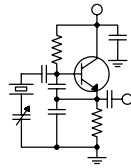


# The Local Oscillator



## *The Newsletter of Crawford Broadcasting Company Corporate Engineering*

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### **Deepest Sympathies**

Most of you know by now that CBC-Chicago chief engineer Art Reis lost his dear wife of 33 years last month. I cannot pretend to imagine the depths of Art's grief, but I rejoice with Art in that Susie knows the Lord and is this very minute in His presence. The sadness and loss are ours, not hers. Surely she must this very minute be awestruck with the glory of our risen Lord. Please join me in support of our brother in Christ during these difficult days.

### **A Good Ending**

No doubt about it, the last half of 2008 has been one of the most difficult times for our industry in recent memory. I doubt that anyone reading these pages is unaware of the downturn in business, the layoffs and all the accompanying doom and gloom. Most of us probably know someone personally who has been affected.

Such times are no fun, but they do represent opportunity, and that's not just cliché. In terms of our engineering operations, such times provide the impetus for seeking out inefficiencies and finding better ways of doing things. I have had conversations with most all our chief engineers about this, and I have been pleasantly surprised to find that most were already thinking along those lines. You will read about some of these ideas in these pages. It is my hope that each of you will find inspiration from the ideas and efforts of others.

During the last few months of 2008, we found ourselves wrapping up a number of engineering projects throughout our company. Two of those came to a conclusion quite literally on the eve of the New Year.

Our friends at Nautel shipped both the KCBC and WMUZ transmitters in December. The KCBC transmitter arrived mid-month, but the WMUZ transmitter didn't get there until right before

Christmas. Because of a one-time tax incentive offered for 2008, we were under the gun to get these rigs installed and in service prior to the end of the year.

We thought the KCBC transmitter would be the easy one... set it in place, connect power, connect the antenna, connect audio and turn it on. Not so. That one turned out to be quite a challenge. First, there were electrical code issues with the installation that required some transmitter room reconfiguration to address. Then, once the NX-50 was connected and ready to run, Steve Minshall fired it up only to find that it produced enough "hash" on the AC power line that it caused buzzes in the audio and drove our UPS units nuts. Evidently, the source impedance on our 480-volt utility feed is low enough that the switching transients from the SCR power supply produced a waveform that caused trouble elsewhere in the collocated studio/transmitter. The solution, after making many measurements and corresponding for a couple of weeks with engineers at the factory, was to install a reactor between transmitter and disconnect. The transmitter is now running fine, and you can read all about it in Steve Minshall's account below.

I thought that the WMUZ transmitter swap would be a lot of trouble. The new rig had to fit into a very small space and be maneuvered in through a couple of doors without a lot of wiggle room. The existing aux transmitter, which will very shortly be sent to Birmingham for use as an aux at WYDE-FM, had to be removed and slid past the existing main. Then the existing main had to be moved into the aux location. Then the new NV-40 had to be installed where the old Continental main used to be. And there was AC, RF (3-1/8-inch rigid), remote control and monitoring connections to be made. I thought all of that would be difficult, but Tom Gardull and Art Reis, with the help of a couple of guys from Nautel, got it done in short order. That transmitter came up

and ran rather unclimactically. The only issue was that the BE IDI-20 importer would not “talk” to the new Nautel Exporter Plus. Nautel has since loaned us an importer that does work.

Then in Denver, we wrapped up the KLVZ ground system replacement and new transmitter building installation just prior to the end of the year. We still have some work to do, namely installing the electric fence wires around the inside of the tower base fences and installing the alarm contacts and transmitters on the tower gates, but the ground system is now intact and as secure as we can make it.



**A motion-activated "game camera" was used to snap this photo, which was eventually used to capture the copper thief.**

Some good news on this front: a copper thief that had been caught on camera stealing copper wire from a locale very near the KLVZ site was arrested late last month. The news story may be available for some time at [MyFoxColorado.com](http://MyFoxColorado.com). While we can't prove that this guy or his partner in crime are the ones that hit the KLVZ site on at least two occasions (he denies any involvement), I've got a feeling that this is our guy. At the very least, the word is now out that copper theft in that particular area isn't the free ride that it once was.

The guy they caught was caught using a “game camera” of the type used by hunters to determine if a particular area is frequented by deer, elk or whatever. A property owner that had been hit before by copper thieves installed such a camouflaged camera, which snapped a series of high-resolution digital photos when it sensed motion. The photos were distributed by the local sheriff and within days, the thief and his accomplice were in custody.

The new transmitter building is essentially finished, but it's not quite ready to move into yet. We are waiting at this point for electrical power to be

installed. This involves first a final inspection by the county, then a cutover by the local power utility. Both are scheduled to take place early this month. After that, we wait... for the ground to thaw enough to



**New KLVZ-D transmitter building with stairs**

trench in a piece of conduit containing extended transmission and sample lines and another containing the electrical feeds to the towers. That could happen in March or April, depending on weather. But the good news is that the hard work of getting the building set into place is done. We can change all the lock combos and security codes and call the place secure once again.

Over the last month, I have had the opportunity to play “engineering assistant” to Amanda. Pete Chamberlain departed around the first of December, so it became necessary for me to help out from time to time. In doing so, Amanda and I wrapped up some longstanding projects and issues. You'll read more about this in Amanda's column herein.

All in all, 2008 was a productive year in the technical quarters of our company, even if much of the work did jam up against year-end. My thanks to each of you for your hard work and commitment. I look forward to a productive and *efficient* 2009!

### **Modeling**

We continue toward the undetermined date (presumably next month) when the FCC's new proof-by-modeling rules go into effect. I'm excited about this. We've worked a long time to get this enacted, and now that it's becoming a reality, situations are beginning to present themselves that are ideal candidates for moment method modeling.

One such situation is that of WXJC(AM) in Birmingham. This site has for years been “monitor point stable,” but in the last year or so, it has been anything but. The cause? Development. Power lines,

wireless towers, restricted access and more have combined to disturb the magnetic field at a couple of monitor points and make it difficult at best to prove by measurement that the station is not exceeding its FCC-authorized standard pattern. We can model this array and license it pursuant to the new rules and do away with the troublesome monitor points, likely

improving the interference protection in the process.

There will be others in short order, so stay tuned. And if you're interested, the SBE has just released an online on-demand study course on AM directional antenna moment method modeling. Go to the SBE website at [www.sbe.org](http://www.sbe.org), click the Education tab and then click Seminars.

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

Hello to all from Western New York! Here we are, at the beginning of another year! I can hardly believe how fast the years seem to fly by as I get older. It's ironic, but have you noticed that as you get older, time accelerates and your body slows down? My mind tells me I can still perform like a 20 year old, but my body has other notions. I can only hope that with age I am building some semblance of wisdom.

This past year has hit the business world awfully hard. Once profitable and successful businesses have closed this past year, and those that have kept close check on their financial situation have down-sized proportionally to income. Many people have lost their jobs simply because it was determined that the business could operate without them.

Radio is not immune to this. In most of the stations here in Buffalo, I have heard of air personnel being let go, some with ten years or more of service to their employer. In most cases, their departure was not credited to poor performance on the job; it was a simple case of the station could no longer afford their services. They were replaced by lower paid personnel (and I might add, less experienced) and as a result, the air sound and quality have diminished.

