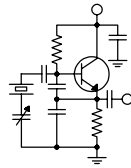


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Recovery

It seems that about 75% of my time these days is spent dealing with issues regarding just one of our 26 stations – KBRT. Things on Santa Catalina Island continue to slowly move toward “normalcy,” but at the KBRT transmitter plant things are far from normal.

At the end of June, we still do not have utility power feeding the transmitter site. Edison actually got power restored to the service pole above the site and got the new transformers set in the middle of June, but they were unable to provide us with the same power configuration (three-wire delta) that we had been fed with since the site was first constructed in 1952. The best they can do is give us a four-wire delta (three phases plus a neutral derived from the center-tap of one of the phase transformer secondaries), but our panel is not wired for that.

Reconfiguring the panel for a four-wire delta – replacing the meter socket and adding a neutral bar – would seem to be a simple matter, and it would be anywhere except on Santa Catalina Island; out there, it’s a different matter. For one thing, our electrical system is not the usual array of disconnects, panels and boxes joined by conduits and wire channel. Instead, it’s a unified “panel” that contains all the switchgear, fuses, meter socket and all. We’ve had a tough time finding a meter socket to fit the old panel. In fact, we’ve concluded that there is no modern meter socket available that will fit. We finally got clearance from the local electrical

inspector to simply install a new meter socket on the outside back of the building with a nipple through into the panel. So at present, we’re waiting on the materials for that project to arrive at the site.

Another big issue is our inability to get propane delivered to the site for the generator. For whatever reason, neither of the island fuel jobbers would deliver fuel for several weeks, and our generator fuel tank was down to fumes. Thankfully, we had rented a diesel generator in late May and had that available at the site when the gas ran out on our own gen. We have been running on that generator for a month now, and Bill Agresta has been hauling 20 gallons of diesel up the hill every day (to the tune of \$100 or more... diesel is \$5.00/gal. on the island – keep that in mind next time you complain about \$3.20 gas!). That diesel gen is very efficient, much more so than the propane rig, consuming less than 1.5 gallons

an hour at full load. That has allowed Bill to keep up with the fuel consumption with four 5-gallon “jerry” cans.

Because we know we likely will not be able to get propane delivered to the site again, we have purchased the rental generator that we have been using. It will easily fit inside the generator shelter, right alongside the existing gen. If we have another prolonged outage, we will have some real options.

We still do not have T1, DSL or ISDN lines at the site, and we have been told that we will not be getting those back. And so we are still using one of the CBC Ku-band satellite network channels as an STL. We were using a tiny



rooftop antenna for this, but it was so small that there was not any fade margin and there was barely enough S/N ratio to get a lock. Late last month, we installed a 6-foot antenna in a nook behind the building where it is hidden from view from all points not on the property. This got us the needed fade margin and S/N ratio. So while we don't have the convenience of the T1 and CAT-Link, we do have a solid unidirectional program feed from the studio. KBRT is on the air, carrying a normal program schedule and sounding fine.

Phones continue to be an issue. AT&T (formerly Pacific Bell) has run a cable to us over the ground, giving us POTS "service" by a roundabout route, but the service has noise on it all the time and provides us with a dial tone only part of the time. We cannot count on it. Last month we installed Hughes satellite Internet service at the site, which gets Bill back on line for email, Internet, etc. We also signed up for Vonage VoIP (Internet phone) service. This service is reliable, but there is a significant latency, over a second, because of coding/decoding time and satellite propagation time. Communicating over the service is a little awkward, but again, it's *reliable* and that's what we need. We need to be able to dial a number and get someone at the site on the phone.

Several people have been a big help in the recovery effort. First, our friends at EMF Broadcasting out of Rocklin, California (north of Sacramento) sent two of its best engineers to the site for

a few days. These guys were able to give Bill some help in fixing a few things, getting some cleanup done and securing a more reliable satellite link. They were also a big morale boost for Bill, encouraging him and letting him get off the island for a day. We are deeply grateful to the EMF folks, who have shown themselves Christlike in their kind assistance.

Then there is Steve Minshall, our long-time engineer from KCBC. Steve agreed to take some vacation time and head down to the island with his wife. While on the island, Steve helped Bill with any number of tasks, including and especially mapping out the rather convoluted, oft-amended 1952-vintage electrical system at the site. It was because of his efforts that we were able to come up with a workable

plan to get the station restored to utility power. His presence also allowed Bill to get away from the site and go camping with his son, Zack. Many thanks, Steve!

The temporary guy wires on tower 2 have been made secure, thanks to our friends at Northstar Broadcast and Magnum Towers. That Sacramento-based crew hit the site in mid-June and in just a day, took care of the situation. Thanks also to Larry Fanning at Utility Tower in Oklahoma, who found this excellent crew for us.

So what's left? Quite a bit, actually, but returning to utility power will go a long way toward returning things to "normal" at the site. Studio personnel can dial in to the remote control to raise/lower power and turn the carrier on and off, so that is taken care of, but I do want to somehow reconnect the studio and transmitter remote control units. I'm thinking that we should be able to do this over the Internet somehow, via a VPN or IP "tunnel." I'm going to lean on Ed Dulaney and Larry Foltran to help me figure out how.

Then there is more cleanup. The tower crew's burned out tool trailer (actually, it's a converted horse trailer) still sits in the middle of our antenna field. The fire investigators have released the scene, so we're good to get rid of the trailer, the burned up performs, guy cable and other scrap. But nothing is easy on Santa Catalina Island.

Our ground screens at the tower bases were largely

destroyed by the fire and the firefighting equipment. At some point in the coming

months, we will need to replace these with new screens and then have rock brought in to cover them. And then we still need to deal with the guy wire replacement, but that can wait a little longer if need be. The towers are not in danger of collapse, but the wires are getting more rusty by the day.

The bottom line is that KBRT has survived and is doing fine, thanks to the excellent efforts of Bill Agresta and some other key people.

Digital Rules

At long last, the Report and Order (R&O) on the new terrestrial digital rules has been released. Actually it came out right after the publication of the



The Catalina buffalo are none the worse for wear after the fire

last issue of *The Local Oscillator*, so we've had most of a month to digest it.

There were few surprises. AM nighttime digital operation is authorized. That was the "biggie" that we had all been waiting on. But there were some operational items that we need to take notice of. In particular, there are some station ID requirements for digital streams (multicasts). These streams must be identified just as the main (analog) program at the top of every hour but with the stream identification also broadcast (e.g. "WMUZ HD-2, Detroit"). And the FCC wants an indication on every digital stream that it is a digital stream, indicating that the text indication on the receiver will be sufficient for this. And finally, all the public interest requirements that apply to the analog station also apply to the digital streams. This means public affairs programming on the air and quarterly issues/programs lists in the public file as well as letters from the public and all that. Again, none of this is really a surprise.

So when can we fire up our AMs in the digital mode at night? Good question. The new rules will go into effect 30 days after publication in the

Federal Register, and that hasn't happened yet (as of the end of June). So we'll continue to wait and watch.

Congratulations

Kudos to Larry Foltran for attaining SBE CBNT certification! I had no doubt that he would pass that test with flying colors. Several other CBC engineers took certification exams in the June exam window and I am equally confident that they passed. Hopefully we will be publishing the full list next month.

Also, congratulations to Brian Bonds, BSEE, who has just joined the CBC-Chicago engineering staff on a full-time basis. Brian has been around the operation on a part-time basis for a number of years, working full-time during the summers, while he completed his studies at Purdue University. We're glad to have him aboard in a permanent full-time position and know that he will bring a great deal to our busiest engineering operation.

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

Hello to all from Western New York!

Not long ago, I spoke with a fellow engineer who is in charge of several stations located in central New York. He recently had a surprise inspection by the FCC, who found numerous small infractions that the station was cited for. He knew that these situations existed, but he would always put off rectifying the problem, thinking he would have time to do it later.

He is an excellent engineer, very knowledgeable in all aspects of broadcast engineering, but a lousy manager of time and prioritizing his work schedule. To his surprise, he was discharged from his position of chief engineer because of the Notice of Violation received from the inspection. I felt his frustration, as he explained his workload to me. He was responsible for the technical operations for four full time stations, two FMs, one directional AM and an ND AM. He was the sole engineer for the stations, so the technical operation of the plants rested solely on him.

As we share similar responsibilities, he asked how I manage to keep ahead of the workload without an engineering assistant. I thought through my answer carefully before responding to his question. My reply was simply, "Time management." I further explained what I had learned over the years, that by managing your time and prioritizing your duties, you can somewhat keep ahead of the ever-changing workload we as broadcast engineers face.

