The Local Oscillator

The Newsletter of Crawford Broadcasting Company Corporate Engineering

Oak Flat… On the Air!

February 28, 2013 was a landmark day for KBRT. On that day, the õswitch was thrownö and the new site went on the air under Program Test

CBC President Don Crawford pushes the button at the new KBRT site.

Authority. And what a day it was!

Don Crawford, president of Crawford Broadcasting Company, was on hand to personally push the button along with chief engineer Bill Agresta, operations manager Todd Stickler, neighbor Larry Boothe, engineers Joel Saxburg and Burt Weiner, and yours truly. At noon on the dot, Bill phoned the remote control at the island site and turned the transmitter off there as Mr. Crawford pressed the RF On virtual button on the NX50 transmitter at the new site. And just like that, the new KBRT was born!

Before putting the site on the air, Mr. Crawford got the grand tour, looking at a tower base area, the inside of an ATU and even the stunning views from the highest point on the property. It was a perfect weather day with sunshine, blue skies, light

winds and temperatures in the low 70s. Visibility was uncommonly good and we could see San Clemente Island, Catalina, Ranchos Palos Verdes, downtown L.A. and Disneyland. Oak Flat really is a beautiful

Success!!

piece of real estate, especially on days like that!

After signing on the new facility, Mr. Crawford and I went to the studio and were guests on *The Bottom Line*, KBRTøs local afternoon talk show, with hosts David Householder and Roger Marsh. We took the full two hours to share with our loyal listeners the saga of the KBRT site move ó how we were forced off the island, our two-year search for a new site, our discovery of the Oak Flat property, the difficulties and even persecution we faced in getting power to the site, a use permit, building permits, and the logistics of building at the site. And we shared how God was faithful to us, taking us from an Orange County Planning Department meeting in which we were told, õYou canøt build that here. Youøre done!ö to unanimous approval by the Planning Commission 16 months later, and then taking us safely through all kinds of issues at the building department, then

through construction, equipment installation and tune-up. What a joy it was to relate God's faithfulness to our audience!

Don Crawford and Cris Alexander join Bottom Line hosts Roger Marsh and David Householder on the air the afternoon of "D-Day"

The station is now operating full-time from the new site, and the station ID is now "KBRT, Costa Mesa." We have left Avalon as our city of license for good.

Of course we recognize that even at 50 kW, the new site does not provide the coverage that the old site did at 10 kW. That is purely a function of ground conductivity, something we can do nothing about, and while conductivities from the new site are pretty good at sixes, sevens and eights, they can't compare with the 5,000 millisiemen conductivity of seawater. Going west, the new facility puts a blistering signal over all of Orange County, a city-grade signal over most of Los Angeles County and a metro-grade signal over most of Southern California from Oceanside to Burbank. To the east, the station covers the Inland Empire with a solid, clear signal, something we have never had from the island transmitter site. We are even loud and clear on the other side of the Cajon Pass in Victorville. That high-growth area will no doubt become a target marketing area for our station from here on.

What we lose is a good bit of coverage to the south and in the San Diego area, which is at the end of a long terrestrial path over the spine of the Santa Ana Mountains and the Pendleton Hills. We also take a pretty good hit up in the San Fernando Valley where the signal must cross the low-conductivity Hollywood Hills and Santa Monica Mountains.

Overall, however, the new facility does a great job, providing a metro-grade (2 mV/m) or better signal to more than 18 million people and a city-grade (5 mV/m) or better signal to more than 14 million. I can't help but remember how just a few short years ago, we were thinking we would have to diplex onto one of the KNVR towers at the Garden Grove golf course with just 3.5 kW, which would have made KBRT a very *local* Costa Mesa-Garden Grove signal at best. God is faithful!

(L-R) Todd Stickler, Don Crawford, Cris Alexander and Bill Agresta in the new KBRT Oak Flat transmitter building.

So what's next for KBRT? We have to clear out of the old leasehold on Santa Catalina Island before the end of December (but I have no intention of dragging it out that long). The first phase of that project is getting the trailer-mounted generator and the Nautel XL12 barged to the mainland.

We will have the generator service company pick the gen up at the Wilmington freight terminal and take it to their facility for complete servicing and conversion to 480 volt operation. They will then deliver it to the new site and complete the hookup, which will have to be done at night now that the station is on the air from the new site. We will have a local mover pick up the XL12 and transport it to the new site, setting it in the space reserved for it in the new building. Power and remote control wiring are already in place for it, and we have all the 1-5/8" rigid line, elbows, couplers and flanges on hand to tie it into the phasor.

We have a Colorado buyer for the ND10 aux transmitter, consulting engineer and station owner Tim Cutforth. When I make a trip out later this month, Bill and I will have to figure out how to get that unit out of the building and down to the barge.

The rest of the equipment will be sold, donated or scrapped. Interested parties should contact Bill Agresta, but be warned: getting it off the island is

the buyerøs problem, not ours!

With the big Oak Flat project now in the rearview mirror, I look forward to my job getting back to normal, whatever that is.

My thanks to all who made the new site a reality, including but not limited to: Bill Agresta, Todd Stickler, Amanda Hopp, Larry Boothe, Michael Sheldon, Ray Grage, Shanan Brown, John Deykes, Patrick Keefe, Kevin Shannon, Bill Campbell, Mike

Balsamo, Joel Saxburg and Burt Weiner. You are rock stars, one and all!

A Fond Adieu

It is with considerable sadness that we say goodbye to Larry Foltran. Larry is leaving our employ on the 15th of this month to take another job. Larry has served us well for the past seven years, and he will be sorely missed. We wish him well.