So far, this economic crunch has not affected any of the Buffalo market engineers. Unfortunately, engineering is not viewed as a profit-making venture, at least from the standpoint of the bean counters. Most stations under-value the importance of the chief engineer and see the position as a drain to the

station's bottom line, especially those stations in smaller markets, and mom & pop operations operating on a miniscule budget to begin with.



We are in a position that can greatly help diminish operating costs considerably. When economic times were good, we were replacing broken equipment with new stock instead of repairing failures in-house. I know my bench time has dramatically decreased in the past few years, and now is the time to re-sharpen those repairing skills to help save valuable revenue. By purchasing your electronic parts from local suppliers, you can save on shipping charges and are in a better position to "bargain" for competitive pricing against national chain electronic suppliers. Every little bit helps. By repairing your

equipment in-house, you are saving the cost of shipping the unit back to the repair center, along with the labor cost of troubleshooting and repair.

Take a moment and look at the expenses you out-source. Can you do the same job yourself to save money? For instance, if you pay to have your transmitter site mowed, can you do the job yourself to save the company money? Take a look around your shop. Do you have equipment that you no longer have a need for that can be sold? How about those times that you needed to hire an additional helper with a problem or project? Perhaps you can trade out your services with that person when they need an additional hand. The list goes on. In order to justify our existence, we must become better at finding ways to create revenue instead of being a "cost center" to

the operation of our stations.

#### **WDCX – Buffalo, WDCX-AM / WLGZ – Rochester**

There is hardly any new news to report on from either the Buffalo or Rochester markets. The month of December saw very little in the way of equipment failures or significant problems. One thing to note, however: we are still broadcasting via the Comrex Matrix on WDCX(AM) in Rochester. Last month, we discovered the coax and isocoupler on the STL receive antenna were full of water. The replacement coax and parts are on site, waiting to be installed. However, the weather has not cooperated with us to get this work done. We have seen some unusual weather this past month, from 70 M.P.H. winds to 60-degree days and near-blizzard snowstorms. Don at Western Tower and I

are hoping to get this work completed by mid-January at the latest.

All of our stations are in excellent shape, with no major upgrades or installations planned for the New Year. This will allow me the time to get some of the outdoor projects that have been pushed to the back burner completed this spring and summer. During the winter months, I plan to get the majority of the old wiring cleaned up and documented in the central offices in Buffalo and Rochester. This has been lingering on my “to-do” list for some time now, and I have all the supplies on hand, and finally the time to get started on it.

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 New Year!

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#### **The Motown Update**

By

**Tom Gardull, CBRE**

**Chief Engineer, CBC–Detroit**

First one on the air anywhere. Our new Nautel NV-40, all solid-state high-power FM transmitter, serial number 3, was turned on Monday, December 29 as the new WMUZ main FM transmitter. Serial numbers 1 and 2 were still enroute to their new homes.

We had to get this transmitter on the air before New Years Day to be able to take advantage of a tax benefit, and the delivery date had slipped from September to December. The delivery truck arrived a few days before Christmas during a snowstorm. Our contractor had to get a forklift to get it off the truck because the small lift gate was deemed not safe for the one-ton rig. The transmitter was set at our back door and a pallet jack took it inside to where the Continental main transmitter used to sit.

We had an electrician standing by to re-run the 3-phase power through new conduit, and our contractor made a short extension of the rigid coax to complete the permanent connections. Nautel was sending setup techs for the final commissioning.

Audio and control cables were started into new conduit but we ran into the first problem. After the conduit arrives at the pre-punched access hole, there is no place to run the cables. There is no access trough or opening to run the wires. This was to be a question for the Nautel reps before I started drilling new holes in the frame. Serial number 3 was sent before Nautel published an instruction manual, so even if I could run cables, I would not know where to connect them.

I made several calls to Nautel with questions and they arranged to send a preliminary manual which answered some questions. On the 29<sup>th</sup>, Nautel reps arrived for setup and Art Reis from Chicago came to help. Art got our torch and made the ground strap connection. Nautel said the wiring path in the back was to remove the entire back panel and push the cabling into the corner of the cabinet. I was going to install a pull-rope for future wires, but that would not be safe since there are enough exposed components that something would surely short or snag during a pull. Art made





the SCA audio connections and connected the composite coax that supplies the main analog audio and RDS.

None of the panels or doors have interlocks. There are no lethal voltages exposed. All the high current activity occurs at the sixteen removable power modules that give us our 26.5 kW TPO and the 265 watts of HD. The Nautel exciter is located in the back at the bottom, so one must be careful with non-lethal but exposed connections when running wires to the exciter module.

The Nautel reps installed new software, and then we energized at low power while on the dummy load. There is nothing to tune or load. We watched the touch-screen as power increased. There are no real meters; everything is monitored by the on-board computer. Power was increased to our licensed value and all was stable. So at 4:45pm, the NV-40 went to antenna.

The NV-40 causes a large heat load. Instead of a single heat exhaust point, the entire cabinet releases heat using many small fans. We are finding our HVAC systems are just able to keep the temperature in range. We are going to add an exhaust fan to the building wall because we need to lower the room temp.

Our SCA transmissions are not working, although the on-board generators show up on the

built-in spectrum analyzer. The audio inputs were missing from the manual but Art wired them after Nautel called with the correct pin-outs on the DB-15 plug. But we get no received audio. Nautel is checking into that.

I attached the remote control connections from the Burk and the studio has control and readings. The built-in touch-screen shows all the readings, layers of diagnostic menus, and the spectrum analyzer. After an LAN IP address is assigned, the screen image and control is available from any computer on the LAN.

There are some bumps. We also got the new Nautel HD Exporter Plus and planned to re-use some of the BE HD equipment to make HD work. But it turns out that Ibiqity has made a major upgrade that Nautel has implemented that creates an incompatibility with our older BE equipment. So while we are transmitting HD-1 audio, HD-2 is awaiting a loaner Nautel Importer.

My first reaction is the NV-40 sound good and clean, and the signal is stable. It was simple to physically install. My thanks to the very helpful Nautel tech people, Mike and Mark, because they had the knowledge needed to make the final in place operations. A big thanks to Art, who wired and then guided our initial learning curve. The first NV-40 on the air is good.

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### News From The South

By

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

First, I want to extend my condolences to Art Reis for the loss of his wife. Art, you're my brother and I love you. Know that you're in my prayers. But know also that, as Bill MacCormick said in an email to me the other day, your loss was Heaven's gain. Having met Susie, I agree with him.

#### Happy New Year

It may be depression about the economy or the election, and I don't know what it's like where you live, but I've been surprised at the lack of Christmas decoration around

here. Last year, every other home was lit up and wired for sound; this year, that's the exception. Most people here have just put up a tree and maybe a wreath on the door; there's not much going on.

Christmas is my favorite time of year. I think I've mentioned before in these pages that no one can do up Christmas like my wife, Sandy. I've seen trim-a-tree places that charge big bucks to decorate a tree and none of them can touch my sweetie. For that matter, we've had people ask if we used an interior decorator on



our home. Nope, Sandy did all that, too. She's just got the knack.