Developing and adhering to a maintenance schedule should be the first priority of any good engineer. Begin by making a list of your equipment and its location. Next to the equipment listing, make a notation of what maintenance should be done on that particular piece of equipment. Does it have filters that periodically need cleaning/replacing? Dirt and heat are the two most common causes of equipment failure. Electronic equipment attracts airborne dust

particles, which build up over time. This dust build-up acts as an insulator, which if not vacuumed out on a regular basis, will cause the equipment to overheat.



Make sure that equipment air filters are cleaned/changed on a regular basis. I generally write the date somewhere visible on the filter and change it every three months. If the equipment does not have an air filter, use a high quality compressed air spray to evacuate any dust collected in the equipment's chassis vents. Equipment that has any mechanical parts should be checked for wear and lubricated on a regular basis. Most all motors today contain sealed bearings, therefore no lubrication is necessary.

Once you have your maintenance list together, decide on how often the maintenance should be performed. Most equipment manufacturers suggest general maintenance duties in their equipment manuals, so if unsure, consult the manual or speak with the service representative at the repair center for maintenance tips. Once you have compiled your maintenance information, create a calendar for the month, and schedule a day to perform the duties. Keep a maintenance log of all your activities, noting the date that the maintenance was performed and what you did. For equipment that has meters or other operating indication devices (transmitters, STL equipment, electrical generators etc.), log all meter readings and check those readings against the normal operating readings or factory test data. By keeping a log of all meter readings, you can look back and see any changes in operating parameters. Preventive maintenance is the best way to avoid equipment failure. Keeping this under control will ultimately give you more time to take care of your other duties and keep your stress level to a minimum.

WDCX – Buffalo

During a recent WDCX quarterly tower Inspection, I found that the tower's guy wire grounds

were broken at all three tower anchor points. There are six guys at each anchor point, with a twisted copper ground wire attached to each guy wire using a split-bolt designed for cable clamping and attached to two 8-foot ground rods. We have experienced a lot of wind recently, and I suspect that the excessive sway of the guy lines along with the age of the copper wire caused the ground wire to break at each attach point on the guy wire. As I replaced the broken wire, I made a half-loop between each guy wire to help with the constant flexing. This half loop, looking like the letter "C," will help absorb the movement of the guy wire and act as a shock absorber. The old wire was pulled taught between each guy line and clamped, with no room for flexing.

Our site plans for the new transmitter building have been submitted to the Town of Boston planning board for approval. We were required to hire a surveyor to survey our property, listing all ground and building elevations, and distances from the current and proposed building to the property lines. The surveyors finally got all this information compiled, and survey maps delivered to me for inclusion in the final site plan. Once we get the final approval for the install, we can forge ahead to get this project underway, and completed by the end of the summer.

WRCI / WLGZ – Rochester

It has been a busy month as well at the Rochester cluster. In my column last month, I mentioned a problem with the sample line from tower #1 at the WLGZ transmitter site. The phase/loop readings were down below licensed parameters on both the day and night patterns. I first looked at the integrity of the line using a voltmeter and calibrated dummy load. I attached the load at the tuning house end and measured the line from the antenna monitor end in the transmitter building. The line measured 53 ohms, a good indication that moisture had seeped into the sample line. Next, I had obtained the TDR from Cris but was unable to look at the line due to an electrical problem inside the tower #1 tuning house. Once I got the electrical problem resolved, I resumed the testing of the line with the TDR. It showed a problem with the sample line approximately 90 feet from the transmitter building. As we have no documentation as to where the sample lines are

buried at this site, we will have to hire someone with a line locator to determine where the sample lines are, dig up the affected line and make the necessary repairs. I hope to have this work completed by month's end.

On Thursday, June 21, Hub-Langie Paving Company began installing our new 2,000-foot long driveway into the WLGZ transmitter site. The old road had not received any maintenance since it was installed back in the early 1980s and had washed away over the years, leaving basically two ruts in the dirt. As I was scheduled to take a vacation beginning the 25th of June, I have not yet seen the completed work. I will report on this next month.

While on my weekly maintenance visit to Rochester on the 19th of June, western New York experienced a severe thunderstorm through the region with heavy rains and lightning. While I was at the Rochester studios, the board operator in Buffalo called, reporting that they were off the air. I was able to get the analog transmitter back up immediately via the remote control, but the digital BE transmitter would not come up. While heading back to Buffalo to get this problem resolved, the storm hit Rochester, knocking WRCI off the air. As I was not too far from the transmitter site, I turned around and headed to the transmitter building. Evidently, the power had glitched momentarily, knocking the filament off on the Continental transmitter. Once I got the transmitter back on and checked to insure that all was working properly, I left to continue on to Buffalo. It was not long after I left that the board operator in Rochester again called to report a problem with the NexGen automation. For the second time, I turned around and headed to the studios to rectify this problem. It was about 6 PM before I finally got to the WDCX transmitter site to troubleshoot the HD-R transmitter problem. I found that the IBOC processor had switched into the Bypass A-B mode when the power momentarily dropped. A simple reboot took care of the problem. It's days like this that make you think.....

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

The Motown Update

By
Tom Gardull, CBRE
Chief Engineer, CBC–Detroit

This month, I'll share with you another example of a simple project that almost became a major outage. BE directions said this project should take about half-hour total, but a day later we still were not done.

BE has a software upgrade for the FM IDi-20 HD-R importer which essentially is the HD-2 originator. This software is for a supervisory program they call Dashboard. Dashboard manages all the subroutines so one mouse-click will, for example, start HD-2 transmitting instead of previously needing to separately start six programs. I

chose to receive the software as a download from their website. Half an hour later, as the progress bar read 99% complete, the memory stick registered "out-of-memory." So I went and got a better memory stick with 2gb and then had a successful download.

The next instruction from BE was to erase the existing software in IDi-20 in preparation for installing the new program, so this step makes an irreversible commitment.

Now with HD-2 off-air, I plugged in the memory stick. I had our operations director get an unzip program and initialize the new program. Unfortunately, the installation process was not following the printed directions. The screens were not matching the illustrations. Something was wrong. I called BE who thought it best to overnight a CD-ROM copy of the software and not rely on the download.

The next day, the CD-ROM started up nicely. Following the instructions got results. But all of a sudden, the screen stopped responding and I noticed that HD-1 was also down. The HD-1 equipment, called an FSi-10, was frozen. A hard reboot was attempted but the screen would recycle to the same point and then freeze again. The HD-2

equipment was now displaying error messages related to inability to communicate caused by the HD-1 freeze. It was all interrelated



The BE staff was again called, but this time they moved me from their "Digital" support staff to the "RF" staff. The RF folks said to reload the software for HD-1. We had that CD-ROM from a February software upgrade. That worked. I had to re-input various parameters. The IP address had disappeared and the call sign was gone. Somehow the HD-2 upgrade had caused HD-1 to corrupt its software.

Now with HD-1 back on the air, I talked again with the BE digital staff about the HD-2 problem. We could not get past one particular screen, which would not let us click the OK box to move on. We finally figured out that since we do not have HD-3, its sound card checkbox needed to show "not used" instead of being blanked out. Several reboots later, the system came back to life.

As my day ends, WMUZ HD-1 and -2 are back on. The PAD information for HD-2 is missing and that is tomorrow's project. Was this software upgrade worth it? I saw some features, such as one-click ability to change bandwidths if we ever add HD-3 or 4, which will make life easier. Hopefully the upgrade made internal improvements which will be more stable. But so far it has been a lot of trouble.

We did get several inquiries about our missing HD-2. Ibiqity was listening and also someone at Chrysler noted their inability to lock on. People evidently are listening.

The BE support staff was quick to answer my questions and give guidance. They had insight into the inner workings of the software, which led to our repair. They responded great.

News From The South

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

A Rant Redux

After last month's multi-part rant, you'd think I was done, but I want to reiterate one more from several months ago. You equipment vendors should provide technical information online, and without making us jump through hoops to get to it. If you're worried about a competitor stealing your secrets, that's silly. There are plenty of ways that they can get that information; an obvious one is just to contact someone who has one of your units. Shoot, they might even get to take the cover off and peer inside as long as they agree to buy lunch.

To make my point, consider Telos-Omnia, a company that makes great stuff and that has excellent technical documentation... and all key info is available on their websites, including schematics. To date, I'm not aware of anyone who has cloned the Zephyr XStream or the Omnia6.EX. There you go.

The most recent offender (and the vendor who inspired this "rant redux") is Harris. During our studio move last winter, I managed to lose the CD containing the technical info for the Intraplex. The other day, I went to the Harris Broadcast website to fetch a manual only to be informed that my registration (an irritation to start with) had expired (more irritation), and that I'd have to get it reactivated (sigh!). I emailed Harris; no response. I then called Harris and, to my surprise, got some hemming and hawing. They offered to email the manuals that I needed on a case-by-case basis, but as I write this, my access to Harris Premium Support still hasn't been reactivated. Still no reply to the initial email, either.

