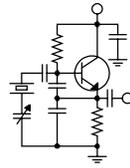


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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The Project Season

Here in Colorado, they call this time of year the “construction season.” While winters aren’t as bad as widely reported along the Front Range of the Rockies, we nevertheless do have a relatively short warm weather season during which all the road construction projects have to get done. I’ve heard it said that the state bird of Colorado is the orange construction cone and that it migrates to the area in late May and to points south in September. I think they may be right!

It works a lot like that in the broadcast engineering world, too. It seems that we have a “project season” wherein we have to cram a whole bunch of projects into a short window of time. A lot of this is weather driven, but a lot of it just seems to work out so that we have a lot of projects going simultaneously for no climatic reason. That is certainly the case right now.

We currently have major technical projects underway in several of our markets. Some of these projects are straightforward and self-contained, but others are much larger in scope and could really be considered multiple projects.

For example, we are relocating our Denver studios and offices this summer. Under that omnibus project heading are a number of other projects – tenant finish of the new leasehold, studio and office wiring infrastructure, microwave/STL systems, telephone line and circuit relocation, security and building access, HVAC... the list goes on. Each of these sub-projects represents days if not weeks or months of work and a lot of expense. This, more than anything else, is why we like to stay put. We have been in our current Denver leasehold since 1992!

At this point, the tenant finish work is... finished. The space is essentially ready to move into. But we’re a long way from being ready to move. We have much of the studio wiring infrastructure in place but there is still work to do.

One thing we discovered late last month was that the electrical work for the “on-air” lights was incomplete. Beside each air studio door, at about eye level, is a quad box recessed into the wall. There should be a 120-volt circuit in the box and a low-voltage conduit stubbed through into the plenum above. Three of the boxes have only the 120-volt circuit and no low-voltage stub, and one has only the LV stub and no 120-volt circuit. Go figure.

The three 18 GHz point-to-point fixed microwave links that we were counting on to connect the new studio location to the KLZ, KLTT and KLVZ transmitter sites ran into a big problem last month. Back in April the Department of Defense entered objections to a couple of the frequencies we coordinated so we had to find new ones and amend our applications. Shortly after that, the FCC Office of Engineering & Technology dealt a death blow to the 18 GHz links. Evidently all three transmitter sites are too close to the Boulder radiotelescope to allow any 18 GHz radiation (even though the fields these links would produce over the site would be far below the specified threshold), so we have had to start over completely with new coordinations in the 11 GHz band. Those coordinations are now complete and we have filed applications for the three duplex links in the new band.

Since there is no way we will receive grants on these before the move next month, we have had to go to “plan B,” which involves relocating the studio ends of the KLTT and KLZ point-to-point T1 circuits to the new building. This turned out to be much more involved than it might seem. For example, the KLZ T1, if we stayed with the current provider, would triple in cost to \$1,200+ per month, pushing it completely out of reach. So I had to start over with a new provider and get a short-term agreement for an entirely new circuit. This has some advantages over simple relocation, namely that the new circuit will (or should) be up and running from the new location and

ready to begin using when moving day comes; we won't have to wait on the phone company to move the one end of the circuit (and hope they get it done on time).

Amazingly, the phone companies seem to be moving away from T1 circuits, instead pushing their high-cap customers to a bulk-bandwidth solution wherein they provide a guaranteed quality-of-service (QOS) level and bandwidth that can be used for anything and everything. For example, they might provide a guaranteed 20 mbps bandwidth that you can use for up to 12 T1/PRI circuits, Internet, VPN or any combination of those and other applications. On the surface this has a lot of appeal, but I can't help but wonder what the QOS is all the way through. They may guarantee 99.9994% up time at both the studio and transmitter ends, but what about all those intermediate nodes and servers that are not under the carrier's control? I'll remain skeptical for the time being.

The part of the project currently under way

is making source/termination cables for all the studio equipment. On moving day we will remove all the equipment from the cabinets in each studio, remove all the wiring, disassemble the cabinets and move them to their new homes. Those rebuilding each studio will have a box of brand new wires with brand new connectors, labels, etc. to use. This will provide us with a unique opportunity to get it right. Before each wire is punched down it will be cut to length and labeled. The finished product will be well documented and with easy to trace wiring.

We've set the date for the technical move for the week of July 19, and the offices will follow the next week, July 26. Art Reis, Stephen Poole and Robert "Bubba" Payne will be on hand to assist. The calendar pages seem to be flying away as "D-Day" grows ever closer. We still have a lot to do, and time is getting short. But that's pretty much par for the course during the project season.

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

Hello to all from Western New York! Spring has finally arrived. It seemed that winter was never going to release its grip on us, with below freezing temperatures well into May. We even had a touch of snow on Mother's Day! It's always refreshing to see the change in seasons, knowing that better weather is just over the horizon, but knowing also that storm season comes along with that change from winter to summer.

The second weekend in May, we had series of strong thunderstorms along with high winds and gusts of over 60 mph. This storm system was no stranger to destruction, spawning several tornados in the Midwestern states, massive flooding in parts of Kentucky and Tennessee, golf-ball sized hail and strong winds. As the storm trenched its way up the Ohio valley, it picked up momentum as it joined with a strong cell coming out of Canada, producing the strong damaging winds off

of Lake Erie that we experienced.

The following Tuesday after the weekend storm, I was performing my weekly maintenance at the WDCX-FM transmitter site and noticed that the nitrogen tank was empty. Not paying too much attention as to when it was last changed, I replaced the tank, logged my readings and continued on.



The following week, I found the tank to be empty again. Knowing that a tank of nitrogen usually lasts us several months, I began looking for the source of the gas leak. After installing another new tank, I waited about an hour to insure that all antennas and feed lines were fully pressurized and shut off gas flow to each to see which one was leaking.

Immediately, the main antenna's pressure gauge went to zero pressure.

Now that the culprit had been identified, we had to inspect the system to see what had opened. I had suspected the black neoprene line that feeds the

antenna, since it has been in use since 1979. Don Boye of Western Antenna & Tower Service made the climb to inspect the gas lines that run up the leg of the tower. He checked the lines thoroughly and found no leaks in either of the feed lines.

Finding that the lines were not the problem, he continued on up the tower to investigate the 10-bay ERI antenna. It was not long at all when he found the source of the leak. The second antenna bay from the top had a broken arm that had split at one of the mitered seams and was lying on the horizontal "T" balun. Not wanting to move it to keep the arm section from breaking completely off, Don made his way down the tower, and I ordered a replacement arm from ERI.