And what about this coming year? If you listen to the experts and pundits, we're in for a hard ride. Dick Morris has been referring to this as an outright depression, not merely a recession. And what do I think? One of the best billboards I ever saw years ago summed up my thoughts quite well: "Recession? *We Choose Not To Participate.*" So simple... and yet so profound. I've never forgotten that. It was during elder Bush's administration, back when I was still living in NC. But talk about a positive attitude!

I do believe that it's going to be a good year, in spite of what the naysayers are nay-saying. God is still in control and if we'll keep our eyes on our primary mission (hint: preach the Gospel), we'll be fine. Besides, the engineering department is going to be too busy to be worried about worrying, anyway. We've got a lot to do in Birmingham this coming year. We're giving Tom Gardull's old Continental transmitter a new home at WYDE-FM in Cullman, we're going to model the WXJC(AM) array in Tarrant, and we've got to finish moving the servers to Birmingham – just to name three of many. But now for the usual rants ...

### The Kaminsky DNS Bug

Over the Holidays, the Internet is always clogged. Before Christmas, you have people shopping; afterwards, the Web is flooded with zillions of Newbies who are trying out the computers that Santa brung 'em. It's always fun this time of year. But a much bigger problem occurred over the summer and most people were unaware of it: a serious vulnerability was discovered in the Domain Name System, or DNS.

If you're not familiar with this, DNS the "master directory" for the Internet. It allows you to use an easy-to-remember name like "crawfordbroadcasting.com" in your Web browser instead of the more cumbersome "216.17.180.19." You could actually use either one (try it; enter that IP address in your browser and you'll get our main Web page), but obviously, the name is easier to remember. Thanks to DNS, you can use that name as a synonym for the IP in most networking software. For example, the commands "traceroute crawfordbroadcasting.com" and "traceroute 216.17.180.19" would return equivalent results.

A fine point: domains devolve down into subdomains, which are read from right to left. In the example "en.george.somesite.com," "com" is the Top Level Domain (TLD); that's the highest level.

"somesite" is a subdomain of ".com;" "george.somesite.com" is a subdomain of "somesite.com;" and so on. The site names "www.crawfordbroadcasting.com" and "crawfordbroadcasting.com" aren't technically the same. They could actually have different IP addresses, though like most hosts, we make them the same for convenience. Other hosts, particularly those with lots of traffic and busy servers, might break up subdomains across several IP addresses. The sites "www.somesite.com," "forums.somesite.com" and "support.somesite.com" could even be on servers in different countries.

For any given (sub)domain name, there's an authoritative DNS somewhere on the Internet that has the final say-so about the IP address. That service is part of what you pay for when you register a domain name. In the event of any confusion or disputes, that authority rules. But to increase the speed of DNS lookups and to reduce the load on these authoritative servers, most local Internet Service Providers (ISPs) have their own local cache of the DNS records. In other words, when you type "www.somesite.com" in your Web browser, the IP address will usually come from your local ISP's *copy* of the DNS records.

This has implications that go far beyond what I'm discussing here. If you've ever had to change a domain's IP address, this is why it can take over a day for everyone to find your new location. It takes time for the info to percolate through all of those local caches scattered across the Internet. (William, our favorite Ubergeek at our local ISP, Hiwaay Internet, grumbles that if everyone would honor the "Time To Live" – TTL – specified in a DNS record, it wouldn't take so long, but now we're really off-topic.)

What does this have to do with the Internet almost blowing up? If you're net-savvy, you might recall hearing about the Kaminsky DNS bug around the end of April. At the time, very few details were provided; we were just told that it was "serious" and that ISPs worldwide were scrambling to patch their servers. I remember being frustrated myself: was it really that bad? What was I supposed to do? Some even accused Dan Kaminsky of grandstanding because he wouldn't release the details.

Kaminsky is a security researcher from Seattle who first made national news in 2005 when he published details of Sony's infamous "rootkit." In that case, a hidden program was automatically installed without the user's knowledge when a Sony-BMG CD was played under Windows. Its purpose was ostensibly to prevent copying, but what concerned Kaminsky was how it burrowed into the

system to hide itself. Worse, in the process, it opened up security holes that could be exploited by other, more malicious software. Under pressure, Sony eventually recalled all of the CDs in question.

In the spring of this year, Kaminsky was at home recovering from an injury. To pass the time, he idly began experimenting with DNS. It was then that he discovered a fundamental flaw in the way these local caches update themselves. Without going into a bunch of arcane details: he discovered that if he made a string of look up requests, the first answer might come back on port #1000; the next would be on port #1001, and so on. The port numbers were in sequence, easily predicted. Kaminsky wrote a simple program that would flood the local ISP's DNS cache with bogus requests. Immediately after each request, the program would provide its own answer on one of these easily-guessed port numbers. To his amazement (and horror), within a matter of seconds, the local DNS cache would get confused, inserting his bogus IP address for a legitimate domain name. Simple, repeatable ... and devastating.

You're doubtless familiar with email scams that claim to come from someone like eBay or your bank, asking that you click a link to resolve "problems" with your account. The link will actually go to a bogus Website (some of them look surprisingly real, too!), where you will be "phished" for your account information. This can easily be countered by simply never, ever clicking such a link. If you have questions, close the email program, start your browser and use your own, trusted bookmark. Better yet, just type it in yourself:

"www.mybank.com."

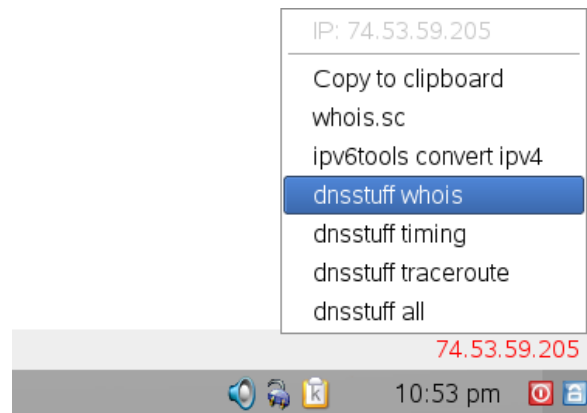
This was an order of magnitude worse and in my opinion, Kaminsky did the right thing in maintaining secrecy. I'm not a big fan of "security through obscurity," but he really had no choice. This bug was ridiculously easy to exploit. Had the word gotten out before patches were developed, your "trusted" bookmarks would have been anything but. I might have clicked on my bank's link – the same bookmark that I'd used for years – and might have gone to a crook's fake Website. If the site was cleverly done, I wouldn't think anything if it said, "Sorry, the servers are busy, try again later" after I'd entered my user name and password. (Hey, it happens, right?) Meanwhile, he'd clean out my account down to the last penny!

ISPs everywhere have been patching their DNS software to stop returning results on these easily-guessed, sequential ports; they use random numbers now. The first thing you should do is to browse over to [www.doxpara.com](http://www.doxpara.com) and click the test

link that Kaminsky provides; you can see if your ISP has patched its servers. The randomization makes it more difficult for a crook to poison a DNS cache.

Note that I said, "difficult." It's much harder now, but it's not impossible. The long term answer is for the Internet to switch over to Secure DNS (DNSSEC), but that's going to take a while. If you're really worried about it, I have a suggestion for my fellow Mozilla Firefox users. Jan Dittmer has written an add-on called "Show IP;" you can download it at <https://addons.mozilla.org/en-US/firefox/addon/590>. This will display the actual IP address of any site that you visit.