I'm not just picking on Harris; they're not the only vendor with a policy like this (Wheatstone, are you listening?). But I'm going to be disappointed if they're moving back toward an "everything is a secret" attitude instead of one that helps out the poor end-user. I can easily carry an Internet-ready laptop

with me rather than having to tote two dozen different CDs and a box full of technical manuals. Thanks to LANLinks and T1 lines, all of my tower sites have Internet access now, too – so I'm waiting on *YOU*, Vendor. Get with the 21st century!

Okay, rant complete. Now this month, I want to take a look at some free software that we've come to rely on very heavily here in Birmingham. All of the following are available for free on the web. This list changes and grows all the time, and if you have suggestions, I'm all ears, too. But I'll start with ...



The Knoppix Linux "Live" CD

Here's a very common scenario: a computer that won't boot. This can happen with any system, but it seems to be especially common with Windows (including the latest XP and Vista systems). If you'll dig into this as we have, you'll learn that it's often caused by a driver file that has somehow become corrupted. That's right, a single file has stopped you cold ... and it gets better!

If you call the PC vendor, they'll tell you to insert the CD(s) that came with the computer and boot onto it to completely wipe the hard drive and reinstall Windows. Please note that *this is standard support policy and practice with most major PC vendors*, from HP to Dell to you name it. *This is the only solution that most vendors will support!*

Needless to say, one might object to this drastic measure. To start with, this takes quite some time – from several hours to several *days* if you've got a lot of other software to install. *Then* you get to wait for Windows to download and re-apply two and a half million updates. Assuming you have a recent data backup (heh), you have to copy everything over to the rebuilt drive and hope you got it arranged correctly and that the file names didn't get clobbered during the copy (by no means guaranteed, speaking

from experience). Otherwise, all of your contacts, your documents, you name it, will be gone. And what if you don't have a good backup?

You need the Knoppix live bootable Linux CD, produced by a guy named Klaus Knopper. You can download an ISO, ready to burn to CD, for free at www.knoppix.net. There are actually several "live" distributions available now, including some specifically targeted to multimedia production and network security; many major "distro" vendors (Fedora, Mandriva, et. al.) also offer "live" CDs. But Todd and I prefer Knoppix because it has excellent hardware detection and will automatically mount all available drives on the computer.

Knoppix (and the derivatives that have followed) was originally intended as a way for people to try Linux without having to actually install it, but it's ideal for doing data recovery. Perhaps realizing this, Knopper has included all sorts of data recovery



and network tools in the latest releases; this CD is a true blue, certified Swiss Army Knife(tm) for fixing a sick computer.

Going back to the example of a dead Windows PC, insert the Knoppix CD into the machine and boot from it. This will take some time; running from CD is a lot slower than booting from a hard drive, and Knoppix makes a lot of choices (such as turning off all direct memory access on hard drives) that trade speed for safety.

If the machine won't boot onto the Knoppix CD at all, that's useful knowledge in and of itself: there may be a fundamental hardware problem (a bad CD drive or a defective RAM stick, for example). But in most cases, the boot will work and you'll eventually get a desktop screen, a portion of which I've shown above. To the left, all available hard drive partitions are shown as icons. They're labeled with Unix-style partition names, so you may have to open each one to determine what's in there. In the illustration, I've clicked on "sda1" to bring up an explorer-style window (the top and bottom have been

clipped in the picture). It's obviously my Windows partition, because I see a folder named "WINDOWS" and a file named "MSDOS.SYS."

Now you have all sorts of options. If you choose to go the "nuke and reinstall" route and want to copy your data from the hard drive first, insert a USB drive; Knoppix will automatically detect it and offer to open an "explorer" window for it. Then you can simply drag and drop the files that you want to save for later restoration. In this illustration, for example, I might drag and drop my old "D-backup" folder, my "Downloads" and of course, my "Documents" folder, over to the USB drive. After reinstalling Windows, I can stick in the USB drive and copy everything back to the "C:" drive.

But that's not the only option! You'll have to become familiar with Linux and with the *powerful* free tools available for disk and system recovery, but

once you do, this Knoppix disk will become absolutely indispensable. I mentioned above that many boot hang problems under Windows are caused by a driver file somehow becoming corrupted; Windows will often give the name the offending file during the boot -- ex., "NDIS32.SYS." Find a good version of that file (if nothing else, on another, similar Windows machine) and put it on your USB drive. Boot with Knoppix and replace that file on the sick machine and you may fix the problem that easily. No nuke, no rebuild, and no day and a half spent reloading files! It's a beautiful thing.

(One tip: for safety reasons, Knoppix disables write access to all user drives by default. To get the copy to work, right click on the hard drive icon and select "Enable Read/Write.")

As for GNU/Linux software in general, you folks should already know by now that I'm a big advocate of this stuff. I'm not a Free Software Nazi; I don't care if you download the proprietary NVidia drivers or use Adobe's Acrobat Reader for Linux, for example, whereas a True GNU(tm) would consider

that anathema. But remember what I said a couple of months ago about the best engineers constantly learning new things? If you're not already familiar with Linux, you need to get with it – and what I just showed you is proof of why you should. I use and recommend OpenSuSE as my main distro (www.opensuse.org). Download it, burn the CDs or DVD, install it and just start playing with it. You can use it right away to browse the Web and do other stuff; if you'll apply yourself just a bit, dig into the system and learn how it works, before you even know it, you'll be a certified guru who can take a Knoppix CD and make it sing. Time's a-wastin'!

Trust me, you'll love Linux's advantages. Just not having to play "whack a mole" with the Start Menu and the little "info" boxes when the desktop first appears alone is worth it to me! Linux is far more stable, far more secure, and – as alluded to above, and as you'll certainly discover for yourself – far, far more flexible when it comes to system recovery and administration. And it's FREE!

Here are a few other essential software titles that we use, in no particular order. The Knoppix CD includes most of these, so you could try them that way. Most of them have Windows versions, too.

Wire Shark (Formerly Called "Ethereal")

If you're using a good Linux distribution, Ethereal/Wire Shark may be included already (Knoppix has it). If not, go to www.wireshark.com and download it for Windows or Linux. It has a GUI user environment and excellent online help.

Be warned: this one is kinda geeky. You should be familiar with the fundamentals of TCP/IP networking, but if you are, this thing is a treat for troubleshooting network problems. The example that I'll use here is confirming that exported PAD is making it from a NexGen ASERV to your HD-R transmitter.

First, install and run Wire Shark on the ASERV. It will set up a packet "sniffer" that can look at all traffic on your network connection. That results in a flood of information, so you'll set up a filter that only triggers on UDP port 10000, which is what PAD uses. Once Wire Shark is running, if you never see a packet appear, you know that the problem is at the ASERV.

If you suspect that it's at the transmitter site, here's a suggestion that's so geeky, you'll sprout a propeller beanie cap on your head just by thinking about it: take your Knoppix CD to the transmitter site and boot the FSi (HD generator) from it. You can run Wire Shark directly on the FSi that way!

NMap

Another geeky one, and one that I mentioned last year when I talked about security. But if you don't have this yet, go to www.insecure.org and download it for Windows or Linux. There's a GUI wraparound available for those who don't want to enter geek-speak at a terminal prompt. However you use it, this thing is absolutely required for checking firewalls from the outside. Refer to my article on security from last year for more.

A less powerful variant recommended to us by Art and James in Chicago a while back, is...

The Angry IP Scanner

Conceptually similar to NMap but with some limitations; for example, you can't do a "stealth" scan against your static IP address from the outside world – essential for checking a firewall. This is a Windows-only program that's intended for checking an internal network. On the plus side, it's fast and easy to use. We like it for quick and dirty checks, and for finding out who's currently connected to the network, that sort of thing. Very useful (thanks, Art and James)! Get it from www.angryziber.com.

IP Cop

Todd and I had been looking for a simple, easy way to control Internet access, one that would allow us to do content filtering (e.g. to screen out porn sites) and traffic shaping (e.g. to stop one person from "hogging" our connection to download a 3 gigabyte movie!). IPCop is what we decided to use, and thus far, we've been very pleased.

Basically, IP Cop replaces the router that you're probably using now on your DSL connection. It will take care of all of the functions that you'll need, including a DHCP server, "virtual" server/network address translation and firewalling. This is actually a complete, self-contained Linux distribution that you will install on a dedicated PC, and to do this right, you'll need (at least) two network cards – one "looking" toward the WAN/Internet connection, and one toward your LAN/internal network. You simply place the IP Cop machine in line between the DSL connection and the switch to the rest of the building, replacing the LinkSys or DLink router that you've probably been using.

