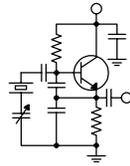


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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NAB Reflections

This year's NAB spring convention was unlike any I have attended in recent years. Gone was the sense of excitement that normally pervades the exhibit floor. The central and north halls (the only two I had time to visit) were almost hushed, and there was a conspicuous lack of traffic. Clearly the economy had an impact on attendance. The NAB claimed something like 85,000, but I think it was considerably lower than that.

There were times when I was able to stop and have a conversation in the middle of a main aisle without causing any traffic problems. Had I tried that in previous years, I would have been run over or cursed for impeding traffic! And we had no trouble finding a place to sit and meet in the seating area outside registration in the north hall. In years past, one would be lucky to find a place to sit on the floor next to the wall!

As I made the rounds and talked to various manufacturers and distributors, I was told that while traffic volume was considerably down, the quality was up. There were fewer people visiting the booths but those who were there were there to do business. That probably made things easier for most everyone except the NAB, which derives the majority of its annual income from the spring convention.

So what was the Next Big Thing displayed at the show this year? Beats me. If there was a Next Big Thing, I didn't see it, and neither did anyone I talked to there. But that doesn't mean there wasn't some good stuff at the show.

One thing I was glad to see was the expansion of the Nautel NX and NV transmitter lines. Last year, Nautel made a huge splash, showing off the fruits of its considerable engineering efforts in rolling out the NX-50 50 kW AM transmitter and the NV-40 40 kW FM rig. CBC purchased one each at the show last year. This year, the company rolled out the NX-25

25 kW AM transmitter and NV-series rigs down to 10 kW. Clearly, Nautel has assumed the lead position among radio transmitter manufacturers as evidenced by its product line, its engineering force and even the size and appearance of its booth at the show.

Another thing I was glad to see was that our friends at Kintronic Laboratories are now offering services for phasing, coupling and antenna systems that goes far beyond the normal design, manufacturing and parts business that has long been their mainstay. With the current economic situation of our industry in mind, KTL is offering an "overhaul" service wherein the company will, in essence, rebuild a fresh design into your existing phasor and ATUs.

And Wheatstone drummed up some excitement with its E-Square audio-over-IP products, E-series control surfaces and new audio processing products. We can always count on the folks from North Carolina to stay abreast of new technologies.

Over in the south hall, I sat in on quite a number of sessions in the Broadcast Engineering Conference. I didn't notice a Next Big Thing over there, either, but they were worth attending. I heard some great presentations on some emerging technologies, and I heard a few that I had to really scratch my head over.

The highlight of the conference for me was the session that I was privileged to moderate, "New AM Technical Rules" (i.e. "AM antenna modeling"). My panel was an all-star team consisting of Ben Dawson, Ron Rackley, John Warner and Glynn Walden. Ben gave a talk on modeling, Ron told us how to make impedance matrix measurements and calibrate our sample systems, and John told us about the WKOX project, which was the first to file a license application under the new modeling rules. After the presentations, those three were joined by Glynn and we had a spirited panel discussion of all things related to AM antenna modeling. We had good

audience participation, and things were rolling along great until the NAB came along and ran us out of the packed room (it seems there was another session scheduled in there for the lunch hour).

I got a lot of feedback on that session, including emails from some very knowledgeable people telling me that they learned something they did not know or that our panelists clarified something for them. It was great fun, and I very much appreciate our panelists, the NAB and the SBE for giving us the opportunity.

The SBE national meeting went very well and was, despite the lower attendance at the convention, a standing room only event. We announced the charter of a new chapter, No. 144 (Hong Kong!!) and the creation of a new staff position, Education Director, as well as the planned accelerated rollout of our SBE Online-U education program. Two regular contributors to *The Local Oscillator*, Stephen Poole and Art Reis, are members of the SBE Education Committee and continue to help me develop new courses for this program.

Indeed I did learn some things during the NAB spring convention, but as usual it wasn't in the conference rooms or exhibitor booths. I learned the most by talking with the people with the knowledge, folks like Ben Dawson and Ron Rackley who are always so gracious, patient and generous with their very limited time. Thanks to them and to all those who made this year's event one worth attending.

KLVZ Project

On the slate for this month is the move into the new transmitter building at the KLVZ daytime site north of Brighton, Colorado. The new building, an Oldcastle concrete prefab, has been ready for some time. We have simply been waiting on good weather and ground conditions. Hopefully we will have both later this month.

The project entails digging a trench from beneath the old building to the new with a spur trench to the end of a new soil pipe running to tower 2 (center). Because all the towers in this array are positive power flow, we can simply extend the transmission lines by adding equal lengths to each. We will do the same with the three sample lines, the 10-3 power cables and the six-conductor control cables. Two new 3-inch and one new 2-inch PVC conduits will be run in the new trenches to protect the transmission, sample, power and control cables from the teeth of the prairie dogs that burrow beneath the site.

But none of this will be as easy as it sounds. The existing cables come up beneath the existing transmitter building, really a 1980-vintage construction trailer up on 6-foot piers, in conduits secured to the concrete piers. Each of these lines will have to be spliced to the new lengths beneath that building, and those splices must be protected. We purchased two telco-style splice pedestals, the kind you see beside just about every road anywhere, for this purpose. How we will cut off the existing conduits just above the soil line without damaging the cables within remains to be seen, and how we will then secure the pedestals over these conduits is yet another challenge. But we're engineers, and we'll meet that challenge. It will work and look great when we're done.

The next challenge comes in getting the existing equipment – especially the phasor – into the new building. The phasor cabinet is exactly 36 inches wide at its narrowest dimension. The door of the new building (this is a prefab, remember) is exactly 34½ inches wide. To get the phasor in, we'll have to remove the door and frame in the new building, squeeze the phasor through the rough opening and then quickly reinstall the frame, seal around it and trim it out.

And then comes the challenge of connecting the extended transmission lines to the phasor. In the existing building, the lines come up from below, so the transmission line connection points are in the floor of the phasor. In the new building, an overhead cable ladder is provided, so the lines will come in from the top. We'll have to cut one or more holes in the top of the phasor, grommet the hole and run the lines down the inside wall of the phasor to the connection point in the bottom.

I haven't modeled it, but I think that extending the transmission lines will be beneficial. In the present system, we have to use an outboard "line stretcher" network to rotate the cusp of the common point around the Smith chart by 180 degrees to optimize the load for digital. The distance from the old building to the new is almost exactly 90 electrical degrees allowing for the velocity factor of the lines, so I'm hoping that the cusp lands close to the right place in the new building without the outboard network.

Still, I can tell that none of this will be easy, but I'm looking forward to it. It's been a long time since I got down in the trenches to build out a transmitter facility. When we're all done, this site will go from being one of the worst in the company to one of the best.

The New York Minutes

By

Brian Cunningham, CBRE
Chief Engineer, CBC – Western New York

Hello to all from Western New York! Every since I was about eight years old I have enjoyed a fascination with electronics. My father and grandfather owned and operated a television sales and service business, which gave me ample opportunities to “experiment” with electronic circuits and circuit building techniques. Needless to say, many of my projects went up in smoke, with a circuit breaker recycle in order.

I can’t recount how many small fires I started while experimenting with different circuits, my favorites being power supplies. I would emulate a supply found in radios and stereo systems and change values of the components to see what affect it had on the supply’s output. I was indeed fortunate to have the opportunity and resources to learn as I went and the patience of my dad and granddad to let me piddle around the service shop and experiment. I’m sure that they both hoped that someday I would join them in the family business, but in the upcoming years, radio would capture my attention.

I wasn’t as much interested in the entertainment side of radio as I was in the engineering side of things. Once I got a taste of broadcast engineering, I knew instantly that I had found my calling, and I would do anything to get an opportunity to pursue that dream.

