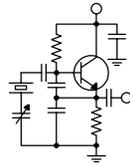


# The Local Oscillator



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

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### **Real Engineering**

Every August, I vacation with my family in the San Juan Mountains of southwest Colorado. This region was rich mining country back in the 1870s and 1880s.

There was, in a very real sense, a “Colorado Gold Rush” in those days. People with gold dust in their eyes rushed to our mountains from mostly points east.

When they got here, many were in for a rude awakening. This isn't like the kind of country around Sacramento where the Sutter's Mill rush took place. No, the San Juans are hard country, very high elevation and difficult access on the best of days. And while those folks could get to their claims on horseback or by mule, they had to haul their stuff up there as well, all sorts of mining equipment including shovels, picks, hammers, buckets, ore cars, rail... you get the picture.

You might think that there would be ample timber in the Colorado mountains for building structures, reinforcing tunnels, making railroad ties and the like. That's not really true, either. Much of the mining activity took place well above the timberline. In the photo above, this is clearly evident. It's mostly alpine tundra up there. It was a long way to the nearest timber and a lot of work to get it cut, milled and up to the claims.

And then there was the milling equipment. It took a lot of hardware to mill the ore into assayable product. Much of this hardware came from back east.

It was hauled to Colorado by railroad and then taken in pieces up to the claims.

I am amazed when I look at the ruins of the old mines and ghost towns. What I see there is real engineering. Those miners had to figure things out for themselves, how to get the stuff to the claim, how to transport ore from the claim to the mill, how to get output from the mill to the smelter. I see overhead cables that were part of aerial tramways that the

miners used to get buckets of ore across wide chasms.

There is one mill up there in a place called California Gulch, just north of the ghost mining town of Animas Forks, that is still largely intact (see photo). If you peek inside, you'll see that every board is numbered. The story is that the complete mill was built back east, then disassembled and shipped to the site. It was then reassembled on site using the numbered designations.



**Gold mill in California Gulch**

I'm amazed at these rather technologically advanced engineering feats from 120 years ago, and I have a lot of respect for the men behind them. Those were real engineers. They had no CAD/CAM programs to help them, no calculators or slide rules. In most cases, they built things on the fly without so much as a napkin sketch. And it worked.

If you ever get the chance, I highly recommend the trek into the San Juans to see this wonder.

### **Apocalypse Now?**

On August 15, the new terrestrial digital

radio rules were at long last published in the *Federal Register*. The industry has been waiting since March for this. The new rules that were enacted almost six months before will go into effect on September 14.

The digital radio rules contain quite a number of provisions, most of them operational in nature, but one of the provisions – AM nighttime digital authorization – is the one that seems to have the attention of a great many in our industry. Most of you have no doubt followed the arguments for and against in the trade press and online message boards.

Two distinct camps have emerged in the months since the rules were first enacted. The “pro” group is headed by WOR chief engineer Tom Ray. Whether or not he volunteered for the job, Tom’s positive outlook and enthusiastic support of the AM HD Radio platform has put him at the forefront of the group in favor of and looking forward to AM nighttime digital operation. This group maintains that the platform is effective and causes little or no additional interference. Of all people, Tom should know. WOR was involved in nighttime HD Radio tests early on.

The other group, the one that opposes AM nighttime digital operation, is by default headed by Canadian radio engineer Barry McLarnon. This group insists that AM nighttime digital transmission will be the undoing of the AM band. They seem to think that massive amounts of interference will be caused, wiping out the nighttime coverage areas of many stations, especially smaller stations. This group seems to believe that an “apocalypse” will occur on the September 14.

It has been interesting following some of the rhetoric. I saw one prediction that the night limit of WJR in Detroit would be raised to something like 14 mV/m from the interference caused by WABC. You may recall that some time ago, I had an email dialogue with the manager of WYSL in Avon, NY who was concerned that his nighttime coverage would be wiped out by adjacent-channel WBZ when the nighttime digital prohibition was lifted. This station, WYSL, was used as an example in one of the recent argument rounds.

As with most issues, the truth lies somewhere in between the two extremes, but I believe it is much closer to that of the Tom Ray camp than McLarnon’s version. I’ve done some study on the issue and made some calculations and found that in most cases, the night limit is not raised at all by the addition of adjacent-channel digital carriers.

Take the WYSL example. The station operates with 500 watts night on 1040 kHz, a U.S. clear channel. Its four-tower directional pattern puts a

main lobe north toward Rochester. The station has a 50% RSS night limit of 13.87 mV/m with that limit entirely set by co-channel class A station WHO in Des Moines, Iowa. WBZ operates with 50 kW on 1030 kHz, first adjacent to the WYSL frequency. That means that the WBZ’s digital carriers will be right in the audio passband of WYSL. I ran the numbers and found that WBZ currently produces a night limit of 6.25 mV/m at the WYSL site. RSS in the –28 dBc upper digital carriers as a co-channel signal and WBZ’s contribution at the WYSL site becomes 6.727 mV/m, a 7.6% increase. But because 6.727 is still less than 50% of the WHO limit of 13.87, it does not raise the limit. It does, however, increase the interference level slightly. But is it enough to make a real difference? I don’t think so.

The WYSL example is typical of what you’ll find on the AM band. In most cases, the added interference from the -28 dBc digital signals of adjacent channel stations is a drop in the bucket compared to the existing interference from co-channel stations.

There will certainly be exceptions. It seems to me that the skywave service areas of the class A stations will be considerably eroded. Those contours are not protected from adjacent-channel interference, and there are typically many first-adjacent channels within and around the contour. When those stations fire up their digital carriers, the interference they produce will appear as co-channel interference to the already weak skywave signals, making them impossible to listen to in many locations. Some might argue that this has been the case for a long time now anyway. I would tend to agree.

I mentioned WJR above. Someone in the naysayer camp predicted a night limit rise to 14 mV/m from digital interference from WABC in New York. I ran the numbers and came up with something like 1.1 mV/m. That’s nowhere near 14 mV/m, but it is more than twice the current 0.5 mV/m “limit” for WJR and it does represent real interference. But the truth is that the WJR 0.5 mV/m skywave contour is not listenable in most locations anyway because of atmospheric and manmade electrical noise plus interference from adjacent-channel stations. So again, the truth is somewhere in between the two extremes.

So, will the earth stop spinning on September 14? Will we all fly off into space? Will the AM band as we know it come crashing in? Hardly. In addition to the simple mathematics of the situation as illustrated above, the reality is that there are very few stations ready to go on the air with nighttime digital signals. There are less than 250 AM stations currently transmitting digital signals. Some

of those are daytimers. Those stations won't be firing up digital signals at night. Of the rest, many have different day and night antenna systems. A good number of those night antennas are not ready for digital operation. My guess is that less than half will be on the air with digital signals the night of September 14. If the percentage of the AM stations within our own company that are ready for nighttime digital operation holds true across the board, about 90 stations will be transmitting digital signals that night.

90 stations is a small enough number that we can evaluate the effect of the added interference. The next few months will be interesting as we see what the real effect of nighttime digital is. And if we have to alter the game plan a bit when we have more data, no doubt that is what we will do.