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

Hello to all from Western New York! This past February 18th marked a significant milestone in the history of Crawford Broadcasting Company, with the 50th anniversary of WDCX-FM signing on the air. This station has become a legacy in Western New York and Southern Ontario, with its dedication and attentiveness to broadcasting Godøs Word daily to literally millions of people throughout our region. A lot has changed since those first days, but one thing remains steadfast, our ownersødedication to maintain and keep WDCX-FM as the õflagship stationö to all seeking Godøs message.

Who would had envisioned back in 1963 that one day we would be broadcasting our signal throughout the world via the Internet, and terrestrially in digital HD-R, with specific messages being broadcast along with the programming, such as song titles, traffic and weather data, etc.? And who would have believed programming could someday be obtained almost instantaneously via satellite and wireless telephone from almost any place on the planet? Technology has greatly enhanced the methods in which we broadcast, but one thing holds true and unwavering a half-century later, and that is the message we deliver day and night to all those who seek His Word.

It is all but impossible to predict what the next 50 years will bring, and by then, there will be someone else reporting in these pages in my place,

but I would gamble on one fact, and that is that WDCX-FM will continue broadcasting well into the next century, by whatever means the future has in store for us, and you can be sure that CBC will be on the cutting edge of that technology.

WDCX-FM/WDCZ – Buffalo and WDCX(AM)/WLGZ-FM – Rochester

I had mentioned in my report several months ago about the increase in the amount of wind we have experienced in Western New York in the past year or so. It seems that weather patterns have significantly changed, and more (stronger) winds have prevailed throughout the Niagara region. During a recent windstorm, one on the fences surrounding tower 5 at the WDCX(AM) site was blown over. Normally, I would just have to re-nail the fence panel back up, but this time, the 4x4 posts were snapped off at ground level by the prevailing winds. With the ground remaining frozen, there is no quick fix to get the fence panel replaced, so I had to string yellow õcautionö tape across the open side of the tower enclosure. Once the ground unthaws, I will be able to replace the fence with new material.

Recently I experienced a strange anomaly with the WDCZ Gentner VRC-3000 remote control. When the board operators called in to obtain readings, almost everything had zeroed out on the remote. Another strange thing noted was that the speech card would repeat õ95 Jö several times during

the call. The local computer at the transmitter site showed all normal readings, and everything there looked good, except for the fact that the voice module was missing in the site map. I re-scanned the system several times, but the voice module would not show up.

Not sure as to which way to troubleshoot, I disconnected the voice command module from the rest of the system, and called into it. I was still receiving the õ95 Jö errors, so I determined that the problem was in that module only. I checked the motherboard for a memory battery, found none, so a hard re-boot was in order. Once removing power from the unit for several seconds, the unit came back

to life with no õ95 Jö errors. I did a system rescan from the host computer, and again, it did not show the voice module in the system. I un-plugged the network cable from the back of the unit, rescanned with it un-plugged, and then scanned it with the network cable plugged back in. It then recognized the voice unit and all has worked fine since then. I love these little un-explained õtorture eventsö that sometimes happen without reason or explanation. Itøs the little things that drive me crazy.

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

The Motown Update
By
Joseph M. Huk, Jr.,
P.E., CPBE, CBNT
Chief Engineer, CBC–Detroit

NexGen Hard Drive Upgrades

In the last issue of *The Local Oscillator*, I mentioned that in the process of upgrading the hard drives in our audio servers, we ran into an issue with the sound card. I have a bench setup with an audio harness for the ASI sound card. After testing the card, I found that I was not able to record audio on the analog input. I used a signal generator to do the test.

At that point I replaced the card with one that I knew was in good order. I then retested the new card and found that I had record audio once again. I proceeded to put the machine back into our equipment rack and hook up all of the connections.

Next, Vito, our operations manager and I tried to record audio from the WRDT control room. Unfortunately, we were still not able to record audio. I went back to the rack room and placed a tone on the input to the sound card and everything was working. I then went to the audio harness that comes from our Wheatstone Bridge Router and placed an audio probe at the audio analog output of the connector that interfaces with the sound card. I found no audio present at that point. At that point, I felt that maybe we had a failure with one of the channels in the Wheatstone. What I found was very interesting.

I looked at the X-Point software that controls the router and found the audio output destination that feeds the record input to the sound card on our audio sever. To my surprise, the signal definition for this device was set to an AES/EBU digital output. Up to this point, no other sound card on any other server was set to AES/EBU. So we set the ASI software in the audio server to channel the audio from the AES/EBU digital input. In the end, we had solved a problem that was present with the current sound card, but the actual root cause of the issue was the software setting in the computer.

The lesson I learn in this situation is to make sure that you understand all of the current audio type selections of each interface in the system. You canøt just assume that all of the devices in your plant are set up exactly the same way.

ZIPOne Audio Processing

In our plant, we inserted a DBX 166A at the output of the Zephyr IP codec to improve the consistency of the audio levels and increase their average level. Since we have added a new show that has two doctors using ZIPOne units from two different locations, we wanted to provide the same processing to our ZIPOne codec at the studio, too. I was able to obtain another DBX 166A so that the

processing would be symmetric between the two units.

Using audio processing with the legacy Zephyr IP has not been an issue. However, during one of our broadcasts we noticed that when either a phone caller or in-studio guests talked to the talent on the other end of the ZIPOne, you can hear their audio at the output of the ZIPOne channel on the console. At first we though we may have a mix-minus assignment incorrectly set on our Wheatstone control surface. However, that was not the case. This problem was not present with the legacy Zephyr IP.

We were able to contain the issue by using the expander gate on the processor to mute the output of the DBX 166A when the talent using the ZIPOne does not talk. The leakage through the ZIPOne codec is low enough in amplitude that we can use the gate to mute it. I see this as good way of temporarily addressing the issue. In conversations with Vito, our Operations Manager, he indicated that the audio leakage, from the send input, has always been present. The audio processor just made it very noticeable.