Once you get it up and running, there's a nice, easy-to-use GUI interface to set all options. You can use it to look for and block certain phrases in Web pages (ex, "see me naked!" or ... you get the idea!). You can also blacklist certain sites and/or IP addresses entirely. Once you do, if an employee tries to browse to blocked material, they'll get a page that

says, "Blocked by the Administrator." All such access attempts are logged by IP address... and don't be surprised when you discover that, even in a nice Christian facility, there *will* be employees who try to browse porn on your connection. It's a fact of life now, and while no one likes "big brother" approaches like IP Cop, they've become a necessity nowadays.

Traffic shaping is also supported. A 3 megabit DSL connection is generally adequate for even a fairly large radio station... *provided* that you

don't have employees who are bandwidth hogs. All it takes is one or two people to start streaming movies and playing big, complex games online and your connection will slow to a crawl. With IP Cop, you can limit how much bandwidth each user will get, when throttling should kick in, and more.

That's it for this time. Again, if you're using some software that you just can't live without, write about it here, or tell me about it. I'd love to know! Until next time...

Gateway Adventures

By

Rick Sewell, CBRE

Chief Engineer, CBC-St. Louis

The biggest project we had going in St. Louis over the last month was the new fencing at the KSTL transmitter site. In all, we put up seven new fences at the site.

When I first took over as chief engineer a little over five years ago, I realized that we had a security/liability issue at this site. The site is kind of unique in that it has elements of a remotely located site (not much in the way of surface traffic immediately around it), and the surrounding neighborhoods are severely blighted. This all combines to give you an uneasy feeling when you have to visit late at night. It is a six acre piece of property surrounded by an aging perimeter fence. We did our best to keep this repaired, but I strongly urged that we put a smaller fence around the tower to keep us in compliance should a section of the perimeter fence come down. We did that almost immediately and continued to work at replacing sections of the perimeter fence as it was needed.

Last year, we had the big storms with the strong winds in July and then the ice storms in November. A good part of the perimeter fence is now in great disrepair. It looked like it was going to be very expensive to repair the sections that needed it, and we would still be looking at other sections going down in the future.

When Cris Alexander was in for a visit in March, he came up with an idea to not worry about the perimeter fence and make sure we take care of our

liability and security issues by putting up smaller fences immediately around the structures that needed

it. Around the transmitter building we went with a chain link fence with barbed wire on the top and a double gate to allow vehicles to be parked inside. This has certainly given me a greater bit of security when having to do those late-night sessions at this transmitter site. I can get my car parked and myself locked within this fence.

We also addressed the security of the guy wire anchors. Around these we installed triangle-shaped chain link fences. These each have gates to allow crews access to service the anchors.

I must say the extra fencing looks impressive as you drive up to the site. It's not Fort Knox, but it has much more of a "don't mess with me" look now.

Battle of the Blimp

While with the fence crew at the KSTL transmitter site, we had one of the more intriguing encounters I have had at a transmitter site. I had just come out of the building to see what had the Bosnian fence crew speaking excitedly in their native tongue when I looked up to see the Good Year blimp. The sight of one of the blimps is not all that unusual since the KSTL site is not far from downtown St. Louis on the Illinois side of the riverfront. But this time, it was very dangerously close to the tower.

The KSTL tower is 356 feet high and if the



The Local Oscillator
July 2007

blimp's elevation was higher than that, it wasn't by much. It wasn't much further than that on the horizontal plane. In fact, it appeared to be using the KSTL tower as an object to circle around as it came up from the south, then circled around the tower and went back south again. This circle was approximately 200 hundred yards from the tower with the blimp at about the tower height. As it went south back toward the Cahokia, Illinois airport, a wind came up and almost blew the thing back into the tower. That really got the Bosnian fence crew going. Where do you go when you're underneath a tower that is about to be hit by a blimp?

I called Cris because I was sure that this had to be some sort of violation. We both came to the conclusion that it had to be and I decided if they did

this again I was going to pursue reporting it to the FAA.

I went to the studio for about an hour and when I got back to the transmitter site, it wasn't five minutes before the blimp was back again. This time it didn't fly in the circle around the tower but went right over it. I estimate that it was somewhere between 25 and 50 feet directly over the tower. One good downdraft and we would have had a new element on the tower.

I called the FAA and went through about seven numbers until I got the rules and regulations enforcement office in the St.

Louis area. They then called up the Cahokia airport to let them know what was going on. Although the blimp was in town the rest of the week, I never saw them get close to our tower site again.



The Goodyear Blimp circles the KSTL tower

Valley Notes
By
Steve Minshall
Chief Engineer, KCBC

My first visit to Catalina Island was during the winter of 1977. I was an Electronics Technician Second Class in the United States Coast Guard stationed at San Pedro California. I was the new guy in the electronics shop.

The Coast Guard at that time maintained LF radio beacons for maritime navigation. One such beacon was at the Casino Ballroom at the town of Avalon on Catalina. The Casino Ballroom was never a gambling casino. The word "casino" meaning only "gathering place" in this case. There was indeed a ballroom, however (and still is), that is world famous. There were many nationwide radio broadcasts of the big-band dances at the Casino Ballroom. I have never had the privilege of dancing on that floor, not yet anyway.

The beacon consisted of a 35-foot fiberglass whip antenna and two transmitters. The signal radiated was pseudo-AM, tone modulated, Morse code. Each transmitter contained two crystal oscillators, one running on the carrier frequency. The other oscillator ran at a frequency offset by 1 kc (That's equivalent to 1 kHz for the younger readers) and was keyed on and off to create the Morse code "modulation."

The transmitter keying was accomplished with a cam-driven microswitch. The code speed was horribly slow but this allowed a boater the opportunity to write down the individual dits and dahs and match them to the call letters on a navigational chart.

There was another cam-driven switch that alternated the two transmitters every minute or so, which provided redundancy. Back at the electronic shop, we monitored the beacons. If they were on continuously, we know that both transmitters were running. If the beacon was only on every other minute, we knew we had a dead transmitter that needed to be fixed.

The beacons received annual preventive

maintenance. This meant an annual trip to Catalina. I was teamed up with a guy named Schwartz (I don't remember if he had a first name – everyone called him "Schwartz"). Schwartz explained to me that the

Catalina beacon required scheduling three days on the island to do one day's work.

The other two days were for recreational activities. This was the tradition and you don't mess with military traditions.

The maintenance consisted of cleaning and a lot of tube testing. We had a scheduled shutdown to clean the base insulator and ATU.

Our superiors at the shop would be listening for the shutdown. We took a field intensity meter with us exactly like the old Nems-Clark AM FIMs, but it operated below the AM band. Our beacon operated somewhere around 400 kc. We had a monitor point where the transmitters were adjusted to produce a specified field strength.

The reason for the specific field intensity was to allow a vessel operator to determine their position at sea by distance and bearing from the beacon. Distance would be determined by the field strength received. I doubt the field intensity measurements were ever actually used for navigation. Multiple beacons provided multiple bearings, this method was easier and more accurate to use for determining position.

I would make two more trips to the island for maintenance and repairs of the beacon with my Coast Guard buddy, Steve Hanley. Now, 30 years later, the beacon is but a memory. And I am back on the island for another stint of radio duty, this time for KBRT.

The KBRT transmitter site survived the Catalina fire quite well, but is left without electrical and phone service. The site is presently powered by a diesel generator and audio is fed via satellite. One of the things I have been able to help with is the installation on a new satellite dish.

The station has been operating on a tiny dish



that is barely able to do the job. It is amazing how the receiver has remained locked.

There is here what is called the "island factor." In this case, the island factor caused the new dish to get lost in transit. For a while, it was believed to have been delivered to a camp on the island, but after some detective work by Bill Agresta, we found the dish on a shipping dock.

The dish installation went very smoothly until we tried to tune in the satellite. After an hour of fussing, I paid attention to a nagging in the back of my head. I then set the dish in a vertical position using a carpenter's level. The elevation angle indicated on the mount was about 32.5 degrees. It should have read 22.6 degrees. It was off by ten degrees! I sort of noticed the anomaly when we first placed the dish on the mount, but it did not fully

sink in for awhile. We added 10 to the elevation angle of 47.7 and raised the dish to an indicated 57.7 degrees. We immediately had a satellite signal. Back at home I always use a digital level to set the elevation angles and it nails it every time.

The electrical problem is frustrating since the utility has the power hot to the entry point, and a few minutes of work would hook it up. Things can't be that simple, however; the island factor kicks in. The old three-phase service was a three-wire delta, but it did not have a neutral and only two of the three phases passed through the meter.

