cards, moving them to different slots, and threatening the unit with a hammer, it still refused to work. Nautel has me trying a number of things to try and resurrect it, but I'm thinking that this one will take the ride back to the factory.

Personally, I've never liked the idea of using a computer to be an exciter! Computers and lightning don't mix, and certainly computers and high RF don't mix. Then there's the fact that there are simply too many moving parts in a computer for it to be reliable 24/7/365. Hard drives, fans, and the vibration that is down pretty quickly. Then there's the dust and dirt found at a transmitter site. Unless you've built your site to be a "clean room" there will be a large amount of dust and dirt that accumulates on the equipment. That shortens the life of a computer. If you somehow have time to take those units out of the rack once a month and blow the dust out of them then you're one-up on me! If you don't have the time to keep up with

Poison ivy lines the canal banks at the KLZ site

that, however, the life expectancy will diminish at rapid rate.

Thankfully, Nautel is coming out with a new unit. Dubbed "AMIBOC," the unit will not be a computer but an embedded DSP system that will replace the dinosaur we now know as the NE-IBOC. Personally, those cannot be ready quickly enough for me! As it sits now, I still do not have an HD Radio signal on KLVZ as the exciter from there was the one that died in the heat, and the spare unit, as mentioned above, doesn't look like it's coming back to life.

Who's Listening?

In my younger days, I spent quite a few long nights working the midnight-to-6 shift as a DJ. One of those stations was a 5,000 watt AM station on the bottom end of the dial. We had a directional pattern with a main lobe that was oriented at about 200 degrees. This station was in West Texas, so the signal carried quite some distance at night.

I can still remember some of the notes I'd find in my mail slot when I'd come in for my shift. We received quite a few reception reports from South America and New Zealand. One report in particular, which included a picture, was posted on the wall of the control room for all to see. It was from a nice looking young lady on the Fiji Islands that listened to the station one evening. She'd mentioned that she had heard both my show and the morning drive guys show. She listened for three hours intrigued by the music and personalities on the radio station. The signal wasn't very strong, but it was strong enough to capture her interest.

I sometimes wonder if radio will ever hold that level of romanticism for me again. It was 1980 when that experience that I mentioned above transpired. Radio was surely a different animal back

then. For one thing, we actually had real people working the night shift! Though there were a few automated stations, the majority were still manned by living, breathing people. And the AM stations back then still played music. News/talk radio stations existed, but they were few and far between. And many of the music stations at the time were actually of a genre called "full-service" radio stations, meaning that they carried news and weather, as well as other important information for the listeners.

Today, when we want news, we immediately think of the Internet. I know that the first thing I do when I want to find out what's happening in Denver is to log on to various local TV station web sites. If it's a national story, then I might peruse the FoxNews or CNN web sites. I just don't even think about turning on the radio to hear the news because I know that I won't hear it! And I don't even have an antenna hooked up to my TV anymore! Of course, even without an antenna I can still receive three or four of the HDTV stations in the Denver area.

The Internet has become our source of *everything*. Radio has lost a lot of ground over the past decade, and the slide is going to continue unless we do something to stop it. HD Radio, with all the benefits it offers, simply isn't going to win back the hearts and minds of the listeners. We need more than technical greatness to rise above the noise.

But let's assume for a moment that we have something unique to offer. Suppose that we have a format on one of our stations that simply isn't available anywhere else. In fact, in many of our markets we have minority-oriented Christian formats. In Denver I have two stations offering such a choice. And, until recently, these were the only two stations with that format in the entire state of Colorado. Will that format alone bring in the listeners?

No, just having a signal in the market doesn't draw in the listeners. If they don't know we're here, then they won't be listening. That's where the word needs to get out. I'm certainly no expert on promoting a radio station, so I won't even begin to try and figure out what needs to be done in that arena. But there is another area that needs to be addressed that we engineers are more than qualified to work with.

If we have something unique, and a large segment of the population knows about it, is there anything that the station can do that will drive them away? In fact, there is. If the station doesn't sound good, or if the signal is weak, people will begin tuning out. If the station regularly goes off the air because of technical glitches, then sooner or later people will stop listening. And it people get used to things working one way – HD Radio, for example – and the HD signal vanishes because of equipment failures, then they will become frustrated with the station.

Obviously there are times when failures happen. As I addressed earlier in the column, equipment will sometimes fail. And, unfortunately, equipment has become less reliable because of the technology curve steepening. Back in the 1980s, the stations I worked for were rarely off the air for more than a few seconds due to equipment failures. Despite the fact that one of those stations didn't even have a full-time engineer, it remained on the air without failure for years.

That's why we engineers need to make sure we have backup plans in place, and backups for the backup plan! If your STL fails, how do you get a signal to the transmitter? If that link fails what do you do then? If the main transmitter fails will your backup transmitter come online? If you lose power will you be able to keep your station on the air with a generator?