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

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

Lots of rain in Alabama lately... including several severe thunderstorms. Whenever that happens, the 40 acre field at the WXJC site in Tarrant becomes a giant, gooey swamp. So... of *course* that's when we'd have problems out there.

Don't even think about driving in that field when it's water-logged. You'll get stuck. I speak from experience. When we repaired some major damage from copper thieves several years ago, we actually rented a four-wheel utility vehicle to help us get around. Otherwise, it would've taken forever.

But now for the real news.

The Copper Thieves Return
Yep, they're back. Jimmy Parker, on his weekly visit to the site, discovered that someone had pulled and had stolen an old copper strap in the field. They managed to avoid the cameras, too – whether on purpose or by accident, I can't say. Not that the video would have been terribly useful (as also reported in previous articles); the resolution is just too low and any thief worth his membership ring will be wearing something that masks his face.

I examined the damage. It looked like this was part of an old ground system, but to be safe, we ordered some strap from Kintronic Labs and called in Danny Dalton to help us bury it. We couldn't find the loose end closest to tower #1, so we had Danny dig until we hit the grounding around the tower base and connected the strap there. At the other end, we were able to find the loose end, so we felt like we had a good ground back in place. Even if it was an old strap, not connected to anything, it never hurts to improve the grounding at an AM site!

Cris suggested that we install the new Doppler-type motion detectors out at Tarrant. We're currently working with the same vendor that our company used at the new KBRT site in California. The plan is to have the motion detectors set off sirens and flashing lights; if they continue for more than a minute, we'll close a relay on the ADS alarm system and call the sheriff.

Whether that will actually help in that terrible neighborhood remains to be seen. Bob Newberry, the local chief engineer for Clear Channel's Birmingham stations, has video images of thieves stealing copper from the WMJJ site up on Red Mountain (near our own WDJC). The thief jumped the fence, quickly grabbed as much copper as he could stuff into a sack, then ran before the police

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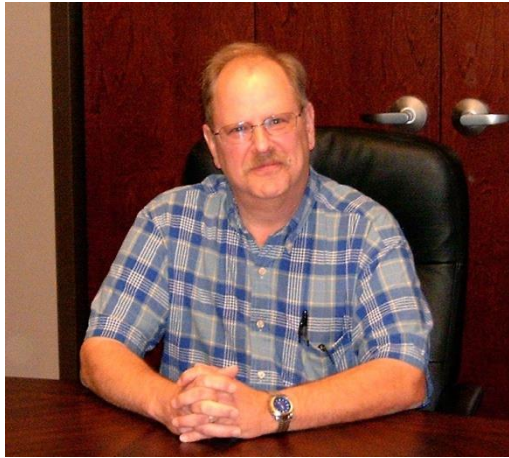
Jimmy Parker stuffing the new strap into the trench; Danny Dalton's backhoe is visible to the left.

ever showed up. He was wearing a mask, and you couldn't make out the tag number on his vehicle.

It's frustrating; I'm not sure what we're going to do to address this. I've said if before and I'll repeat it again: these kids will do thousands of dollars' worth of damage just to get $10 worth of copper. I have seriously thought about posting a sign with my cell number saying something like, "If you're that desperate for ten bucks, call me and I'll GIVE you the money."

A New Tower Choke

I mentioned the severe storms: a few days after we discovered the missing strap, tower #3 at Tarrant took a sustained, repeated lightning strike. This kept tripping the breaker to tower #3, meaning that it wouldn't switch patterns. When I investigated, I discovered that the tower lighting choke had been damaged beyond repair.

Burned choke from tower #3 at WXJC.

All of us have fixed chokes by simply bypassing the burned section, but I didn't want to do that in this case for two reasons. First, those are high-impedance towers, and we need all the "choking" we can get. Second, the damage was pretty severe and the coil measured a dead short. That tells me that the insulation was probably damaged and the some of the turns were probably shorted together in the coil. Not good, and safest just to replace the thing.

Disabling Java

Most people have heard the name, "Bill Gates." He, of course, is the founder and former chief guru at Microsoft. A name that you may not have heard, though, is "Larry Ellison." He's the guy who runs the Oracle Corporation, and in the geek community, his name isn't exactly revered.

Years ago, Sun Microsystems had a great idea: they developed a simple, easy to use programming language that supported all the cool GUI stuff right out of the box. Ready-to-go windows, message boxes, dialogs and all that other stuff was built in. Thus was Java born, with the slogan, "write once, run anywhere."

It was a great idea; you could write your software in Java and it would run on Windows, Linux, MacOS and any other system that supported a Java Runtime. Our own mail server software is written in Java and runs on the Jetty Java Server. Scalix, the software that we previously used, ran on the Apache Tomcat Java server. Both are quite popular.

Most of us, though, primarily experienced Java on the Web. It was a great way for a Website to include real programs that you could click and run. The FCC and the National Weather Service, for example and just to name two, have used Java heavily in the past. They're migrating away from it now, though, and for a good reason.

Like any programming language, Java has had its share of bugs and security issues. Sun did a credible job of addressing these. The only real complaint that most people had about Java in the past was that it was a bit slow. It wasn't the fastest-running language on earth, but given its portability and the ease with which you could program in Java, it became very popular in the geek community.

However, that's not the biggest complaint nowadays. A few years ago, Oracle bought Sun Microsystems and the first question that the geeks asked was, "What will happen to Java?" Ellison assured everyone that Oracle would continue to support and develop the language. However, the sad reality is that under Oracle's tenure, Java has rapidly

gone downhill.