I've noted the IP addresses used by my bank and other financial institutions so that I can watch for changes. If you do, the only caveat is that the business itself might change the IP (some busy servers – such as those at Google – deliberately rotate IPs to share the load). But as a general rule of thumb, the first two octets in the IP address will rarely change. For example, your bank might be at 200.200.1.10 today, 200.200.2.11 tomorrow and so on. But if you see a dramatic change, right-click on the IP address at the bottom right of your browser window; Show IP brings up a menu that will let you do a reverse DNS lookup (shown highlighted in the image). If the lookup says that the IP address is in Hong Kong, well, you'll know something fishy is going on!



### AM Modeling

WXJC has been under an STA for quite some time. We've got a source of reradiation and we just haven't been able to run it down. One reason is that the entire area around that transmitter site in Tarrant, AL, has been built up and we can't physically get access to most of the places that we'd want to take field strength measurements. This is a common problem, of course, and quite familiar to any

engineer who has to maintain a directional AM.

The good news, as previously reported here by Cris, is that the FCC has finally (!! ) approved the computer modeling of AM directional arrays. We're hoping that WXJC will be one of the first to benefit from this; right after the first of the year, I'll take the base impedance matrix measurements for the model. This is a relatively new system; we completely rebuilt it in 1999, and the copper theft back in February of 2008 means that we've got all new copper (at least around the tower bases), too. We should have no problems.

I can't think of a better candidate for modeling because it's a textbook example of why the new rules have been so badly-needed. You have a well-maintained, well-designed and properly-built array. You have engineers and a company who genuinely care about operating legally and keeping that array within tolerance. The problem is, you also have man-made obstacles all around the thing that utterly prevent any serious attempt at doing an old-style proof. New construction (including new towers just outside of the 3 km limit) further complicate taking accurate field strength measurements.

When I was running down our high monitor point back in January, I tried to use the field strength and location data from the original proof. Most of those points were either inaccessible or had obvious re-radiation problems. What was once a series of cornfields and wooded areas had become one neighborhood after another, complete with power lines. When I got farther away from the site, several points were located in a rural area that had since been bought by a mining company. Even if I'd ignored the

"no trespassing" signs, it was sort of difficult to take a reading at the bottom of a giant pit with 200-foot mining cranes all around it. The crowning touch was in the middle of the run in downtown Gardendale, AL, where a 200-foot water tower now stands. As I moved away on that radial, I could literally see the thing right in line with the transmitter site!

My only complaint, for the AM band in general, is that the FCC took so long to approve these badly-needed rules. It may be too little and too late for some struggling operations. Some have been forced to operate for years at reduced power under an STA, which has degraded their coverage (and thus, their listenership). Others have had to eat the cost of a complete proof, which has increased their debt load. Yet still others – let just be honest – have operated illegally, crossing their fingers against an FCC inspection.

Now that I've had a chance to look over the new rules, and after talking to Cris about how we're going to do it here in Birmingham, I feel really good about it. AM modeling is not a way to "get around" a badly designed or badly maintained array. If your ducks aren't in a row before you show up with the network analyzer and impedance bridge, it just won't work (unless you want to make up numbers and lie to the FCC, which will simply expose you to monstrous – and well-deserved, in my opinion – fines later on).

I plan to keep everyone posted about it in these pages. I'll even take pictures, especially if I can get Jimmy or Todd down into that wire vault behind the building.

Until next time!



## Gateway Adventures

By

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

Dealing with interference issues is part of a broadcast engineer's job description. If you're in the industry, sooner or later you're probably going to come across some sort of interference problem that either your equipment is creating or someone else's equipment is causing yours.

Recently I had a couple of curious instances that I have never had before. Nine months ago, we installed the Motorola Canopy system to serve as an STL for KJSL. Part of this system is mounted on the KSTL tower, which is on the riverfront across from downtown St. Louis. The frequencies used for these systems are in the unlicensed band around 5.7 GHz.

One part of the system is a radio link between the KSTL transmitter building and another radio at 255 feet up on the KSTL tower. This gets us around having to run a CAT-5 cable up the tower.

Just a few weeks ago, the link went down. Fortunately, we have a backup STL connection using Ethernet encoders that took over seamlessly, so that listeners probably never even noticed. I logged into the web servers of all the Canopy radios involved in our STL and found that the above mentioned link between the building and tower was down. When I looked at the status page, there was a message that stated that the transmitter of the radio was shut down for 27 minutes due to radar detection.

Not knowing what this meant, I contacted one of the techs at our Internet service because they use lots of these radios and have a more extensive knowledge of them than I do. He didn't know for sure, but he called someone with even more experience and called back to let me know that this was caused by the detection of military radar. The units, by law, have built in a shutdown feature should they encounter the military using the frequency. My guess is that a military plane probably flew directly over the transmitter site and caused this to happen. It hasn't happened since, and I am glad we put in backups that seamlessly jump right in on a failure of

our STL.

Another incident that happened recently occurred as I got home one evening. I turned my kitchen radio on to KJSL only to find a lot of hum with station audio. My first assumption was that there was something happening locally by that particular radio. I went and tested this theory on other radios in the house and found that they, too, had the same interference. I tested the car radio in my driveway and found the same problem.

I was now beginning to think this was more than a localized phenomenon, so I called other station personnel to see if they heard the same thing – they hadn't. I just wanted to make sure the hum was coming out of our transmitter and I was relieved to know that it wasn't.

Still, the signal was unlistenable around my home, and this was not only annoying but I wondered if this might be something that would cause interference to the station in other places. I went around the house unplugging appliances one by one by this did not cause any appreciable difference to the amount of interference. Finally, I remembered that I had the station's Field Intensity Meter in the car because I had just come from doing monitor point measurements. This would be ideal for sniffing out the problem because I could aim the meter and find the cause of the problem by watching the meter strength. The fact that I could walk around with it didn't hurt, either.

After walking around my house and property, I finally found the place with the strongest amount of interference was the utility power meter that measures power usage for my home. This was located outside on the electrical service entrance to my home. This particular meter is one of the new meters that can remotely tell the power company the power usage. I believe it uses the 900 MHz band, so it is a mystery as to why it was causing the interference on KJSL's frequency.

The station's frequency is 630 AM, so I



tuned the FIM up and down the AM dial but could not find any other frequency that had the interference. I then wondered (worried) if this would be happening wherever one of these new power meters was located. I wandered around the neighborhood with meter in hand, walking up to the electrical meters located on other people's houses.

Fortunately, I didn't get myself arrested and I was greatly relieved to see that the problem was isolated to my house. I'm sure some of my neighbors were thinking some nice thoughts about me at that point.

I still had the interference occurring at my

house and had determined that I would call Ameren IP the next day to see what they knew about the problem. However, by the next morning the interference was completely gone, so I decided that I would wait for it to come back. Fortunately, it hasn't. Unfortunately, I can't be sure exactly what caused it to occur in the first place.

Considering how many of these new power meters are in place, I do wonder if there are any others causing problems for AM signals. I certainly will be keeping this experience in mind when a listener calls in with an interference problem in the future.