I've run through the emergency drill here a few times, and each time I find other potential points of failure that should be addressed. For instance, with the failure of the NE-IBOC at KLVZ, and the failure of the backup unit, I needed to figure out another way to get the station on the air. That meant switching over to the night site, and reconfiguring the day transmitter to operate without the NE-IBOC. Since there isn't a separate analog exciter in this transmitter I had to move jumpers and set the audio levels so that it could operate properly.

These are things that I try to think of when it comes to emergency planning. Unfortunately I am one of the worst when it comes to putting information like this down in a tangible form. That's where I really appreciate Amanda's help! She takes notes... lots of notes! And that will help us out in the future.

And everything that we do to keep the stations on the air adds to the perception of reliability to the listeners. Sure, the romanticism of radio may be gone, but it can be replaced by something else that is just as wonderful. All we need to do is look for it!

Another Heat Story

We've been baking here in Colorado. I've lost count on the number of days that have exceeded 90 degrees, but I do know that we've not seen this sort of summer in 100 years! There have been two days that the temperature has reached the triple-digits. And at my house, where I have an "unofficial" weather station, the temperature has exceeded 105 on one occasion.

Now imagine what happens when the outside temperature is 98 degrees and the A/C fails in a building where you have a 50,000-watt transmitter! That's not a pretty sight, but it happened at KLTT.

Normally, the Burk remote control warns us when the building temperature exceeds 90 degrees. That gives me time to dial it up and reduce the power. This time, however, the Burk never said a peep and the temperature in the building peaked at 122 degrees! That was when the ND-50 said "enough is enough" and shut itself off. I then got a call from the operations manager saying that the station was down and wouldn't come back on. When I logged in on the Burk about 30 minutes later the temperature was still well over 100 degrees in the building.

So I had to take the long drive to the site. When I got there, the main A/C was dead and the backup A/C was barely putting out any air. So I scurried up to the roof to see what was happening. In the backup A/C, some birds had built a nest that caused the condenser fans to not work properly. That, in turn, made the coils freeze up. I fixed that problem fairly quickly. But the main A/C wouldn't come back on at all.

When this system was designed, there was a fail-safe built in that prevents both units from running at the same time. This is because there isn't enough power at the site to operate both A/C units simultaneously. If the temperature goes above 82 degrees the controller switches from the main unit over to the backup unit... and it stays there until the temperature drops below 80 degrees.

With the condenser not doing what it was supposed to, the temperature in the building never dropped below 80 and in fact it kept increasing until it reached that magical 122 degrees where the ND-50 shut down.

Near as I can figure, the area where the controller is located is the warmest part of the building. So on a 98 degree day, it's not unusual for the temperature to reach 82 degrees there, even if the rest of the building is at 75 degrees. So I increased the temperature threshold to 92 degrees. That should give us a little larger window for staying on the main A/C.

As for the Burk failure... well, as far as I can tell, the script used to monitor temperature is working perfectly! It was just that it failed at the point it was needed most, which has been typical for the problems I've had with scripts before. They'll work perfectly until you absolutely, positively need them to work. And that's the point where they'll fail.

The DNC

I decided to play it smart and leave town during the Democratic National Convention! Our studios are less than a mile from the epicenter of the convention, and I'm certain that we will have more than a few problems with navigating around here during that week.

A friend of mine is going to be working with the media at the big speech by Obama at Invesco Field. All I can say is, "Better him than me!" Besides the fact that I hate large crowds, I hate political speeches even more! I guess that's why I wouldn't make a good politician.

Besides all the pomp and circumstance surrounding the event, there are many protests scheduled as well. Estimates range from 20,000 protesters to over 150,000 protesters that will be congregating at the convention. If the convention itself wasn't going to mess up traffic, then the protesters certainly will.

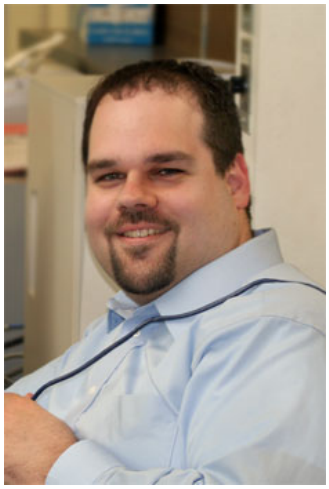
So I'll spend that week avoiding anything having to do with downtown Denver. One nice thing is that my house is quite a few miles from Denver, so things there shouldn't be too crazy. Well, except for the fact that 70% of the police force in my little town has volunteered their time with the security detail at the DNC. That gives a whole new meaning to the phrase, "There's never a cop around when you need one!"

Until next month... press on!

Digital Diary
by
Larry Foltran
Corporate Website & Information Technology Coordinator

The End is Near….