Software like our mail server isn't the problem; we can keep an eye on that and access to the actual Java "engine" is strictly limited to the server software itself. The real vulnerabilities appear while browsing the Web. You might click on a Web site and *without your even knowing it*, a Java "app" embedded in that page could do malicious things to your computer. Oracle just patched a bunch of vulnerabilities, but now some new ones have been discovered! The safest thing to do is what security professionals have been recommending for weeks: just disable it. It's sad, but it's not worth the bother anymore.

In Firefox under Linux, go into "add ons" and disable the "Ice Tea" Plugin. Under Chrome, you can type "chrome://plugins" in the address bar and look for the line that says "Java." Click "disable" and you're done. In Safari, you click "Safari -> Preferences," select "security," then uncheck the line that says, "Enable Java."

In Internet Explorer, not surprisingly, it's not that easy. In IE 9 and 10, you can supposedly click the gear icon to the upper right, select Manage Add-Ons, then disable Java in the list. Some security researchers are warning that this will not reliably disable it entirely. According to them, you might even go to a Java test site, have it tell you that Java is disabled... *but some functions will still be active*.

The above are just examples. For the definitive way to disable it in your browser, do a Google search for "disable Java on [enter the name of the browser that you're using]." Check a couple of different sites and follow the instructions as closely as possible. Infoworld, just to name one, has covered this very well in the past year and their site (infoworld.com) has some excellent tips.

The bottom line is that I strongly recommend that you disable Java in all Web browsers, throughout your facility. Even better, unless you absolutely need it for something, *just uninstall it entirely*. (That, too, isn't easy, especially under Windows, though.)

It really is a shame. Java had such promise. The problem is, we just can't trust it anymore. The good news is that most Websites have switched to alternatives like Javascript (which is NOT Java, even though the names are similar) that are more secure and reliable.

Until next time, keep praying for this nation!

Valley Notes
By
Steve Minshall
Chief Engineer, KCBC

I have been meaning to get a *Local Oscillator* contribution out for months but it seems there is always something that takes me away from writing. Here is hope that I can finish this without interruption.

I spent a week at the end of October helping out at the new KBRT site. It is a tremendous project and I am amazed at so many facets of it. Just getting four towers put up in Southern California is an achievement in itself.

This was the first "no compromise" site that I have ever helped build. I have helped build quite a few and they have all had compromises. Every AM site I have worked with has had compromises that I have had to deal with. It was sure nice to see conduits of adequate size for all the circuits to the towers. Every AM tower site that I have worked with has had either poorly installed conduits or direct burial cables. In every case of direct burial cables I have had failures.

My best conduit story is an AM station that, "to save money," built its 4-tower array in a dredge pond. This is where, when they dredge a waterway, they put all the sludge. I will give them credit because they did install nice big conduits to all the ATU buildings (shacks are what they were in actuality, very flammable shacks as they would find out). The first time the dredge pond was flooded, the water entered the conduits at the ATU shacks and came out the other end, in the transmitter building, which quickly filled with about three feet of water. This is just the tip of the iceberg when it

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comes to compromises at that site. Those compromises cost them dearly and I assume they still are.

The first few days I was on site at KBRT supervising, things went very well and we got a lot accomplished. The last couple of days I had to get busy doing actual work and I managed to make a few mistakes. Fortunately they were easy for Cris to correct the following week.

My week at KBRT was followed by a scheduled surgery on my right arm to correct a problem from a surgery a year before. To recap, in October of 2011, while moving an ATU at a brand X station, I ripped a tendon. (Here is a perfect example of correcting a compromise AM installation that really caused me pain and suffering).   I had surgery to reattach the tendon and my body went haywire producing bone material at a rate that surprised all involved. The result was a massive amount of bone that locked my forearm bones together. This meant that I could not rotate my hand more than about 10 degrees.

The corrective surgery was done with a nerve block instead of general anesthesia and I highly recommend this style of surgery if it is possible. I donøt remember anything but they say I was talking to them the entire time, no doubt giving away state secrets.

My arm is now much better and continues to improve. Not using a bunch of muscles for a year takes a while to recover use of them. I did end up with one unexpected complication. They prescribed a drug that prevented the bone from re-growing after the trauma of the last surgery. One of the rare side effects of the drug is tinnitus. I now have a slight ringing in my ears, I would say roughly ten kilohertz. It is slightly annoying, but not a real problem. It may go away with time, but it is what it is. One of these days I might try to zero-beat this with an audio generator and see if I can determine the exact frequency.

The Chicago Chronicles

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

The IT Geek as Broadcast Engineer
Why anyone would let this happen, I do not know, but somehow Iøve been a member of the Education Committee of the Society of Broadcast Engineers for quite a while. But itøs an important position, because on what it does rests the future quality and quantity of people entering this field who truly want to be professional in it.

One of the goals of the Education Committee is to look around the industry, find out where the knowledge needs of the broadcast engineering community are, and do what it takes to fill them.

As more and more traditional broadcast engineers (read that, RF-savvy) retire or pass on, station managers are beginning to find out, always belatedly, that these folks need to be replaced ó when the station, especially in a smaller market, needs repair to the point where itøs almost beyond it.

Back in the day, the oh-so-clever small market manager would figure that heød shave sizable bucks off the payables line by hiring the local appliance repairman, or the two-way radio shop technician to be the station õengineer.ö Some of those *may* be good. I know of one, a close friend who started as the two-way shop tech and is now a well-respected member of the broadcast engineering fraternity ó or was. He just had to take medical retirement from his contract engineering business. Sad, but you see my point.