### **CBC Digital Nighttime**

As we roll into September, we are making preparations at several of our stations to commence nighttime HD Radio operations. At three locations, this process is simple: we just leave the digital on at sunset. KLZ, KKPZ and WDCD are all DA-U stations (operate with the same parameters day and night). That makes things easy.

We have some work to do at several other stations. WEXL in Detroit is directional day and non-directional at night. We had to construct and install a phase rotator network between the transmitter and phasor input when we first did the HD conversion to get the digital to work properly. Our sweep of the nighttime antenna input showed that it was acceptable

with a good orientation already, so our phase rotator network included an RF contactor to bypass the network at night. Tom Gardull has got to make sure this contactor is properly wired in and working and he has to set up the night parameters in the NE-IBOC before the 14<sup>th</sup>.

WLGZ in Rochester is another station that will need a bypass relay for nighttime digital operation. The parts have been shipped to Brian Cunningham and he is working on getting the change implemented. We expect good night digital performance from this station.

We have experimented with the 50 kW daytime transmitter at KLTT and found that it works just fine in the digital mode at the 1.4 kW night power. Ed may have some fine tuning to do yet and he will undoubtedly have to set up a different parameter set in the HD generator for nighttime operation. We suspect that much the same situation exists at KCBC. We'll be looking into that shortly.

We will likely try some of our low nighttime power stations in digital at night to see what kind of performance we get. I suspect that in most cases, it won't be worth operating the HD after dark, but we'll see. At all other stations, we will wait and see how things settle out. All of the remaining stations will require significant additional investment to make them work in digital at night. Before we make that investment, we'll see how the interference picture shapes up. Call me a "cautious optimist" in this regard.

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

**A Look Back**

Hello to all from Western New York! It was about this time five years ago that Cris, Nevin and I began talking about filling the needs of the engineering position for CBC's Western New York stations. At the time, I was working for S & B Communications, who was having moderate financial problems and facing closing the contract engineering business in a short matter of time. Since that time, a lot of water has passed under the bridge.

When I first started, I found our facilities in need of a lot of TLC. The first three months I spent cleaning the transmitter sites, inside and out, getting them up to an acceptable standard. Then a maintenance schedule was developed for all the studio locations and an assessment of the immediate needs was made with actions scheduled according to importance. It took a while, probably longer than I had first anticipated, but our Western New York stations are in the best shape they have been in a very long time.

As far as site improvements, the Buffalo station has received an emergency standby power generator, tower painting, new fencing at the tower site, a new automation system and countless other improvements to our equipment inventory. In Rochester, the WLGZ transmitter site has also received a new standby power generator along with new fencing and a new road into the property. Other site improvements are slated for the near future. At the Rochester studios, WRCI received new broadcast cabinets along with the production rooms. This year we purchased a portable generator for the studios along with various other support equipment. Crawford Broadcasting was the first in each of these markets to go on the air in HD-1 and HD-2 with separate programming for each of the HD-2 channels.

I do not know what the future holds, but I

know that I have had a blast the past five years. I pray that the good Lord sees fit to keep me here. Even after all the years I have been in radio engineering, I still look forward to going to work, although sometimes it can get frustrating when things do not go as planned or when everything happens at once. Where else could you have this much fun and get paid for it!



**Welcome!**

I would like to take the opportunity to welcome Gary Liebisch to the Nautel Sales team! Gary recently joined Nautel as their Northeast territory sales representative. I have known Gary for about eight years or so, and I know he will do a great job. Gary and I worked together several times while he was with Harris Corporation on some pretty big projects in Seattle and Baltimore.

Welcome aboard! I look forward to getting together soon and doing some reminiscing.

**WDCX – Buffalo**

On August 14<sup>th</sup>, I attended the Planning Board meeting for the discussion of allowing WDCX to go ahead with plans for installing a new prefabricated transmitter building at our Boston, New York transmitter site. All of our plans were conditionally approved by the 12-member board, provided we submitted a revised topographic and boundary survey showing the adjacent landowners' names and the current zoning of the property. Within a matter of a few days, the Planning Board chairman had this information in hand as requested. The Planning Board will meet again on August 28<sup>th</sup> and give their go ahead for this project. Once it has officially entered into record, we can pull the building permit and continue full force with this project.

Thermo Bond, the building manufacturer, had a delay in shipping the building, which was initially scheduled for August 10<sup>th</sup>. Doug Olson, our

sales representative from Thermo Bond, reported that they received the wrong service panel. Square D, the manufacturer, was out of stock of the correct breaker panel. According to Doug's best estimate, we should see the building arrive the week of September 17<sup>th</sup>.

Last month, immediately after submitting my column for publication, I noticed water leaking from the WDCX main coax. Don Boye of Western Tower and I were at the transmitter site discussing placement and fabrication of the ice bridge when I noticed a large wet spot immediately below the tower. As we had not had any rain recently, I had Don go up the tower to look for the source of the water. About ten feet up, Don discovered that the water was dripping out of a ground kit. He cut away the sealant and rotted ground strapping from the coax, and several cups of water poured out. As I have not seen any change in the transmitter's reflected power, I can safely assume that the water has been contained between the coax outer conductor and jacket. Don looked further up the tower, and found almost all ground kits had rotted and broken away from the tower. These were the old braided ground strap type of kits, which are no longer used because of this problem. The new ground kits are made of stranded copper wire encased in a plastic jacket, which keeps moisture away from the ground strapping. When Don installs the new ice bridge for the building, he will also replace all the ground kits on the main coax and inspect the auxiliary and STL feed lines for any damage.

While on the topic of the transmitter site, I have recently noticed that power has been slightly dropping on the main Continental transmitter. It appears that the 4CX15000A tube is getting weak, as I am able to vary output power by raising/lowering the filament voltage. This tube only has 5900 hours on it, well shy of the 8000 or so that it should get. I called the sales rep at Econco and ordered a new one. I will request an evaluation of the old tube to determine why the rebuild prematurely failed. Econco

stated that if they find the old tube to be defective, they will provide a credit towards the new rebuilt.

#### **WRCI / WLGZ – Rochester**

Last week at the WLGZ transmitter site, some vandals kicked in the gate of our emergency generator. One of our neighbors noticed the intruders riding around the site on 4-wheelers and promptly ran them off. Unfortunately, it was not before they had damaged the gate on the wooden generator fence. Site security has always been a problem there, and with close to 50 acres, it would be too costly to fence in the entire property to keep people out. As soon as I put up "No Trespassing" signs, they rip them down, and they always find a new way to get into the property. For several months prior to the latest incident, the Monroe County Sheriff's office was patrolling the area on a regular basis, which kept the intruders away. Recently, the deputy who was keeping an eye on the site for us was reassigned to a different job, so regular patrols have been sparse.

Another project I will have to complete soon is to get the AM HD ready for nighttime operation. Some minor adjustments will have to be made in the night CP network, and an RF switch will have to be installed to take the line stretcher network for the day pattern out of line, between the transmitter and input to the phasor cabinet. At some point I will need to get the line stretcher network mounted into a cabinet. I received a cabinet some time ago from John White, but it is too large to mount inside the building. I will check with Kintronics to see what they might have to offer for an enclosure.