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**Valley Notes**  
**By**  
**Steve Minshall**  
**Chief Engineer, KCBC**

I spent the last month of 2008 installing a new, state-of-the-art, 50 kW transmitter at KCBC. I felt quite privileged to now have a brand new transmitter with the "old" ND-50 as a backup. I doubt there are too many 50 kW stations with a solid state main transmitter and a solid state auxiliary transmitter.

The NX-50 is an amazing transmitter. The entire transmitter is contained in a single cabinet, not much bigger than the 1 kW rig that had previously occupied the spot. The transmitter is controlled by a computer and a touch screen front panel. A couple of really neat features are a real-time Smith chart load analysis and a spectrum analyzer on the front panel display.

The output filter occupies most of the top half of the transmitter and appears to be very robust. There is not a single mica capacitor to be found in the output network; instead, more modern ceramic transmitting capacitors are used. The ceramic capacitors run very cool, evidence that internal resistive losses are very low.

The power supply occupies most of the bottom half of the transmitter. The power supply is SCR controlled and uses a very low-loss power transformer that barely gets warm. The power supply runs at just under 400 volts output.



The actual RF-generating part of the transmitter is incredibly small and is obviously very efficient. There are 20 RF modules that are located behind the front door. The modules are "series combined." If a module is removed, a relay closes the connections for that module so that the remaining modules can remain operating normally and the transmitter will continue to operate at a slightly reduced power.

The Nautel engineers believe in a single ground point for all external grounds for the transmitter. This is something that I, too, believe in. This grounding scheme is designed so that currents from a lightning strike will not find a path *through* the transmitter. In this case, all external grounding finds its connection being made to the transmitter at the RF output connector.

The installation of the transmitter was not without problems. I found early on that I had RF problems in the adjacent rack. Unfortunately, what makes for an excellent grounding scheme for lightning currents is not necessarily a good RF ground. Bonding the adjacent rack to the designated ground point on the transmitter evidently was not of low enough impedance to keep the rack and the transmitter cabinet at the same RF potential. Keep in

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The Local Oscillator  
January 2009

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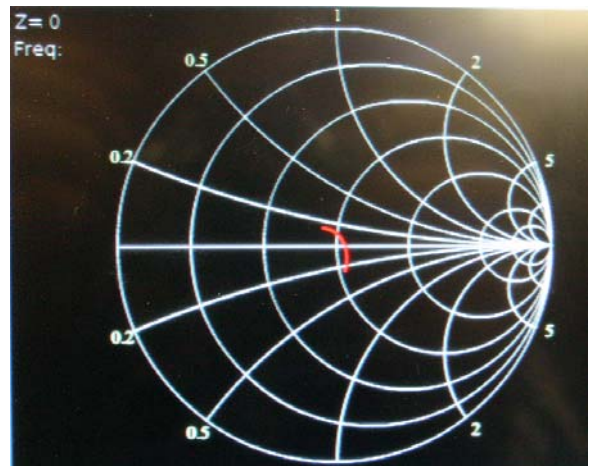
mind that this is a 50 kW facility and the cabinets in question are within ten feet of the phasor. I had to explain to our electrician why two grounded conduits could spark when touched together. The RF problem was solved by bonding the four corners of the two cabinets together with 2-inch copper strap.

The next problem was not so simple to solve. The SCR power supply in the transmitter

created some hash on the AC lines in the building. Our studio equipment hummed and the UPSs started cycling on and off. The fix for this, at this point, has been to install a 3-phase line reactor on the 480-volt feed to the transmitter. The reactor provides filtering of the high frequency components and increases the impedance of the AC supply to the transmitter, which lessens the peak currents produced.



**The NX-50 sits almost within the footprint of the old MW-1!**



**Real-time load analysis is one of the big features of the new NX-50**

## Catalina Tales

By  
Bill Agresta  
Chief Engineer, KBRT

Greetings from Santa Catalina Island!

This has been an interesting month on this always-strange island. Just before Christmas, we got some pretty serious winds up here along with a bit of rain. This revealed a little shortcut the contractors who replaced the Telco poles for AT&T snuck in after the fire. I had already noticed that they did not hang weights nor did they use anchor guys as the previous poles had, but after the storm, we also found that they only buried the poles a foot or two in the ground. This left the entire span across our driveway hanging from the trunk cables, and since at the same time a couple of our phone lines began to get noisy, I figured we were going to eventually lose everything. With another storm predicted for the Christmas holiday, my trip to the mainland to see my parents was called off and I stayed on the island to keep watch at the transmitter plant over the holiday.

The big issue here is that many times, all transportation to the island is canceled during stormy weather, and if all our Telco lines, including our T1, broke, I would have no way to get to the plant to deal with the situation. I have a couple of people on the island who act as my back up for little issues while I am away, but they were all on the mainland as well, so this left me with only one option, to spend Christmas alone with my dog and the buffalos...

Things got better the following week, however, as I did get off the island for a few days and was able to spend New Years Day with my family. I also got a chance to do some driving and listen to the KBRT signal all the way down into the San Diego area. I am always blown away at how great we sound way out there, and our HD coverage is pretty impressive as well.

With a brand new year ahead of us, I am reorganizing my to-do list for the journey ahead. With the economy looking worse all the time – especially here on the island, I am doing my best to

cut waste and make every project run as efficient as possible. Our plant is already pretty efficient in the way of lighting and other energy usage, but there are lots of little things that chew up nickels and dimes that are easily remedied.

I have cut my mail runs to every other weekday unless UPS or FedEx calls me with a next-day. For those of you who are unaware of our situation here regarding mail and other deliveries, nothing is delivered to a home or business here on the island. Everyone needs to go to

the Post Office to get their mail, and UPS, FedEx, etc. are all flown over by a subcontractor. The nice thing about this is that they call me if I get a next day package or anything that looks urgent, so no more wasted trips. It's not only the gas I am concerned with here – it's the wear and tear on our truck over the awful "roads" that have become so bad that they literally tear the steel apart!

I know it has been a while since I wrote a good buffalo story, but since our new fence went up, things have become pretty quiet up here. My dog stays in and everything else stays out so, no more stories to tell.

I went out to trim the tree next to our satellite STL antenna a few days ago and I realized how amazingly stable it has been. You may remember that we went to satellite after we lost our T1 during the fire in 2007. Since the Telco is still having issues, we have left the STL on the satellite and sometimes I forget all about it, not having to deal with it as I always seemed to with the T1.

The entire plant ran almost too well last year as I saw very few surprises compared to previous years. Of course, what the plant lacked in *island factor* last year, the locals made up for. They have a very bizarre outlook on things, and this is becoming more and more evident with the slowing economy. As fewer tourists are traveling to Catalina Island, they raise and raise their prices, then complain about how bad business is. The tours here have doubled in price





over the last year, and where we used to see four buses passing the KBRT driveway all day long, I might see two or three a day now. It has even become a bit eerie here now, especially if I make a run to the market in the evening and the only person I see the entire trip is the checker at the market. You know things are getting too quiet when you begin talking to your dog!

I hope you are all looking forward to a great New Year although I believe it will be a challenging one.

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.

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### The Chicago Chronicles

By

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

The usual writing about radio and engineering will have to yield this month. I am writing this through tears.