Can the rapid expansion of the Internet come to a screeching halt in 2011? According to several exports, it certainly could. Although continuing expansion of the domain URL suffix list such as .com, .net, .org and many others provides a seemingly endless supply of web addresses, the unique combinations of Internet Protocol (IP) addresses or IPs that reside behind these URLs will soon be in higher demand with a continually dipping supply. These reports have been quietly circulating within the IT world for quite some time, but talk of global panic as a result of the drying supply of IP addresses has recently been spilling into the mainstream media. It only takes one short newspaper article or a quick two-minute evening news story to trigger an avalanche of related questions from friends and family. Rest assured and watch the horizon, for there is a viable albeit slow-moving plan to resolve this problem.



First, let me give you a short lesson in "IP Addresses 101." The IP address format most advanced computer users are used to seeing consists of four groups of numbers, or octets, separated by periods (typically referred to as "dots"). Although technically each IP address is a stored as a binary string of numbers, it is displayed in a format that is easier to read. For example, one IP address block commonly used for closed or private networks is 192.168.0.0. This format is called IPv4, which has been around since September of 1981and uses a 32-bit address format. This limits the pool of possible unique IP addresses to approximately 4.3 billion. That may sound like a lot of possible addresses to you and to the engineers who initially developed this standard, but the explosion of Internet users gobbling up IPs like there's no tomorrow has severely affected this pool. These days, you can't only label the person behind a computer as an Internet user. Anyone with a PDA, high-tech cell phone, or other mobile device that accesses the Internet needs to wear that label as well. Every one of these items requires an IP address at some point in the chain. Tell me again… how many folks bought the new iPhone the first day it came out? You get my point.

So now what? Enter IPv6, stage left. Although around since the 90s, there has recently been a sense of urgency in more widely deploying IPv6 because of the imminent drought of IPv4 addresses. What makes IPv6 different is its 128-bit format as opposed to its 32-bit sibling. This will definitely take some getting used to, especially for folks who dread change. On a positive note, the new format can accommodate billions upon billions of unique addresses and not even break a sweat.

If you haven't come across an IPv6 address yet, the first thing you will notice is how the format differs from IPv4. For example, an IPv6 address could be **2002:c0a8:101:1::1**. Believe it or not, that's actually the shortened version. Similar to the current "hidden" scenario of IPv4, the majority of Internet users will never have to use or even see these addresses.

Although it seems as if the IT world is always ready to leap at the latest and greatest thing, I believe we will see IPv4 and IPv6 playing together for quite some time. Let's take an office building with a static IP address as an example. No, the size and color of the building doesn't matter… just work with me here. Our imaginary office building is equipped with a private network that accesses the Internet through a set of static IP addresses. The static IP addresses are set up using an IPv6 format, but that isn't required for the computers within the building. The internal, or private, network continues to use their internal IPv4 addresses if desired which should simplify network setup and maintenance especially for those who have a tough time remembering IP addresses to begin with. Yes, I fall into that category. Thank goodness for Post-It notes!

So where are we today in terms of IPv6

deployment? Let me put it this way: we have a very, very long way to go. Internet Service Providers (ISPs) have been dragging their feet to convert their operations, and the continuing use of non-compatible legacy software has slowed the implementation process. Perhaps the upcoming 2008 Olympic Games will give IPv6 a much needed boost. According to several publications, all network operations at the '08 Olympics will use the IPv6 format. To many techies, the athletic competition could end up taking a back seat.

Software companies have already been making the switch over to IPv6, led by big names such as Apple, Microsoft, and Linux to name a few. Based on reports, software developers are solely geared towards implementing IPv6 into new software as opposed to patching old software. Users who are happily equipped with 10-year-old or older equipment and still need access to the outside world, may soon find themselves spending money to upgrade.

As mentioned earlier, deployment has been slow and may take quite some time. Of course, companies may be quicker to react once the cost of a static IP address begins to rise quickly to match the falling supply. Hmmm… sounds very similar to another widely used product suffering from skyrocketing prices.

…until next month!

KBRT • Avalon - Los Angeles, CA
740 kHz, 10 kW-D, DA
KCBC • Riverbank - San Francisco, CA
770 kHz, 50 kW-D/1 kW-N, DA-1
KJSL • St. Louis, MO
630 kHz, 5 kW-U, DA-2
KKPZ • Portland, OR
1330 kHz, 5 kW-U, DA-1
KLZ • Denver, CO
560 kHz, 5 kW-U, DA-1
KLDC • Brighton - Denver, CO
1220 kHz, 660 W-D/11 W-N, ND
KLTT • Commerce City - Denver, CO
670 kHz, 50 kW-D/1.4 kW-N, DA-2
KLVZ • Denver, CO
810 kHz, 2.2 kW-D/430 W-N, DA-2
KSTL • St. Louis, MO
690 kHz, 1 kW-D/18 W-N, ND
WDCX • 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
WRCI • Rochester, NY
990 kHz, 5 kW-D/2.5 kW-N, DA-2
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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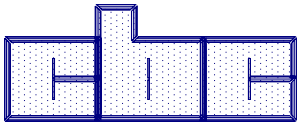

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