However, in my past days of contract engineering, Iøve had to clean up after so many messes made by bunches of these engineering wannabes that I can safely say, without fear of contradiction, that every contract engineering has had the same experience. And one of the worst I ever encountered was a station which was *owned* by the local two way radio-shop guy! Oy!

Lately, however, the emphasis has shifted from hiring guys who may have had a modicum of
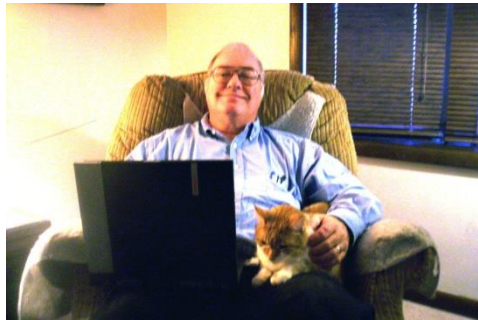
experiences with RF (TV, radio and two-way repair) to the local computer geek, or, let's be nice about this, the IT person. I don't knock these guys for their IT expertise. Here at CBC-Chicago, and in all the major markets, what we have to deal with now are a whole string of computers which have been created to think that they're broadcast equipment. While no longer locally repairable, the big issue with most of this equipment is their interactions with each other. In that sense, the IT can soon be made to feel right at home. And that's not to mention the good that comes from the factory getting directly involved with troubleshooting the equipment via the Internet. What a Godsend!

But there's a downside, when all too many station managers end up learning, the hard way, that the ways of RF and the ways of digital are not close to being involved with the same knowledge base. And that's a problem on several levels.

I recently heard a horror story of an unfortunate IT guy at a TV station (which will remain anonymous) who was pressed into service to replace an IOT in a UHF TV transmitter. The resulting $72,000 disaster cost the IT guy his gig and, I would argue, unfairly. Frankly, *I'm* an RF guy by training, and *I* would need to spend at least *some* time under a experienced engineer's wing in order to be able to replace or even deal with an IOT myself.

So, Lesson 1: IT ain't RF, and vice-versa. We in engineering know that. Too many others in this business don't.

Lesson 2: I would suggest that IT is easier for an RF guy to pick up than is the RF by an IT guy. Why?

The biggest problem facing anyone in IT who is trying to learn RF, is this: In order to successfully learn a new concept, one has to start by relating the new concept to something one already knows. In RF, and in basic electricity, it's not difficult. Relating water pressure to voltage and water flow to current flow is one concept. Any kid who's played with the garden hose on a hot day can pick that up. Equating tubes and transistors, especially FET's, to water valves, is a great way to teach amplification theory. The British have it right ó the idea of calling a tube a "valve" makes more sense because it puts the basic concept across. On a different slant, teaching Ohms Law by way of the Eagle, Indian and River method has worked in all the Ham Radio classes I've ever taught, because wet-eared newbies can instantly relate to that.

My experience suggests that it isn't as long of a learning curve to pick up knowledge of IT from having been an RF person. The concept of "on/off" is already well known to those who know transmitter theory. A valve, operating in Class B or C is, after all, an exercise in the concept of "on" and "off." Once there, however, I would suggest, because I've lived it, that it's only a small jump from that to simple digital logic. That's where digital logic IC's, with their AND, OR, and NAND gates, flip-flops and so on, can be a help. Having to work out a truth table in your head to make sure that a logic circuit will work is a tremendous way to begin to understand the concepts of digital logic, which are the building blocks upon which the foundations of IT rest. (Don't bring up Boolian Algebra to me, not yet, anyway. I'm still working that one out).

Don't get me wrong. There is plenty of evidence to suggest that the digital world and the analog world can function very well in peaceful coexistence inside the same brain. Most of the engineers in major market are walking testaments of that. As a second piece of evidence, I give you those who practice Amateur Radio. IT and RF have worked side-by-side together in many a ham's brain for well over twenty years. Witness, for you experienced hams, the TAPR project. It happens, that's enough hope for me.

The SBE Education Committee is taking seriously a suggestion to develop a course geared to IT folks who want to become RF dudes, but who don't know thing one about it. I don't know when such a course will be ready, but when it happens, both I and the SBE will let you readers know.

The Problem of "Non-Cookie-Cutter" AM Antennas

I never seem to run out of ideas for this column, and more than a few times inspiration comes across my desk at almost the last moment. Such was the case recently when Cris sent an email to the troops asking if any of us knew of any AM station with an antenna which was: a) slant-wire fed; *and* b) formerly series fed, but with the base insulator now shorted to ground.

I sometimes envy my fellow CBC CEs because, alone in the company, Chicago has no AM stations. The tech side of AM is still the love of my life, and I've devoted a lot of time to learning however much I know about them. This concept, however, I had not seen before, so I started shaking the trees of some of the consulting engineers and CE's within my circle, to learn their experiences.

Not surprisingly, the kind of AM antenna feeding arrangement I've described is hard to find, and getting rarer. The reason is simple ó the FCC won't license slant wire antenna feeds, and has not

done so in over 25 years. Slant-wire-fed radiators often have issues, both of õpatternö integrity and in bandwidth. A non-DA station will not be non-directional if it utilizes a slant wire feed. It has to be thus, considering the geometry of the thing. Simply put, slant wires radiate; that distorts the omni-directionality of the station. The FCC doesnøt like that. However, I do know of one directional AM station utilizing a slant-wire-fed tower, and itøs the high-field tower to boot. The õkicker towerö is newer, series-fed and carries relatively little power. To cap the climax, that station has beaten all the odds because theyøre also HD-operational. I have the station info if anyoneøs interested in knowing.