As many of you already know, I lost my best friend, confidant and true love of 33 years, my beloved wife Susie, early on the morning of December 15, to a brain aneurism. Without knowing the situation at that moment, I awoke at exactly 2:00 AM, just in time to hear her last unassisted breath. Since it was time for her early morning medication, I tried to rouse her. When I couldn't, I went around to her side of the bed and felt for a pulse and breathing. There were none. I instantly called 911 and started mouth-to-mouth resuscitation. The ambulance was there very quickly, in just a few minutes, and they worked diligently on her, got her heart re-started, and her breathing resumed. Then, after about twenty minutes, they put her in the ambulance and took her to the ER. Looking back, I now realize that she died in my arms as I tried to revive her.

Susie was comparatively young, really, only in her mid-60s, but that wasn't the whole story. The truth is, the last 44 years of life were a gift given her by the grace of God. When she was 21, in July of 1964, she was driving a car from Ventura County to San Diego, California, when the brakes failed on a downhill grade on the San Diego Freeway. She lost control of the car, which went over the guard rail and an embankment, and rolled over a number of times. Since this happened before the days of seat belts let alone seat belt use, Susie was thrown clear of the car,

which then rolled over her. Almost every bone in her body was broken. She was in a coma for six weeks, during which time she went through the near-death experience. In it, she was told that she was not ready for heaven quite yet, because God had other plans for her, including a happy and fruitful life.

The doctors told her parents that she would not survive, then later that she would be a vegetable for the rest of her life; then, that she would never be capable of cognitive thought, or of talking, or walking. She would never, they said, be able to bear children, because her pelvis was so broken up. And she confounded those 'experts' by doing all of it. Indeed, she married, bore two children, then after ten years, she divorced, and a few months later, she married me.

Susie really lived her life as if she had been given that second chance. She, and we, made friends by the droves. The memories abound. She was a legendary cook and baker, of which hundreds of people, including many here at CBC-Chicago, will attest. She, raised as a Mexican to cook as a Mexican, once won second prize in a Polish cooking contest, with a Greek dish, baklava. Her recipe for seafood enchiladas is a popular feature at a local Mexican restaurant. The Susie Kitchen, as we called it, was home to almost every kitchen gadget known to man, and her cook book library was the envy of all who saw it. I once asked our housekeeper what she would do if she had all of this, and the answer was, "I'd salivate!"





But that wasn't Susie's only talent. She could knit and crochet up a storm. She worked two years to create what would eventually become a magnificent lace altar cloth which is now part of our church parish's altar linens. If you attend her memorial service on January 10, you will see it. She was also an active poet, with membership in the International Society of Poets. We met in ham radio, helping to form the local radio club in Pocatello, Idaho. She was a whiz at Morse code (so much for brain damage), and kept her license up for over thirty years. And yes, up until a few years ago, she was active on the air.

Susie was a loving, giving, often funny, active and a fiercely independent person, but in the last few years, the ravages brought on by that horrible auto accident started to take their toll. Everywhere a bone had broken, there came traumatic arthritis, and with it, increasingly unbearable pain, everywhere in her body. And with it came the frustration that she couldn't do a lot of the things she had once taken for granted. Yet she insisted that she wouldn't spend her last days in a nursing home. She didn't. She didn't want to be on life support if she went into a coma, which she finally was, but only until our two sons and our grandson could come to her bedside from Florida and say their tearful good-byes, exactly 48 hours later. Brain-dead though she was by then, we knew she was looking down on all of us in that ICU room at 1:45 in the morning. And she wanted to donate as many of her body's organs as practical so that others could live and have the gifts that only organ donation can bring. That, too, happened, so some parts of Susie are still alive, giving life to several people we'll never know and who will never know her. Her heart and lungs, both strong to the end, were donated for research. Finally, she wanted to be cremated and buried in the columbarium of our own Church of St. Edward and Christ in Joliet, and that, too, is going to happen.

Beginning with our own minister, The Very Rev. Kathryn White, I put the word out to all of our friends and loved ones about what had happened. It is at times like this that you know the number and quality of your friends, and I cannot be more gratified with the tremendous outpouring of love and sympathy which has come my way. (And advice, I might add... both my sister and my best friend have made the point of telling me that, having been the veteran of a happily successful marriage, I now have a big target painted on my back which only

unattached females over 21 can see. Just what I need.)

This company, Crawford Broadcasting, from Mr. Crawford on down, has led the way in compassion, and for that, I will be eternally grateful. Other employers should take note. To our friends at our church, in my professional life, especially the local SBE chapter, and just in our life, all have had a hug, a kind word, a tear, a handshake, dinner, an evening out with others, Christmas cheer – it's been overwhelming, and a lesson in the practical side of being a Christian. I am so thankful for all of that. I won't forget when it's my turn to comfort a friend in this same situation

I'm also thankful for what Susie and I had. An "I love you" for each other every day was standard operating procedure, and I always tried to *think* about what I was saying, to really mean it. I am so happy that Susie and I had those talks about what each of us would do if the other one passed on first. Painful though those conversations were at the time, in the end it made the decisions I had to make much easier, and I thank her for that, from the bottom of my heart.

I know that, in short order, I have to move on with my life, but it's going to take time, and a lot of teary-eyed 'missing her' moments. They say that the grief process includes an 'anger' phase, when you rail at God or the loved one for having left you alone and bereft. That's not going to happen with me. How can I be angry with God? It wasn't just Susie that received the gift of forty-four years of life she wasn't supposed to have. I received thirty-three of those years. I can't be angry with that. Only grateful.

And I can be grateful for one more thing: Susie isn't hurting anymore. That's the greatest gift of all, for both of us.

Please, when you've read this all the way through, and if you're married, call your spouse. Just call and say to her or him a heartfelt, "I Love You." When you are together, exchange an embrace, not just a little one because you only have a short moment, but an extended one, when you have the time to really do it. Do the little things to let your spouse and your kids know that you really love them. God gives us the *now* in which to do it. He doesn't promise us tomorrow. Do all of this, and you won't have any regrets when the time comes for God to bring you or that loved one Home. I did, and I don't.

Until next month.....

## The Portland Report

By

**John White, CBRE**  
**Chief Engineer, CBC-Portland**

It's been an interesting two weeks here in Portland, with something like three feet of snow. The big argument is, was it worse than '68 or '37? All the while the mayor-elect whines about how much the storm has cost the city and orders the city closed to all but 4-wheel-drive vehicles with chains all around. There is late or nonexistent garbage pickup, no FedEx, no UPS, no USPS, stuck Trimet busses all over the city, and bare grocery store shelves. And as of this writing, it's not over yet.



However, I do want to change course a bit from the storm. We had a storm-related tower light outage, which exposed a weakness I suspect is present with all LED tower light conversions. As the storm abated and warm temperatures brought melting, we had a tower light failure. Both the beacon and sidelight circuits developed a short, tripping out the tower light circuit breaker.

Like most wiring where tower lights have been converted from incandescent, the KKPZ lighting circuit is fed from a 20-amp 220-volt breaker. One phase feeds the beacon and the other the side lights. Excluding turn-on surge, the beacon typically draws 10 amps with 4 amps side light current.

Converting to LED lamps, which are more efficient, reduces both the beacon and side light current to around 0.5 A. From a circuit safety standpoint, this isn't a problem as the conductors are typically oversized to reduce voltage loss due to the length of the wiring needed to reach the top of the tower.