The following morning with a new arm in hand, Don made the climb to make the repair. As soon as he touched the damaged section, it broke off, just as he suspected that it would do. With a new arm on site, this would not be a problem. However, Murphy's Law kicked in. Upon inspecting the area of the "T" balun where the arm was making contact with the balun, Don found an area about the size of a half-dollar where the antenna had arced, burning a hole in both pieces. After placing a call to Cris to report on the progress of the repair and the additional findings, I had to phone ERI again to order the additional parts. Cris and I agreed that we should replace the other arm of the antenna bay. The sections arrived on Monday morning of the 24th, so Don and his helper rigged the tower to hoist up the new bay and install it. After installation and checking for leaks, I pressurized the antenna and had Dan open the end cap of the antenna to purge it. Happily, no water emerged while purging the antenna, although moisture was found in the arms of the damaged bay, it apparently did not proceed any farther. I purged the antenna about six times, and placed it back on the air. I am happy to report that it is working perfectly with no leaks.

While on the subject of the WDCX-FM tower site, I have noticed that we have a new neighbor somewhere in the vicinity of the tower site. I have found numerous bear tracks on our property in recent weeks, more than likely a black bear that has migrated up from western Pennsylvania. In the last couple of years, there have been rising reports of bears in the Western New York area. Last year one was killed by an automobile on the local interstate I-190 not even a mile from my house! Needless to say, I have been extremely cautious of my surroundings while at the transmitter site. I'm sure that I look like a big juicy pork-chop to a hungry bear, and do not want to end up being the main entrée at his next meal.

WDCX-FM - Buffalo

We had in our budget this year to purchase a couple of the Zephyr IP ("ZIP") units to replace the old ISDN units we have been using for several years now to get programming from our Buffalo station to WDCX(AM) in Rochester. With the NAB special that was offered recently by Telos, if we purchased the units now we would save almost two thousand dollars over the regular price. Needless to say, we made the purchase and I spent a couple of days getting the units programmed and installed in their respective studios. The installation went without incident, and I am happy to report that they are working flawlessly and sound phenomenal! By switching to an IP-based unit we are saving a minimum of \$400 per month over the cost of the ISDN long-distance calls. I know Art and his crew in Chicago have been using these for some time now, and have not reported any major problems with their operation, so I am confident that the Zephyr IP units can be relied upon to get programming audio to our Rochester sister station.

Another small project I completed last month was to get the AMB-OS system programmed for receiving shows we air from the Ambassador Network over the Unity 4000 satellite receiver. The receiver was installed as soon as we received it, but the Rochester station never had a DRR log generated to record these programs. Steve Napoli made several trips to Rochester to get the logs set up, and in the meantime I programmed the computer attached to the AMB-Os receiver to send out the programs at the proper time. In order for this to work properly, I had to install one of our retired Broadcast Tools switchers to switch between regular programs received from the Unity 4000 receiver and the AMB-OS receiver. As we have only one audio channel between the transmitter site (where the sat receiver is located) and studio, a switcher was needed to select the proper audio source for background recording of the teaching programs we air.

WDCX(AM) / WLGZ-FM - Rochester

Last month I had to replace the motherboard on the WLGZ-FM NexGen on-air workstation. For a while after making the repair, the computer seemed to work fine, but as time progressed, the board operators began noticing some quirks in its operation. They would load a window, such as voice tracking, but not all of the window would be displayed, and at other times, the monitor would blank out for only a second or two. After a reboot, everything would come back to normal and be OK for a day or two

then the cycle began all over again. On the next visit, I will check the system's memory and the amount of CPU usage, to try and get an idea as to why this is happening. If any of you have any ideas or suggestions, please let me know. I do not want to replace the computer unless it is absolutely

necessary.

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

WMUZ Law Day

Law Day 2010 is now in the history books.

When preparing for the event we had originally planned on using the Marti RPU for the

feed back to the studio. At the beginning of the week of the remote we went down to the Goodwin law offices and did a quick check with a hand held to see if we had sufficient signal strength back at the studio receive site. Considering we were using a rubber duck and 5 watts of transmitter power, the signal strength was rather good. Subsequently, on Wednesday, we tried the Marti transmitter and 5-element Yagi antenna to test the link. The signal strength was good, but a slight amount of hiss or noise was still present. We adjusted the antenna azimuthally but our feeling was it might be objectionable to some listeners. So at that point we made the Marti a backup to the Comrex Matrix.

Using the Matrix at this venue proved to also be a challenge. The only POTS line available was a fax line within the Goodwin law offices on the 3rd floor of the complex. Therefore we needed to provide cabling from the ground floor parking lot to the law office. I used my survey measuring wheel to approximate the length of cable we needed to purchase. The amount of cable measured was 371 feet. At that point I went to Home Depot to purchase the cable and connectors we would need to make the connection.

Prior to the wiring, we tested the Matrix to make sure the Goodwin fax line was of sufficient quality to support the connection. The Matrix upon connection renegotiated twice to a baud rate of 21.6 kbps. Therefore, I locked the remote Matrix to that baud rate so that we would have a connection that

would not waver from the resultant baud rate. This proved to be a prudent decision since when the additional cable was added and the broadcast started, the connection never had any issues during the five-

hour broadcast event. Locking the baud rate on the Matrix was a strategy we used with the Evans family broadcast we host on WEXL. Ever since we locked their Matrix to 19.2 kbps, we have not lost a connection. I figured it was worth trying the same strategy in this case.

During the event we had a live band and a solo artist. With the band we received a monaural mix from their sound reinforcement mixer and input that into our remote program channel mixer. With the solo

artist, we used our wireless microphone and we provided her with an interruptible foldback (IFB). The IFB was implemented by using one of our 450 MHz Marti unit transmitters and a portable hand scanner and earphone. She could monitor herself and the talent while taking cues from the control room's talkback circuit. Her music tracks were prerecorded on the Nexgen and played out while she accompanied the tracks on site. Sunny Day, the voice talent indicated she never had this kind of monitoring channel and felt it helped here with the performance.

The only thing that did not work to plan was the SCA channel as a second IFB. I needed the extra channel to separate the talkback activity from the PA feed. The SCA receiver reception was not good at this particular location. Going forward, I am going to buy a new FM log periodic antenna so that I can handle locations that do not have optimal signal strength. Also, I am going to requisition a new Marti RPU transmit antenna with low loss cable to improve the Marti's performance. I do not feel it will take



much more work to get the Marti performance where it needs to be to ensure broadcast audio quality.

