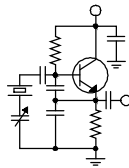


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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On the Road Again...

For the past couple of years, I have been running back and forth to Southern California almost exclusively. Other than NAB conventions, I haven't been much of anywhere else.

In June, however, I did manage to get back on the road to other locations. I made trips to St. Louis, Buffalo, Rochester and Albany. It was good to get back into the markets and see our people and facilities. One of the facilities, WDCZ(AM) in Buffalo, I had not seen before. We purchased the station at the end of last year, but I had not personally seen it. It's always interesting to mentally reconcile



The WLGZ(AM) Directional Array

what I have seen in photos with the real thing.

WDCZ really is a nice, if old, facility. It's a five-tower inline array that uses free-standing 245-foot iron towers. The phasing and coupling system is a mid-1980s vintage Kintronics system that was updated somewhat a few years ago when Cumulus station WHLD moved in to duplex at the site. The main transmitter is a Harris DAX-5 that is equipped for HD operation. Evidently the former owner turned

the HD carriers off when WHLD moved in. Most of the equipment is late model and in good condition ó not what we would generally purchase, but serviceable nonetheless.

We do have some work to do at the station, however, and fairly soon. The tower base piers have considerable surface cracks, and some have even had pieces break away. None of this is of structural concern, but it must nonetheless be addressed. We are going to have to find a contractor that can deal with this in much the same way we had to do similar work at WRDT in Detroit last year.

I would also like to see what's up with the HD signal. It's possible that the bandwidth of the diplex filters simply won't accommodate digital operation. No one seems to have any definitive information on why it was turned off. If we can get it working again, all the better.

Overall, however, the station is in good shape. It sounds quite good and has great coverage, especially into southern Ontario where the WDCX-FM signal has been compromised by interference from Canadian signals.

I was very pleased to see the WDCX-FM transmitter site. I had not been to the site since we installed the new Thermobond transmitter building and Nautel NV40 transmitter. Brian did a great job with this very professional installation. The photos I had seen did not do it justice.

And I paid a visit to the WDCX(AM) six-tower site in Rochester. That site looked about like I remembered it. The equipment was in great shape, working and sounding great. In fact, I had spent some time listening to the station over in Buffalo, which is about 90 miles west.

Albany

CBC is entering a time brokerage agreement with Don Crawford, Jr. ó WDCD(AM) in Albany and will, in early July, begin providing God & Country

programming for that station. Readers may recall that this station was one of ours until a few years ago. It operates with 50 kW full-time on 1540 kHz and provides a blistering signal up and down the east coast.



Satellite antennas at WCD(AM). The new 3.8 meter C-band antenna is on the right, and the CBCSAT Ku-band antenna is on the left.

To prepare for the new format, we purchased a 3.8-meter C-band satellite antenna, Wegener iPump receiver, new ABR202A receiver and various other sundry equipment. David Groth and the crew from Radio Engineering Services has been at work installing all this and reconfiguring the studio facility for split operation (the AM and FM stations have been 100% simulcast for some time now).

Rain, rain and more rain delayed the installation of the new satellite antenna until the late part of June. The ground in the vicinity of the antenna mount was simply too soft to get a boom truck in there to lift the antenna onto the mounting pole. After the lift was eventually made, the tire impressions were clearly visible in the grass.

I spent a couple of days in Albany the third week in June and got a look at our old facility. It was fun seeing the place ó lots of memories there. I rebuilt the antenna system in the late 1990s, and that antenna system is still working well. The Nautel XL60 main transmitter was the first in North America. It still works great as well. Overall, WCD(AM) has a very nice facility ó studio and collocated AM transmitter site, and it should do a great job for our company with the new format.

St. Louis

Also in June, I had the opportunity to drop in on our St. Louis operation. The week before my

trip the KJSL site evidently sustained a lightning hit on the power line. Some damage was immediately apparent, but some was latent. For example, the öBö power amplifier in the öBö power module sustained a modulator and SCR failure. That showed up right away. But a couple of days later, the fuse blew in the Kintronics antenna controller power supply, and at yet another time, the Omnia5.EX audio processor stopped working.