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

### The Motown Update

By  
**Tom Gardull, CBRE**  
Chief Engineer, CBC–Detroit

I thought I had this, my next *Local Oscillator* column, all planned out. We were installing new T1 terminal equipment. I would have a glowing installation progress report about a new product. But we have run into snags and the equipment does not work. So that report will have to wait until next time.

We do have progress on returning the Song Title/Artist PAD to our HD-2. WMUZ had lost the HD-2 PAD after we installed the new Ibiqity importer software. That “upgrade” caused an incompatibility between NexGen and the BE importer. Ibiqity has sent BE a software patch to be used as a temporary bandage to convert TCP from the NexGen export page to the UDP that the new Ibiqity code in the IDi-20 Importer wants. BE will add this to a future update to their HD Dashboard control program. BE has been very helpful to solve this problem for us.

The Christian Radio Consortium is upgrading their satellite facilities. The majority of our programs are to switch to a new satellite receiver. Focus On the Family Group had been the lead agency when the Unity 4K conversion happened seven years ago. Ambassador is the lead agency this time. The new system is being referred to as Amb-OS. They will be sending a free new receiver to all participating stations. We will still have the satellite dish aimed at the same satellite. This new receiver will have some of the features that were discussed at the beginning of the Unity 4K era, such as ability to self-store programs and have Internet accessibility to allow verification of downloads. The new equipment will also have multiple AES audio outputs so we can be digital into the Wheatstone system without converters. The promotional information says we can

take feeds live, record them ourselves, or have the new receiver record and playback later on a schedule.

I am expecting our new receiver to arrive any day since the Amb-OS early plan was to have an operational system in place by this fall. Nothing here yet. Amb-OS says we will have to purchase any backup unit we might want. I have not heard which programmers will stay with the Unity 4K feed, so we will keep the old receivers at the ready. I have already installed a four-way L-band splitter so we

can run multiple receivers from the LNB. WMUZ will have both Unity 4000 receivers and an Amb-OS main. Hopefully we will get an Amb-OS backup unit since the majority of WRDT programming comes from the satellite.

We have managed to avoid most of the bad weather damage that has beset so much of the country. This past weekend’s weather caused some stress to our facilities. I got a call at midnight telling me WEXL was off after an evening of storms. We still had commercial power but the transmitter was overloading. I went out to check the ATU for damage when I saw a glint of light reflecting from one leg of this three pier self-supporting tower. I walked over to where the tower superstructure attaches to the concrete pedestal. There I found the basin formed by ceramic insulator gap filled with water, shorting the tower to ground. All three legs had the same water problem. I quickly scooped out enough water to clear all the metal and WEXL was back. There are supposed to be drain holes to prevent water buildup, but there was so much rain so fast and too much build up of crud clogging the tube to bleed away the water. WRDT lost power for an afternoon and its generator ran for six hours. But that’s nowhere near a KBRT level of use!



## News From The South

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

### Good News And Bad News:

I'd like to start off with some good news. In the previous issue, I said that the next generation of HD receivers would be better than the current ones. That may be happening more quickly than I thought it would, and that's very *good* news indeed.

When listening to 1260 AM (WYDE) on the older Kenwood receiver in my truck, I can travel north on I-65 and receive full stereo HD-R not quite to Fultondale, AL, about eight miles from the tower site. At that point, it starts dropping back to mono. As I continue north to Gardendale, no more than 12 miles from the tower site, the audio starts switching from mono HD-R to analog, and soon drops back to (very noisy) analog. I've talked to Ed Dulaney, who has a similar Kenwood receiver, and his experience has been about the same in Denver. Not very impressive.

Todd purchased a Directed HD-R receiver from Crutchfield a few months ago and I had a chance to listen to it the other day. This is an add-on type unit; Todd is using the built-in RF modulator to feed into his original car stereo. It sound great, and better yet, the range is at least twice that of my Kenwood. We were able to listen to 1260 AM in full stereo to at least 16 miles from the transmitter site, and to very clear-sounding mono all the way to my home north of Warrior – about 22 miles from the tower site, as the photon flies. Excellent!

The FM is just as good. I normally drop to analog on the road to my home when listening to WDJC with the Kenwood, but the Directed receiver in Todd's vehicle locked up solidly and never dropped the HD-R right up to my driveway. I was very impressed, and I plan to retire that Kenwood and to pick up one of these receivers for myself. If you're interested, go to the Crutchfield Web site and do a search on "Directed." As I write this, it's available for about \$180, and as far as I'm concerned, it's worth

every penny.

But to temper this good news, I have to report some bad news, too. Not only are the auto manufacturers dragging their feet on putting HD-R



receivers in new cars, the analog units that they're installing – especially on the lower-cost models – leave a lot to be desired. This past weekend, Sandy and I rented a car and embarked on a whirlwind trip through North and South Carolina. This was a Chevrolet Malibu. It was fun to drive, but the radio was terrible. The AM was so bad that I won't even discuss it; the FM wouldn't

do stereo unless the signal was practically melting the antenna. Even when it did receive full stereo, the audio was blurry and distorted-sounding. It basically ran in mono 90% of the time as I drove from Columbia, through Augusta and Atlanta and back to Birmingham on Sunday.

We're still in transition to digital, and we can't ignore our analog listeners. The Malibu is a small, lower-cost car, and I can easily see Mom and Pop buying one as Kid's first automobile. Now: imagine that you're that kid, listening to that cheesy FM radio. It sounds flat and lifeless, because it's in mono. Now he sticks in a CD with MP3s that he has burned on his computer ... and wow, it sounds so much better! See what I'm saying? He'll be left with a bad impression of radio, and it's not even our fault!

We can only hope that the auto manufacturers standardize on HD-R receivers in new cars; I'm hoping that by 2009, they'll be common... and if they're using receivers as good as that Todd's Directed unit, we'll be in good shape. My experience with that rental car causes my optimism to be cautious, but I'm optimistic nonetheless.

### Deja Vu All Over Again

It has been hot here, I mean, *really* hot – week after week of three-digit temperatures with very

high humidity. And of course, the 850 AM site in Tarrant decided to blow up during this heat wave, which was *deja vu* all over again for me. We rebuilt that site when we bought the station in 1999, and it was just as hot and humid. Same as now, we were in a drought then, and the ground was so hard that it took weeks to trench in the lines to the towers. The Ditch Witch kept breaking down. We'd go about 20 feet, then have to stop to reseal the chain, over and over – all in the scorching sun and sweltering humidity.

Given that the weather is once again hot and humid with drought conditions, maybe that transmitter site has been thinking of those good old days as well. Maybe it has just missed me and wanted me to spend most of the past few weeks out there. I reported in last month's *Oscillator* that we suffered some damage to the ATU at tower #1; not long after that issue came out, the problems really started. Both tower #1 and tower #4 lost the connectors into the ATUs to arcing; the line at tower #1 burned all the way down into the soil pipe and concrete pad under the ATU. We've made temporary repairs, but parts (and a backhoe – whimper) are on order for a more permanent fix.