But why is this all important? I wonøt answer that here in terms of the origination of the question, but in discussing this situation with a few of my PE friends, a common theme came up. The FCC is not particularly interested in licensing any AM antenna array that they cannot assume they know everything about; in other words, õoutside the norm.ö That has, for a number of years, confined facilities applicants to designing radiators of either one of two types: series-fed or skirt-fed. Exotic antennas, such as Franklin arrays, the FCC is reluctant to license, and as I mentioned, forget about slant wires unless the AM antenna has utilized it for more than 25 years (yes, probably a good thing).

Their reasoning is sound, as far as it goes. Let me illustrate: The FCC received an application for modification of a non-DA antenna from a major Midwestern Class A station operating on a clear channel. The goal was to increase the efficiency of the radiator. My source told me that while the FCC ultimately gave their approval to the project, they were, to quote my source õright in the hip pocket of the consulting engineerö throughout. Apparently, the FCC expressed concern that the more efficient radiator would negatively impact other stations which now share its channel at night, even though they might be outside of the 750-mile õprotectionö distance from the Class A. For one thing, the FCC wanted to know the current distribution on the radiator, in order to assess that impact. The consultant had to provide it, a tough thing to do. For those of you who are less experienced in this business, yes, that can be a big deal.

Read that, õan expensive proposition.ö There are some stations which have the resources which makes such an expense justifiable. But what if the circumstances say no? The consultant canøt eat the cost of such a study, and in many cases, neither can the station. Example: A Class C (local channel) station in Michigan wanted to install a half-wave Franklin-style antenna. The Commission wouldnøt license it, even though they had granted the construction permit for the project. The project had to be abandoned, and the antenna had to be modified to undo the original design. Apparently, the new radiator was *too* efficient. Somebody had to eat the cost of that. I donøt want to know who.

How would I mitigate such a cost? What I might do would be contact a nearby universityøs College of Engineering School of Electrical Engineering to learn if there was any interest in making such an antenna current distribution study a graduate student project. Specification One for such a project would be that the school would have to develop a good working relationship with the consultant. The professor overseeing the project would do the õnuts and boltsö with the student, so that the consultantøs time would be utilized most efficiently. In doing such a project, the students involved would gain valuable experience and insights into the real world, the consultant might add to his or her knowledge base, and the student or students involved may make a valuable addition to his or her staff. Finally, the resultant knowledge could then be added to the FCCøs knowledge base.

Maybe Iøm pie in the sky on this, but I canøt help but believe that there are situations which call for such a strategy, especially in the world of AM engineering. Not all students are computer oriented. Some have some real esoteric interests within the universe of electrical engineering. The industry needs to find these folks and get them into careers in broadcast engineering, especially in AM. Helping prove to the FCC that there some off-beat AM antenna designs are worthy to build and license might be one way to do that.

Your comments are appreciated, even if they are brick bats. Iød like to know.

Until next monthí

The Portland Report
By
John White, CBRE
Chief Engineer, CBC–Portland

I have been dealing of late with an ongoing problem with our profanity delay. That problem with the delay was a real irritant. Randomly, a power bump would cause the delay to reboot, waiting for an operator to push the bypass switch to rebuild the delay. The critical path gear – console, automation computers, processing, and delay – were all connected to a UPS. None of them except the delay had a problem that I could find.

Gathering data was a real problem. When someone was near the delay, they weren't looking that direction. And often no one was near. But I did eventually get enough info to determine the UPS was being activated as its beep could be heard briefly. Sometimes a blink of the lights would be seen, but not in all cases. Frequently, when the profanity delay reset, I also found the HD mod monitors were locked up, requiring power cycle reset.

Since I had swapped out the profanity delay for another with no change, I initially made the assumption that the profanity delay problem was due to an issue with the UPS. It didn't switch fast enough, or have enough voltage, or was not a sign wave or something of that nature. With the available evidence, that did appear to be a reasonable assumption. I could clearly tie the reset to a power glitch, but no UPS seemed to resolve the problem.

When all of the UPS "solutions" failed to resolve the problem, I began to look for other answers.

The first stop was the manufacturer's web site under the support tab. I found manuals, operator only. Q&A, all unrelated to my problem. In general, nothing useful.

So next I called the delay manufacturer and spoke with the service department. At that point, I learned that they had never seen the problem before. They could only suggest I send the unit in for repair. Since I suspected that would only cost us money and produce the same results, I chose instead to look deeper myself. I did, however, determine that a schematic for the unit is not available.

I decided to do some exploring inside the unit on my own. I found the supply is a separate board and provides plus and minus 5 and 12 volts. It is a small switching computer supply, which isn't a surprise as the delay is really a small and specialized computer.

My first thought was, does this supply have glitch protection built in? Some computer supplies will shut down with a power dropout or bump as a protection device. I was able to get a manufacturer and part number, so that allowed me to continue the investigation.

After some searching, I did find the manufacturer's specification and cut sheet for the supply board. There was no schematic, but the sheet did have a block diagram, which showed over-voltage protection but didn't show any glitch protection circuitry, and the specification didn't list any glitch protection.

Reading further, I found this interesting spec: Hold Up Time - 12mS/115VAC at full load – 80mS/230VAC.

What this spec is telling us is that the supply will provide full output for 12mS when power drops out. That's less than one cycle (16.6 mS). Most UPSes will switch in at around one cycle. So what that spec is telling me is that best case, the UPS is marginal to pick up quickly enough to keep the delay supply from dropping out, and for hard to rapidly detect brown-outs, it is much worse.

Now, knowing the cause of the problem, the real task was finding a solution. The hold-up time is a function of the input filter capacitance. The larger the capacitance, the higher the energy storage. So one possible solution was to increase the capacitance. A messy solution at best.

An alternative solution was to find a power supply with a longer hold up time. That would require a similar shape and size to fit the location. Not likely at best.