So it seems that the only problem is the lighting current sensor sensitivity. This is easily changed by adding primary turns to the current sensor. Problem solved.

Well, not quite so. Let's look at this situation a bit closer using the beacon for an example. In a typical current sensor, the current-dependent

sample voltage will be around 5 volts RMS for 10 amps of beacon current, the sample voltage rising and falling with the current. Now consider this: with the new LED lamps, we changed the turns ratio to 5 volts for 0.5 amps.

Now consider what happens when the tower light circuit shorts at the tower. The circuit breaker is 20 amps. At least 20 amps of fault current will be needed to trip the breaker. That's a 40-fold increase in the sensor primary current. A quick calculation shows

the sample voltage just went to 200 V. The bottom line is all four tower light sample channels on our tower light monitor are now non-functional and need repair. It's clear to me that 1 amp secondary cartridge fuses are required on both branch circuits. Some form of voltage transient suppression would also seem a good idea.

So how did this storm go? There are lots of discussions about record winter storms in the Northwest. Last month's storm lasted two weeks with roads closed much of the time. Flooding is still to come with rain and melting. Portland chose to "plow a packed base" and not use de-icing.

And the toll at Mt. Scott? Tree limbs down all around. A warped access gate when a limb broke and fell as it was opening. Several days with iced up towers and SWR problems. Several other stations had similar problems as snow depth was higher than base insulators. At Mt. Scott, we lost power and ran for some time on generator. And of course the tower light failure.

Lots of drifting snow with the wind. That did me a favor at the access gate as the trees funneled the wind through the gate, keeping that area clear. At the door was another issue. I had to shovel snow at the door to get into the building.

Quite a few local broadcast stations suffered outages and problems, mostly due to power and tower

icing conditions. The exciting happening occurred the last week of 2008 as a crew was on one of the West Hills towers doing some emergency repair.

The West Hills site is a very busy tower farm area with multiple 1,000 foot towers. At about midday, the tower crew heard what they described as a car wreck, then about 10 seconds later, they heard a bang. What they heard was the parting of the south

guy at the second level from the top of the channel 6 analog tower. The second bang was the guy insulator hitting the tower.

Fortunately, the tower did not come down and temporary repairs have now been made. And it's just the beginning of the winter. Where are Al Gore and Global Warming when you need them?

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

Finally, a little time to breathe. Things finally slowed down some for me in December. At KLVZ, GRB Construction finished the ground system project on the 6<sup>th</sup>. The stairs for the new building also were delivered. They are still waiting for a coat of paint, but at least we can get into the building easily.

The first half of the month involved lots of interaction with Qwest. The T1 to the KLTT transmitter site line kept going down almost every time the outside temperature got below freezing. Typically at night, I'd get a call that KLTT was popping on and off the air. I usually had to find someone around the studio that could put the transmitter on backup ISDN.



**The ground screen was blacktopped to prevent theft.**

After several days of this, I finally got on the phone with Telos. They told me how I could access

our ISDN unit remotely. This helped a great deal. Now, I could log on to a computer on the network and get access to dial the ISDN myself. After a few more days of having problems, we finally just left KLTT on the backup ISDN. Every day when I'd notice that the T1 was down, I'd call Qwest and they would say all was fine – the problem was our equipment. So my dad

and I went out to the transmitter with our EZ Tester (T1 test set) and found that the problem was not us, it was Qwest. We'd call Qwest, and they'd come out and find nothing wrong. In the mornings when I was at the studio, I'd check the studio end of the T1 line and it also showed errors on Qwest's end. We'd go back and forth with Qwest. Because it was intermittent, they could not see a problem on their end. One snowy day, Qwest looked on their end. The guy found a lot of problems with the grounding and fixed the problem. Hoo-ray! Finally fixed... or so we thought. As it turned out, this was not what was causing our problem.

On the evening of December 9<sup>th</sup>, a very cold evening, my parents and I were just finishing up dinner when Mike Triem called me and let me know KLTT was popping on and off the air again. He was at the studio, so I had him put KLTT on ISDN. With great hesitation, my parents and I went to KLTT for the night. This time, though, the T1 was staying



down. Qwest came out a couple hours later and looked at it. We unplugged our tester and the tech plugged in his, finally seeing the errors we were seeing. The next morning, they traced the problem down to a manhole near downtown Denver where mice had gotten into the cable and chewed things up. They repaired this and the problem was finally fixed!!! Or was it?

On the 15<sup>th</sup>, the T1 went down again, and Qwest finally opened up a “chronic trouble” ticket for us. After a few days and after replacing all the equipment on the circuit from end to end, they finally found the problem. It was on their end, at the “slick” where the fiber-optic cable transitions to copper near the KLTT transmitter site. We haven’t had a problem since. Praise God for that!

In the midst of all of this, I had to figure out how to get the backup ISDN working with KLVZ. Every time KLTT went down, so did KLVZ because they both use the same T1 line (the audio travels by T1 from the studio to the KLTT site, then by microwave from there to the KLVZ daytime site). But there was something wrong with the backup ISDN for that site. There were actually two problems. One was that my predecessor had jury-rigged the audio bypass relay so that the backup ISDN fed only the right channel of the Omnia. Neither the Omnia nor the NE-IBOC liked that one bit (it made a strange “flanging” sound on the air). The other problem was audio dropouts in the ISDN audio coming from the studio.

A little investigation revealed a couple of problems at the studio end. One was a configuration problem, and the other was that the ISDN was being fed pre-delay. I had to configure the Wheatstone bridge router to feed the ISDN post-delay.

Also in December, I got to learn how to set up a new show on StarGuide satellite by myself. It was a lot of fun and a good feeling doing most of it on my own. I had to put a new StarGuide III in the rack, get it hooked up, and then called ABC to get it authorized. Then I got to do all the audio wiring. I did the transmitter first so that when I got done at the studio I could test the audio right away. It worked! I also got to hook up the relays for the show so it would fire the local breaks in NexGen.

While dealing with the T1 problem at KLTT, I noticed how cold the building got at night. It was in the 50s and would not get warm no matter how high I turned the heat up. It seemed to only blow cold air. What I found was that the heat was never connected when the new HVAC unit was installed a couple of years ago. Evidently, my predecessor told Choice Mechanical not to connect it. I guess he didn’t think we’d need to be warm at night.

It has since been turned on and stays warmer in there so if I need to work at night for an emergency, I can turn the heat up a little and get warm fast.

One very intermittent problem I had to deal with was the flasher for tower 1 at KLTT. I kept getting alarms on and off that the tower lights were out. Finally, while Choice Mechanical was working on our heat, we took the flasher down. I noticed it would not turn at all by hand either. I took it apart the next day and cleaned it up good. I used the Dremel and got the contacts cleaned up good too. I put it back together and it ran smoothly. That afternoon, we headed back out and hooked it back up.



**On days like this, we need the heat to work at our transmitter sites!**

I also noticed one day while I was working at KLZ that my hands were ice. I could not get them warm. The heat did nothing but make an awful noise. I turned on our aux transmitter, the AMPFET-10, into the dummy load, but that didn’t help much. Finally, I was able to get Choice Mechanical out to KLZ and found that the furnace blower motor was shot, some of the time delay relays were going bad and the filter had apparently not been changed in years (or so it looked). They fixed it all up and now my hands and feet stay warm out there.