One of the tools I used to learn the basics of electronics was the Heathkit electronics kit. Over the years I have purchased and built a number of the kits, beginning with a simple AM radio and working up to sophisticated test equipment such as oscilloscopes, VOMs and oscillators. It is a shame that the company no longer sells these kits. They are still in business but now concentrate on educational systems electronic learning materials for classrooms, schools and training centers.

A Little History Lesson

Edward Heath founded the Heath Company in the early 1900s, but believe it or not, he started out selling light airplane kits! One of his most popular was a kit called the “Parasol,” and it was very popular with airplane enthusiasts. Ironically, Mr. Heath was killed in 1931 during a test flight of one of his kit airplanes. After his death, the Heath Company remained in the aircraft and replacement parts business.

In 1935, an engineer named Howard

Anthony purchased the Heath Company. After World War II, Mr. Anthony purchased a large stock of surplus wartime electronic parts, designed and marketed an oscilloscope with the idea that anyone, regardless of his technical skills, could assemble the kit himself without extensive electronic knowledge simply by following the precise step-by-step instruction manual. The manual was the key to his success. It contained simple, non-technical instructions and large blown-up diagrams that showed the builder what to do and how to do it. Orders poured in by the thousands, and the Heath Company had found a new beginning. After realizing the success of his do-it-yourself electronic kits, he soon added amateur radio and hi-fi component kits to his growing line.

In 1954, Daystrom, Incorporated purchased the Heath Company after Mr. Anthony was killed in an airplane crash (I see a pattern developing here). Daystrom took Anthony’s original ideas and expanded them to include, in later years, a Thomas Organ kit, computers, satellite television earth stations and even furniture and woodcraft items to attract a wider range of customers. The company changed ownership again in 1962, when Daystrom was purchased by Schlumberger, Limited, a company known for development of electronic techniques for oil exploration.



The heyday of Heath's success lasted into the mid 1980s, when declining interest in build-it-yourself electronic kits forced Heathkit to close its doors for good in 1985.

I can still recall seeing the different ads for Heathkits in magazines of the times, such as Popular Electronics and Radio Electronics, and I still have (somewhere in my attic) some of the yearly catalogs Heath would send out showing the different kits available.

I'm sure that there is a collectors market for these old catalogs, but I wouldn't think of selling them. Just to look back at some of the kits I had purchased and built over the years, the satisfaction I got when I first turned on the power switch of the project I had just finished and seeing it work for the first time! This was something I built, my creation!

And what a learning experience it was! I wish my grandchildren had the opportunity to experience Heathkit like I did. They were fun kits to build, but more importantly, they taught patience, discipline and other skills that would carry a person forward in electronic troubleshooting and repair.

WDCX-FM – Buffalo, WDCX(AM) / WLGZ-FM – Rochester

Like many other CBC markets, we in Western New York have limited the number of visits to each transmitter site due to the high costs of such travel. In unsettling economic times, it only makes sense to monitor and control operating costs, as these costs directly distract from the station's bottom line. From an engineering standpoint, this creates a somewhat larger workload, as you only have one visit to complete all your duties that you would have done in numerous weekly visits.

The upside of this is that by staying in Buffalo more, I have been able to get a lot of the little projects done that I didn't have time for in the past. The downside is that all the little things in Rochester tend to get pushed aside because of a lack of time in the market to get everything accomplished. Keeping a running list of these little projects and careful planning of each month's visit will insure that eventually everything will get done.

In last month's visit to Rochester, aside from the typical maintenance at the studios and transmitter sites, I found that the HD-2 channel had shut down, the PSD data for RDS was not working, there were programming issues with the remote controls, and there were continuing issues with site intrusions at the WDCX(AM) transmitter site.

If any of you have had the displeasure of contacting Broadcast Electronics technical support

department recently, I'm sure you have found their tech support to be deplorable. As I mentioned earlier, last month when I arrived at the FM transmitter site, I found the WLGZ HD-2 channel down. Investigation into the cause revealed that the importer hard drive had completely filled up with data. I called BE's tech support department, left my callback number and waited... and waited.

After two hours, I called back again and was told that I was in the call queue and that someone would get back to me in a few minutes. After another hour's wait, I got fed up and called Art Reis in Chicago to see if he had experienced this problem with any of his IDI-20 importers. He had no advice to give, but he had an "in" at BE and placed a call on my behalf to the tech support department. In a matter of minutes, they did return the call.

I explained to them what had happened and what I had found out so far. Microsoft SQL Server, which runs on the importer as part of the Ibiquty software, had filled up a data file on the hard drive. BE's only solution was to blow out the hard drive and reload everything back on it. They stated that they had seen this before, but no other solution has been found to rectify the problem. Reluctantly, I pulled the importer out and returned to Buffalo for the re-installation of the software.

Not completely confident in the advice given to me from BE, I did a little investigation into the cause of this. What I found is that the SQL Server was loaded and run in "Full Recovery Mode" in which transaction log entries are kept for both database integrity and database recovery purposes. Inactive log records are retained in the transaction log, and all operations are fully logged, including operations that qualify as bulk operations. This log will continue to grow until a log backup is run or you run out of disk space.

The transaction log is a log of all transactions run against a database and all database modifications made by those transactions. The transaction log is a critical part of the database's architecture, and is predominantly used by the SQL Engine to ensure database integrity, to allow transaction rollbacks and for database recovery. When a server is restarted, SQL uses the transaction log to see if, at the point the server shut down, there were any transactions that had completed but whose changes may not have been written to disk, or any transactions that had not completed. If there are, then the modifications that may not have been written to disk are replayed (rolled forward) and any that had not completed are rolled back. This is done to ensure that the database is in a constant state after a restart.

To avoid all this, the SQL Server should have been installed and configured to run in "Simple Recovery Mode," where the transactions log entries are kept only for the purpose of database integrity and are not kept for database recovery purposes. Once the log entries are marked as inactive, that is, once the associated data pages have been written to disk, the log entries can be discarded. In simple recovery mode, when a checkpoint operation runs, all inactive log records are removed from the transaction log and the space is made available for reuse.

One other thing to note: the SQL Server has a control console that can be used to make changes in how the server operates. For some reason, the control console is *not* loaded on the importers and therefore you do not have the ability to effectively manage the transaction logs. That's how you can end up with a drive full of unusable data.

I am still trying to learn all I can about Microsoft SQL Server and have held off blowing out the hard drive until I explore all my options. If any of you have any experience with SQL Server, give me a call. There's got to be a better way!

As far as the other problems we had in Rochester, a simple reboot of the Inovonics 712 RDS encoder took care of the locked-up data for the RDS. Unfortunately, the only receiver we have for the RDS is located at the transmitter site, so the board operators were unaware that there was a problem to report.

In Buffalo, after a recent storm blew through, I got "Burked" again, using a line taken from our folks in Denver (who occasionally use "Burk" as a four-letter word). The communications port on the ARC-16 had frozen up, meaning no data was being reported back to the studio unit or the autopilot computer. A power reboot was in order to get the readings back up and working.

One other issue I noted during a recent maintenance visit to the WDCX-FM transmitter site was that the generator had faulted out with an over-crank alarm. I cleared the alarm and tried to start the genset but all I got was a rapid click-click-click on the DC relay. It turned out that the battery had failed after only about three years of service. I took the Interstate battery out and returned to the store where I had originally purchased it and they replaced it under

warranty. I sure was surprised at the cost increase of automotive batteries since I purchased the original one in 2005. They have almost doubled in price. The replacement price under warranty, with us paying only 58 percent of the cost, was as much as I paid for the original battery less than three years ago.