One reason for our trouble, ironically, is that the XL60 is such a great transmitter. It could do yeoman's work as an RF welder; it shows no concern whatsoever for a reflected power of several thousand watts. One of our lower-powered towers in that array can go completely shorted and the transmitter probably won't even notice. If it does, it'll just lower the output power a bit until the reflected falls back under the "safe" limit – still more than enough juice to reduce the ATU at tower #1 to a smoking hole in the ground.

This is not a criticism. I know that there are some engineers who still don't trust solid state transmitters for high powered service, but I can assure you, Nautel has long since worked all the bugs out of that. Don't even think about using terms like "unreliable" in the same sentence with "XL60." That transmitter is a battleship. The Tarrant array has been hammered by lightning and we've suffered all sorts of failures in the phasor and ATUs, but that transmitter just yawns and keeps pouring out the watts. In seven years of service, I've had to replace a single PA fuse and a modulator module, and those were probably just routine failures. I have no complaints about the XL60; it's almost bulletproof.

But the very ruggedness of that transmitter and its insistence for staying on the air even if the phasor has caught on fire, mean that we've had to think of new ways to protect that array. We can't

depend on the XL60's VSWR cutback, and the remote control isn't quick enough. After a lot of discussion with Cris and Ed, we decided to install some fuses on the lower-powered towers. I have also constructed a very sensitive, quick-acting protection circuit that watches tower #1 for any reading out of tolerance; if it sees that, it immediately switches the transmitter to low power. We're keeping our fingers crossed, and if the protection circuit works as well as I hope, I'll post the schematic in a later issue.

### **New Blood in an Old Business**

The Society of Broadcast Engineers has made this a key theme of late: we need to attract new talent to our business. I support Cris's candidacy to the SBE board in the hopes that he can help address this problem. But as Sandy and I were cruising through NC and SC this past weekend, I had a lot of time to think. Naturally, going through my home stomping grounds brought back memories... not all of which were pleasant.

Before I continue, let me flatly state that our company compensates its engineers quite well. Crawford Broadcasting Company, from Mr. Crawford on down, genuinely appreciates what we do, and it's hard to put into words how much I appreciate that. I thank God for my job, and I'm not the only one who feels this way. Not long after I took the job in 1998, Art Reis sent me a "welcome aboard" email and said, "If you don't agree that we have the best boss in the business, you're crazy!" He's right.

But this is most manifestly not the case across the board. I haven't always worked for Crawford Broadcasting and I can tell you from long and sad experience that it's very difficult for most contract engineers to make a decent living. Unless you're lucky enough to score that "big gig" with a large market station that actually appreciates what you do – and is willing to pay what you're worth – you'll very likely get tired of it and move on to something else.

Here's one story (out of dozens) that illustrates the problem: In the early 90s, I received a call from the director of engineering for a large broadcast group, which shall remain nameless. He actually tried to beat me down to \$10 an hour(!) to do *extensive* repairs to a station that had been hammered by a hurricane. I told him that was unacceptable and quoted my actual rate (which was still quite reasonable). He then tried to trick me. He brought the station manager on line with us in a conference call and said, "Stephen here has agreed to \$10 an hour ..." Frankly, I was both angered and hurt by what he did. Did he honestly think that my work was worth no

more than that of a bag boy at the local Food Lion?

Another problem was collections. A station would call and scream, "We're off the air, help!" I'd go do a ton of work... and then wait *forever* to get paid. The station owner would either try to force me to reduce my bill, or would take months to pay in installments. I finally got tired of it and moved on to other things. I taught electronics to technicians at a large service center in Fayetteville, NC. I worked on my music and tinkered with amps and effects to make a little side money. I ran the family insurance agency and even did contract programming in C/C++.

But by the late 90s, hurricane Fran soured me on insurance and I started thinking about radio again. Maybe things had changed? Sandy put her foot down: the only way she'd agree would be if I'd take a full time job with a reputable large market broadcaster. I searched for months. Most broadcasters were still looking for someone who was willing to work 24 hours a day for as little money as possible. Finally, I talked to a station in Dallas, told them in advance the salary that I'd need to take the job and the manager invited me out for an interview. I drove all the way out there – and he offered about half of what I'd *clearly* told him I would need.

Here we go again, I thought. I drove back home very disheartened. I almost gave up. But then I responded to an ad that a fellow named Cris Alexander had run in one of the trades. And now you

know the rest of the story (and you know why I thank God for this job!).

Here's the point: My experience is by no means unique. So how are we going to bring in "new blood" if our industry isn't willing to pay those people at least as much as they can make driving a truck or running the deli at the local supermarket? A kid fresh out of technical school is going to look at his or her choices. Why should he (or she) become certified and work in our industry if he can make more money, with saner hours and less hassle, elsewhere?

So how could the SBE help? Among other things, the SBE should embark on a PR campaign directed at *broadcasters*. We apparently need to educate *them* about just how much a radio or television engineer has to know nowadays to do this job. We must make them understand that we're not just glorified technicians who tinker with transmitters between Magnavoxes at the local TV shop; we're valuable team members whose preventive maintenance will save them multiplied thousands of dollars in the long run.

Until we address these very real problems, we're going to have trouble attracting – and just as importantly, keeping – engineers. That's my opinion; take it for what it's worth, but again, it's based on hard, bitter experience. Until next time!

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### Gateway Adventures

By

**Rick Sewell, CBRE**

**Chief Engineer, CBC–St. Louis**

I am very much in favor of automating transmitter sites. Since we went to automating the two sites here in St. Louis three years ago, there has only been one incident where one of the stations did not make a pattern or power change on time. That is drastically different than when these operations were handled by human beings. It was not uncommon for me to call the operator to let them know they had forgot to make the change. And those were the times I knew about.

We had an anonymous person in St. Louis who made it his business to make sure AM radio

stations made their power or pattern changes on time. He would call the operators and then call me the next day to let me know they forgot to switch the station until he called a half hour later. My guess was that he was a DX listener and that stations not switching power or patterns interfered with his hobby of finding distant AM stations at night. That's why I used to worry about the call the day after a forgotten pattern or power change being placed to the FCC instead of me. I was very thankful when he called me to let me know about the problem. So although computers can have their reliability issues, so far the computer has



outperformed the human in this instance.

Another area where the computer has proven to be more effective is the communication of out-of-tolerance conditions. Too often in the past, I would find logs with readings that were out of legal limits. Instead of finding out immediately after the operator took the reading, they would write the readings down and go about their business without letting me know. The computer had been very effective in this area, sometimes more effective than I would like! There's nothing like a call to my cell phone from a computer in the middle of the night!

With the Burk Auto Pilot 3 (AP3) software that we use to automate our transmitter sites, I have been able to take this form of automation to an art. I know Ed Dulaney has done some very interesting things with the scripts he has written for AP3 in Denver. With all that being said, I have found one major drawback to the automation of transmitter sites... the dependency factor. The board operators have so come to depend on the transmitter site operations being handled by the computer that they hardly think about them at all unless we go off the air.

With the high amount of turnover in these positions, we are now in our second and third generation of board operators who have never really had to worry about pattern and power changes. Even the operators who were here before that time seem to have forgotten a good deal of what they used to know, proving the old adage, "If you don't use it you lose it."