Rick Sewell and I spent a couple of hours troubleshooting and repairing the failed power module. I brought a batch of parts and we replaced modulators, driver IC, a PNP transistor in the mod drive circuit, and the modulator crowbar SCR (which was shorted). All the resistance checks were identical to those of a known good module, so with high hopes we reinstalled the amplifier and module ó to no good effect. Evidently there was still a problem, and I didn't have any more parts to throw at it, so we ordered a module swap, which took care of the problem. It will be interesting to see what the issue was.

The Kintronics power supply was fixed by replacing the fuse, but the Omnia was a different story. The symptom was no output. Rick tried a few power-cycle reboots, but it would hang on the Omnia splash screen and go no farther. I brought a new firmware PCMCIA card and tried that, but we got the same result. Finally, on the advice of Omnia Audio tech support, Rick removed the PCMCIA card, shorted out the lithium battery inside the processor for 30 seconds, then reinstalled the card and powered it up. It booted right up without issue. Evidently the on-board RAM got corrupted in the power glitch. Clearing that out allowed the fresh data to load from the card.

We found another issue at KJSL. A couple of the night monitor points were about 40% high. The previous measurements, made in April, showed all to be okay, so something had happened to mess with the pattern. The antenna monitor and common point bridge showed no parameter shift, so after dropping power to 50%, we turned our attention to our next door neighbor, the KTRS 4-tower 550 kHz directional array. The towers in that array have 630 kHz traps in place to float them on the KJSL frequency. We suspected one of those traps might be damaged or out of adjustment, so Rick called their chief engineer.

The KTRS engineer told Rick that he thought they might have a problem, too, because when they turned their transmitter off, KJSL audio was in the air monitor. That's a clue! An inspection of the traps revealed a cracked capacitor, evidently

from a lightning strike. After the cap was replaced (KTRS had a spare on hand), KJSL disappeared from the KTRS air monitor and the KJSL night MP field strengths returned to normal. It would have been nice had the other engineer investigated why KJSL was in his air monitor before we discovered the high MP field strengths.

Detroit Chief Engineer

As of this writing, we are still seeking a chief engineer for our Detroit operation. We have had a couple of initially promising applicants that did not pan out, so our recruitment continues. I very much appreciate Joe Huk and Russ Harbaugh looking after our facilities on a contract basis until we find someone.

The position requires five years minimum chief engineer experience, CBRE or higher SBE certification and a good understanding of and experience with AM/FM transmission systems, solid-state AM and FM transmitters, phasing and coupling systems, LAN/WAN, microwave links, and digital media systems.

If you know of anyone that meets these criteria, have them contact me at techjobs@crawfordbroadcasting.com.

KBRT Update

We are just about done on Santa Catalina Island, at least as far as our building, equipment, etc. are concerned. In June, Bill Agresta got most of the remaining stuff cleared out. Tim Cutforth came to the island and removed the ND-10 transmitter, the phasor and antenna tuning units.

What's left is dismantling and disposal of the towers. I am working on getting bids for that. In all likelihood this won't take place until late August.

The new site and facility are doing great. Bill has spent the entire month on the island, so the new facility has had to run on its own, and it's done so without issue.

Hopefully we'll get Bill back up there this month to start some fire mitigation work, clearing the grass away from fences, buildings, guy anchors and the like. I figure it's just a matter of time before a wildfire comes through, and we need to be prepared with adequate buffers and limited fuels. Just about everything on our site is grass so there are very few trees and little in the way of brush, so a fire would presumably move through quickly. If we can keep a fire from damaging any improvements as it transits the site, we'll be good.

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

Brian is on vacation and will return in next month's issue.

News From The South

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

Mo Weather

Once again, the weather is the key story this month ó though I'dl start by saying that, thank the Lord, we didn't have a great deal of damage from the storms that have been rolling through. It has been hot, though, hot and humid. I thought that southeastern NC (from whence I originally hail) was bad; this place has it beat. One can amuse one's self for hours just watching the water pour from the drains on the air conditioning units. Not drip, pour. I'm not kidding.

As you might imagine, keeping an AC unit fit and trim in this environment is a trick. If I had to do my career all over again and radio wasn't an option, I'd probably choose to be an AC technician in the Deep South. It doesn't matter how many repair companies spring up here, within a few months at most, they all have as much work as they want.

The studios and offices at 120 Summit Parkway have needed a good bit of attention. Because the units run non-stop, 24/7, they fail on a regular basis. Just this past month, we've replaced a controller card and have had a leak repaired in one of the rooftop condensing units. Don't ask how much it costs to recharge a 35-ton unit with coolant. It ain't pretty.