Several months ago I had programmed our Burk VRC-2500 remote control at the WDCX(AM) transmitter site to handle switching between the day/night patterns and also to shut the transmitter down at midnight and power back up at 6 am. These functions were working fine, but we were getting alarms whenever a change occurred. Every night at midnight I was getting a wake up call from Mr. Burk telling me that there were alarms pending. I re-checked the macros that I had written to handle the switching and noted that a delay should have been written in between the MuteMeter command and Mend. Once the delay was put into place, all of the alarms ceased.

We continue to have problems with unknown persons entering the WDCX(AM) transmitter site without permission. Each time I visit the site; I find new tire tracks in the tower field. Several months ago, someone tried to drive through the gate across the driveway, totally destroying it in the process. I have received one estimate to replace the gate and am waiting for two other contractors to submit their bids before proceeding with the replacement.

At the present time, the intruders are simply driving around the gate, even though one of our neighbors had put some rather heavy logs and metal culverts in this area to discourage trespassers. No matter what we put across this area, they simply push, pull or knock it out of the way to get in.

I don't know what the big attraction there is. I only hope that they are not growing illegal "weeds" somewhere on the property. We have a little over 50 acres of land there, so it would be easy to plant a little patch somewhere and have it go unnoticed until mowing time.

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
Tom Gardull, CBRE
Chief Engineer, CBC–Detroit

The summer vandalism season is off to a big start here in southeast Michigan. I was called on a Saturday by the alarm company that they had been signaled by the WRDT burglar alarm. I drove to the transmitter site to find four windows smashed. I found the brick and metal rod used to break the windows inside on the floor. So I had to get four windows replaced.

We replaced broken panes elsewhere in that building two years ago after vandalism by installing Lexan. This is a tough, clear plastic which claims to be bullet-resistant. I noticed this time that the Lexan panes previously installed only had scratches on them but no breakage. It looks like Lexan is living up to its claims. There are still several panes of regular glass remaining in the building, but the Lexan might frustrate the vandals before they discover which panes are still glass before they break them.

Some of my new duties this year include landscaping and horticulture. Winter was tough on some of the trees around our offices. We had three trees split apart. One fell into our driveway, another out into the street, and one into our side yard. The upper branches that fell into our driveway were small enough that I could cut them off to clear our path into the parking lot. The other two trees and the trunk of the first tree are too big for my pruners. The city took care of the one in the street and the other is on our lawn waiting for a tree service. I have also cut back several pine trees and shrubs which were growing into the parking lot. I will have to put some grass seed down in some bare spots. No flower planting is planned.

I finished installing new studio cabinets in two production rooms. We have now replaced the cabinets in all our air studios and production rooms with furniture built by Graham Studios. Rod Graham was most helpful in designing cabinets which would

fit in our odd-dimensioned rooms. My goal was to get a lot of tabletop workspace, legroom for interview guests, a clean appearance and meet ADA standards. I will say our tenth room was the best planned as we learned what had worked best over the six years of new construction for the rooms. Rod has invited me to submit photos to a trade publication to showcase our installations.



Graham's shop did make a mistake sort of in our favor. Graham custom makes the wooden rack cabinets (he calls them "pods") to whatever size we specify. We ordered a pod with 21 inches of rack space because that was all that was necessary for the equipment used by the producer. However, we received a pod with 36 inches of rack space. I now have plenty of room for

expansion but had planned for a much lower profile pod. The producer has asked that I fill the empty rack space with some old equipment to make it look better.

I installed a software update in our new Nautel NV-40 computer-based transmitter. That transmitter has been working very well, with a few minor bugs such as a touchscreen freeze-up. Nautel sent a new compact flash card which had software to be loaded into the main controller. This has to be done while the transmitter is off, and the whole process took about a half-hour. There were several confusing instructions in the Nautel documentation. In a phone call to support, I learned that I should ignore an entire page of instructions because the new software was fixing a problem involving that exact page. Once the download was complete, the transmitter came back on and some changes were noticed on the display. There were other internal changes made, too and I hope to find them as we use the transmitter over time. SCA modulation had been a problem waiting for a fix, and I will test that in early May.

News From The South

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

Sweating the Diesel Fuel

My last few *Local Oscillator* columns have all started with complaints about the weather. I hate sounding like a broken record and fortunately, things are calming down a bit.

Unfortunately, Mother Nature decided to give us one last hit on Sunday, April 12th, when another bad storm rolled through. This wasn't a quick hit and run; we basically had a miniature tropical storm that lasted for several hours. The severity of it caught the utilities flat-footed; it was considerably worse than had been predicted a few days earlier. Alabama Power – who, to be fair, generally does an excellent job with something like this – was left scrambling for crews to repair the damage.

The ground was already saturated from several weeks of rain, so we had trees and power lines down all over the place. We lost power at both WYDE-FM in Cullman and WDJC-FM on Red Mountain. Cullman came back up by evening on Monday, but WDJC-FM was still on generator. Even worse, we were told that it might be a week before power would be restored.

Visions of poor Bill Agresta swam through my head... after that big fire, he'd been forced to ferry fuel to his generator on Catalina Island day after day, for weeks on end. I had no way to carry that much fuel up there, not on such short notice, so I had to come up with an alternative. I'll share this tip with you.

If you're faced with an extended outage, reduce the load on your generator. Lower the power on your transmitter. This also reduces the load on the HVAC, further reducing the current drain. The end result is a substantial increase in run time. Diesel Service and Supply (www.dieselserviceandsupply.com) has a handy chart that will help you predict how much you can save by reducing power. (Look for the "Tools and Info" box at

the lower right of the main page.) It's not linear; if you reduce power by half, you won't automatically double your run time, but it's close. (Again, refer to the chart.) This trick got us over the hump until the truck could arrive to top off the tank.



The Red Mountain Park

Speaking of Red Mountain, all of the land around WDJC-FM's transmitter site has been purchased for the creation of a public park. The director had a meeting with those of us who have towers on the mountain about the proposed changes. The good news is, we'll have 24/7 security and paved roads to all of the transmitters up there. The only requirement for us will be

to fence in our tower guy anchors.

The director was a sharp fellow, especially because he had the sense to ask when he didn't know something. I appreciated that. For example, the Park's management had apparently thought that we would only need access to our transmitter sites during the day. We quickly corrected that. We also asked that they ensure that the roads be rated to carry an 18-wheeler and be wide enough to handle a new transmitter building or large generator. The director said this shouldn't be a problem, so all in all, I left the meeting pretty satisfied.

Modeling, Part Two ...

We waited for week after week for the rain to stop and for that field at the 850 AM site in Tarrant to dry out. When it rains, that field becomes a muddy Eater of Trucks. I've had to call for a tow several times just trying to drive to a tower base. Finally, after we'd had several days of nice, sunny weather, we decided to do the next round of base impedance measurements.

I've mentioned in a previous *Local Oscillator* issue that this takes more time than you might think.

The biggest issue is that you want to measure the impedance of the tower, and only the tower. Lighting and other appurtenances must be disconnected. All other towers are either shorted or floating as you make each measurement, so obviously, you're off the air while this is happening.

To help shave off some downtime, I ran the system at reduced power and got all of the lighting chokes disconnected well in advance of the shutdown and measurement phase. Figure one shows the lighting wires disconnected at tower #2, safely tucked out of the way. This particular tower is interesting: on all of the others, the output J-plug is right at the bowl insulator. This one, though, was constructed so that unplugging the J still leaves a lot of feed line and a big toroid in the circuit. I was afraid that would alter the result, so I completely disconnected the output feed at the bowl insulator. The other towers were measured at the output J-plug.



Preparing for Measurements at Tower 2

We did three actual measurements at each tower base: first, we measured the impedance at the ATU output (the bowl insulator and/or J-plug). Second, we shorted the base of the tower (see figure 2) and measured the impedance of the feed line itself. Finally, we measured the lighting choke, because its impedance, while very high, still has to be accounted for in the model.