To further complicate matters, the old system originally had a separate single-phase service. At some point, the single-phase service was removed and the single-phase 240/120 volt circuits were fed from a transformer with a center tap on the secondary providing a neutral for the 120 volt circuits.

Now the station is required to use all four wires from the utility which means hooking up the neutral and that means a new meter is required. The electrical panel was installed in 1952 and I am sure it was an impressive piece of state-of-the-art equipment

at the time. Now, 55 years later, the panel is a relic. Installing a new meter has proven to be impractical. Fortunately it appears (at least right now) that the inspector will allow a new, outdoor meter base to be installed.

At first glance it appeared that we could discard the old transformer but we soon realized that we had a new issue. While the utility is providing a 240/120 volt four wire delta service, the generator is wired as a 240/139 volt wye. We realized we must keep the transformer in order to use the generator. The electrical work should be done in a week, but when you multiply one week by the island factor...well, it could take a while.

In the mean time, we fill four 5-gallon jugs with diesel in town each day and then fill the generator at the site. Having fuel delivered to the site is costly and unpredictable... the

island factor again.

My primary mission for this trip to the island was to give Bill Agresta a well deserved time-off. However, with the island factor kicking in, Bill has not been able to get away. Even so, I have been able to lend a helping hand with some projects and he was able to get away for one night's camping with his son.

I was able to take some interesting photos of the island and will share them here. Cody is the KBRT dog. He rides along with us in the back of the truck (did you know Andrew made trucks?) and is well known around town. He gets lots of attention.

There are still a number of WWII military relics around the island I entered one bomb shelter and photographed what I thought was a bat in the darkness. The flash revealed a whole ceiling full of bats! You will see the passage way to the underground generator room as well. Golf carts are the primary personal transportation vehicles for the islanders. It is appropriate that a tow truck for a golf cart would also be a golf cart.



The world-famous landmark Catalina "Casino"



"Cody"



The "Andrew" Tacoma



Bats!



Avalon Tow "Truck"



WWII Passage

The Chicago Chronicles

By

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

One of the things I love about this job is that it satisfies, in part, my love of writing. I really have fun writing these columns, and I seldom seem to run out of things to write about. Just as I think I'm running into writer's block, something comes along. Call that a blessing. This month, it's a blessing in disguise.

We here in Chicago Engineering have had kind of a honeymoon going with our big 150 kW Caterpillar UPS, which keeps the power clean at our WPWX Burnham transmitter site, a.k.a. Camp Desolation. This one device has prevented over 700 transmitter outages across the exactly three years (as this is being written) since its installation. I have an upcoming article in *Radio World Engineering Extra* about this very device. But there is one thing about the UPS which has bothered me from day one, and that one thing sort of came back to haunt us this past month: We don't know enough about what makes it tick. And, we found out the hard way some unintended consequences of the way the system is configured.

It started a few weeks ago when I got a call around midnight from assistant engineer James Kelly, informing me that Power 92 was off the air. I was not well that day and had just gone to bed, but I immediately got up and called the remote control. I got through because the RC is powered through a small UPS of its own. I tried to bring both analog transmitters back on line. No dice. Well, we had a power outage, but what had happened to the generator? I called James and assistant engineer Brian Bonds and told them to get out there, and then I started making calls to Edison.

When James and Brian got there, they found the generator to be in "emergency stop" mode and the Edison power feed was out. I instructed my guys to switch the gen out of "emergency stop" mode and, with a little coaxing, it came up. Still not trusting, I called the generator service department from home and then headed out there, sick and all.

When I arrived, we still didn't have power to

the building. Then I noticed that the step-down transformer between the UPS and the main building disconnect wasn't humming.

That meant that the UPS wasn't putting out. When we opened the UPS building door, we were almost blown away by the extreme heat that hit us all in the face. It had to have been over 120 degrees in there! But there was the UPS, still running OK even though it had no load and its air conditioning was dead. We'd really blessed out.

When things had cooled down a little (which was about five minutes), I went in and did an inspection with a flashlight. I found that the breaker, which follows the UPS output, had tripped and had to be manually reset. That was not easy to do. It actually took a couple of minutes to get the breaker to physically respond at all. Once done, however, everything came back to life, with one exception. The main analog rig wouldn't come on the air *until* the plate overload alarm was reset. That was a clue. What had done that? That had never happened before on this rig, the most reliable transmitter we have.

That wasn't all. Between the transmitter output stage and the UPS, there is a plate supply breaker, a transmitter main breaker, and the building main breaker. None of them had tripped or blown a fuse. This outage, assuming that it started in the plate circuit of the main rig, passed through *three* breakers or disconnects without affecting any of them, tripping only the *fourth* breaker up the line. What was that all about?

The rest of the night consisted of the arrival of the Edison service man, who helped us with testing various parts of the system, and of the generator man. He looked the gen over thoroughly, wondered aloud about the load the gen was seeing, and then suggested a load bank test, which we've since ordered.

That could have been the end of the story, but fortunately, it wasn't. Several days later, the same scenario repeated itself. This time, not just the output breaker but also the input breaker to the UPS



tripped. The same transmitter plate overload warning LED lit up again. All the other breakers were unaffected. Fortunately, senior engineer Mack Friday was on site at the time, reset both breakers and the main rig overload, and put the station back on the air with only a few minutes of downtime.

Now we had a pattern, and it led straight to the transmitter final stage. After drive-time that day, James and I put the backup on, went through the transmitter high voltage supply and the final amp, thoroughly cleaning everything (which wasn't much because this job had been done recently), and we replaced the final tube. We found no evidence of any kind of arcing within the rig, either in the final cavity or the HV supply. But, ever since then, it's been peace at last, with no repeat performance of these symptoms, and as of this writing, it's been almost two weeks since the last outage.

I believe that this particular tube was developing internal arcing, which is pretty consistent with all of the evidence and observations we've made. It's not the first time I've seen that happen. That tube had a little less than 8,000 hours service life on it, but I suspect it's going to have to be rebuilt.

For those who don't know, 8,000 hours of useful life on a final tube of this size before rebuild is not acceptable. Where I spent my childhood in this business, namely television nearly 40 years ago, a tube gave its greatest value when it ran properly for 50,000 hours or more. I saw a few tubes that didn't get rebuilt until they had 70,000+ hours on them. Now understand that those were water-cooled monsters, but still, that was the benchmark on which I cut my teeth, so my standard is that a tube, to be considered a success in our service, has to have a good deal more than 20,000 hours of in-service life. In such service, internal arcing should be practically unknown. Usually, the failure mode is that filament emission starts to drop to a point where you can't make full power in the transmitter anymore. That should be considered the end of a tube's useful life. The tube we have in the rig now has close to 20,000 hours and is still going strong. Now *that's* a tube!

Getting back to the UPS issue, you've probably guessed why the UPS building was so hot. With the output breaker tripped, there was no AC (as in alternating current) getting to the AC (as in air conditioners) in the building. Now, why didn't the

designers of the building think about this possibility?

Oh, but it gets better. Remember that the manufacturer of the UPS is not Caterpillar, and neither is the company which supplied the shelter into which the UPS was installed. The shelter manufacturer also installed the circuit breakers ahead of and behind the UPS. That wouldn't have been so bad except that the breakers they installed were really overcomplicated for the job they were supposed to do. What do you mean, Art, overcomplicated? Easy. They have *microprocessors* inside of them. That's right, and they have *adjustments* on them which, from what we've seen, were probably not set for an optimum operating point at the factory. How do we know? All the adjustments have been set at one extreme end or the other, which is probably how they left the breaker factory. And we don't have any



WPWX UPS building

instructions, or any other clue, as to how to properly adjust those cute little trim pots. And, since these monsters are microprocessor controlled, that makes them beau coup expensive to replace, something on the order of \$2,800 a throw. And, we're told by a local supplier, after four trips or so, these breakers are approaching the end of their useful life. They get weak and must be replaced.

That's a lot of bucks per trip, kids.

Further, and here's the kicker, the UPS manufacturer didn't even know that these circuit breakers were installed by the building manufacturer. Had they known, they wouldn't have approved of either the type of circuit breaker used or even of the manufacturer, which is one of the top makers of these things in the world. Worse, they didn't even approve of the fact that there was an input circuit breaker at all (since there is already a 480 volt disconnect installed ahead of the UPS, per code). Just between you and me, it appears that all the rules had been violated here. Now, what else could possibly be wrong with this system? Can you say, "The honeymoon is over"? Well, I hope not, but we are a lot more wary about things since all this has happened. For one thing, we initiated a maintenance log for the UPS, just like we have for the transmitters, even before this situation came up. That should nip future problems in the bud. We hope.