Also, we need to document well in advance the locations where the Marti works best. Then set up time will be kept to a minimum. In this case,



A bird's-eye view of the Law Day festivities

since the broadcast started at 11:00 AM, we needed sufficient setup time to ensure a smooth broadcast. Unfortunately, the stage, tent and riser were not available until 10:00 AM. That did not give us enough time cushion to do an optimal job. We were at the venue at 8:00 AM and hoped we had that equipment set up with time to optimized it before broadcast.

All things considered, the broadcast turned out well. I would like to thank Mike Markham and Anthony Faletti for helping me with the organization and implementation of the broadcast. Without their help, the event would not have come to fruition.

WRDT(AM) Daytime Facility

The construction work on the WRDT daytime facility is complete. Town and Country Outdoor Service completed the work last week. The transmitter building has been painted and the generator building has been stripped of paint and a new door was installed along with a fresh coat of paint. The generator building has been roofed and painted as well. The transmission line chase has been built, installed and painted. This is the second half of the facility renovations is planned for later this year. These improvements will pay large dividends in keeping our equipment running within the facility dry and safe from the elements.

T1 Issues at our WMUZ Studio facilities

Last month I mentioned a little bit about the

T1 infrastructure issues with AT&T. Our service provider FirstCom has been very responsive in mitigating the further resolution to issues we have with our second T1 circuit. Our second T1 has had many perturbations to its service over the last few weeks. Just within the past week, FirstCom was able to capture further data errors. A copper jumper was replaced as well as a copper pair repeater. Hopefully



Rear of WRDT transmitter building showing the new transmission line chase

over time we will see a reduction or elimination of the issues we have been experiencing. In parallel with the task of containment of the issues with the existing infrastructure, Cris has been working on a microwave link to move location of where we obtain our T1 service. I will report out on our progress next month as to how this saga pans out.

KJSL Programming From Detroit

Last month I mentioned that we were providing the Bob Dutko show to our sister station KJSL in St. Louis. The programming offerings of live shows provided to KJSL are expanding. Since the programs originate from our other Detroit stations WRDT(AM) and WEXL(AM), profanity delay functionality must be implemented to our satellite uplink delay unit. Based on some very good suggestions from my colleague Rick Sewell in St. Louis, we are going to port the dump button closures and satellite uplink delay to our Wheatstone bridge router to provide the selection of what studio's delay dump switch is active at what desired time and day. The Wheatstone uses macros or "salvos" to proved automated switching. Next month will share the progress of the implementation of these features.

News From The South

By

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

A Model Array!

We are done with the essentials of the WXJC (850 AM) night pattern modeling project. We've also completed a partial proof and have filed for updated parameters on our day pattern. It took longer than we'd hoped because of almost-constant rain, but as I write this, Cris is preparing the 302 for the FCC. After two years of fighting an out-of-parameters night pattern and living with an obviously-shifted (albeit legal – just barely, at times) day pattern, we're finished!

This has been a learning experience for all of us, and I'm going to share a few things that we picked up along the way.

GPS – A Blessing and a Curse

One of the reasons why modeling is so attractive, and should be given serious consideration by anyone who operates a directional AM, is that it eliminates the need (and major expense) of having to do a proof. Even a partial proof, as I found out on the day pattern, is a pain in the neck. If you're dealing with an older system like ours, the geographical conditions that existed when the array was first licensed (1970 in this case) will almost certainly have changed.

The proof radials for these older arrays were laid out using rulers, compasses and pencils on USGS Topo maps, often on the transmitter room floor. One of the worst-kept secrets in the industry is that these maps are often inaccurate – in our case here in Alabama, they are sometimes laughably incorrect. For example, just north of our site is Carson Road, which changed name and split off from New Castle Road many years ago. The 7.5 minute map for that quadrangle still shows the original names and routing. (Not that it's all that much better now; I think they update the maps here once a century. If you have one of those cool in-car, talking GPS units, be prepared to run into a dead end or a one-way street

here that your GPS has never heard of. I'm speaking from experience.)

When laying out the radials for the proof, the engineers who built the array had no choice but to



use these maps to determine where to take measurements. A straightedge and pencil works marginally well within a single quadrangle (assuming no map errors, of course, as just discussed), but as you cross map boundaries, the chances for error increase each time.

This is especially true in our case, where the array is located right in the upper left corner of the quadrangle. You are literally jumping from one map to the next just to locate the monitor points, much less to run the entire radial!

Modeling provides relief from a “don't-ask-don't-tell” situation as well. Nowadays, with the availability of \$100 GPS units that are accurate to within a few feet, let me assure you that you will discover that many of the distances and bearings that were derived for the original measurement points were off. In some cases, they might be in error by over one degree of bearing.

Even with my cheap, hand-held Magellan unit, I can easily use bearing and distance to know that I'm standing in the correct spot to within 10-20 feet. In those few cases where I was able to positively locate the original measurement point, it was amazing to see how far off some of them were. What is the FCC's position on this? It doesn't have one, at least not officially. “Don't-ask-don't-tell,” indeed.

Old-timer engineers (like Cris) love to bore you with stories of boating and hiking to make all of those measurements (uphill, barefoot and during a hailstorm, of course), but don't let them fool you. *Every* engineer *always* takes pains to ensure that the field strength measurements can be taken as closely to a nice road as possible! In central Alabama, that's not always easy because so many of our county roads have no shoulder. Literally. The roads are narrow, twisty things with a ditch right off to either side.

There's nowhere to park at the measurement point, so you have to drive up the road a ways, then walk back to the spot. Now, add in the fact that the original measurement point may have moved (or was incorrectly located to start with), and the joy is multiplied.

Another joy in hilly terrain like this is that the power company will run the utility poles as close to the road as possible. Even worse, they often crisscross the road, literally jumping from one side to the other. When coupled with the fact that there's no shoulder, or that the shoulder might literally be a 50-foot drop, this can make it very difficult to find a measurement spot that's well away from a power line.

One of our radials, 347 degrees True from the site, runs across a largely-unpopulated and/or closed area. There is a huge gap in the measurement points on that radial, and I told Cris that I could hear the dueling banjos as I drove around looking for places to make measurements. There is one stretch on that particular radial that is truly a No-Man's Land. It's part of the Warrior River valley, and the only thing out there is rabbits, rattlesnakes and suspicious old-timers who'd rather shoot first and ask for your ID later. (Maybe.) That was a ball, I assure you.

Finally, even assuming you *can* locate all the right spots and dodge the power lines, remember that we're talking about *Alabama*, here. It takes quite a while to drive to all of the measurement points because of fellows like the one pictured. Jimmy and I watched this guy weave from side to side, wobbling, bobbing and knocking off tree limbs, convinced that we were about to see someone win a Darwin Award in real time. As soon as we could, we left him to wallow off into the sunset on his own.