Relatively Quiet On the Server Front

After the mad scramble to replace the Barracuda Spam Firewall last month, it was relatively quiet in April. The only irritation – shared by all of us – is that Barracuda is having to “relearn” our email habits, so an occasional spam still gets through. You’ll know when this happens because you might get two or

three similar spam messages in row, but then they’ll suddenly stop. Barracuda has “learned” that those messages are unsolicited junk.



Shorting the Tower Base to Measure the Feedline

You can do all of us a favor: don't automatically ignore or reject quarantined messages. Take the time to click the link when Barracuda sends you an email (or visit <https://barracuda.crawfordbroadcasting.com> and log in with your email address and Crawford password). Delete those messages that are spam and forward/whitelist those that aren't; this helps Barracuda with the “learning” process.

Outlook users have another option: click the link at the bottom of the login box that says, “Get Email Client Plugins Here.” Choose version 2 and install it. This will add “Spam” and “Not Spam” buttons in Outlook that you can use to classify messages. There's a similar plugin for Thunderbird – I have it and it works fine – but Barracuda considers it beta software. You can't download it directly. You must first contact support@barracudanetworks.com and ask for it; they'll send you a link, with instructions for installation.

I'll let Todd finish up for this month. The latest gem that he's dug up is called FreeNAS. Technically, it's beta software, but it's BSD-based, so we trust it and it works like a champ. Until next time!

FreeNAS -- A Simple Data Storage Solution Todd Dixon, CBNT

Call it what you will, but several years ago when the venerable Stephen Poole, C.E. here in the CBC-Birmingham Cluster, introduced me to open source software, he created a monster. My curiosity regarding open source software solutions is insatiable. To his dismay, I rarely stick with one Linux distribution and learn it inside and out; I am always

toying with the next piece of innovative software. This is how I found LTSP (the Linux Terminal Server Project), which has ended up saving the company a small fortune in Birmingham by prolonging the lives of older office computers and re-purposing one of our old Nexgen HP file servers. Admittedly, the version I wrote about took some real computer knowledge to put into place, but after several upgrades of the LTSP software (<http://k12ltsp.org>) it is now a more plug and play experience.

With that success beginning to wane, I was primed to find another purpose for that file server's counterpart – another NexGen HP file server that had been used at our 19th Place studio. We had a local FTP server here in Birmingham running OpenSuSe for use by our production staff, our creative writers, and engineering to quickly reference product manuals that we have either downloaded or have acquired from manufacturers. We were considering upgrading the FTP server's OS from version SuSe 9.3 to OpenSuSe 11.1. At about that time, I had become fascinated by a computer product called a Pogoplug. It is basically a little networked computer the size of a typical "wall-wart" power supply that you plug to a wall outlet. You then attach a USB thumb drive or hard drive and have instant network attached storage.

The two ideas collided when I saw FreeNAS, a BSD-based distribution that handles FTP and NAS in about a 70 MB package. BSD is an operating system used in high traffic web servers across the internet and is virtually bulletproof with regard to network security. While we hadn't had an ounce of trouble with our FTP server, a new OpenSuse installation would have easily been about a 5 gigabyte install. Pogoplug was good for personal use, but not for the volume we were planning on. FreeNAS (<http://www.freenas.org/>) is optimized to not only handle FTP and HTTP traffic, but can also provide MS windows shared folders with Samba/CIFS for our employees that we have here in Birmingham. After a pretty basic installation process, you are left with the web GUI shown in the illustration.



Main Configuration Screen for FreeNAS

This HP file server was loaded with twelve 36 GB SCSI drives which FreeNAS set up in a software raid and we were off and running. After some simple user and group setup, we backed up our FTP server. We also house a nightly file backup from Denver in Birmingham. It was backed up to our FreeNAS server too, a double backup. As you can see in the image above, FreeNAS works fine with an old Pentium III (933 MHZ), showing only 1% CPU usage and 20% of the 1 GB total of RAM. I'm not exaggerating... the thing screams. We are about to put it online full time as our complete replacement for our FTP server, but it has ended up giving us much more. Amanda has had some issues with one of their file servers out in Denver. She has packaged it up and sent it to us and we are planning on putting FreeNAS on it.

Each of us probably has a storage room filled with machines that have lost a step in speed or need a \$50 hard drive. The echoing sentiment among these pages and elsewhere is extend life, troubleshoot, fix, and reuse. We need to always be searching for how we might repurpose a computer or server so that we can get the maximum benefit from it. FreeNAS has helped us to accomplish this. It is elegant in function and a perfect option for us to continue to give even more data services to everybody here in Birmingham even while our budgets have been tightened.

Gateway Adventures

By

Rick Sewell, CBRE
Chief Engineer, CBC–St. Louis

The recession continues to dominate the headlines, and all of us are feeling the effects of this deep, lengthy downturn in the economy. Saving money and working efficiently are certainly the mindset of most of us who are still blessed enough to be employed.

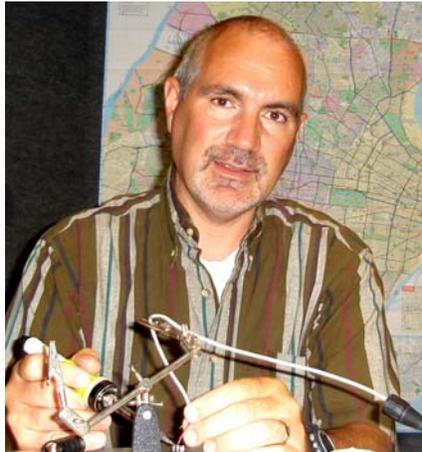
Last month I addressed one of the ways we started to save time, which of course almost always equals money, through the automatic downloading of FTP files that are used more and more for sending long-form paid programs to Christian radio stations. At the time of that writing we had just begun to get this perfected and we are now beginning to see some of the time savings that have come with taking this step. The two main employees who did most of our FTP downloading, converting and loading of programs for KJSL are now finding that they have more time to work on other things. This has been timely since we lost a full-time employee just recently at KSTL so the time freed will be used to pick up the slack there.

The mindset of saving money has certainly caused me to constantly look for other ways to save. On my last few trips to the transmitter sites I have examined carefully ways to save electricity. This means looking at every piece of equipment and making sure it needs to be on and running all the time. I even found equipment that was taken out of service still plugged in.

We got rid of our ISDN lines about nine months ago and I had overlooked the modem. It was kind of hiding, tightly installed between two other pieces of equipment. Now is this some huge savings in electricity? Not really, but it certainly no longer needs to be plugged in, using electricity unnecessarily and adding heat to the rack. If I hadn't been looking at everything with this critical eye towards saving money, I probably wouldn't have discovered this until

I had an occasion to move one of the adjacent pieces of equipment.

I have also looked at the lights that are on at night. Here's where you have to find a balance between saving electricity and providing security. I really didn't find much here that I would change. This



is an area I have always debated in my mind anyway with remotely isolated transmitter sites. Do the lights provide security or do they help attract attention to the site that might have gone unnoticed without the lights? Of course we already have lights on that are hundreds of feet in the air attracting copper thieves to our sites anyway. I would guess the best way to determine the lighting needs versus saving electricity is to visit the site at night and see what is really needed.

Another area of possible savings involves looking at all the computer monitors. We would expect that employees would turn off the monitors when they are no longer using them. However, with human nature being what it is, that doesn't always happen.

A really easy solution to this is to go to the desktop properties of Windows and select graphic properties. There you will find power savings settings. You can turn the monitors off automatically after a certain amount of time when there is no longer activity on the workstation. One word of caution: be careful with the hibernation settings and turning off the hard disks. If the computer has to be on 24 hours a day, you will want to select "never" on these. But with more and more computers being used in our facilities, making sure the monitors are not running all the time can save a lot of money.