I've chatted with Cris Alexander and Mike Cary about replacing this complicated, computer-controlled system with old fashioned zone thermostats. Look: you know me. Stephen loves him some technology. When we built the new studios in 2006, I was all about getting that computer-based system to monitor everything. But the truth is that it has been more trouble than it's worth.

Here's why. At the end of the day, if you have One Big HVAC unit (as most businesses do), you're going to control the temp in each zone with a VAV, PIU or something similar. The big unit puts out the cool or hot air and the zone unit simply routes it into the rooms as demanded. The fancy-schmancy

computer thingie just sends a command to the VAV/PIU when it senses that the zone wants air or heat.



Simply put, *the software just replaces the individual zone thermostats*. It supposedly does a better job of monitoring each zone, watching for waste and things like that ... but the more I've thought about it, putting "smart" thermostats in each zone would probably do the same thing with considerably less opportunity for failure. Best of all, if the thermostats are available locally, Todd, Jimmy and I can replace them. It ain't exactly

rocket science.

That's my theory, anyway. I've been talking to our local HVAC service company about this and they say that honestly, they could go either way. Another disadvantage to the "smart" computer-based system is that the components are surprisingly expensive to service and repair. (Almost as bad as alarm system stuff. But don't get me started on that.)

WYDE-FM: Exhaust Science

At the 101 site in Cullman, we have two 5-ton wall-mounted units on our prefab shelter. Of course, they both decided to fail at the same time last month ó and they did. One needed a condenser fan (the one that blows the warm air in your face when you walk behind it); the other needed a compressor. It was extremely hot at the time, so we had no choice but to reduce the power on the transmitter for a bit; it was just getting too warm in the building. We have a fan that will move the recommended amount of air through the building, but when it's 98 degrees outside, it's just not enough.

As for the exhaust fan, we've run across another hilarious (read: annoying) problem. If one of the AC units burps for a minute (say, you've had a brief power outage and it's timing out), it quickly gets very warm in the building. The exhaust fan comes on ó and pulls warm, moist air in from the

outside. When the AC unit finally comes back on, it's fighting with the exhaust fan, the building stays warm, and the power meter rotates so quickly you can hear it humming.

I finally decided that I had enough of this. I am an engineer, I reminded myself. I solve problems. I put on the propeller hat that Amanda Alexander gave me a couple of years ago and cogitated. The answer hit me: I really don't want the exhaust fan to come on unless the AC units have actually failed. If those AC units are putting out cold air, I *don't want* that fan to run. So, the solution was to use not one, but *three* thermostats, wired as shown in figure 1. Two of them are mounted on the exhaust vents for the AC units and are wired with *AND* logic - we must lose both unit 1 *AND* unit 2 - with a failsafe thermostat in the back of the building. So far, so good at WYDE-FM; I am going to do the same thing at WDJC-FM, Lord willing.

It's still too hot here. Not much we can do about that, though, except keep the AC units running as best we can!

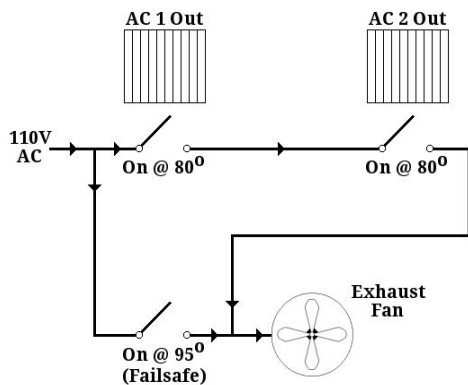


Figure 1 - Wiring the exhaust fan thermostats to prevent operation if the AC units are working.

Audio Editing Software

When we first installed our NexGen system years ago, Prophet only supported a couple of different editing programs, one of which was SawPRO. That thing would in fact record audio, but it was a boat anchor. It was anything but intuitive to use. I only tried it a couple of times, said, "ew," and went back to the \$59 program that I use on my PC at home. It rocks, I can do what I need, and that's that.

Then we managed to collect a couple of Cool Edit Pro licenses, and we noticed that everyone

in the building wanted to use those PCs to do their audio work. Adobe bought the software and renamed it "Adobe Audition," and we bought those licenses. We had pretty much standardized on it.