The reason for the aux transmitter not putting out much heat was that a regulator module was not working. We began digging in to this and found some fuses blown. We ordered new ones because we had none. We continued testing, trying to find the problem and actually blew several more fuses. After several hours of working and testing, we found a wire that had been disconnected at some point in the past and mechanically reattached but never soldered. This is in a circuit that pre-charges the large modulator capacitors. We now have the transmitter putting out enough power to run on (5



kW), but we had to order some more fuses to replace a couple more that blew during troubleshooting.

KLZ finally received the new integrated Exporter Plus and AM IBOC Exciter from Nautel. These are their newest units, fully integrated with no HD, CD-ROM or lengthy boot-up. After getting it set up and tested, we took it out to KLZ and powered it up. We could not get it to lock up in HD at all. No matter what we'd do, nothing changed except the fact that the transmitter got very unhappy with us. After a day and a phone call to Nautel, we found the reason why: units. The new exporter and exciter use microseconds instead of samples or whatever the arbitrary units were that the old NE-IBOC uses. There was no easy way of converting the NE-IBOC units to the Exporter Plus/AM IBOC units the way we needed, so the engineer we spoke to gave us a range and sure enough, it worked.

Now the only problem we have is PSD (PAD). We have the default PSD, but no song/title information from NexGen. What I found is that the new units use the new iBiquity export architecture

and that our NexGen system exports in the old format. Evidently, the new iBiquity export architecture is not backwards compatible, so we have to wait for RCI to come out with an update to fix it.

Peter Chamberlain left the company on December 12 to pursue other opportunities. After discussing with my dad what I needed in an assistant, we both decided on the same person, Keith Peterson. You might remember that Keith worked as the engineering assistant here from 1999 until 2007, and he did a great job when he was with the company before. We found out that he was available and brought him in for an interview. He started on January 5 and will be giving me a much-needed hand with various projects that need to be done. I have no doubt that Keith will do a great job and that he will feel at home here at the company again. Welcome back, Keith!

That about wraps it up for this month.  
Happy New Year!

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**Digital Diary**  
by  
**Larry Foltran**  
**Corporate Website & Information Technology Coordinator**

**Out with the old, in with the new...**

It's common knowledge that computer equipment tends to age less gracefully than many other items in your house or office. Folks frequently joke that your newly purchased computer is outdated by the time you reach your car. Although thankfully the situation isn't that extreme, it is a bit frustrating trying to keep up with technology.

I've gotten into the routine of replacing my "main" home desktop computer every five years. Laptop replacement is a bit more frequent, but that's a topic for a different day. It's actually a good idea to start saving your pennies for the next computer as soon as you make your latest purchase. That way it won't feel like such a big hit in the wallet next time around.

I recently decided to move away from

purchasing OEM machines and decided to build one from scratch. Well, I didn't construct the mother board or the processor, so *almost* from scratch.

The first step was to identify what my

computing needs were and determine what type of components I would need. In this case, I wanted the most robust and fastest machine possible for everyday use along with playing my beloved flight simulator.

Flight Simulator is a very CPU- and graphics-heavy application, so I knew I would have to spend some extra cash in those areas.

After I put together my wish list of components, I decided to head over to my favorite OEM web site and see what they would charge to build a machine with my specifications. Surprisingly, I found that a similar but not identical machine would cost me three times more than if I were to do it





myself. Since I'm all about saving some money, I submitted my component order immediately and patiently awaited their arrival.

I don't plan on discussing each and every component, but I would like to touch on some areas that folks ask me about often. These items are memory and disk space. Not enough memory and your computer will be sluggish. Not enough disk space and you'll find yourself sifting through data trying to determine what you really need and what can be deleted.



#### **Time to install the memory**

For my new computer, I decided to load it up with plenty of disk space. With the price of storage drives dropping and the amount of space increasing, I was able to get a 1TB drive for the same amount I paid for a 250Gb hard drive just a few years back. Is having 1 terabyte of storage overkill? Only if you ultimately don't need the space. As operating systems become more and more bloated, it makes sense to load up on the disk space, especially for folks who like to take digital photos, download music, and still have room for their favorite applications. Granted you can easily install an additional hard drive if it becomes necessary, but why not be prepared from the start? Of course, it ultimately comes down to cost and the bottom line overall. Keeping that in mind, I did find that the difference in price between the 1TB drive and one that was slightly smaller was minimal in my opinion.

The amount of data storage available to a home user these days is actually quite amazing. I remember reading about office data servers with 5TB of data and thinking how massive that amount of storage was. Today, with my desktop storage and an array of external back-up drives, I find myself nearing the 4TB mark already.

With the amount of storage taken care of, the next major decision was how much RAM to

install. I decided to start with my OS choice. My plan from the start was to move away from XP and stick with Vista. To ensure the computer would run properly, I would need at least 3Gb of RAM. As I mentioned before, I wanted this machine to chew up any application I threw at it without hesitation and also be prepared for the future. 4Gb of RAM would be my minimum option, but I was seriously looking towards loading up with 8Gb. I ultimately ended up staying with 4Gb of DD3 RAM instead of going the full 8Gb. There are very few applications today that can utilize 8Gb of RAM, so it could simply be a waste at this point. I decided on a pair of 2Gb DDR3 SDRAM, leaving two more slots for another 4Gb in the future.



#### **How many updates???**

As I mentioned earlier, I decided to go with Vista as my OS option. One thing to keep in mind is that Vista does come in either a 32-bit version or 64-bit. Since my goal is to someday have 8Gb of RAM in my computer, I decided to purchase the 64-bit version. A bit unnecessary with 4Gb of RAM, but required to run 8Gb. In fact, Vista Home Premium can support up to 16Gb of RAM and Vista Ultimate can support a whopping 128 Gb of RAM. Quite honestly, I hope I'm years away from loading up a PC with 128 Gb of RAM or even 16Gb for that matter. If the plan were to stick with 4Gb of RAM for the life of the computer, the 32-bit version would have been just fine. My scenario called for a bit more though.

After about an hour of assembly work, my new computer was complete and humming away. The downside of building your own machine is loading all of the necessary drivers and related applications. This can be somewhat time consuming and occasionally frustrating. Although the benefit is that your new machine doesn't come loaded with useless applications right out of the box. You install what you want and, most importantly, what you need.

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So if you're up for the challenge and would like to save some money, why not give it a try? Component documentation and warranties have become exceptional and you're able to upgrade whenever necessary. Replacing a component here and there is much more cost effective than purchasing a brand new computer. In fact, I hope that this will be my last full computer purchase. I'm sure if you ask

my wife, she'll agree. ☺

On a final note, I pray that 2009 holds prosperity and success for everyone at Crawford Broadcasting. May your families stay healthy and safe during this brand new year. Happy New Year!  
...until next month!



**The finished product!**

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The Local Oscillator  
January 2009

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**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*

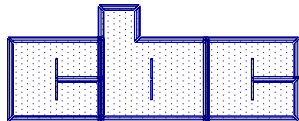
**WYDE-FM • Cullman - Birmingham, AL**  
*101.1 MHz, 100 kW/410m AAT*

**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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