These are just a few ways to think about what can be done on the engineering side to save money. I am sure that as we continue to look at what we are doing we may find even more.

Valley Notes

**By
Steve Minshall
Chief Engineer, KCBC**

Tower lighting is a unique aspect of our business. Most broadcast towers require some form of lighting so that airplanes don't run into them in the night. Lately, I have been spending more time on tower lighting problems than actual broadcasting.

My first radio job started in March of 1980 at an AM/FM combo in Klamath Falls, Oregon. I had two items at the stations that needed immediate attention. The first was the EBS decoder – it didn't decode. TFT sent me a dozen replacement capacitors at no charge (think about that!) and I had the unit back in service.

The next problem was one of tower light monitoring. The station was building a new four-tower array for night. The towers were up and lit but there was no way to remotely monitor them. The temporary solution was to have an employee visually check them every night, but that would not suffice for the long term.

The station was operating on an extremely tight budget and the remote control that they had purchased was a used – and I do mean *used* – Schafer system that had a stepping relay. This remote control required *two* continuous copper phone lines. This seems ludicrous by today's standards. The transmitter circuits were actually selected and connect to a milliamp meter at the studio though several miles of copper wire! This sort of remote control is indeed ancient, but it did have one interesting feature: the meters actually read real time variations of whatever parameter you had selected to monitor. It even had provisions to remotely read an analog modulation monitor.

My task was to somehow come up with a way to remotely monitor the lighting on all four towers, and do it cheaply. The solution I came up with was to build a current sampler for each tower. The sampler consisted of four parts bought from Radio Shack: a minibox, a terminal strip, a 6.3-volt transformer, a bridge rectifier, plus a homemade

resistor.

The resistor was a coil of bare #14 copper wire wound about a half-inch in diameter and several inches long. The current to the Austin ring transformer on the tower passed thru the resistor, causing a drop of something like a couple tenths of a volt. The 6.3-volt winding of the transformer was placed across the resistor and the "120 volt" side would develop a few volts, which was rectified by



the bridge.

The meter across town in the Schafer remote control read the AC current to each tower in real time. You "saw" the beacon flashing and you could even count the flashes per minute if you were so inclined. Try that on a VRC-2000! One of the unexpected but very cool things about the current sampler is that it was very non-linear. A slight drop in current caused a large drop in sample voltage and a side lamp failure was obvious.

The sample circuit described above can also be built using an ammeter shunt for the resistor or, better yet, a current transformer can be used with a rectifier to provide a sample voltage. The latter is in use at one AM site that I take care of. The output is smoothed with a large capacitor to give an average current, and the sample fed to the remote control is very stable. Recently, we had one tower that read five percent high. After a few weeks, that tower went dark and the reason for the higher reading was found: it was the current going into the ground from failed insulation of the direct-buried wire. Eventually the conductor was eaten away and the wire failure was complete.

Life with incandescent lighting was fairly routine. Lamps were replaced at regular intervals and mechanical flashers had to be serviced now and then. Now, LED lamps are being installed and a whole new set of problems has arisen. It is distressing when a technology that *should* have made life easier has done just the opposite in some cases.

For the most part, my LED lamps have been very reliable but a few have failed along the way and when that happens, it is not a happy time. When an LED lamp fails it normally requires removing the fixture or at least the guts of the fixture and taking it to the ground. All of my failures have been during the warranty period, so I have yet to actually make a repair of a fixture.

The side light fixtures cost about \$200 each and at that price, it is cost effective to have one on the shelf ready to swap out. The beacons cost upwards of \$2,000 dollars and it's tough to justify that sitting on a shelf. I have had two beacon failures and each time I

had to wait for a replacement to be made. The manufacturer does not keep any on the shelf either! Replacing a beacon can take several weeks. I doubt the FAA is amused by towers remaining unlit for that length of time.

It seems that each time I get a new LED beacon sent to me, it is the latest/greatest generation. The manufacturer I am dealing with is up to version three now. Each one has fewer LEDs than the one before. The latest has just a few LEDs and a bunch of mirrors to concentrate the light on the horizontal plane. I can't even see if the thing is lit or not during the day until I am about a mile away!

Catalina Tales

By
Bill Agresta
Chief Engineer, KBRT

Greetings from Santa Catalina Island!
Miserable is the first word that comes to mind when looking back at last month. Most of it was spent fighting an ongoing sinus infection while trying to keep my cool and move forward with the many projects here at the transmitter plant. What made this even worse was the timing of a few events that decided to show their ugly faces over the last couple of days of my sinus misery.

Battery Woes

It began with my expensive Optima truck battery that is supposed to last 10 years and hold up to anything. Well, I'm not sure if it was the heat or the awful and rough roads here, but it died just a little past its first birthday. I believe a connection inside that straps the cells together came apart because suddenly it was only able to produce 4 volts.

We don't have a store here on the island that sells car batteries, so I hiked home and got the tractor for a jump. I had my helper working at the plant, so I took him with me to drive the tractor back. We jump-started the truck and I drove back to the plant with him driving the tractor behind me... or so I thought. When he did not show up in a few minutes, I drove back and found that the tractor had stalled and the starter failed. I towed him up a hill with the truck and he was able to

put it in gear and get it started again.

When we got back to the plant, I made an extension out of a piece of copper so I could fit the tractor battery into our truck and called it a day. The next morning, I went out to exercise our generators and wouldn't you know it, one of them had a defective battery as well! Like the old saying goes, when it rains, it pours!

As the sinus infection just seemed to get worse, I was going round and round trying to figure out the cause: pollen, dust, dry air or what? Thank God for a good friend of mine who found the cure, a device that is popular in Germany called an "air washer." It is simple in design. It circulates the air through some disks that rotate through water both removing dust and adding humidity. One night of this in my bedroom and I got up feeling great, something none of the medicine or sinus washing was able to do. Now with the sinus misery behind me, I am operating in turbo mode and have not looked back since.

IP Progress?

I have been working on a solution to our ISP issues and have made some progress but still have a couple of hurdles to jump. Our HughesNet satellite Internet that we installed after losing our DSL during



the fire has been anything but a reliable service. It has grown increasingly slow and seems to have more and more outage issues as time goes on. I got a wireless USB modem from Verizon Wireless and was amazed at the speed, but I have to go up on the hill behind our plant in order to get service. I recently installed a couple Yagi antennas in series as a passive repeater to catch the signal and beam it down the hill to our plant. It works but is still a bit patchy, so I am going to try some more tweaking before opting to purchase an active repeater.

I also found a company who builds a very nice N-Type router that runs off of the Verizon USB modem. So far it has been an amazing performer, but I am now interfering with our 5.8 GHz wireless 4-line phone system and looking into a DECT 6.0 phone to remedy this issue. Though this costs a little to get into, it will both save us a substantial amount in monthly fees as well as provide far superior performance.

What Would You Do?

With all the scare over the swine flu, I thought I should end with this, a very testing event that recently happened to my pastor and me. The church I attend here on the island is a very small and humble one. Our pastor left the island about ten years ago to support his wife's mother who was dying in New York and wound up working with one of the largest churches in the area. After being so very blessed to work at a church with literally unlimited resources, God made it clear to him that he needed to return here to the island to once again pastor our little church.

While he was gone, our church went through some very bad times. As God is always so faithful to do, he made us stronger and taught us through this. But as most of you know, His awesome work in us is never done, at least not as long as we remain here in our earthly bodies. This was the case during a recent Sunday night service as five of us, including our pastor, were ending our discussion.

Part way through the service, a lady had walked in and sat down next to me. She had been outside the church during other services and we had been praying for her as it became evident that she was

struggling with alcohol. As the service ended, our pastor asked if anyone needed prayer. She stood up and said that her boyfriend and his dad who she lives with had just returned from Mexico and both had the swine flu and needed prayer.