Maybe not. A week later, the site suffered a power outage that lasted a day and a half. After three

short outages in two hours, we had to go to the backup analog transmitter to both save fuel and keep the generator from being overloaded. We called in both the UPS manufacturer customer service department and the local Caterpillar service man. They got together on the phone and with the modem (the UPS is remote controllable from the factory via a phone modem, and has a local serial port just made for a laptop, both of which are real good ideas), and between the two of them they found a possible cause for the generator outage. During the UPS recharge (that is, the spin-up of the three ton disk which is the UPS's source of energy) the UPS itself was sucking up so much power from the gen that it couldn't handle both the recharge process and run the transmitting equipment at the same time. This likely caused the generator governor to initiate a slow-down of the gen, causing a frequency fault, which shut down the whole system. The good news is that the problem is correctable in the UPS parameters programming menu simply by slowing down the recharge rate, which means less current draw on the gen. Of course, spin-up then takes longer, but I call that acceptable. What frosts me is that this sort of thing should have been dealt with during the system's initial set up, long ago—and it wasn't.

This UPS has been a godsend, to be sure. You'll have to pry it out of my cold, dead fingers. However, if you even find the need to have one in your transmitter site, be *sure* to specify in the UPS order that there be no input breaker ahead of the UPS, and if there is going to be an output breaker, specify something simple and less expensive, like a Square-D KAL-series or equivalent. Don't let the manufacturer of the shelter sneak in any other electric breaker setup. You'll save yourself a lot of hassle. And, to save your generator, try to have the UPS adjusted to be as light a load as possible.

Yes, we've taken action on the circuit breakers. Both of the original units are coming out. The input breaker will not be replaced. The output breaker will be replaced with one that isn't microprocessor-controlled. I don't mind microprocessor-controlled bulk erasers or a microprocessor-controlled litter box (which my cat has). Just don't microprocessor-control my circuit breakers. It causes too many problems.

Yes, this has been a learning experience, but it isn't an experience that is particularly satisfying because the situation had to fall down on our heads in order for us to really learn about the system. I have to chalk it up to not knowing what questions to ask. That's why I'm writing this: to give you, the reader, those questions to ask. One thing is left for us to do,

the changing of the electric power circuit to keep the UPS's air conditioners on line if the power to the rest of the facility fails because the UPS output breaker has tripped. This will be a challenge since the output of the UPS is 480 volts while the air conditioning units run at 240. Sounds like a new step-down transformer and a little rewiring are in order. Later. Let's get past this crisis first, and then let's do it right and budget for it.

It's always something.

Speaking of which, consider that, with the computer age now in full swing around the globe, it isn't just death and taxes which are inevitable anymore. There are also software upgrades. And I almost forgot: software crashes.

This has been brought home with a plethora of software updates suddenly appearing for all of our HD equipment, without exception, from automation to transmitters. I have learned some lessons here. First, not only are upgrades inevitable, but as a good little CE, you'd better make it a routine to watch for them and implement them when they come along. If you don't, it can and will get expensive. We have a BE FXi-60 in our house that hadn't had a software upgrade since it was installed in November of 2003. The operating software in there was working well, so why worry about it? Well, the system that was in there was so old that: a) it won't work with the latest upgrades of the equipment around it, and b) it can't be upgraded in the field anymore. Really! We had to send that critter back to the factory. That kind of cost gets a little tough to explain to the DOE, by the way.

The lesson—visit the manufacturer's website regularly to look for the latest software and firmware upgrades for all your equipment, because the manufacturer won't always tell you that those upgrades are there. (Thanks for that, fellas). And make it a point to keep a kind of mental list of the software versions that live in each kind of equipment you have. That should be easy if you keep all the software versions the same in each type of equipment. And, having a good memory for numbers makes it even easier. Otherwise, keep the list in your PDA.

Having said all that, be careful about doing your upgrades in the field. As I mentioned in an earlier article, upgrading the software in the HD generators turned out to be quite problematic, and although the upgrades for the RF exciters went smoothly with the one exception just mentioned, when it came to the HD-2 importer upgrades, that turned into a nightmare of upgrades which just didn't "take."

It's really a crap shoot. In the first case, I did the install wrong because of a missing step or two in the factory-supplied instructions. It got so that I got on my writing horse and wrote a set of notes about that particular install on the forums.crawfordbroadcasting.com web site. Look for it in the "HD Radio" section. Once I called the factory and got the missing step added to the procedure, that first install went well and the new HD-2 software is on the air and doing just fine.

However, the second station's software upgrade has turned into a nightmare. After five tries at it, I can now see in advance exactly where the install is going wrong, and after several calls to the factory and a few emails with screen shots, all we've learned as of this writing is that there may be some kind of a bug in the software which affects only certain (a minority, we're told) of installs. The software gang is working on it. Great. It had to be us, didn't it? Don't tell me we have to send the whole importer back for a re-work! I'm doing no more upgrades until we get this situation straightened out, but the point is that you never know when an upgrade will go really, really bad anymore, but you have to do 'em anyway. Damned if you do, damned if you don't. I told anyone who'd listen years ago that fat code breeds bugs. Did anyone care?

Now that I've done my little bit of bad-mouthing, I must add that the importer upgrade, once done successfully, it's really worth the wait. The graphics are way cool, especially compared to the old version, which were really bad. And the audio is better. And at long last, you can correct the software's "on the fly" errors without shutting down the HD-2 audio. Nirvana!

Finally, let's rant a little about HD – again.

The Broadcast Electronics HD-R list server recently had a big thread about the issue of shutting off the analog delay on sports broadcasting, and it generated the biggest thread I've ever seen on the forum, especially for something which started out as

innocuously as a simple little question on how to shut off the HD entirely. Having put my two cents worth in on that thread, I feel compelled to share those thoughts here.

1. Why have the analog delay shut off for *away* games? There's no one in the home stadium trying to listen to the away play-by-play during those games, is there? Duh?

2. Why is a certain local station (here in Chicago) apparently petulantly shutting off its HD signal during live sports broadcasts so that it doesn't have to deal with this issue of complaining HD radio listeners (like me) and then turning it back on after the game, which is usually after sunset, in violation of the applicable rules as of this writing? Just wondering.

3. What is wrong with having a micro-power analog FM signal transmitting play-by-play audio for the exclusive use of listeners within the stadium, with audio un-delayed by *anything*? It's been done this way in drive-in theaters for years. Limit the power to less than the Part 15 maximum into a properly designed antenna, or leaky coax, strategically placed. Then promote it – in the stadium only. That's all you need. License not needed, either, if you do it right, and in stereo, no less. Let the Walkmen rule. Why hasn't anyone else thought of this approach? Where are the brains in the sports business, anyway? (Don't answer that.)

4. Forget trying to sync up radio audio to the television feed. I've seen enough sports on TV while trying to listen to the play-by-play over the radio to know better than to even try. As I've said before, the difference in audio delay between radio and TV varies all over the place, even within a given game. I think that it's time for TV to start timing their delay to the radio feed, rather than the other way around, anyway. Can we call that one up for a vote? C'mon guys, we can win this. There *are* more radio than TV stations, right?

That's enough for this month. Blessings to you all.

The Portland Report

By
John White, CBRE
Chief Engineer, CBC-Portland

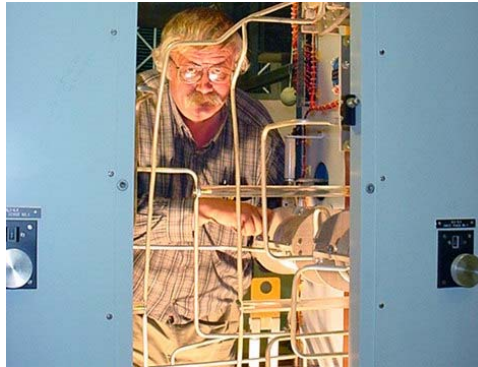
What can be said about June? It rained on the Rose Parade, nothing unusual about that. We had a visit from the Tire Fairy at Mt. Scott. The Tire Fairy, second cousin to the Tooth Fairy, deposits old used tires at various properties in the dead of night. Finally, the state legislature has closed up shop and gone home.

The Oregon constitution specifies a legislative session every other year on odd numbered years. The standard joke about this time on odd years as the legislature grinds to a close is that when they go home, we will be safe for another 18 months. Didn't work this year as the legislature scheduled an emergency session for January of next year.

There is one particular bill I have been watching due to its potential (negative) impact on private residential and business property. As a result, I have noticed a major failure of the "media," print, radio and television – that's us, folks. I found lots of words, the Oregonian claiming that the legislature will fix the people's mistake at the ballot box. The Albany Democrat-Herald editorial, "Respect the will of the people." No real information about what the legislature is doing, no "Four Ws" (what, where, when, why). Nothing on TV news, more on radio. In these days of information technology, why is there no information about what is actually in a bill, like what it would do. Seems like a huge unmet need to me, an opportunity. Will radio step up and fill the vacuum?