Then I took a closer look at the spec. The supply is built to operate from 112 0r 240 VAC, no voltage adjustment switch required. Notice the hang time spec at 240 is 80 mS, over 6 times as long.

After think about the problem a bit, the power is wired 120 and the UPS are 120 also, I had a bright idea: Why not use a step-up transformer and make the AC input be 250 V? Ultimately, that was the solution I chose. I found a Triad 120/240 V auto transformer that fit quite nicely in a deep four square electrical box. The transformer is connected to two pig-tails, one a standard 120-volt plug the other a standard EIA power connector. A 2A slow blow fuse provides protection for the adapter. The adapter simply replaces the power cord with no modifications to the profanity delay required.

The task remains to test the fix long-term. Hopefully, there will be no more unwelcome resets of the delay. I did some testing prior to putting the adapter on line. Those tests do suggest the delay is
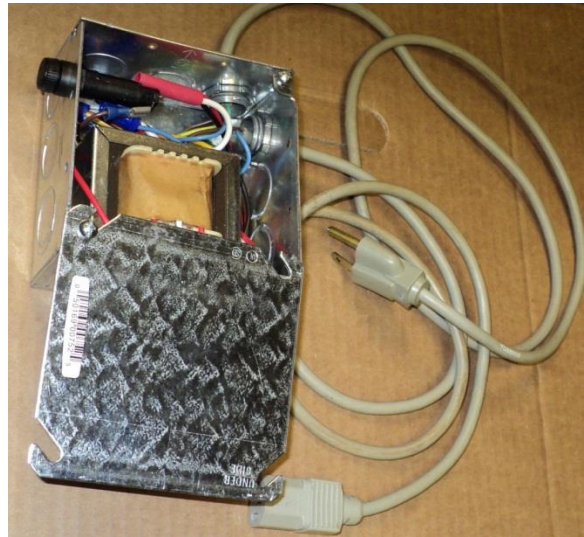
much more tolerant to power glitches. Now time will tell the tale.

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

Burk

Yes, I finally got the new units installed. We received our ARC Plus remote control units with the Dual-X IP-8 adapters the end of January. I spent the first week of February going to the sites, installing and programming the new units.

I must say, I like them a lot better than the old ARC-16 units. Installation was a breeze. Programming wasn't too bad, either. I must say I like the fact that each ARC Plus can have its own calendar and macros stored locally in the unit. This way, if there is a connection issue between the transmitter site and the studio, I don't have to worry about if it switches power or patterns at the right time.

The web interface is also a very useful tool. I have had an UltraVNC shortcut on all the NexGen computers here for the board ops to gain access to AutoPilot for troubleshooting and monitoring. No more. Each ARC Plus has its own web interface. I am able to create a login for each individual operator so they can monitor it that way. This makes it safer

for us. We have had the same password for several years now as well as having had many people come and go over the years with the info to log in. Thankfully, nothing untoward has happened, but I am now able to remove that VNC access so that only I can get access to it.

I am still fine tuning each ARC Plus. It seems that each time I log in, I will notice a meter is wrong or maybe I don't have the limits correct for metering. I must say, I am really enjoying this new equipment. Burk did a great job with this one. Anything to make things a little easier for me and our operators is always welcome.

KLDC Canopy

We have had over two great years of no connectivity issues between the studio and the KLDC transmitter site on Ruby Hill in Denver. That all came to a halt shortly after going home for the day on February 8th. I got a call, during rush hour, of course, that KLDC was off the air.

I immediately began working, trying to resolve the issue remotely. While we were not

completely off the air, the station audio was popping in and out. This is an issue we have had before. After not being able to resolve it remotely, I called my dad, and since it seemed I might have to go to Ruby Hill, which is not located in a good neighborhood, he decided to go with me.

We went to the studio first because I have had luck with resetting the CM-20s and codecs in the Intraplex on that end to get the issue resolved. Not this time. Actually, when I tried that, the station went down completely and we were not able to get a link to the transmitter site. I kept resetting the Motorola Canopy (microwave link) on the studio end to no avail.

So we headed out to Ruby Hill, in rush hour, which took what seemed like forever. When we arrived, the ARC Plus was completely off and the transmitter had every alarm lit up. All we could figure was that there had been a power surge of some kind. We worked and worked for over an hour and had no luck with getting the link to the studio working. Something was wrong with the Canopy. It was showing a good signal, but for some reason we couldn't pass traffic over the link.

To get the station back on, we borrowed Entercom's ISDN unit they have in their room next to ours at the site. This at least put us on air. And because of the smart ARC Plus unit (which came right back up with a power cycle), I didn't have to worry about KLDC switching power without a link to the studio.

The next morning I drug my poor husband, Jordon, out to Ruby Hill with me so I could attempt to fix the problem. While we were on the air, we don't want to stay on ISDN for long because it's too easy for it to disconnect. We worked for the better part of the morning, well into the afternoon, and once again had no luck. We had gone to the KLZ transmitter site to grab some extra Canopy backhaul units. We set them up and still had issues getting a good connection.

A storm system was on its way, so it became very windy up on that hill. Jordon was a trooper and kept going up to the roof to do things with the unit that I asked. He almost froze while helping me out! We still had no luck, though. Finally we called it quits when the snow hit. I was at a loss. This would have to wait until Monday.

First thing Monday morning, my dad and I went back out to Ruby Hill. He made sure I was setting up the Canopy backhauls correctly, which I was, and we began trying to troubleshoot more. After having no luck for over an hour, we decided to head back to the studio. Maybe the issue was on this end. Once again, we began working on the issue. We had replaced both ends with a different Canopy thinking maybe one was bad. No luck. We set up the two Canopy backhaul units in the shop and let them connect to one another to see what kind of throughput they had in a for-sure, no-interference environment. We were amazed to find that the throughput was on the order of 700 kbps in one direction and 200 kbps in the other, nowhere near enough to pass audio! Those units are supposed to be 7 mbps aggregate, or 3.5 mbps in each direction. Something had definitely gone wrong with one or both.