As she said this, I realized that she had been hacking and coughing through the entire service. My brain went into shock mode as I considered what my response should be. My pastor, however, jumped up without hesitation, laid his hands on her and began praying. Realizing that if we believed God was going to answer our prayers to heal her He could certainly protect us, I reached over and laid a hand on my pastor. Immediately I heard this voice saying, "Man of little faith." I stayed until we were done praying and then, after she had left the building, went straight to the restroom and washed my hands and face!

I really struggled with this experience the entire night as I tried to conclude what our balanced reaction as Christians should be. We need to act out of wisdom and yet with that Godly wisdom we always need to walk in faith!

The following morning, my pastor's wife, who was upstairs with the kids during the service the prior night, asked me about how the service went. As a health official here on the island, she was shocked when I told her the story, wondering why we did not say anything sooner. Well, I was a bit in shock and my pastor... well... I think he was so deep in the Spirit that it never really hit him. The good news is that the pastor's wife immediately went to visit the woman, her boyfriend and dad, and though they were sick, it was not the swine flu.

This was an amazing learning experience for me however and I am still weighing this one, where exactly is that line between having faith and simply tempting God? I certainly cannot imagine us as Christians saying no to someone who asks us to pray over them, yet if someone approaches you who has a disease, perhaps something that you know has the potential to kill you, what would you do?

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

Devotion to Accuracy Department, etc.

The little schematic I included in last month's Local Oscillator article on tower light savers has a mistake. On the right hand relay contacts, "NO" and "NC" are reversed. The text is right, the picture is wrong. Correct that on your copy, would you please?

Hope you like the new picture with this issue. It's the last picture Susie ever took, from her scooter, no less.

Now where do we go?

No sooner had *The Local Oscillator* gone to press last month then we already had a topic for this month. A couple in fact.

We took a double whammy right at the end of March when WPWX and WSRB lost their microwave STLs, and the WPWX ISDN stopped working, almost simultaneously! It was a real big case of bad luck, and maybe there was something we could have done to prevent it in the one case. But let's start at the beginning.

The WPWX transmitter site ISDN line has been problematic for quite some time now. The problem is all at the transmitter site end. Long time readers of this column are already aware that the Burnham site is in a once-thriving, now dead, industrial park. Industry? We're it. And the only phone service into the place happens to be a dilapidated 50-pair phone cable, some of the length of which is so old that (and this is a geek alert moment, folks!) some of the cable on the path, I am told, is 20 gauge double-cotton-covered wire! That is so old-school, 100 years, that the school was torn down as unsafe years ago! Problems on this line are chronic, and so are our complaints. Rumor has it that a section of the line was just replaced, hopefully the aforementioned 20-gauge section, but the problems have continued, intermittently of course. We're having to check the line every business day now. Our AT&T rep in Omaha, the good lady Lisa Goodman, is surely getting sick of hearing about this. She's talking escalation. I'm screaming, "Fiber Optic Cable!" I

don't know if the local engineers want to do that right now. After all, it's a 50-pair cable on which we're the only customers, in a dead industrial park that Calumet City can't seem to resuscitate.

Now about that the microwave STL issue. That's a lulu, because we know for a fact that the problem was caused by some local UHF transmitter which apparently "went into business for itself." In other words, it put a nice fat spurious signal right on

our shared frequency, blew out both STLs for an hour or so, and went away, not to return. Not yet, anyway. Hopefully, someone else got the brunt of the interference, someone who could figure out where the problem was and correct it. It didn't stick around our STL frequency long enough for us to get out the spectrum analyzer, stick it in the

car and go looking for it. But it did so long enough to disrupt our two biggest operations for the last hour of afternoon drive – not my idea of nice day.

Because of this, we've had to face the fact that the StarLink STL signal, at one watt, is not quite robust enough to escape the effects of interference due to tropo-ducting, spurs from local transmitters, or even interference from the WSRB STL. We *have* to go to the ISDN when things get bad, but when the ISDN goes away, well, we've run out of air speed, altitude, and ideas. So, for the moment, we've had to put WSRB back on the 6000, we're looking to change the STL frequency for that station, and when that's done, increase the power of the WPWX StarLink to the level allowed on our license, maybe on the WSRB STL as well. Enough, already. I have other, less traumatic things to worry about.

Syndicated Programming vs. SX and Streaming

Let's start with the basics here: If you're going to put your programming on the Internet, you have to report all of your songs in real time. That's because there are six pieces of info which are required to satisfy the Sound Exchange (SX) reporting requirement: Title of song, artist name, album title, distributing label name, time the song airs, and the number of listeners on the stream at the time. All this



is to properly (and fairly) assess the streaming station (us) the proper amount of coin for each song based on the number of listeners who allegedly hear said song at that time. The syndication service *should* supply the first five pieces of data on that list. Most only give a partial list at best. Tom Joyner, for one, supplies none. Michael Baisden supplies three pieces of the needed info, title of song, artist, and time played (obviously, only the streaming service can supply data for number of listeners at any given time). But SX still requires the album title and name of the distributing label. No one doing syndication seems to be doing *that*. So we (read that "Engineering") are having to come up with a way of doing it ourselves, or we can't stream our syndicated broadcasts, at least not properly. This is all being left up to us in engineering, just to satisfy a legal requirement which has little if anything to do with engineering.

One thing which James Kelly and I have discovered in our research of this subject – and Cris Alexander backs this up – is that most of the *other* broadcasting entities consider all this song reporting stuff to be so draconian and burdensome that they are ignoring it, or are reporting in such a way so as to satisfy only part of the SX requirements. We talked to one PD at an old-line broadcaster, one whose name you'd recognize, and they don't stream PAD data at all. They do their reporting of what songs are played through their "streaming division," but apparently not when. As I said, that data is both important and required.

Now, it may be that SX hasn't really started serious enforcement of the streaming rules yet, and apparently the majority of broadcasters are "rolling the dice," figuring that the odds are in their favor that SX, frankly, won't catch them. We at Crawford prefer not to work that way, to err, if you will, on the side of caution. But I'm tell you nice little software entrepreneurs out there, there's money to be made in inventing the right software to report properly for royalty purposes any song which streams, and thus supplying us broadcaster/streamers with the means to do it within the rules of copyright can be profitable to you, too.

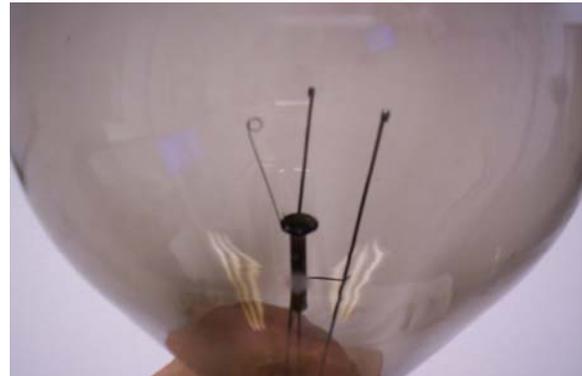
It's not that there aren't already solutions out there. I've reported previously in *The Local Oscillator* on a software service for cell phones called "Shazzam!" which will pick up almost any piece of music audio and display title and artist, plus the means to order that song right over the phone. But in the form in which we've seen it, it's not complete for our purposes. That technology relies on a huge database of song "audio prints" which is compared to the song your phone hears, from whatever audio source, to produce that title and artist "answer," but, no album title and no label info is made available, at least to the user. Here in Chicago, WPWX uses a service called BDS, which tracks the number of times a week that each station doing Top 40, Hip-Hop, Rap, or Adult

Contemptuous plays any given song. They probably use the same approach as "Shazzam!" There are other such software devices and services out there (Billboard Monitoring comes to mind) which do something on this order as well. I would suggest that it's no big deal to add on the album title and the label information, to provide a nearly complete data service for broadcasters to ensure proper capturing of that information which SX requires to keep a station stream-legal for any audio source, be it automation, broadcast networks, or mixes, or even classical "long form" pieces originating for air on CD, such as symphonies.