I became quite alarmed about the problem when I found operators who did not know how to turn the transmitter back on after a storm outage. Upon further investigation, it seems this was not limited to just a few operators. Even those who were training the board operators have had limitations on what they understood. Indeed we had a case of the blind leading the blind.

It has become obvious to me that I had to step in and take matters into my own hands. Despite the fact that we have been told that the training in these important areas has taken place, it is plain to me that it hasn't been effective. In the coming weeks I will be setting up re-training sessions for the board operators. I will start with the basics of transmitter operations and have them relearn what they should already know.

The computer has made it too easy for them. Although I am not going to stop the computer because it is essential for the times we have walk-away operations, I am going to ask the operators to begin detailed logging of the transmitter site operations for a while. Even those these are logged by the computer, requiring the operators to do them again will force them to familiarize themselves with the operations. I am also going to conduct impromptu inspections of the board operators to make sure they know how to at least do the basics. I am hoping that by the end of the month we will have operators who are not totally dependant on the computer.

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### Valley Notes

By  
Steve Minshall  
Chief Engineer, KCBC

The transmitter at KCBC, a Nautel ND-50, has been very reliable over the years. But nothing lasts forever, and such is the case with the ND-50. I received a call one morning recently. The station was off the air. The ND-50 refused to put out power and was tripping the main breaker of cabinet two.

Upon arrival at the station, I warmed up the old RCA Amphiphase and put it on the air. I tried the cabinet two breaker

myself and not only did it trip but so did the 400 amp breaker on the wall! After 27 years of this stuff, I know the symptoms of shorted rectifiers and this was it.

Working on the rectifiers in a solid-state 50-kilowatt transmitter is more like working on a car than electronics. The smallest wrench required was a 7/16" and the largest was a 1-1/8". With the rectifier assembly removed from the



transmitter and the leads from the rectifiers separated, I found four shorted and two open diodes. They were all the “straight” polarity (not the “R” type) and I only had three spares. The replacements arrived the next day, the assembly was rebuilt and the Nautel was back on the air.

I like the Nautel power supply because it is simple. The parts count is low: a circuit breaker, transformer, diodes, choke, and capacitors. This makes it reliable and easy to fix.

Over the years I have had a number of transmitter rectifier failures. One of the most frustrating was in the KCBC Ampliphase transmitter.

At the time it was the only full-power rig in the building, so when it went off it was a crisis. The power supply for the beast consists of three “pole-pig” style transformers that feed 12 kilovolts to the rectifier assembly. The filtered DC output of the power supply is at 16 kilovolts. When something goes wrong in the rectifier cabinet, it is a significant event!

Many times I have stood in front of the rectifier cabinet and turned the plate switch only to be assaulted by a horrendous BANG and a brilliant white flash. It seems the rectifiers in the rig ran flawlessly from the early sixties until about 1991. Just as luck would have it, I signed on with the station in 1990. The station was under a different ownership then and money was tight, so we scrounged “used-but-good” rectifiers from another Ampliphase and replaced the bad ones as needed.

We soon ran low on replacements and had no choice but to replace the entire rectifier assembly.

We purchased a custom built assembly from the Peter W. Dahl Company and this put an end to our failures.

The most bizarre power supply I have ever seen belongs to the RCA BTA-5H. This thing used a “Scott-wound” transformer that produced a four phase secondary from a three phase primary. The rectifier system consisted of four big thyatron tubes. The only neat thing about this power supply was that you could vary the output voltage continuously from 0 to full by use a variac connected to the grids of the thyratrons. Overload conditions in the transmitter would cut-off the thyratrons providing a very quick removal of voltage. This was probably pretty slick in those days, but it sure did over-complicate things!

Once we were into the sold-state era, the thyatron scheme raised its ugly head again in the form of a whole series of transmitters using SCRs. These work fairly well but are often the source of mysterious breaker trips, transformer noise,

generators going crazy and broadband radio interference to sensitive hill-top neighbors. I have never been a big fan of SCRs in transmitter power supplies and I really don’t see the need.

I have one transmitter that has, I think, 48 SCRs used as switches and rectifiers. The SCRs switch secondary taps on the transformer and are controlled by a microprocessor. This is another example of over-complication in my opinion.

The transmitter power supply that wins my award for best design belongs to the Harris MW-50. The output voltage was 25,000 volts at several amps. As far as I know the MW-50 I took care of has never had a power supply failure. The power supply consists of a transformer, rectifiers, and one capacitor. That is pretty simple. My only objection is that it uses a step-start circuit, which is overkill; inrush current could have been handled much more simply. Not that I should complain about that since it was built robustly enough that it never failed.

The MW-50 power supply was designed using a transformer with a wye and a delta secondary. The result is a transformer with six secondary connections, each shifted by 60 degrees. When these six transformer leads are connected to a specially wired rectifier system the result is a DC output with a one percent ripple at 720 HZ. That is easy to filter! I have never seen another radio transmitter with this “12 phase” rectifier, but they are common with UHF television klystron power supplies. The 12-phase system is easy on rectifier diodes and greatly simplifies the filtering. I don’t understand why this concept has not been further exploited since it is so easy and inexpensive to implement.

Now I have a couple of AM transmitters that don’t have a power transformer at all. The line voltage is rectified and filtered directly from the AC mains. There is no isolation and most of the circuitry “floats” in the cabinet. This is reminiscent of the old 5-tube radios. I don’t like this concept but it does work and as long as it is reliable I will be relatively happy with it.

I have a number of transmitters that use switching power supplies. These supplies are small, light, and efficient. They are not easy to fix. Often the best way to handle a failure is to exchange the power supply, and that is not cheap. On the positive side, they are used in quantity so if one fails, the transmitter will remain on the air. Time will tell if these switching power supplies are a blessing or a curse.

## Catalina Tales

By  
Bill Agresta  
Chief Engineer, KBRT

Greetings from Santa Catalina Island! It's been about five months since my last column and as you already know, much has happened since then. I'm sure you have all been reading Cris's articles both here and elsewhere regarding the ongoing recovery efforts since the fire here on Catalina Island.

Things always seem to move like molasses here on the island, but since the fire, they are slower than ever. On the positive side, the progress we are making is good solid progress. Our new electrical grid is more stable and reliable than ever and our main Nautel XL12 transmitter is happier than ever with good, stable voltage.

Though Edison was pretty quick to rebuild the power grid, AT&T has not done much to bring the phone lines back to a reliable state. We are currently running on a "Mickey-Mouse" setup, routing our lines all over the place on very old trunk lines until it finally arrives here at the plant. Our phones are back but the lines are pretty dirty and I cannot get a POTS codec to lock over them to save my life. Our T1 is also back working again, but again, it's nothing close to what we had before the fire. In fact, it has proved to be so unreliable that we are still running our STL over a satellite link. The cleanup effort here, both inside and outside the plant, is pretty overwhelming all by itself.

The old *island factor* has gone to work in turbo mode since the fire, bringing us everything from swarms of bugs to bizarre and unexpected equipment malfunctions. I had a weird week in late August that you won't believe... or maybe you will. Read on.

I tried to get off the island for a single day only to get a 6 AM phone call while on the mainland that the studio could not turn on the transmitter. I called my island backup person who had worked all night as a harbor patrolman and had just gone to

sleep. He got to the plant, rebooted the exciter and we were back on-air.