A stragglehold on the concept of center of gravity!

Using the Antenna Monitor for Troubleshooting

I mentioned this last time, but it's such a cool technique, I figured I'd cover it in more detail here.

In our case, we're dealing with an older system that was designed many, many years ago. We knew that the sample lines were okay because Cris had loaned us the network analyzer just for that purpose. They were precisely the same length (to within less than one tenth of a degree). But as also mentioned last month, it had become obvious that the array had been badly adjusted by the consultants when we purchased it in 1999. We had good-looking numbers on the antenna monitor, but some components in the system were getting unacceptably hot and the pattern just didn't "feel" right. One of our monitor points was always right at the limit, while the others were surprisingly low. In addition, we didn't seem to be penetrating into Birmingham the way we thought we should.

Field engineers like yours truly know all of the usual tests: check your base currents, use the OIB to check the ATU input Zs, things like that. Another clue is that over the years, we've had several component failures to tower #1, our lowest-powered. We decided that since we were modeling the night array and switching to sample loops (meaning that we'd have to do a partial proof anyway), it was an ideal time to figure out what was going on in that day array once and for all.

We started seeing things that made no sense. I wanted to limit how much I knocked us off the air, of course, but just by counting turns on coils and estimating reactances, the tee networks appeared to be badly misadjusted. To make a long story short, the consultants had mismeasured the lengths of two of our transmission lines and had then tried to cover it up with creative tee network adjustment. The worst case was at tower #5, which is the day reference: they had told Cris that it was 135.5 electrical degrees, and he had (naturally) used that figure to make up the day phase budget. In fact, it was closer to 190 degrees, meaning that our origin (the reference phase at the reference tower) was way, way off to start with! Some "creative" tee network adjustments, indeed!

We had already sent the network analyzer back to Cris; he needed it badly for some problems that they were having in Denver. We decided to use our PI-1900 antenna monitor to check phases at different points in the system. An antenna monitor isn't difficult to understand: it takes the samples applied to the rear panel, one of which is designated the "reference," and then simply reports the

differences in amplitude and phase between them. This makes it an ideal test instrument in the field. In our case, since we knew we could trust our new sample lines, we took a couple of toroids and some equal-length RG58 cables and started plugging them in at different spots in the array.

We generated a bunch of numbers, which Cris then crunched to determine the actual line lengths. That's when we discovered just how badly the consultants had blown the original numbers. I don't know if they realized their error and simply tried to cover it up with a bunch of misadjustment or what. I can't prove that. But Cris had originally set the system up such that the worst-case tee network in the phasor was still between 80-110 degrees, which is fine. The worst-case ATU was less than 120 degrees. As it was, one of our tee networks had been centered to less than 40 degrees, and one of our ATUs was so far off that I still don't know what it was. (Rather

than taking the time to run it down, we just fixed it and moved on.)

Finally, the consultants had reported that the driving point impedance (DPI) on that low-powered tower, #1, was 269 +j488 ohms. In fact, it was about 540 +j500 – a rather dramatic difference, don't you think? The ATU was thus totally wrong, meaning that I had to rebuild it from scratch. Fortunately, we had a few extra components on hand, and I was able to do that. The good news, once I was finished, was that everything looked great, the antenna monitor looked great, the partial proof looked great, and all of the component at tower #1 were cool to the touch. Best of all, the signal in downtown Birmingham have improved noticeably. Beautiful!

That's it for this time. Until next month!

Gateway Adventures

By

Rick Sewell, CBRE

Chief Engineer, CBC–St. Louis

As usual, this spring has certainly had its share electrical storms and subsequent damage to equipment. I have always wondered about the logic in putting giant metal rods in the air and then attaching equipment via copper wires to other end.

If you wanted to try and attract lightning strikes, the plan above would make a pretty good start. It makes about as much sense as flying a kite during a thunderstorm. But in the long run that proved to be a good thing. The same goes for us; we get to broadcast even knowing that the next electrical storm could take us off the air.

I have always been fascinated by the wonder and power of a good electrical storm and the strange ways in which they work. It must be fun to try and predict the somewhat unpredictable nature of these storm systems. Just yesterday I had a storm pop up over the KSTL transmitter site. Instead of moving, it just hung around like a stray cat, delivering one knockoff punch after the other. As soon as it seemed to lose energy, it would gather strength again for

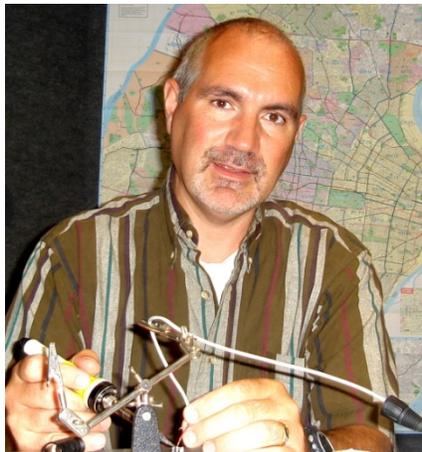
another round. This stretched out for six hours!

Meanwhile, my house, which was less than ten miles away, didn't get a drop of rain during the time period.

This was one of those storms that seemed to think it was in control of the radio station. While we experienced the usual SWR shutbacks on the transmitter, it was also unusual in the fact that it kept causing the remote control (or at least the equipment associated with the remote control) to jump to unexpected commands. At one point the main transmitter went to low power, another time the

antenna switch went to the auxiliary transmitter position. This is something that I haven't experienced at this site before.

Earlier in the month, this same remote control completely lost its mind, literally. The station did not sign on at 5 AM as expected, or so it seemed. I got alarmed that there was no carrier. I logged into the AutoPilot computer to see what I could do to get it on the air but to no avail. The telemetry showed no movement.



I waited a half hour to see if I could get the auxiliary transmitter on the air since it could only be used during day power levels. It didn't respond either, so I took off to the transmitter site to see what I could do. On the way there, I heard the station on the air and at the full daytime power. So something was working right. Somehow the remote control was getting the commands through but not showing telemetry or status.

This is a Burk ARC-16 remote control system, so if you are familiar with them you know how they use site designations for each remote attached along your system. When I got to the site, the remote control showed every site along the chain of our remote controls but I could not select the site for this specific remote even though I was on the remote itself. I came to the conclusion that the remote control had lost its configuration. I figured that I was in for a manual reconfiguration but remembered I had

the AutoLoad software and had saved the configuration for the remote control. I didn't think it would work but I thought it was worth a try. I connected the computer and loaded the configuration and hit send. After about 20 minutes it was done and all my configurations were restored.