Changing gears, a lot has been said on these pages about the problems getting the parts we need for our trade. In the Portland metro area we have a number of major electronics manufacturing and design business – Tektronix, Intel and Xerox to name three. Despite the concentration of electronic technology in Portland, a combination of state and city regulation along with a changing marketplace has driven the parts houses out of business. Even Winks Hardware and Portland Nut and Bolt, both Portland landmark businesses, may disappear. Parts and hardware are no longer an hour away. I have been

pushed more and more to the phone and mail order parts houses like Mouser. The parts are three to five days away, but at least they have the parts.



I mentioned all this because of an experience I had doing some remodel work here in Portland. I remember a video by Tom Peters I saw some years ago. Peters is a strong advocate of custom service and in that presentation he lauded Fed-Ex for answering the phone on or before the first ring.

I had the following experience with a recent parts shipment. Tracking has changed and is now on the Internet. After waiting the required number of days, I saw by the tracking that the package was out for delivery. By 2 PM, no package... back to the tracking. Now on hold, "Need an apartment number." Folks, our studios are in an office building, not an apartment building.

So said I, then I called the phone number I found hidden off in an obscure place. Ring, Ring, Ring, Ring. Computer answers "This is XXX, say track a package, or say ship a package." I want neither, so I tried 0, *0, and #0. Each gave me CLICK....BUZZZZZZZZ.

Okay, I tried tracking, entering the tracking number. "The package is on hold, need an apartment number" said the computer CLICK....BUZZZZZZZZ. GEEZ! I already knew that!!!!

Now I am getting creative, dial yet again, "Say track a package, or say ship a package." "Dihedral oxyl flumix," I say. "Sorry I didn't understand," said the computer, "say track a package, or say ship a package." "Monatomic negative reactance," said I. After several such exchanges, the computer finally relented and transferred me to a real person.

After giving additional address instructions, I expected the package only a day late. I did ask why they didn't call the contact number on the shipping

label. (A contact number is standard for a Mouser label.) They said there was no number.

Next day, noon, no package. Being proactive I drop everything and go to tracking. Here is what I saw for the previous day.

1:30 PM, no apartment number for KKPZ.

3:15 PM, address correction entered.

8:30 PM, address correction removed, post card will be sent.

Back to the phone, say ship or track, yadda, yadda, I finally work up to a supervisor to find where the package is located. It's now 2 PM, so I get to fight the rush hour, finally returning at 6:45 with the package.

Needless to say I will never again use them. From now on I will specify FedEx ONLY. Oh, by the way, when I finally got the package, the contact phone number was prominently shown on the label in LARGE type.

This should be a lesson for us and how the public views our product. We should strive to make all aspects of our listeners experience be positive.

Those parts were for the distribution of audio in our new studio. One of the problems with the equipment pods is the limited space. No room for punch blocks. I am using MTA pin connectors and PCB wire wrap stock to distribute audition, aux, and utility audio to the equipment pods. The MTA connectors are an IDC connector that provides a clean and simple space conservative connection. It's a huge improvement over the typical mass of wires.



One other tip: cross-connect panel wire loops make a huge improvement in wire management. They work well to keep wire runs manageable.

**Rocky Mountain “Hi”
The Denver Report**
by
Ed Dulaney, CBRE
Chief Engineer, CBC - Denver

Reminiscing

There’s always been something “special,” at least in my mind, about radio. About 35 years ago I remember getting my first shortwave radio receiver. It was a Christmas present that my mom bought for me at Montgomery Ward. It had this really cool flip-up front panel that displayed a simple world map along with a legend of world time zones. And it had a dial where you could select your local time, and figure out what time it was in England, on anyplace else in the world! As I recall, it was a five-band receiver. Sure, the selectivity and sensitivity was extremely poor, but I really didn’t care! I listened to VOA, BBC and other “exotic” broadcasts with the enthusiasm of a typical ten-year-old.

Back then, radio was simple. There wasn’t any form of digital broadcasting, except for RTTY and Morse Code. And anyone with a \$29 radio could listen to broadcasts from around the world. All it took was a little imagination and one could easily close his eyes and see Big Ben, the Eiffel Tower, or even Red Square as they listened to these broadcasts. It fostered in me a love of history and of cultures from around the globe.

Today radio has become something – dare I say – less than exciting. There is more focus today on the delivery of the message than of the message itself. In many ways we have created a package of bologna out of radio! By that, I mean we have thrown in every possible scrap of anything resembling “food” into this medium, hoping that it is somehow palatable to the typical listener. And it’s not necessarily our fault that radio has gone this direction. As has been written about over and over again in the trade magazines, radio has serious competition for the ears of listeners, with MP3s, satellite, and the Internet being our greatest “enemy.”

We’ve also lost the ability to be something that the local population can relate to. I see many

radio stations around this country trying to sound chic by giving themselves some sort of hip new name. It’s only a matter of time until someone calls themselves “RadioPod 101.1” or “102.9 The Net.” It’s a bad case of lost identity, and I see no cure for it in the near future.

The thing that got me thinking about this was a trip I made to Texas last month. I had the wonderful experience of driving through New Mexico during a period when a unique combination of E-layer skip and ducting brought dozens of stations alive on the FM band – and all of this happened on a barren stretch of road where there are normally only one or two FM signals to be heard. I listened to a couple of stations in Medicine Hat, Alberta (that’s Canada, ‘eh!), a couple in Montana, and one in either Georgia or Tennessee. I can’t be sure on that last one, as it was in and out too much – and it’s possible that there were two separate stations that I was hearing on the same frequency.

Yet there were many more than just these five stations that I heard. However it was impossible to tell where they were. They were all the typical music-liner-music-liner formats, and the liners were as generic as they could be. One of them billed itself as “Light 97 FM” and played an 80s & 90s A/C format. Another one called itself, “Grizzly 94.9.” But none of them said what city, state, province or even planet where it was broadcasting from. I did an Internet search when I got home but turned up nothing that resembled the stations I heard.

Why is it that we have radio stations when the stations serve almost no purpose? Just for fun (relatively speaking), I gave a careful, critical listen to all the stations we have in the Denver area. If someone were in town, would they know that they’re listening to a Denver station? Chances are that most of them would not. Even some of the talk stations which air national programs do little more than mention the area during their local spot breaks.



Thankfully, the Crawford stations in Denver do a pretty good job of identifying themselves and stating their missions. And they'd better! Though I don't have anything to do with the programming of the stations, I still read most of the memos that come from the desk of Mr. Crawford. If someone were to listen to our station and not know what we stand for then it's time to lock the doors, kill the lights, and call it a day – permanently! We have a mission, and a mission statement, that outlines exactly what we are. And the listeners know it.



A crew from GRB Construction installs the new Canopy system at KLZ

That's what'll beat those MP3 player, satellite and 'net folks. It's not about the medium, it's about the message.

Interference

We've had our share of problems lately with the STL to KLZ. The 5.8 GHz band has become quite noisy lately, and getting the Canopy system to stay connected has been challenging. This, of course, is one of the problems with having an unlicensed STL path to the transmitter. Without frequency coordination, it's difficult to "own" any specific channel.

Last month, we purchased a new system from our local Motorola dealer. The PTP400 series, while still using the 5.8 GHz band, is supposed to be much more resistant to interference issues. It uses Orthogonal Frequency Division Multiplexing (OFDM) instead of the Quadrature Phase Shift Keying (QPSK) method that the current Canopy backhauls use. It can also seek out a new frequency

dynamically to get around interference on any one specific channel. But, as I have discovered, it's not perfect! In fact, it seems to suffer from the same problems as our existing Canopy system. Part of that problem may be in the antenna. The one that the system comes with is a 23 dBi panel antenna. An optional upgrade is a three-foot parabolic dish. That boasts a 31 dBi gain. It would increase the signal along the path by 16 dB, which should significantly improve the reliability of the link. I'll probably order a pair of those and see if the system becomes more robust.

KLZ Antacid

Last month you remember me telling you about the hiccups that we were having on KLZ. The cure for those hiccups was interesting, to say the least!

Amanda and I spent a little time tweaking the "line stretcher" network between the main transmitter and phasor. This network shifted the phase of the load as seen by the transmitter by about 50 degrees. I nudged it a little and changed the phase rotation by about 15 degrees. Wonder of wonders! The signal improved significantly.

It just goes to illustrate how delicate the HD spectrum is. KLZ is pretty close to a worst-case HD Radio station. With sidebands that are beyond 2:1 SWR and a wide-spaced two-tower array, it's difficult to get the perfect bandwidth that the Ibiqity specs call for. Therefore, a slight shift in the phase, which rotates the cusp of the load as plotted on a Smith chart, can make a world of difference in the signal.