The following morning, the exciter did it again and wanted to play hardball and not reboot (it finally rebooted on the third try). I planned to use our ND10 backup transmitter for the next day (Saturday) so I could remove the HD-exciter from the rack and see what the problem was. So Saturday I woke-up, turned on the ND10 and all was well. I removed the HD-exciter

and resealed all the cards and it seemed to boot up fine.

Just then, I heard my daughter screaming in the shower that sewage was squirting out of the drain and all over her. I calmed her down and took her to a hotel in town where she could shower and get dressed. I returned to the plant and as I pulled into the driveway, the station went off the air. I found that the ND10 "A" exciter had failed, so I switched to the "B" exciter and back on the air we went. Then I got to go out to the septic tank and do some digging. I got that fixed (tree roots in the drain pipe) and went back into the plant to find a large puddle of water flowing into our ND10 from the air conditioner! I quickly vacuumed up the water with the shop-vac and tore apart the air-conditioner. I was able to mouse it to get us by, but it will need to be replaced (the condensate drain pan has rusted through).

I went to bed about 2 AM only to be wakened the following morning first by the dog barking frantically and then by my daughter telling me there was a crowd of people and several buses in our driveway. Half asleep, I'm thinking to myself, "What am I about to find? Should I bring a rifle? A baseball bat? Should I just start running and never look back?" Well, I decided to go out, camera in hand, only to find that the Conservancy had given permission for a Pussycat Dolls video to be shot in our driveway! After an entire day of half-dressed girls

on Ducati race bikes racing up and down our driveway, I had to wonder if the next thing I would be dealing with is space aliens landing in our tower field!

I owe many thanks to a small group of friends that without their help and immediate response, KBRT nor I and my family would have come through this situation as well as we did. Joel Saxburg and his wife Judy have been there not only for KBRT from a contact engineering standpoint but also have provided tremendous emotional and

spiritual support for my children and me. Joel has made several trips to lend me a hand since the fire and has experienced quite a bit of the *island factor* for himself. He is always one to keep a level head and a positive attitude, two attributes that are very needed in this wacky atmosphere! Being a single dad with a 16 year old daughter and a 14 year old son who both home school, I always look forward to some time with those godly men and women who can offer a mentoring friendship to them. The Christian body here on the island is not a very strong one so friendships like these are invaluable!

I also wish to thank Alan Guthrie from EMF Broadcasting who, along with an assistant, came to the island to relieve me for a couple days. They hung out with my son and got quite a few things done at the plant, including getting us a nice new Ku-band satellite dish (now our "STL dish") and mounting it as well as finding some time for doing some fun stuff

with my son. Again, good, strong, godly people like this are the greatest blessing I could ask for in a time like this.

Burt Wiener has also been a great blessing to us. He and his wife have done several remote broadcasts from the island and we have had some good times together. After the fire, when we found ourselves in a desperate situation trying to reestablish an STL, Burt came though for us with a temporary dish and technical support. I look forward to doing dinner with him and his wonderful wife on the

mainland soon. Those two are always fun to be around!

Then there is KFI CE Tony Dinkel, a gentleman known locally as "Mr. Satellite," who came along with Joel to help get the satellite STL up and running during the early stages of this whole thing. I was in pretty bad shape during those first couple of weeks after the fire, having three broken ribs. I could hardly turn a screwdriver. People also told me that I looked like a walking scab since I was covered from

head to toe with poison oak! About all I was good for was to point! As we were all completely overwhelmed, friends like this were the key to getting us back on the air. We simply could not have done it without them!

I am still pretty buried with work here, so I'm cutting this a bit short. As you can imagine, I have plenty of stories to write about, so I'll be back next month with lots of mind-boggling news and views from the bizarre little place we call Santa Catalina Island!



**Pussycat Dolls Video Shoot Taking Place in the KBRT Driveway**

## The Chicago Chronicles

By

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

### **Congrats!**

This month, it's first things first: Congratulations to our own Brian Bonds on attaining his SBE Certified Broadcast Network (CBNT) certification. That's two certifications for him. Also, James Kelly has obtained his Certified Broadcast Technician (CBT) certification by means of license. He's also known around here as WB9SRS and he passed his General Class amateur radio license exam in the spring. James and our intrepid Senior Engineer Mack Friday are now working on their CBNTs as they find the time, not an easy feat around here!

And on a somewhat related issue, I hope that you members of the SBE got your official ballots for SBE officers and board members. Our own Cris Alexander is running for the board, and we as an industry need his input and energy in that capacity. I hope you voted for him and I hope he gets elected. Having said that, I have to muse, "As if he didn't have enough to do....."

### **Inventory – Again!**

August is considered to be the time of the dog days of summer, in both baseball and in Crawford Broadcasting Company's engineering department. It never fails: Inventory. Less gets done in both development and repair because of it, and after about eight of these, I never get tired of tiring of it. It's always the same procedure: Get a lot of copies of the inventory list sorted by property tag number, item and location, and hand them out to the crew. Then enjoy the biggest Easter Egg Hunt of the year. In one pass, the average 'find' rate is somewhere between sixty and seventy percent. Then the tedium begins. Where are the rest of the items? When you have somewhere around 800-900 items to start with, that's a lot of items you haven't found on the first go-round. Worse, there are items – about twenty or thirty – which you find that don't have

property tags on them. How'd that happen? We have a standing rule around here that no equipment gets put into service until it's tagged. Grr! Well, nobody's perfect. You know, I never hear that old, tired saw more than I do during inventory time.

Well, once the list has been reduced down to those items still missing, the list is regenerated with all the items not yet found... like two of our consoles in control rooms two and three. Brother! The list whittles down. This time, all the areas are rechecked with different folks to do the various rooms, just to have a different set

of eyes everywhere. More surprises are found. A few things which were on the 'missing' list last year, and maybe the year before, turn up. Well, well, there's hope after all. Then we have to expand the hunt to include people's offices. It's really shocking what you'll find in some of them. How'd those items get there? We didn't authorize that!

In the midst of this, the fellow on our staff who's in charge of the tabulation of our data got rear-ended on the freeway going home and his car was totaled. He's out for a few days until he can get different transportation. A couple of things we've been looking for to complete a couple of old projects get found. Several items which needed repair but were stored before they left are found and sent out. We're down now to well less than a hundred things left to find, and about twenty-five items needing tags, but we're going to wrap it up well before deadline and get it into corporate. The big thing which keeps me going on this year after year is the fact that this procedure is important for the company, and if I can do anything to help this place's bottom line, I will. No kidding.

### **AP3**

Inventory hasn't kept us from pursuing another project which has become a real joy in my life as a CE: getting the various aspects of remote control and monitoring of our stations available on



the Internet for near-VPN-style monitoring from home. Within the Crawford family, we here in Chicago are definitely not the first ones to do this. Birmingham and Denver at least and many of the other markets I'm sure have been doing this for awhile.

The issue has been in getting a clear block of time to do the job right. (Aside: I just picked up one of those beer can insulators at a local liquor store where I get my occasional lottery tickets, on which the inscription reads, "I'm sorry, but I'll just drop everything I'm doing just to solve your problem!" Believe me, it fits here.)