Finally, we found a pair of backhauls that would pass 1.5 mbps in one direction and 750 kbps in the other, enough to get audio and remote control through, so we installed that link and got off the ISDN.

The next day, we ended up purchasing the Ubiquity Nano Bridge M5 with two-foot dishes for both ends. We drove up north a ways to 3dB Networks to pick the units up, then proceeded to Ruby Hill to install one end. The next day, when Keith was available to help, we installed the studio end. Once we lit up and aligned the antennas, we had tons of throughput, over 50 mbps!

We are grateful the Nano Bridge units work as well as they do. Those of you who still use the 5.7GHz Motorola Canopy units might keep Nano Bridge in mind. They are reasonably priced (under $100 for each end with the large antenna) they provide a lot more throughput.

APT Horizon Nexgens

Since installing the Nano Bridge units we have had minimal issues. The issues we have, we believe will be fixed with new APT Horizon Nexgen codecs that we have on order. We are awaiting their arrival so we can get KLDC upgraded. The Intraplexes with CM20 cards work, but clearly those cards don't play well with a lot of network traffic. We are hoping the APT codecs will fix any issues we are currently having with occasional audio glitches.

Looking Ahead

March does not look like a busy month. If weather permits, it will be a good time to get the sites and studio cleaned up good. For the most part, things are behaving, making the workday a bit boring, yet satisfying, knowing that everything is okay. I hope we get those APT codecs in and installed for KLDC and one other station. We just can't make up our mind which station. I am still hoping for one good blizzard. The one from the last weekend in February,

while it was a lot of snow, wasnøt nearly as much as the 2003 blizzard.

I guess that about does it, so until next timeí thatøs all folks!!!

Digital Diary
by
Larry Foltran
Corporate Website & Information Technology Coordinator

Google… The Data Monster

Googleøs alleged email scanning practices were recently pushed into the spotlight as Microsoft prepares to launch its outlook.com email system and retire hotmail.com. Although this is certainly nothing new, especially considering the number of related lawsuits that have been filed against Google in recent years, it appears that the general public is taking this practice more seriously this time around.

Google has generally been a very secretive company in terms of its technology, methodology and general practices, but some information related to its email scanning process has made it to the public domain. What is known is that each email is scanned for specific keywords which may reside within the message. Keywords are extracted and then used to add context-specific advertisements to the messages or the userøs overall Google õexperience.ö

Privacy advocates have stood up, claiming that this practice is a blatant intrusion of user privacy. For security-minded leaders of business, this should also raise a red flag in terms of any business-related messages being sent to or from any system other than the companyøs internal mail server. Granted, it is certainly unlikely that Google will be providing any of the extracted information to third-parties or direct business competitors, but having this type of sensitive information sitting on a server is just the type of juicy target some hacker overseas is dreaming to gain access to. Unfortunately, Gmail has been targeted in the past and will certainly continue to be a significant target for cyber intrusion.

The other primary concern is that Google refuses to spell out its exact data retention period. At one time, Gmailøs user policy did specify that data would only remain on the active servers for a period of up to 60 days. Of course this did not include backup servers, which could potentially retain data for decades to come. Since then, any related wording has been removed from Googleøs privacy policy and they contend that this data would be removed from active servers õas quickly as is practical.ö

Despite the fact that social media users log on in droves on a daily basis to post every little aspect of their lives online, the general public has become very sensitive to infringement to their perceived online privacy. One recent article claims that although 70% of Gmail users didnøt know their mail is being scanned, 88% want this practice to stop. I think itøs safe to assume that many of these users could make the move to Microsoftøs outlook.com system simply because of privacy concerns. But will they be free from email scanning? No way.

Microsoftøs privacy policy specifically states that services may include personalized content and advertising. They are certainly not conducting phone polls to identify the personalized content. Although much of this could conceivably come via browser cookies, content-based keywords could derive from the mail it scans while attempting to identify spam or other unsafe messages. Whether or not this data will be used for advertisement is not the primary concern, but rather how long this data will remain on their servers, active or backup.

I certainly understand that in todayøs technology-focused world, complete privacy is nearly impossible unless you decide to live out your days in a secluded cabin in the Yukon. But we must always make every attempt to a least be aware of what personal or sensitive business information could be tracked and the impact if it were to be made public. Quite honestly, Iøm not concerned about Google or Microsoft scanning through a message I may send to my Aunt Margret that may include a recipe on making my award-winning brownies. In this scenario, public mail systems will work just fine, although I may spend the next several months seeing ads for baking supplies or foreign brides named

Margret that want to meet me. My concern falls to sensitive personal messages such as bank account information or other sensitive information, or confidential business-related messages being sent via public mail systems.

Although not as common as it has been in the past, I do occasionally encounter Crawford Broadcasting employees using Gmail accounts as their primary contact method. I always make a point of strongly recommending moving to a CBC mail account and would urge those of you who encounter similar situations to do the same. Although data and information security in general is a multi-faceted effort, every little step makes a difference.

In closing and in full disclosure, I do not have an Aunt Margret nor do I possess any ability to bake.

KBRT • Avalon - Los Angeles, CA
740 kHz, 50 kW-D/0.19 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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BROADCASTING
COMPANY
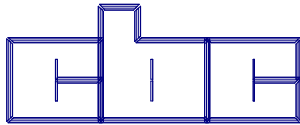
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