Recently, we decided that we'd like to have a few extra licenses - we have more rooms than we have editing software. When I looked at Adobe, however, I discovered that they've decided to go to that inexplicably stupid "subscription" model - you can't just buy the software outright, they want you to pay them a fee every month. It's all part of their so-called "Creative Cloud" thingie. Or something like that.

I guess they haven't chatted with Microsoft about how well that "subscription-vs-buyout" thing worked for them. While we wait for them to come to their senses, in the meantime, we need audio software. I sicked Jimmy on that, considering that he actually attended a for-real studio school several years ago and, like me, is a musician.

Remember my program, the \$59 job I mentioned a moment ago? It's by a company called Magix, and it really is good. In fact, it's amazing. I had Jimmy look at that one first. Unfortunately, the low-priced consumer versions, while great, only support 16 bit encoding and a 44.1KHz sample rate. That's fine for me putting together MP3s at home, but that's inadequate for professional work. Magix offers a professional package called "Sequoia" that will do it all, but it's more expensive than Audition! I hated it, but we had to leave Magix and move on.

After testing several packages, Jimmy found a gem called MixCraft, from a company called Acoustica. It will do everything we need, it supports high sample rates and 24 bit audio, so it's got the horsepower. The good news is that NexGen will now work with most audio programs that will accept command line arguments; you simply have to set up the "call" strings and arguments in NexGen's config. We will sic Todd on that when our software arrives. That boy is never happier than when he's arguing with a computer.

Audemat Relio

We actually bought two of these remote control units late last year; they were the last unresolved item in my 2012 Cap-Ex budget. We ordered them ... and waited. And waited. Audemat apparently had to build them for us; they didn't have any ready to ship.

When the units arrived earlier this year, we quickly realized that we'd want the analog interface panel. The actual interface port on the unit is simply a SCSI connector, and Todd and I had initially just

taken a spare SCSI cable from the junk box and had punched it onto a 66 block. But it quickly became obvious that in our climate, that just wasn't going to be reliable. We ordered the Audemat analog interface panel.

We had to wait some more. The panels arrived, but there were no cables with them. Audemat rushed us some cables and they were the wrong ones. Finally, we received the correct cables ... *after* we had already found another pair in the junk box and had wired everything up.

As for the unit itself, it's nice. Like the newest Burks, it's self-contained and doesn't require a separate computer to run scripts or macro commands. It has two network ports on it, and also supports dialup, so it's hard to make this thing unreachable. It supports the Simple Network Management Protocol (SNMP) and you can write your own SNMP commands. It has a ping function that will allow you to detect if it's lost IP connectivity, at which point it can switch to one of

the backups.

We will no doubt use these until we get our money's worth out of them, but Cris has convinced me that the newest Burk, the ARC Plus, is a better deal. The Relio, while nice, has some drawbacks. The first, to be honest, is the fact that it's apparently a sideline for Audemat. The fact that we had to wait to get everything we needed was troubling. The Relio unit itself is cheaper than the Burk, but Audemat nickels and dimes you to death on the needed interface panels. Finally, the included software, while quite powerful, is anything but intuitive. You must first define each piece of monitored equipment; then you must define what you're monitoring and assign inputs and outputs; and so on. You will find yourself referring to the manual constantly while you're learning how to use it.

Burk is an American company, with American support and the best of all that they know and love remote control. While the company has branched out and does other things nowadays, remote facility control is still the heart of their business. It's hard to argue with that.

Until next time, keep praying for this nation!

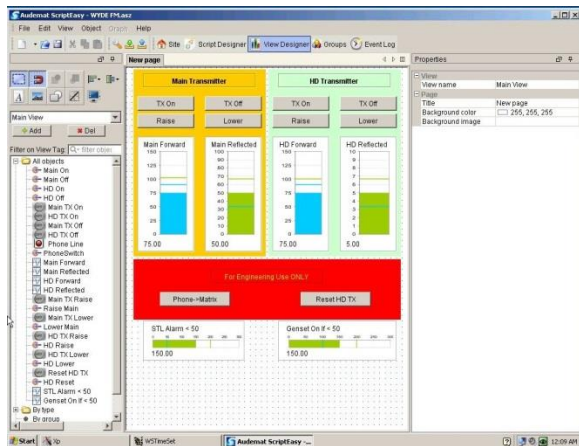


Figure 2 - Programming the Relio for WYDE-FM.