Like most of you other CE's out there who have done this, we're using the Burk AutoPilot version 3 package (hereafter referred to as AP3) and the VNC Server/Viewer combo. I've learned that there's a lot of programming and set up time which one can devote to this. In fact, one could actually make a career out of programming this system, including at home, where you should be paying attention to the family instead. But there comes a point at which you could liken the experience to playing some Internet or on-board video games. It becomes, shall we say, both addictive and time-burning, so, if you've yet to get going with this kind of project, take my advice and plan it all in advance!

If you're running multiple sites, one thing I've learned to do is to try to make sure that all the sites are configured as closely alike as possible for such things as which channels get the assignments for transmitters on/off, power raise and lower and tower light monitoring. In and of itself, doing that takes a good bit of time at the sites. Then, when using the software, set up the readings and virtual button labels to read as clearly and similarly as possible. In short, strive for the best in human interfacing. Remember, when you're done tinkering with the system, your board operators are going to have to use it, and that means that you're going to want to have a short learning curve to understanding the system.

With the version we have, there are several small but annoying 'bugs' in the AP3 system. One that I'm particularly fond of is that it is impossible to program channel 1's labeling in the 'compact' mode, one of three modes (standard and 'bar graph' being the other two) available in the software. The 'standard' mode is frankly the most bug-free, and may be the most intuitive, but in my experience the bar graph mode is a mess; it's really buggy, I would avoid that mode if at all possible. All those modes are selected within programming, and since you as a CE have the most control over that, you pick the mode which best suits your needs.

As expected, the AP3 has both a 'programmer's' mode and a 'users' mode, with separate passwords and privileges for each. We set up only the two user levels, frankly, to avoid complication. However, if we have to have a different user setup for each up for each user (ala the Prophet/RCS system), then at least we can do it.

The one thing which the AP3 has done for me is to help me to better monitor everything going on at all my sites, at once, at a glance. It sure beats calling all the sites on the phone. Instead of calling me with a message, I'm having the AP3 text-message me with discrepancy reports, a much better way to get hold of me at 3 AM, for instance, without waking up my wife. Another area of concern has been transmitter room temperatures. With at least one air conditioning unit thinking about failing every other week, it's nice to be able to check that data at least once a day without having to go out to the site and investigate. With four sites as far flung as eighty-five miles, that's a lot of gas being saved.

Do I like the product? Does it need to be improved? Absolutely to both. Worth the cost? Yes, especially when Burk gets the bugs worked out. Now, when can we expect that to happen? Don't ask, it'll be eventually, I'm sure, but it didn't detract enough from the value of AP3 to prevent me from getting it now.

#### **HD-100**

HD rant: Well, actually there isn't one this month, but will a review of the Radiosophy HD-100 radio do? Good, then. Here it is.

Actually, I'll have to admit, this is my second re-write of this review, and my second Radiosophy radio. I wrote it, and then decided to let Radiosophy know what I felt about their product via email on their web site and that I had written a review of it. Talk about getting their attention! The call came to my cell phone less than two days later, and the nice lady at the other end told me that I had received a 'version six' radio', which was, admittedly, buggy. They were being collected as fast as they could find them, over 3000 of them, and being sent back for re-work, she said. Just as she promised, within a few days, the new, version seven radio was at my doorstep and the version six was on its way back to the factory in China for 're-education'. Better them than me.

Having said all that, the Radiosophy HD-100 is something of a study in contradictions. In a world where the main selling point of HD-R is its sound quality, here we have a radio which receives HD-R reasonably well but without the sound quality



because the RF performance varies from radio to radio within a particular design. Further, the infamous 'blending' phenomenon is almost but not quite non-existent in the HD-100. The stereo and the noise in a low-signal area are both there. The switch threshold is just a little too forgiving. And there is no manual mono switch to make that noise go away.

As expected, where I live some 44 miles southwest of the Loop, HD radio reception from the Chicago FM's is hard to come by, only one local Joliet station has it and the only two Chicago stations which are powerful enough to possibly get through to my home with a viable HD signal are both yet to become digital stations. Don't get me started there, but at least one of them, the 100 kilowatt monster signal which is Moody Bible's WMBI-FM, is working on it with a fund-raising drive to defray the costs. Their AM is also looking to become HD as well. I'll let you know when that FM signal is up and running. It should be a model for HD coverage in this market.

And that brings me to my final point on the HD-100. To my mind, this radio is a commentary on what HD Radio consumer-grade technology is doing as opposed to what it should be doing. This radio should have been on the market a couple of years ago as a jump start for public sector acceptance, much the

same as what Mad Man Muntz did for television fifty-plus years ago. If that had happened, public awareness and acceptance of HD Radio might have happened faster.

As of now, however, the public's choices for HD Radio receivers are either expensive or non-existent (the portable walkman-type radio comes to mind). HD radio, in other words, is a technology looking for the ideal chip-set-inexpensive, power-sipping, and performance-and-feature laden. As my father used to tell my sister and me, "Whatever you want, you can have it either cheap, fast, or right, or rather, any two of the three, but not all three at once." Well, fine, we're not getting our wish in a timely manner or it would have been here a year ago or more. So, let's just say that it's time to get it both right and cheap and, since we've waited all this time already, soon. Until then, the Radiosphy HD-100 is going to have to do as a fair example of an entry-level HD Radio receiver, imperfect though it is. All I hope is that the public doesn't get the impression that the HD-100 is what HD Radio is all about. They've got to learn that there is better HD Radio out there (read Stephen Poole's column last month) or there will be perception problems with John Q. Public down the road.

See you next month. Blessings!

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### The Portland Report

By

**John White, CBRE**

**Chief Engineer, CBC-Portland**

It's pet peeve time. One of my pet peeves is the use (or sometimes misuse) of technology to solve a nonexistent problem. I think this all ties in with how we do our jobs as individuals and how we as an industry serve our clients – our listeners. Recently I had a demonstration of the misapplication of technology. First, some background..

Some years ago, I worked with a project called Automatic Parts Catalog, or "APC" for short. Prior to that project, every vehicle make and model had a yellow page sized book of parts diagrams and corresponding part numbers. The APC

project put all those shelves and shelves of parts books on computer. Using an array of 26 hard drives, the hardware was pushed the limits of the available technology.

APC is an example of the proper use of technology. The product meshed with what service mechanics and parts counter personnel do everyday. No more lost books, torn pages and part number transcription errors. The significant point is that the technology was serving the user, customer, or client.

Most homes today are infested with rodents of various varieties: optical, 2-button and 3-button.



The modern computer could not function without the mouse. As it turns out, that's really quite wrong. More about that later.

The personal experience that got me thinking about this subject came in the form of some new gear I received. Inside the box was the gear and a CD. What am I supposed to do with this? What's on the CD, I wondered? Can't read it. Try another computer, and another.

Finally, I determined it did contain a large PDF. Now the problem was, how do I get it back to *my* computer? That took finding a computer that supported a memory stick and could read the CD.

Printing it was another experience. A print attempt resulted in my computer grinding away, minute after minute. Finally, after an extended period, I got the message, "Out of disk space." It chewed up nearly a gig of space. In the end, I printed it 10 pages at a time.