I think that the reason it worked was that the computer I was using with AutoLoad was actually attached to another remote control along the chain and thus the software could log into that remote and then transfer the config information to the other remote. This was a good demonstration of why it's important to save your configurations for these remote controls with AutoLoad. If you haven't done so, you might want to do it soon. The AutoLoad software comes free with the remote control. You will, however, need an ESI card or a CI interface to make it work.

Catalina Tales

By
Bill Agresta
Chief Engineer, KBRT

Greetings from Santa Catalina Island!

This has been a very frustrating month as I try to even get simple things done. The island is changing quickly, and it seems for the worse when it comes to maintaining our operation. It has become nearly impossible to find workers here as with the terrible economy and island politics they have all left the island. I have been searching for a couple guys who can help me with weeding the tower field as we do a couple times per year but as of now, I've got no one. The town itself has had a small surge of tourists but most of them are just looking, coming to check out the new stuff that the Santa Catalina Island Company is advertising, things like the new Zip Line Eco-Tour. After seeing the prices, I don't think many of these people will ever be coming back!

We have had a very interesting time trying to figure out why KBRT has gone back on the air a few times the past couple months after it was powered down at the end of the broadcast day. After digging deep, checking out everything and anything



that could cause such an occurrence, Cris and I have come to the conclusion that this has got to be someone on the outside calling in to our remote

control. We had an issue with this several years ago and I changed the phone number that our remote control was hooked to, connecting it to a number that only accepted calls from numbers who transmit their caller ID. I also installed a caller ID box in line with the remote, and after this, the problem stopped. I figured once they realized they had to show their caller ID, the game would be over. Now, many of these people know how to morph their caller ID to another number, so the fun begins once again. But then, this is what the password is for, right?

After thinking about this, I recalled talking awhile back to one of our board ops who was having problems working our remote control from her cellphone. She asked me to hold on while she got her notes. I thought about that, figuring that many board ops probably have the phone number and password written down on something and many of them have

step-by-step instructions of how to operate the transmitter, or at least bring it up via the remote control. Then the question occurred to me: where do they keep such notes?



The KBRT Ranch on Catalina Island

I am sure that more than we want to admit, folks keep them posted on things like their refrigerator at home or in a similar place where anyone who goes into their house or car can see. This can be the cause of big issues as their children or their children's friends or even adult friends get hold of this information. I think it is in our best interests to talk with all the board ops and anyone else who holds this information and make absolutely sure they keep it very guarded at all times. I have also changed both the user and admin passwords and from here on out will be changing passwords randomly but often.

I have been dealing with so many Internet issues that simple tasks have often become frustrating and time-consuming. This is just the case as I write this month's *Local Oscillator* article hoping our Internet connection returns soon so I can actually send it off to Cris for publishing. The people at HughesNet always seem to be playing with something, blocking ports and all kinds of other nice stuff at random. When I call them they either do not admit they did anything or say, "Oh, didn't you know this change was scheduled for today?" I guess in order to use their service they require you to constantly read their tech-blog and always be making changes. The problem is, that is not what we paid for. We just want a simple and solid Internet connection that we can rely on. I guess these days, that is asking a lot!

On the good side of things here, our

mechanic finally found the time to make some needed repairs on our truck and he did a great job. It is nice to be able to put in the key, turn it and it just works. We had a sensor that went out and that required me to spend some time playing with the gas pedal sometimes to get it started. He also fixed the driver's side window and our steering, yes, steering. That year Toyota had a few recalls because of an issue in the steering column and I have had to be very careful after I realized that it never got repaired properly. It's nice to say, even on this crazy island some things can eventually get fixed how they are supposed to be!



Some things almost make our struggles on Catalina Island worthwhile!

As for those pictures I promised you all last month, that is another issue. Along with all the fine Internet issues I deal with on a daily basis, my laptop hard drive seems to have thrown a fit and corrupted some of the info. I decided not to fire it back up and take a chance on losing more info, so I have instead removed it and will be soon trying to recover all I can. So the dozen or so pictures I had planned to send Cris for consideration in this month's *Local Oscillator* have been replaced by only two. I will soon hopefully recover the other pictures as well as take more that I can share with you all.

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

The Chicago Chronicles

By

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

Project Sheherazade

Our question last month dealt with something really esoteric. This is something that I hadn't known before that I found recently while digging through the FCC Rules. (It's wonderful what you'll find out if you'll really read those things.) Anyway: What is the one commercial FM channel on which, until now, stations using it had to worry about how close to they were to a TV station operating on channel 6?

I can see it now... everyone is scratching their collective head, asking, "Commercial channel? I thought that the only channels which have an issue with TV channel 6 were the ones below 92 MHz!" Well, not quite. Check out rule in FCC 73.207 (c) which states the distance limitations for stations operating on 98.5 MHz to stations operating on TV channel 6. It depends on the operating class of the FM station, of course. Now, why? Well, do the math. 87.75 MHz TV analog sound carrier, 98.5 MHz FM, 10.75 MHz frequency spacing, close enough to 10.7 for governmental definition of "interference potential." Now it makes sense.

Yeah, I know that the issue is moot, unless maybe your station is operating near a still-existing digital TV channel 6, such as in Philadelphia for instance. But then again, the analog FM sound carrier is gone, so it doesn't make any difference anymore, does it? Still, it's an interesting bit of knowledge for use at your next SBE meeting conversation.

Now, for next month's question: What is litz wire, and what is it good for? Betcha a lot of you old school dudes know the answer to that one.

The Alligators are Winning

I had to run back through some of the back issues of *The Local Oscillator* this month just to make sure that I hadn't done this sort of column before. We've had enough trouble with emergency power generators across time that maybe I'd mentioned a similar idea in the past.

This time, the story is with our Beecher

(WYCA) generator, which is all of thirteen years old going on twenty. Bottom line, the thing quit a couple of months ago and so far, we've still not been able to get it going. Anyone ever see the movie, "The Money Pit?" Well, this story is kind of like that.



The Beecher generator was bought new when the station was acquired back in the late of 1997. It's an Onan 20 kW rig with a Ford LRG425i engine, which until this past winter had been operating very, very reliably. But about eight or nine years ago, something happened

which really affected it. The power went out at the site during the summer of 2003 and the generator came on. And stayed on... and on and on.