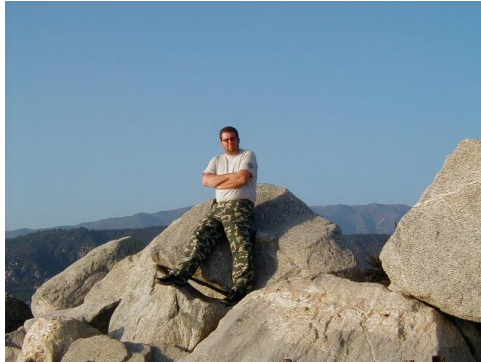
Mainland Memoirs

By
Bill Agresta
Chief Engineer, KBRT

Greetings from Oak Flat! The past few months have been filled with a very tough ongoing project of moving the remains of the old KBRT transmitter facility off of Santa Catalina Island. With all the idiosyncrasies of the island, this job seems to never end. We have sent trailer load after trailer load of old stuff to be disposed of and equipment to redistribute across the channel on the barge. We have had to deal daily with the barge company and freight haulers, neither of which has been easy or cheap. I'm glad most of this part of the job is now done.

The inside of the old building looks rather eerie after all those years as a transmitter facility, now standing nearly empty. Next on the list is the dismantling of the three towers and demolition of the tuning houses, and I have to deal with a few items I left behind to keep the place livable as we work this project. After that, we pray this project will be *done!*

Though I have worked most of this project



alone, I have had some help with some of the larger items of transmitters, phasor, etc. Using trailers made the rest of the project doable though still an issue at times as we tried to predict the timing of the barge to get those trailers to and from the island. I used my shop on the mainland as a sorting station, and the dumpsters in the complex there also came in very handy as much of the stuff was not really worth saving of especially since we have been so limited in time and space. The good, savable stuff, however, has managed to all go to places where it can be reused or recycled, so we did do our part to keep this project as environmentally friendly as possible.

During my time working on the island, I am glad to report that the new mainland transmitter facility has performed flawlessly. I have not had to go up there for any type of emergency for quite a while now, so the hiccups of the newly installed equipment seem to have settled and the site is running well.

That does not mean, however, that there are no projects up there. In fact, my list is quite overwhelming. Security remains a top priority up there, and I still have many other little projects to complete. I need to do some cleanup inside the transmitter building as well as do some work on the security trailer. Rodents have finally figured out we are there as well and have begun to chew up plastic and cardboard left outside, thus forcing me to rush and build a storage shed to keep our weed abatement equipment in before it, too, gets chewed up.

I will share many of my projects up there with you all as I begin them, but for now, I must get back to work. There is still plenty of stuff to move here and there.

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

Al Antlitz

Every career starts out with a teacher or, if you will, a mentor. In Ham Radio, the person is known as your “Elmer,” whether it’s a fellow or a gal who brings you up in the way you should go. I have, in my professional life, been blessed with quite a number of “Elmers,” actually, but few were more influential in my life than was Al Antlitz. On Thursday morning, June 20, I was called by the manager at the station where he worked as operations manager, Virginia Beehn, informing me that Al had passed away just moments before. I was the first one she called with the news.

Al succumbed after a fairly short illness at the age of 77. He worked right up to the day he died. Those of us who knew and loved him also knew of his illness, and that it was only a matter of time before he would be Taken Home. I hadn’t reckoned it happening quite this soon. So, there was still the shock factor.

My reminiscing about Al began almost instantly.

I actually met him in Ham Radio on a local two meter repeater, in 1976. I had recently arrived in Chicago from Idaho where I’d had my first CE gig. I’d learned of a Chicago classical music station called WFMT while in college. Indeed, WFMT was one of the attractions which made me want to be a part of the Windy City broadcast scene.

We got to talking on the repeater that evening, quickly figured out who each other was, then just as quickly moved to another frequency to settle in for a long yak session, over four hours worth. I picked his brain shamelessly, and before the QSO ended I realized that there might be many more such evenings on the air. There were. I also found out that Al’s wicked sense of humor was at times so dry that you could stick an olive in it.

Al was one of the most amazing engineers I had ever met. He was chief engineer at WFMT for over 25 years, after that the station GM for a time, and he made the place into one of the best engineered

radio station in the country, especially for that era. What makes this all the more incredible was that Al wasn’t formally *trained* in broadcast or audio engineering. He did it a lot like I did it – in the School of Hard Knocks. His formal training was actually for the ministry in the Church of the Brethren, with a Masters of Divinity degree from Bethany Seminary. And I can vouch for the fact that he was one incredible Biblical scholar.