So, who's going to be the first in line to make money on keeping us broadcast folks stream-legal?

The Twilight Zone: And what really *did* happen to those beacon lamps?

We lost all of our Beecher beacon bulbs in one brief blast recently. (I spent days trying to get all the "b" words into that sentence). The thing is, we don't know what caused the blast. It was either lightning or a power surge, but whatever it was, it didn't take out the Omnia processor (which such events *always* do) or anything else at the site. But the picture tells the story. So badly did whatever it was



vaporize the filaments on one bulb that it took out their supports as well! And the other four bulbs didn't fare any better either (one was already lunched when this "event" occurred). Anyone have any ideas?

One thing we did in the aftermath of this incident was to remove the voltage booster transformers from all of our tower light controllers and turn them into door stops. We'd been clued in on this thought a few months back by Cris, but it stayed on the lower part of the do-list until this experience made a believer out of me, and out they came. Still, it took more than that to kill the bulbs and nothing else. Hmmmm, I wonder how the renters on our tower (a local ISP) fared... Did their system die as well?

Until next month, peace be unto you all.

The Portland Report

By

John White, CBRE
Chief Engineer, CBC-Portland

Hard Times in Stump Town

Over the last few years, I have talked a bit about solar activity, frequently from the perspective of radio signal propagation. I have learned a lot about our sun in recent years, including things I know that just ain't so. One example is the myth of the 11-year solar cycle.

With the advent of modern satellite technology, we now understand the sun alternates between north magnetic and south magnetic sunspots every eleven years for a total solar cycle of 22 years.

What we thought was an eleven-year sunspot cycle is only a half-cycle.

And we know there is nothing so constant as change. The sun has hit a 100-year low in sunspot activity, a 50-year low in solar wind pressure, 55-year low in radio emissions, and a low of "Total Solar Irradiance."

Up until two years ago, the big guns in solar study were predicting a higher and more energetic new solar sunspot peak. Every few months, each of the major solar centers pushed out the start of the coming solar cycle.

Who predicted that the sun would be so quiet when the big guns thought the sun would continue to grow more energetic? A few did, Fairbridge and Shirley back in 1987 as well as did Landscheidt in 2003. What is common to both is the perspective that humans are not the center and in control of the universe.

Just the same as people have begun to notice the quiet sun, I have seen all kinds of extreme reaction, from coming of the next ice age to the sun

being irrelevant and humans will cause the seas to rise by 50 feet. What does that have to do with Hard Times in Stump Town? Stump Town is an archaic nickname

for Portland from back in the days when Oregon had a forest products industry.

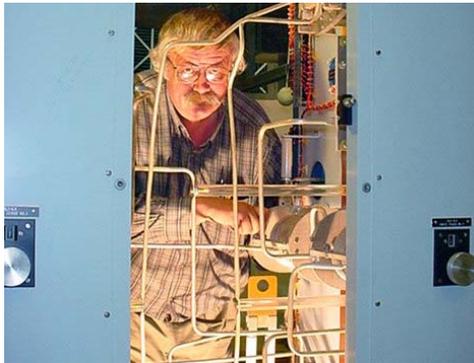
Just last week, the latest Oregon unemployment numbers were released: 12.1 percent. A local print press outlet had an odd take on the cause. They felt layoffs alone don't account for Oregon's unemployment. They also attribute the rising numbers to retirees, non-working spouses and job-hunters.

We have been hearing all sorts of proposed solutions, raising the tax on locally produced craft beer by 2,000 percent being one of them.

I have noticed Portland's local radio media steeping up with common sense. A local talk/news competitor has begun featuring what they call "Buy Local Friday." The concept is really quite simple: set aside a 15-minute segment of air time to allow small business to call in and give a 30-second elevator pitch. I remember thinking when I first heard about the idea, "Yeah, that ought to be really boring. A 15 minute commercial." But as I listened, I became fascinated. I began hearing ideas, services and products that I never considered or even thought existed. I heard displayed much of the creativity and self reliance of the American people.

At KKPZ, we continue to go about the day-to-day tasks that keep our station on the air. I also sense an undercurrent of stability and common sense, an island of calm during troubled times.

I think the radio broadcast industry can be proud.



**Rocky Mountain Ramblings
The Denver Report**

by

**Amanda Alexander, CBT
Chief Engineer, CBC - Denver**

Phone Line Trouble

T-1! T-1! T-1! April was another month with T-1 problems. “Where,” you ask? KLTT... again!

On April 16th, I got a phone call about KLTT being off the air and the board op was not able to get to KLTT on the AutoPilot computer. This is one major symptom that told me it was the T-1 line. I had seen it too often to not know. I immediately routed the audio through Wheatstone and put KLTT and KLVZ on the backup ISDN (the KLVZ daytime site gets its feed from the KLTT site, so when the T1 goes down, both stations lose audio and data). This got them back on the air and I immediately called Qwest.

It had been a semi-wet day, sprinkling on and off all day. I had church that night and was worried I'd be working all through my young adult group's meeting. Thankfully this was not the case. Instead, it was afterwards when we were fellowshipping in a local restaurant that the phone calls started coming in from the Qwest technician.

The guy first headed to the studio and I had to get our ops manager (who lives a couple of blocks from there) to meet the guy. He determined quickly the problem was at the transmitter end. He then headed out that way. It was pouring down rain by this point. Just walking out to my car a short distance I got soaked. It didn't take the Qwest guy long to find the problem, and he fixed it. Unfortunately, I don't recall what he said the problem was. I was busy driving in the rain and was more focused on that than on what the guy said. I do recall hearing him say something about replacing some wiring.

The next day I got another phone call that KLTT was off the air. I looked into it and sure enough, T-1 AGAIN! I called Qwest and gave them the ticket number from before. They did pretty much

nothing because it had been snowing quite a bit. They traced down the problem to the cable that runs under the county road at the transmitter site, saying water

was getting into the line. What did this mean for us? No T-1 for a couple of weeks, manually changing power and patterns on three stations by dial-up remote control!

The next morning, a Saturday, I got up before “sunrise” and waited a few minutes and then turned the transmitters onto day mode.

I connected KLVZ to the ISDN. About an hour later I got a phone call that KLVZ

was off the air. I looked and found the ISDN feed to that station disconnected. I reconnected and an hour later got another phone call. This went on for awhile. I didn't have time to babysit the ISDN unit, either. I had to get my parents to the airport for their flight to the NAB convention.

Later on that morning I got a phone call that KLTT's audio was distorted. I turned on the radio and sure enough, you could barely make out what was on the air. I did everything I could from home without success. I had the ops manager reboot the ISDN unit, but that didn't help. I headed out to the site around noon with my dad to see if the Omnia had frozen or something else had happened. We got out there and found pretty much nothing... everything was fine there. We messed around and traced the bad audio back to the ISDN unit and once again, I had Charlie reboot the unit at the studio. This time around, it came back normal. Problem fixed.

The KLVZ ISDN kept disconnecting all morning on its own. After I took my parents to the airport, I headed straight into the studio. We only have one ISDN unit in engineering. The other one Ed had moved into KLZ for the Colorado State University football and basketball games we broadcast. He had originally told me we could no longer use it as a



backup for the stations. I had to get it working in hopes of not having the ISDN disconnect every hour. The issue was no input audio to the Zephyr, even though it appeared to be properly connected to the Wheatstone router.