At the time, we didn't have an alarm for power failure at Beecher – yes, it's an oversight on our part, I'll own up to that. All of our sites are now alarmed for both commercial power loss and for transmitter room over-temperature issues as well. Further, we were in the midst of a major project at the time and with just Mack and me as the whole staff, and we didn't have the time to go out to Beecher to do a weekly inspection. It's corrected now. We're at all of our sites a lot these days.

But the Beecher gen, back at that time long ago, stayed on for about *three weeks* without stopping until I got there and found the situation, called Edison and screamed for them to replace the dead fuses on the pole out front. There was no rhyme or reason as to why they had blown except possibly for heat. That done, the generator duly shut down, I called Cummins to get them out there the next day for a full PM on the thing and reported the whole tawdry story to Cris. He advised (a gentle word there) that the alarms had better go in there ASAP. They did, at all the sites, as I said. The Cummins tech told me that the Beecher gen had come through its little ordeal with flying colors, except for the hour meter reading, which was a little high. Yeah, about 500 hours too high.

Across the years, the little 20 kW rig kept on keeping on, exercising every week, taking over as the power source for the site when it had to, working its

way up to about 1200 hours of actual “on” time – about the same amount of “on” time as our vintage 1990 Onan 70 kW rig at Kirkland – until sometime early this year when it stopped working. I noticed it when the gen hours meter didn’t move between two maintenance log readings. I tried to start it. No luck. I called Cummins N-Power. It was almost time for the twice yearly preventive maintenance visit anyway, so the tech came out and had a look at it. The gen needed a different tech – and a cleanup. Mice had been taking up residence in there. Cute. I thought we had fixed that, and we had the fine-mesh chicken wire to prove it. But no, they had found other ways to get in. By the time you read this, they will no longer be in residence. I did the obligatory cleanup of the mess. Only then did the second tech come out and tried a tune-up first, the first one the gen had ever had. No dice. As a certified wizard in such matters, he knew where all the other wizards were, and he consulted with them. That’s when things started getting, uh, interesting.

The part which our tech’s fellow wizards pointed to (and correctly) was a thing called the crank position sensor, and I’d never heard of one failing before. But that’s the key. Ford knows that it seldom fails, too, so it is buried way down inside the engine block, close to the flywheel where it belongs. But replacing it requires taking apart much of the generator, meaning all of the front end and then taking out the crank position sensor – in our case, in pieces. Not good. That’s a lot of labor, a lot of time, and that means... aww, now you’re getting ahead of me.

Parts obtained through Cummins can be rather expensive, but found that I was instead able to order some things through the local farm implement repair service (having a transmitter site out in the middle of nowhere does have its perks!). I also ordered a new serpentine belt as well. The parts arrived and the tech returned to put them in. The gen still wouldn’t start. Another confab with his fellow wizards, some tests, and then the bad news: The timing belt had slipped a couple of notches.

You don’t have to be a Certified Professional Broadcast Engineer, or a Certified Professional Auto Mechanic, to know that a slipped timing chain has the potential of being a death sentence for an otherwise good engine. The youngest of my engineers here in Chicago lost his last car about a year ago when the timing belt let go while he was driving at full-tilt boogie on the freeway. That car is now replaced. He gets it.

So now, the question comes up: Is the gen worth repairing, and for that matter, how do we find

out without taking the heads off and examining the pistons, valves, and cams? (\$!) What we’re hoping and praying for is that the timing belt “jumped” (as the gen tech put it) upon generator startup. At least there would be no engine speed involved and in such a case, little or no damage. It also doesn’t hurt that, according to the Cummins shop boss, the engine is a single-overhead-cam job, which makes much less the possibility that the valves will meet the pistons violently.

But we’ve already put several thousand dollars into a generator which was bought new for something like three times that amount. That’s getting fairly near the point at which you stop fixing and start the process to buy new. But we need a working generator. Getting a new one will take a great deal of time, maybe several months. So, what do you do? Decisions, uncertainty, stress, grey hair.

To top it off: In case you haven’t noticed, to aid in determining whether to fix or buy, manufacturers of a lot of stuff, generators included, are discontinuing the manufacture of certain critical components for their equipment. Example: Cummins has informed us that the electric current sensors for their generator output circuits are no longer made. They got the last five in stock, and we need two of them. While this particular part is not absolutely essential to the performance of any generator, the point is that there are much more mission critical parts, which have also been, or are about to be, discontinued, possibly rendering the product obsolete. And in the case of our Onan, that’s just on the alternator side of the system. On the engine side, Ford is doing much the same thing. You all know what it is: Planned Obsolescence. Well, with our stable of generators, one of which goes all the way back to 1991, and for most of our big ticket items, such as transmitters, et al, we’re frankly not ready for that sort of thing. Now, how do we get the manufacturers to listen to us? Generac, anyone? But then again, are any of them any better?

One more note before I move on: The one part of the engine-side wiring which the mice *had* eaten was the AC connection to the engine block heater. The engine block heater uses a plug-in AC connection, just like at home, but with the line cord now gone (I hope that offending mouse got a shock from it!) Cummins wanted to replace it. Why should we, though, since the unit was otherwise working just fine? At that point, our official staff electrician, Warren McFerren, stepped in. Skip the rubber house-wiring system, he said. Better yet, let’s do the connection with BX cabling. Well, BX isn’t “code” everywhere, but out in rural America it is, and it’s

darn well mouse-proof to boot. So Warren jerked what was left of the line cord out of the block heater and cut a new hole in its base for the BX fitting. The



BX cable was used to connect the block heater

placement had to be just so, to keep the BX outer conductor away from the hot AC connection inside, but as you can see from the picture, Warren managed it and the old block heater is now back in place with its new armored AC connection. A new run of AC wiring was added going back to the AC breaker box inside the transmitter room. At the suggestion of the Cummins tech, we also added an on-off switch to the circuit to provide safety for the folks who have to work with the block heater and coolant in the future.

The mice will never be a problem to that block heater again.

Recycling

I'm aiming this piece not so much at our folks here in the company, but rather to those folks who read this from the outside who are fairly new to the business.

One of the things about which I am a conservative, is that I truly believe that too many folks are too willing to throw away things which, with a little effort, could be repair and put back into service. It rubs me the wrong way as an engineer. Further, I have enough problems with having to send things, *anything*, out to a repair shop to get fixed rather than get it done in-house. More on that in a moment.