But, and I don’t know how he did it, Al got electronics training, probably on his own, in the 60s, and in short order, he had persuaded Bernie Jacobs, the founder of WFMT, to hire him as CE. Talk about a leap of faith! Back in that day, WFMT was using Altec consoles, RCA transmitters, and who knows what for audio processors. With ownership’s backing, Al began an audio upgrade at the station, to the point where it won awards for the quality of its on-air sound.

Al started with the consoles. He didn’t have much faith in the ability of the commercially-available on-air boards of the day to produce high-quality audio, so he investigated what was out there to see if he could do better. At about that time, instrumentation-grade solid state op amps were starting to come on the market with decent-to-high slew-rate performance, along with low noise and distortion. Because these op-amps were so expensive, however, the only consoles using them were the large recording studio types. So, with the assent of management, Al started designing, bread-boarding, and developing an air console worthy of WFMT, made up of these devices. And he built not one but several of them, in his basement, and took them to the studios and wired them in. They sounded beautiful, they were 100% analog, and they lasted over fifteen years.

Next, Al turned his attention to audio processing. Back in the day, the state of the art in audio processing for both AM and FM was, shall we say, stuck in the dark ages. They say that the revolution in processing started with the now-legendary Orban Optimod. But the Optimod 8000



was never really designed for processing classical music. Al knew that he could do even better, at least for formats which didn't need "sledge-hammer" processing. So, he spent a couple of years developing what became the Antlitz Moduplex. This box was literally an analog computer, which used some very expensive components such as logarithmic amplifiers, super-precision diode-emulating circuits to keep the zero-crossings of the audio waveform smooth, and precision comparators. Power supply voltages were adjustable to keep the two of them, positive and negative, within .01 volts of each other. The power transformer was toroidal, a new design for that time, all the better to keep the hum field confined. All in all, the Moduplex was a wonder of electronic engineering and a beast to set up. It would take hours to adjust one to perform at specs, but once in, the settings stayed put forever. For all this, the cost wasn't bad, something like \$3,000, but for that kind of money it had a lot of quality. Any radio station doing a format such as classical music loved the sound that came from the Moduplex. Public stations bought them in droves.

I persuaded the owners of the station for which I worked, WXRD in Woodstock, to buy one. Thing is, the station's format at the time was classic rock. Would the box work in that format at all? I spent time with Al in his basement watching while my Moduplex was being built, and learning a lot about analog audio along the way. When I put it on the air, management loved it almost. We had the clearest, most transparent audio of any rock station in Chicagoland, and management liked that part, especially compared to the processor it replaced, but they wanted, well, more density. Hmmm, the Moduplex had its limits in that area, but with Al's help I was able to get the sound dense enough to make management happy. It was still on line when I moved on to another gig several years later, but not for long. My replacement didn't understand it, and took it out. I'd love to have it back. I know,

however, of stations which use the Antlitz Moduplex to this day. Gordon Carter, who replaced Al as CE at WFMT and is now retired, still gets calls once in a while from stations which still use the Moduplex, asking how to deal with them. That's more than 35 years after its introduction.

Al dealt with analog because that was what there was at the time. He left WFMT after almost 30 years. By that time, digital processing was starting to take over. Consoles followed some time thereafter. Analog was passé anymore, so that part of Al's life was almost, but not quite, over. After WFMT, Al worked for a variety of places, including Burk Technology, Northern Illinois Broadcasting (WNIB, WFMT's competitor), Bonneville Broadcasting, and most specially, at WBEZ Chicago where, in 1996, he designed and managed the construction of their still-showcase Navy Pier facility. I was brought in to build temporary studios for the air staff, to allow them to move in before the job was complete. I found Al a delight to work for and with. So did the other engineers there; they were top-notch, did a superb job, and the completed project would have won awards, had it ever been submitted.

Shortly after the project was done, however, Al was dismissed by WBEZ station management. Politics. He ultimately landed at a religious station in Joliet. He just couldn't stand not working, or not being useful. But on occasion he would call me in to work on their Continental 816R2C transmitter.

That's where the story ended, on the day before the start of summer. I know he's fought the good fight, and that his last days knew much suffering, but I know that he is now in a Better Place.