After about an hour of frustrating work, I called my dad. He suggested I use the NTI "Digilyzer" to make sure the audio was getting to the unit. The "Digilyzer" will accept and decode an AES input to the onboard speaker. So I did and it was. I looked at the unit and it was showing the audio. I was relieved, yet mad. I had checked all the connectors numerous times.

I unplugged and plugged them back in and nothing. Then I get on the phone with my dad we figured out that there was an issue with a setting inside the Zephyr. I fixed that, dialed the transmitter from that ISDN unit and monitored it for a bit. It appeared to be working so I closed up shop and left for the day in hopes of having a relaxing evening. It held steady until the night mode switch, which is at a different site and didn't need the ISDN feed. The next morning I had to reconnect the ISDN at sunrise. It didn't really give me problems all day.

The following Monday, it began giving me problems again. Thankfully I was at the office. I called Qwest and opened a ticket. They did a test on Monday and found there was a problem with the KLVZ ISDN at the transmitter end. Finally on Tuesday, they were able to get out there and fix the problem. We haven't had an ISDN problem since. As of this writing, we have been ISDN and T-1 problem free for a week now. I am hoping and praying it is the last of the problems for a long time.

TFT Trouble

We had two TFT EAS 911 units go down this month. One has been shipped back to TFT to be repaired. The second sits on the bench. I am waiting on a call back from someone at TFT to help me troubleshoot the problem. The gentleman I spoke to last week wanted me to take the battery out to reset it to factory default. However this is an older unit and there is no battery. I have tried everything I know and still cannot get it to reset. I'm going to keep calling him until we get this resolved.

This particular began sending out Required Weekly Tests every two minutes. I think this started during a power surge which apparently does cause this problem every so often with these units. By setting the unit back to factory defaults, it should reset whatever signals in NVRAM that the power surge set and I can reprogram it and get it working again. If anyone remembers how to get an older EAS911 unit without a battery (the backup is in the clock module) set back to factory defaults, let me know.



NTI Digilyzer

Tower Painting

GRB Construction has begun painting the towers at KLZ. They finished one tower in mid-April. The weather has been rainy and snowy on and off since, which makes it muddy at the site. They have to wait on it to dry out before they can resume the work. The west tower is very bright now, though. It looks good.

Graffiti War

My helper, Keith Peterson, has been busy with various projects. One important one we're trying to get done ASAP before someone reports us is removing the graffiti from one of our tower base fences. That's right. Kids trespassed and tagged one of the KLVZ night tower fences. Keith was able to get some pickets turned around and then they began breaking. Next step, just sand them down – or power wash them. I don't think these kids were too bright because the fence was wet, they tagged it while it was raining or snowing, or it rained or snowed shortly after the tagging. The paint didn't really stick all that well and it appears washed out.

More Projects

The month of May will include getting the east tower painted at KLZ as well as moving into the new building at the KLVZ daytime site. The project is slated to start May 18th. With any luck, it will be a smooth transition. I will be sure to take several pictures so my column has something more than just words.

Until next time, that's all folks!

Digital Diary
by
Larry Foltran
Corporate Website & Information Technology Coordinator

Conficker, and MyDoom, and Sasser...Oh my!

April 1st has come and gone, and the world's computers haven't been turned into zombies controlled by some mysterious cyber-master. The media hype related to the Conficker worm has silenced and any related reports have moved from the new websites' homepage to a distant corner of the tech news section. Even now as some reports come in that a small number of computers are receiving instructions by an originating machine, it seems as if Conficker has already ended up in the bin of "old news." Why shouldn't it be old news? We've been here numerous times before. Ah, how quickly we forget.

The first virus on record was written in 1971 by Bob Thomas. The Creeper virus was designed as an experiment in self-replicating applications. Creeper infected specific mainframe computers on the ARPANET, an early predecessor to today's internet. The computer world was changed forever.

Moving ahead to 1999, we were introduced to the latest big bad virus, developed by David L. Smith, called Melissa. Rumored to have been named after an exotic dancer, this virus was spread via email typically featuring a subject line many found hard to resist. Once accessed, Melissa would self-replicate and send out another slew of messages to those in the victim's email address book. Mr. Smith ultimately received a 20-month jail sentence and \$5,000 fine for all his hard work. In my opinion, he got off easy.

Only a year later, we were introduced to the ILOVEYOU worm. Similar to Melissa, this worm was initially spread via email featuring the words I LOVE YOU in the subject line. Opening the email would reveal a Visual Basic Script with a similar title. Aside from replicating itself and sending out additional infected emails, the ILOVEYOU worm causes all sorts of damage to the computer's operating system and registry. Some sources estimate that over 50

million computers had been infected, costing \$10 billion worldwide to remove it and repair the damage done. Although a Filipino student, Onel de Guzman of Manila, was suspected of authoring this worm, he was not charged due to the lack of related laws in the Philippines.

In September of 2001, Nimda became the hot name in computer worms. Nimda primarily targeted Internet servers, quickly bringing web traffic to an absolute crawl. How quickly? One report shows that it only took 22 minutes for Nimda to reach the top of listed reported attacks. Because this occurred only a week after 9/11, many initially speculated that this cyber attack was linked to Al Qaeda. After taking a closer look, most experts now believe that this worm originated in China. Although email was once again the primary avenue of infection used by this worm, Nimda could spread via hacked web sites and shared networks.

While taking a look at a complete list of viruses and worms that hit the Internet in recent years, I found names that I had mostly forgotten. Names that, in their day, made some computer users stay away from the Internet for fear of ruining their PCs. Names like Michelangelo, Blaster, MyDoom, and Sasser. Some were responsible for a great amount of damage. Others, although receiving a great amount of media attention, were simply flashes of nothing. One specific worm example that received undeserving media hype was Michelangelo. Set to remain dormant until March 6th, Michelangelo's birthday, the virus failed to infect the vast number of machines that would render it a major problem. Despite the seemingly constant news barrage, the virus ultimately only infected a few hundred computers according to some reports.

PCs have primarily been the target of worm and virus authors, but mobile devices are no longer immune, especially as they become more sophisticated and software driven. Back in 2004, Cabir.A infected a



small number of Bluetooth-enabled cell phones. Although no damage was done, it presented a new direction for malicious software authors. Since then, there have been four other cell phone specific viruses reported in recent years.

Early on, phones were mostly infected via Bluetooth transfers or text message attachments. As iPhones and Blackberries grow in popularity, access to the Internet and email via mobile devices becomes much more commonplace. I believe we will begin to see a surge of malicious software targeting mobile devices in the near future. In fact, there are numerous companies already developing security software specifically for cellphones. In all honestly, I believe zombie cell phones could pose a greater problem than a zombie home or work computer. Although I'm far from being an expert in cellphone software, I doubt it would be impossible to develop some sort of rogue application that allows a master computer to retrieve call information or even possibly record phone calls made on the infected cellphone. As more people use

their cellphones to keep up on their financial information or even purchase items, this type of data could be in danger as well. Perhaps some malicious software could even instantly transform your expensive smartphone into a paper weight. Just imagine thousands of cellphones going silent at one pre-determined time (although in certain instances, that could be a blessing in disguise!).

As the devices we use on a daily basis become more sophisticated and we become more reliant on them, it's difficult to predict the impact future malicious attacks could have. So keep your antivirus software updated, keep up on your OS updates, and stay away from any suspicious email attachments. Take a deep breath and we'll all get through this together. If not, I suppose we could always go back to a traditional phone and typewriter. Tangled cords and broken ribbons seem much less stressful in comparison.

...until next month!

The Local Oscillator
May 2009

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

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

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

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

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

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

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

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

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

WDCX • 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

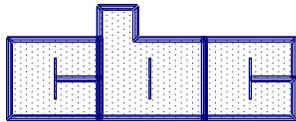
WYDE • Birmingham, AL
1260 kHz, 5 kW-D/41W-N, ND

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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