Now KLZ is extremely clean, and the HD dropouts have diminished greatly. We're not perfect, and as I have time I'll probably do a little more tweaking. Still, you have to love how the smallest of changes can have the biggest impact on the signal.

Nighttime HD

I'm really getting frustrated by the slow-as-molasses pace the FCC is taking on getting the nighttime HD rules published. It's been over two months since they approved it and we've seen the R&O dangling out there like a carrot in front of our nose. But until it is published in the Federal Register, we can't do squat.

Personally, I think that every AM broadcaster in this country that has converted to HD Radio should just thumb their collective noses at the FCC and start broadcasting in HD during the evening anyway. Why not? The ruling has already been approved. All we're waiting on are the wheels of

bureaucracy to move forward. How hard can it be, folks? Type the doggone report, send it to the Register and get it published already!

Of course these are just my personal feelings, and they most certainly do not reflect the opinions of Crawford Broadcasting.

Pretty KLTT

The new paint is on the KLTT transmitter building. After months of wrestling with contractors, I finally got-'er done! It's nice to see a building that isn't a strange shade of eggshell white with strange splotches of grey, black, and other odd colors mixed in!

Some people would say that the paint on a building doesn't really matter as long as it keeps the elements out. But as our D-of-E would likely say, the appearance of our building reflects on our values. If the building is ugly, then people tend to think of the station as ugly. When guests from our of town visit (like high level representatives of Nautel, Omnia, BE, or others), we should have the appearance of a station staff that takes pride in its work. Part of that pride is a clean and inviting transmitter site. It does leave an impression on our guests, and on our staff as well.

Not Again...

Yes, he's done it again! Sometimes I do wonder about him. Doesn't he realize the problems he causes when he goes off like this? Life was simple, why must he complicate it?!

I'm speaking, of course, of Mr. Alexander. Last month he did some measurements for KLDC to see if we could augment our pattern and let out our very tight nulls to the northeast a bit. After doing those measurements and filing them with the FCC, he decided to go a step further. He sent me on a quest to measure the conductivity through some of the most rugged, mountainous terrain that Colorado has to offer. Since the M3 maps show a 10 mS/m conductivity there, and knowing that the more likely conductivity in the mountains is 2 or 3 mS/m, he said, "Go west, young man!" And, therefore, I went mostly south, but a little west, since I needed to measure the 195-degree radial.



600 miles and a few dozen pounds of dirt later...

Almost 600 miles and a few dozen pounds of dirt on the car later, I had the measurements. And, sure enough, they showed that we can let out the KLDC signal to the south by a large amount. So an application is being prepared and will soon be sent to the FCC, and now we await yet another upgrade to the signal, likely bringing the power of this once 1 kW daytimer "peanut whistle" to 10 kW!

And that means that all those fine people that helped out the last time will likely be brought back to Denver next year for more measurement fun and games! Just remember, guys and gals, that walk-in measurements are easier to do when you get to walk in on radials that don't traverse rivers and swamps. And the best way to insure that your radials are free of those obstacles is by taking the Chief Engineer to that nice fine dining establishment that he loves so much!

A Question of Logic

I'll end this time with a problem in Boolean algebra for you to solve. If you have a signal, designated as "2b," and that signal is applied to both inputs of an OR-gate – with one of the inputs running through an inverter – what would the output signal be? Or, to put it more simply, "2b, or not 2b, that is the question."

Until next month, press on!

Digital Diary
by
Larry Foltran, CBNT
Corporate Website & Information Technology Coordinator

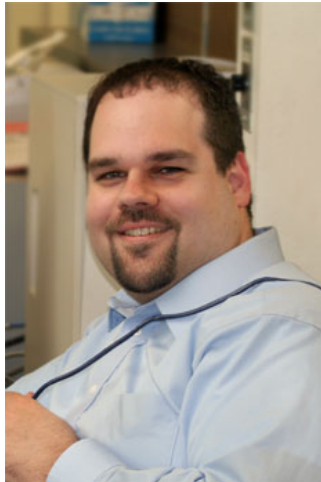
Anyone who has been around computers for awhile knows that data gets lost from time to time. Whether you saved it to some remote location on your hard drive or the file you need was in a directory you deleted two months ago, you will occasionally encounter this type of frustration. If your data is important enough that losing it will result in a reaction greater than a simple sigh, you should be backing up the content of your hard drive or server. The big questions are how often and to what type of storage device or media to use. The decision is ultimately yours, but there are several factors that can influence your solution.

A short time ago, computer users had only a few different options for data backup. For home users, the most common was the 3½ inch floppy disk capable of holding an astounding 1440 kb of data in its high density form. I can still remember span zipping my important files across a dozen or more of these plastic marvels. Thankfully, technology has made many more options available, each with much greater storage capacity than those floppy disks of days gone by. Actually, floppy drives have gone from standard equipment on new PCs to an infrequently selected option.

Zip Drives – The Iomega Zip drive craze began in the mid-90s when this medium-capacity storage option hit the market. Consumers went from storing just over 1mb of information on a floppy disk to having 100 mb or more of storage capacity. Although older versions required the user to have a zip drive installed on his PC, newer versions of these can be plugged directly into a USB port. These devices are slowly disappearing from the technology landscape, but they can still be found at computer swap meets and are very inexpensive. Data retention on zip drives is typically 10-years, which does not make this the best option in my opinion.

CD-RW – I still remember how amazed I was when I

first heard about rewritable CDs. This quickly became my preferred method of data backup and stayed at #1 for quite some time. Although this may still be a viable backup option for many users, it can be useless for those of us who can fill up a 40 gb hard drive without blinking. Data backup onto CD takes time. The more data you have, you expect to spend more time swapping CDs in and out of your drive tray. Also keep in mind that most CDs of this type only have a data retention lifespan of 5 to 10 years.



USB Flash Drives – (Thumb drive, memory sticks, etc.) Since becoming available just a few years ago, thumb drives have made it easy to store data and, when hanging around someone's

neck, has become the quickest way to spot a computer geek. These amazing little items are available in a variety of different shapes and storage capacity, finally allowing computer users to store gigabytes of data quickly and easily. Although I store plenty of data on my thumb drives (I'm up to 4 now), these should not be used as a dependable backup option. In fact, I regularly back up the data from my thumb drives. Although they can sometimes seem indestructible, thumb drives can go bad in an instant and they can "wear out." I've heard that most of these devices have a writing capacity of 10,000 to 100,000 times to any one location on the flash memory. Although that seems like a nearly impossible limit, users who frequently use their thumb drives can expect to reach that limit at some point. It only takes one small part of a file to become corrupt as a result of "bad memory" to render the entire file useless.

External Hard Drives – We finally come to my favorite and preferred backup option. There are plenty of "ready made" models available, but I prefer building my own external drive unit. You can simply select a hard drive that will suit your storage needs and install it into one of the many external drive cases available at most computer stores, allowing you to

plug it straight into a USB port. You can have vast amounts of data storage and, teamed up with some backup software, you have an option that takes care of itself. One of the key features of using an external drive for backup is that it's portable. Although you can't simply put it in your pocket, you can move it off site after the work day is over. I personally have an external drive where I backup all of my important data and digital pictures. Whenever our family goes on vacation, I can quickly disconnect it from the USB port and pack it in my luggage. That provides an instant off-site backup of my important data.

The other big question is backup frequency and, in this sense, frequency has nothing to do with

radio broadcasting. How often you backup your data depends on how often you modify your files or create new data. I personally perform a full backup of each computer once each month and backup my thumb drives once a week. I obviously access the files on those more frequently than on my hard drives. Diligence is obviously also an important factor. Establishing a back up schedule is useless unless you stick to it.

Always remember that in terms of hard drives, it's not a question of if it will ever fail. It's more like *when* it's going to fail. Being prepared and backed up can turn a complete digital tragedy to simply a nuisance.

Until next month...

The Local Oscillator
July 2007

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
810 kHz, 2.2 kW-D/0.43 kW-N, DA-2

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

KLVZ • Denver, CO
1220 kHz, 660 W-D/11.5 W-N, ND

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

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

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

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

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

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

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

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

WDCD • Albany, NY
1540 kHz, 50 kW-U, DA

WPTR • Clifton Park - Albany, NY
96.7 MHz, 4.7 kW/100m AAT

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

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

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

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

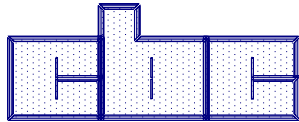
WYCA • Crete - Chicago, IL
102.3 MHz, 1.05 kW/150m AAT

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

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

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

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