One of the outcomes of that big Easter evening lightning strike at our Hammond studio site was the loss of several of our office printers. Those things were really destroyed and just had to go to the recyclers to be shredded, or whatever they do with them. Meanwhile, sitting in storage in one of our multi-purpose catchall rooms are a number of printers which have just quit for minor problems. We sent them to our local business machine repair shop,

and lo and behold, the cost to fix them up turned out to be a mere thirty to forty percent of the cost of replacement with new. That's the key. If the cost to repair is less than half of the cost to buy new, fix it and put it back into service. That's cost-effective. As a rule of thumb, if the cost to repair is over half the cost to buy new, then recycle and get a new one.

There are mitigating circumstances, of course. If the item in question is otherwise non-replaceable, you have two choices: either bite the bullet and fix the thing at a confiscatory rate, or reconsider your whole strategy about how you use this item, and start over.

Case in point: After years of faithful service, our station audio logger died. We tried getting it fixed. Well, the first time, the cost was high but we did it because we couldn't find a reasonable hardware substitute. But then the manufacturer of the device let us know that not only were they not fixing the logger in the future, but if we sent it back we'd never see our property again. Armed with that ultimatum, we plotted to ditch the old logger box. In the process, we learned that the state of the art in audio logging had moved from hardware to software, and that we could go that route for a good deal less money. The new system is actually a part of our RCS Prophet automation. That made things real easy. The new logger is a dream to work with, and cheaper. Oh, and now we are on a two-year plan to rid our operation of all equipment which was ever made by the manufacturer of our old logger. So there.

Repair, in or out of house?

Another thing which riles me about this "repair vs. throw away" situation is the propensity of equipment manufacturers to make their equipment impossible to repair in the field, except by their "authorized service centers" or by the factory itself. I understand why they do it. I just don't like it.

Time was when manufacturers designed their products to be serviced by the folks who used it. Then two things happened. First, the number of engineers in broadcasting fell to the point where there is, on average, less than one per station. Second, the manufacturers found out that either they had a wonderful profit center in their in-house repair department could be, or they found out that they didn't want to do repairs but they could rely on a network of local, independently-owned repair centers to do the job. It was either one or the other, depending upon the situation. Either way, equipment began appearing with labels which said "No user-serviceable parts inside." That meant you, too, you broadcast engineers!

To seal the deal – and in fairness this isn't the only reason they did this – they went to surface mount technology, which is tough to deal with in the field, even for some of the service center techs. We here in Chicago are weighing the idea of learning and equipping ourselves to do repairs on surface mount-based equipment. The whole idea is, we have folks on staff who are competent and eager to learn and do

this sort of thing. But the equipment that's been coming out doesn't seem amenable to being readily repaired, not just by the users, but at all. And it becomes a matter of “bucking the trend” to suggest that equipment be made user friendly, as such.

What do you think? I'd like to hear from you folks on this subject.

Until next month, blessings!

The Portland Report

By

John White, CBRE

Chief Engineer, CBC-Portland

To paraphrase an oldie, “Computers – you can't live with them and you can't live without them.” It seems that problems run in patterns and groups.

Gaggles and schools, I am not sure what the proper term is for group of computers. Possibly a giggale? Definitely not a giggle and absolutely not a grin.

I suppose I should have taken it as a hint when the NexGen audio server started complaining that it needed defrag. Actually that wasn't a surprise as we have a large amount of long-form programs that change on a daily basis.

What was a surprise is the message not enough disk space to defrag.

Our first reaction was, “HUH?” That was about the last message I expected to see. Drive space just isn't a problem we ought to be seeing. And none of the usual looking around gave an answer as to why.

So out came the big gun tools. Find *all* files on drive C between this date and that date. That brought up way more files than expected. When numbers get big the tendency is to think in bazillions. Yup – that is a lot of files.

Changing the view to sort by file type gave a lot more light on the problem. Lots of MP3s. Seeing MP3 files isn't a huge surprise as many of our source programs are delivered in that format and then converted to WAV files.

So now we had two tasks, the latest being deciding which MP3 files we could delete – not a small task with a bazillion of them. But the real question is, why did we have all those files on the system? The NexGen conversion utility replaces the

old MP3 with a new WAV file, so what is going on?

It turns out that you can convert in more than one way. Using the network, drag and drop will create a copy on the NexGen server. Then NexGen will convert the file on the fly. But there is a “but” – isn't there always? The utility replaces the MP3 with a WAV. On the fly, NexGen makes a WAV copy of the MP3. Small detail, big difference.

So... next came streaming. Both Cris and I thought getting the Internet stream up and running was going to be “plug and play.” Yes, in the back of the room with the raised hand you ask, do I know about Murphy's law? If I didn't before, I sure do now.

Cris placed an order for the same computer we have used as a streaming encoder at other stations. The computer worked fine and that should have been a clue. The answer sure was. Quote the computer company: “We don't make that one any more, try this one. Trust us you will like it.”

So we did, and we didn't. The replacement computer has the same nice small profile. The problem is, this computer won't take a full-size PCI card, such as the M-Audio and E-MU 0404 sound cards. Back to the drawing board.

“We have this other, larger model that will work real fine,” spake the computer company. And it did have two full-size card slots. The M-Audio card installed just fine, but (yes another one) the E-MU 0404 card was a PCIe and the computer had two PCI slots in the riser.

Back to the drawing board, page 3 or is it 4, I forget. Off I go to get a PCI version of the 0404.



So sorry, we don't make that any more. Gee, like I never heard that before.

Back to the computer company. Who does a computer company have answer the phone? A computer of course. So the game of 20 questions begins: is it bigger than a bread box? Finally a real person answers and another round of questions ensues, including every answer I gave the computer to get here.

Finally a new question: is the battery next to the PCIe slot? One moment, let me look. Back at the phone, if you would like to make a call please hang up and try again.

Second verse, same as the first. Real person number 2. Same explanation. Same question is the battery beside the PCIe connector on the mother board. Yes, but the riser covers it up. Then like a bell the voice said, "Oh we sent you the wrong riser."

Page 9. The proper riser is here, the cards are in. But, by now you had to know that was coming. But the computer tells me the network cable is unplugged (it's not). The problem is, the activity lights on the computer say the cable is connected and recognized.

And here is where I get to say, "Continued next month."

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

Time just keeps on flying by. It seems at the end of each month I look back and am just amazed at how fast the month went by. It was no different in the month of May. The faster time flies, the closer the move date gets. It's now less than two months away.

The engineering room is practically complete. We have a work bench and cabinets. We have cables punched down and run to the proper racks. The phone/network stuff is all

punched down. Things are beginning to look like they should. The studios finally have the glass installed, the lights work – all we need is cabinets and equipment. The cubicles have been installed in the office area. We have a refrigerator in the kitchen. It is amazing how much the place looks like a professional office.