Those of us who knew him, who learned from him and loved him all mourn his passing, but beyond that, I'm at peace with it. What remains are the things Al taught me, and that's a lot. We should all be as blessed as he was, and as those who learned from him still are. Peace.

The Portland Report

By
John White, CBRE
Chief Engineer, CBC–Portland

As I write this, it's nearly the Fourth of July and summer has finally visited the Pacific Northwest. The mild, cool and wet spring has contributed to an abundant growth again this year. Then as summer finally arrived it brought with it power dumps and thumps.

It's amazing how, like modern society, much of the modern radio station depends on computer-based products that demand constant, stable and uninterrupted power. Even the slightest glitch will disrupt computerized equipment operation, invoking Murphy's Law.

The classical solution is the use of Uninterruptible Power Supplies (UPS) to ride through brief brownouts, outages and disruptions. Longer term backup is provided via backup generators. UPS devices are neither new nor exotic. Some form of energy storage, usually trapped electrolyte lead gel-cell batteries, are mated with a power inverter which is connected to replace AC power during a power glitch. These products should be a *solution* to problems and not a *source* of problems. Yet over the last several years the typical battery life seems to shake out at less than 18 months.

A search of available literature, particularly the last several years, offers no explanation for reduced service life. The most authoritative data suggests float service voltages between 13.3 and 13.6 VDC. Below 13.3, the cell develops chemical-based problems and above 13.6, the cell experiences electrolyte problems.

In all cases, I have found the data shows the expected float service life time should be five years or more so long as battery temperature is controlled. In a room-temperature environment, battery temperature should be well controlled.

Nevertheless, Murphy's Law still holds: manufactures specification and research data will overstate real life. Using a 60% Murphy factor, five years becomes a still reasonable three years, nearly twice that I have seen in real practice.

Many years ago, Johnny Towerseed visited Mt. Scott. On that particular day, his tower seed sack developed a hole through which seeds poured, resulting in the fertile growth of towers, many of them close to the

KKPZ site and producing significant pattern impact. Fortunately, most of the tower owners have installed de-tuning equipment.

Last month, I mentioned a newly-acquired current probe that just fits the bill as we have, yet again, even more cell antenna work going on at towers close to the KKPZ site. As the Mt. Scott antenna farm multiple towers are close-spaced, the ability to use the classical methods to adjust detuning is limited.



The nearly as good adjustment alternative is to monitor tower ground current, adjusting for minimum current. The photo shows the pre-work adjustment using my new probe.



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

KLDC Backup Transmitter

Early in the month I headed to KLDC with my dad to check on things. We hadn't been there in a while and I like to get an eye on things periodically even when things seem to be running smoothly. We typically fire up the Nautel P400 aux transmitter, which serves as a backup at the site when the main transmitter fails. Much to our surprise, nothing happened. We immediately began digging into it, knowing that if the main went down we were dead in the water. After a while of troubleshooting and finding nothing obvious, we took the transmitter out of the rack and headed back to the office with it. Thankfully this is a very small transmitter and although heavy, it is portable.

We stopped at the KLZ site on the way back and used the air compressor there to blow the unit out. Unfortunately, since we don't go to that site too often, it things get pretty dirty. After a good cleaning, we took it back to the office, put it on the bench in the engineering shop and began opening it up. The problem was a burned up resistor and zener diode in the modulator circuit. After replacing those with parts on hand, we tested the transmitter and found it working. The next day we took it back to the site and put it back in the rack. It feels good to have a backup transmitter again.

Ironically enough, on the way to the transmitter the day we discovered the issue, my dad was telling me how any time a major piece of equipment fails, whether it is the main unit or backup, all engineers need to treat it like it is the main unit, because there is no telling when that backup might fail. I guess God had a little lesson in there for me for that day to reiterate that, even though I always endeavor to treat any equipment failure as if it were the main unit and work to get it fixed right away.

KLTT Recertification

June marked time to recertify KLTT sample

system because it is licensed using moment method. I still can't believe it's already been two years since we last did it. With this particular recertification, my dad was unavailable. With all of them so far he has been there doing all the hard work with me helping. He decided it was time for me to do it on my own. It was nice too. He set up the network analyzer while I went to the four towers to disconnect the sample system. Then he began showing me how to do it all. I was actually surprised at how easy it was. The next day I decided it was time to go run the radials and get the measurements needed there. That took the better part of a day. Then that weekend, I had to do some off-air work anyway, so I had Keith come out to help with taking the sample transformers out of each antenna tuning unit and I measured them and compared them to make sure everything was within tolerance. I even got to fill out all of the paperwork myself to file for the recert. Talk about a feeling of accomplishment!