We still have a lot of work to do to prepare for the move. Cables for three of the stations still need to be made. I have no doubt we will continue to be busy up until the move and even after.

The transmitter sites have begun to get away from me. We had several days of rain which caused the weeds to spring up. The growth in the tower base areas has become astronomical... at least that's how it seems. Now that our general contractor, Mike Kilgore, is done with the new office space, he has been working on putting up new tower base fences at the KLTT site. While checking on his progress, I noticed how tall the grass was growing inside the tower bases. It is so hard to remember at times to check inside the bases because the horses keep the grass in the fields eaten down.

It seems my list of things to do is ever growing, especially now that I do not have the time I



Cubicle area in the new office space

need to keep up with everything. This project is taking most if not all of my time. Even with the Saturday work that gets done every so often, staying caught up is still difficult. I predict June will be

spent trying to get things finished up before the move and getting caught up on everything.

I hope to have more to write about next month. So until next time, that's all folks!

Digital Diary
by
Larry Foltran
Corporate Website & Information Technology Coordinator

Safe Disposal

As some of you know, I frequently bring up cyber privacy issues within these monthly columns. Whether it's ensuring that your computer is free from spyware or that you are using a secure password for your accounts, keeping your information and general data from those who can misuse it seems to require constant vigilance these days. This month, I'd like to touch on a topic that goes beyond keeping your data secure during your day to day computing. In fact, it's an area that most people fail to even consider. So we'll start by asking, what happens to your data when you dispose of your computer or other data storage devices?

My wife frequently jokes that I run an informal rescue for abandoned computers. It seems as if I'm the one who gets the call for advice whenever someone is in the market for a new computer, which always leads to them offering to give me their old machine. Given how my brain works, I typically suggest that they use the old computer to set up a network based storage server rather than simply discarding it. But more often than not, I find myself bringing home yet another unwanted computer.

At first, I used these acquisitions to slowly build my super-network of orphaned computers. The square footage available to me has diminished in recent years, so I now generally scavenge the parts and discard the remaining, often obsolete, components. In the vast majority of cases, the PC's hard drive is one of the components I hang on to. After a self imposed waiting period of a month or two to ensure I don't receive a frantic call from the previous owner looking for data that they desperately need, I will format the hard drive and install it into one of my data storage computers.

One thing that always surprises me is that there is still plenty of data on the hard drives when I

get them. Perhaps it's simply a matter of the owner trusting that I won't misuse the sensitive information on the storage device, but sensitive data is sensitive

data. Granted I'm not the type of person who will sift through a discarded computer just to see what I can find, but can you afford to be that trusting?

Just last year, the hard drive on my laptop went completely dead. The computer was under warranty and the vendor was willing to send me a replacement hard drive but required me to send me old hard drive back. After several arguments over the phone and online chat, they refused to allow me to keep the old hard drive. I promptly returned the replacement drive they sent and invested the money for a drive replacement of my own. My caution paid off when I was able to extract quite a bit of data from the old hard drive, which included financial information. Although the risk that someone would have touched the data on the old drive is probably very low, I prefer not to spin that wheel.

While we're on the topic, it's not only computer hard drives that should be considered. How many of you have simply thrown an old cell phone in the garbage as soon as you get home with your brand new model? At one time, only phone numbers could be retrieved from your cell phones. But with the introduction of the smart phone, you have a lot more data and sensitive information at risk.

Now that I possibly have you panicking over all of the computer hardware you've ever thrown away or donated in the last few years, let's take a look at how you can change your ways and ensure that your important information, or even your photos of Fluffy, won't end up on someone else's hands.

So let's look at an example scenario. You just finished copying all of your data from your old computer to your brand new model, and you intend to



simply donate your old PC. You can simply format the hard drive and everything is clear...right? Wrong! Formatting a hard drive will not completely eliminate the data on it, but rather just makes it tougher to get to. There are several different types of data recovery software that can be used to scan a used but formatted hard drive that will extract all sorts of data. What you need to use a hard drive eraser that will effectively destroy the stored information. Although there are several options available that I've used in the past, I've most recently been using KillDisk exclusively based on a personal recommendation. One good indication as to the quality of the HD eraser software and its effectiveness is if it's in line with the US Department of Defense's guidelines and standards. If it's good enough to keep our nation's secrets from ending up in the wrong hands, it should be able to handle your application.

Conversely, cell phones are equipped with memory-based storage rather than a hard drive device. In most cases, I find these easier to clear than a hard disk drive. Some smart phones come equipped with a clear all or erase all feature, essentially providing the owner with a quick and easy way to wipe the storage memory clean.

That brings me to ultimate approach in data elimination – physically destroying the data storage device. Whether it's completely disassembling the hard drive, using an old cell phone for target practice, or smashing an old flash memory stick to bits, destroying the device will prevent most people from retrieving your data.

Don't neglect those old backup CDs you have collecting dust either. In many cases, the backup data on those CDs may be obsolete to you, but may still be valuable to an identity thief. For these types of data storage devices, I prefer to use my paper shredder which is also designed for CD destruction. Keep in mind that not all shredders are designed to accept CDs, though.

Destruction of the storage media isn't the end-all solution. There are in fact methods of retrieving data from badly mangled storage devices. There are numerous companies around the world that specialize in data recovery from storage devices that have seen better days. A prime example that comes to mind is that of a 400MB Seagate hard drive that was onboard the Space Shuttle Columbia when it exploded during re-entry in February of 2003. Found amid the shuttle's wreckage, a data recovery firm was able to successfully recover data relating to a scientific experiment conducted during the mission. Considering the condition that hard drive must have been in, that's pretty amazing to say the least.

You can see that there are several options available to you when you're ready to clear out some of your old computer equipment. Whether you decide to wipe the drive clean or physically destroy the storage device, your mission will be accomplished. Unless you have extremely confidential information on your storage device, you can rest assured that someone probably won't go through the trouble or expense of restoring your destroyed hard drive.

Until next month...

The Local Oscillator
June 2010

KBRT • Avalon - Los Angeles, CA
740 kHz, 10 kW-D, DA

KCBC • Riverbank - San Francisco, CA
770 kHz, 50 kW-D/1 kW-N, DA-1

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

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

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

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

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

KLWZ • 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

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

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

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

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

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

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

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

WYRB • Genoa - Rockford, IL
106.3 MHz, 6 kW/65m AAT

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

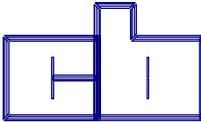
WYDE • Birmingham, AL
1260 kHz, 5 kW-D/41W-N, ND

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

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

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

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