Mowing

It's that time of year again. Mowing season. We had to take our tractor out to the KLVZ daytime transmitter site as the county was fussing at me about the noxious weeds. I had been told the weeds out there were okay, but as it turns out they aren't. Thankfully the gentleman who was calling me was kind enough to give me a website to look at the various weeds the county does not allow. Keith had the place mowed in about a day or really two half days. I now have him preparing the KLZ for fireworks. We have some wooden fences around the KLVZ night towers at the KLZ site and that is a very populated area. So he is busy making a fire barrier just in case someone decides to try and set the field on fire because they are being dumb. In case you haven't heard, Colorado is on fire again this year. We have numerous fires burning throughout the state. Some are human-caused fires, others are lightning-caused. Either way, things are very dry and people just don't seem to understand that certain things just



shouldn't be done.

Next Time

As I write this, Independence Day is less than a week away. Many, many thanks to all those who have served or who are serving in the armed forces. While I may not be happy with the leadership of this country, I will be forever grateful to the men and women who have fought and currently fight for

my freedom. Even though it is getting harder and harder to be a Christian in this country, I still don't have to worry about being open about my faith. I will not be put to death or jailed for believing in Jesus Christ. That is an amazing thing. I pray you all are able to enjoy the holiday and please remember to thank a veteran. Without them we may not be free.

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

The Local Oscillator
July 2013

KBRT • Avalon - Los Angeles, CA
740 kHz, 50 kW-D/0.2 kW-N, DA-1

KCBC • Manteca - San Francisco, CA
770 kHz, 50 kW-D/4.3 kW-N, DA-2

KJSL • St. Louis, MO
630 kHz, 5 kW-U, DA-2

KKPZ • Portland, OR
1330 kHz, 5 kW-U, DA-1

KLZ • Denver, CO
560 kHz, 5 kW-U, DA-1

KLDC • Brighton - Denver, CO
1220 kHz, 660 W-D/11 W-N, ND

KLTT • Commerce City - Denver, CO
670 kHz, 50 kW-D/1.4 kW-N, DA-2

KLVZ • Denver, CO
810 kHz, 2.2 kW-D/430 W-N, DA-2

KSTL • St. Louis, MO
690 kHz, 1 kW-D/18 W-N, ND

WDCX • Rochester, NY
990 kHz, 5 kW-D/2.5 kW-N, DA-2

WDCX • Buffalo, NY
99.5 MHz, 110 kW/195m AAT

WDCZ • Buffalo, NY
950 kHz, 5 kW-U, DA-1

WDJC-FM • Birmingham, AL
93.7 MHz, 100 kW/307m AAT

WEXL • Royal Oak - Detroit, MI
1340 kHz, 1 kW-U, DA-D

WLGZ-FM • Webster - Rochester, NY
102.7 MHz, 6 kW/100m AAT

WRDT • Monroe - Detroit, MI
560 kHz, 500 W-D/14 W-N, DA-D

WMUZ • Detroit, MI
103.5 MHz, 50 kW/150m AAT

WPWX • Hammond - Chicago, IL
92.3 MHz, 50 kW/150m AAT

WSRB • Lansing - Chicago, IL
106.3 MHz, 4.1 kW/120m AAT

WYRB • Genoa - Rockford, IL
106.3 MHz, 3.8 kW/126m AAT

WYCA • Crete - Chicago, IL
102.3 MHz, 1.05 kW/150m AAT

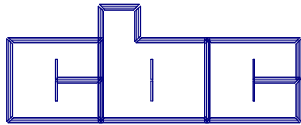
WYDE • Birmingham, AL
1260 kHz, 5 kW-D/41W-N, ND

WYDE-FM • Cullman - Birmingham, AL
101.1 MHz, 100 kW/410m AAT

WXJC • Birmingham, AL
850 kHz, 50 kW-D/1 kW-N, DA-2

WXJC-FM • Cordova-Birmingham, AL
92.5 MHz, 2.2 kW/167m AAT

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