Yes, I know that the industry standard is the "paperless office." Everyone does it that way. But is that really a good choice? Very often, we in the broadcast industry are working in an 8x10 building out in the middle of a field. That's nothing like a computer lab or living room. Does technology serve us well? Very often the answer is no.

I did say I would talk more about the use of a mouse. Quite some years ago, I had the opportunity to work on a business messaging product. At that time the Radio Shack computer had just been

announced. The project director for the product had transferred in from Xerox and the product licensed and implemented the Xerox graphical user interface. To the right on the keyboard was a keypad of arrows, page, home, next, end, open, select and close. These keys moved object selection around the screen.

One day I overheard the project director's answer to the question, "Why not use a mouse?" The short answer was, "We don't draw messages." (Xerox used the mouse to draw.)

The long answer is this. Visualize entering new items in the yearly inventory we just completed. The process goes like this: Type in the name, reach for the mouse – point and click the next field, type in the model, reach for the mouse – point and click the next field, serial number, reach for the mouse – point and click the next field. The process involves constantly reaching between the keyboard and the mouse.

Now visualize using only the keyboard and no mouse. NAME, arrow key, MODEL, arrow key, SERIAL NO, arrow key, LOCATION, enter, next item. Much less work.

The radio broadcast industry has been given an excellent new technology, HD Radio. It's really up to us to control how we use that technology. Will we make it a toy or will we use it to serve our listeners? That's really how I think of the listener experience, thinking about and considering what we do from the perspective of our listeners.

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

**Troubleshooting**

Last month, I was reminiscing about how much simpler it was to troubleshoot problems in the “old days!” Transmitter problems could usually be traced to a soft tube, STL problems were almost always related to the mixer in the Moseley receiver, and audio level discrepancies could be remedied with a cotton swab and some alcohol!

Sure, there were some problems that took a few extra brain cells to track down. I remembered one problem with an ITC cart deck that took me a week to track down. The doggone thing would just stop for no apparent reason, and it happened on only two different carts! Turned out that the music bed contained just the right frequency to trip the stop-tone decoder in the deck, and the heads were in such bad shape that it “listened” to the audio channel for those tones. Ah, the wonders of yesteryear!

Nowadays, troubleshooting is a lot more difficult. There are many more subsystems in an average radio station today. Just last month we were having issues with our STL at KLZ. The signal was perfect, yet the Intraplex would “digiburp” on a pretty regular basis. Finally, I ran WireShark (<http://www.wireshark.org>) on the network looking for problems. What I discovered was that the network traffic from the transmitter to the studio was really ugly! This is a steady audio stream and should be nearly a straight line. Yet it had more bumps than the Rocky Mountains.

After a couple of days of trying everything we could think of, including shutting off the KLZ transmitter to see if we were getting RFI in the link, I had almost given up hope. I had Amanda make a crossover cable to plug the Intraplex at the transmitter directly into the Canopy system, bypassing the switch completely. Wonder of wonders, the stream was virtually perfect.

So I had her plug it back into the switch. With nothing else in the switch active, the traffic was

still perfect. Okay, so that ruled out the switch. I had her start plugging other things back in one-by-one. Nothing there seemed to make even the slightest bump to the UDP packets being exchanged between the Intraplex units.

However, about five minutes later, the grunge was back. Now I was perplexed. Amanda had run out to get some parts from the hardware store, so I waited for her to return to the transmitter site. When she arrived, I had her unplug things. When she got to the DigiOne SP for the Burk, the stream smoothed out again. So I had her plug it back in. The stream stayed smooth. That’s when I

remembered that the Burk waits about five minutes to reconnect to a site that had been disconnected. I went over to the AutoPilot computer and manually reconnected to the site. When I did... you guessed it!

Now we knew what was causing the problem, we just didn’t know why it was happening. The DigiOne SP uses TCP for connection between sites while the Intraplex sends out UDP packets. Also, the Canopy operates as a Layer 2 bridge device, just like the switch, so it could care less what sort of packets go through it. But, for some reason, the Digi was causing the Intraplex to send out garbage.

What I finally ended up trying was configuring the Digi to be a 100Mbit/Full-Duplex device. It defaults to auto-sensing the network connection. I’ve run into this sort of problem before where a device that should automatically configure itself ends up having issues. This seemed to lessen the problem by an order of magnitude! There was still a little hash on the UDP stream, but it was a lot less than before.

And it’s a good thing that this fixed the problem, as I was about to hand Amanda a cotton swab and some alcohol and have her climb the tower and clean the heads on the Canopy STL!

**Flat Panel Monitors**

Am I the only one that has problems with



flat panel monitors dying within a few months of their warranty expiring? This past year, I've seen three monitors go south 14 - 16 months after purchase. Our original IBM monitors that were purchased with the NexGen system lasted almost five years.

Most of the monitor problems can be traced down to faulty power supplies. But these buggers are potted, and therefore impossible to repair. And a replacement power supply is about 75% of the cost of a new monitor. It just doesn't make sense to buy a new power supply when a new monitor could be purchased for just a little more money.

A friend of mine who works for Clear Channel has noticed the same issue. He uses the Dell monitors and has seen more than his fair share of those take an early retirement. The other thing I've discovered is that it doesn't seem to matter whether I buy a "high-end" monitor, like ViewSonic, or one of the good quality bargain monitors like Envision. None of them last as long as they should.

This is, unfortunately, a side effect of "globalization." Monitors and other computer parts are built in countries that have much lower standards than the United States. But it's not just computer parts that are affected. Automobiles, power tools and many other goods are built to much lower tolerances because manufacturers want to save a few dollars. I know of a couple of people that have vehicles that were made in the USA back in the 1970's that are still running strong with 400,000 miles or more on them! And I'm hoping that my Kia will manage to get to 100,000 miles before it dies.

I suppose my whole point of this section is to just gripe about the sad state of affairs in this country. We've come to expect things to be designed and built poorly, and therefore we are no longer surprised when a monitor fails after a little more than a year of use. Do you think that it's time we set our expectations a little higher?

### Annual EPM

Last month, Amanda and I completed our annual EPM for all four Denver stations. And, as expected, all the stations passed with flying colors!

It was a very opportune time for these measurements, as *Radio World* had just run an article about HD Radio. It was an excellent article, with the exception of the last few paragraphs. There was yet another supposed engineer complaining that HD Radio signals cause stations to exceed the NRSC-2 mask.

*What rock do these people live under?* I've been running my HD carriers for three successive

EPM's and I've yet to see any of my stations exceed the mask. In fact, on the nighttime signals (which currently do not have an HD Radio capability) I see *more* splatter and noise in the sidebands. Imagine that, there is more interference if you *are not* running an HD carrier! The reason for that is because the filter for the HD sidebands is truly a brick wall. Once the signal reaches a certain frequency it simply disappears. That's not the case with random analog signals.

Later this month, we'll see nighttime HD Radio broadcasting begin. Two of my stations, KLZ (560) and KLTT (670), will be running their NE-IBOC exciters at night. KLVZ (810) will need an NE-IBOC exciter at the night site before it will be able to run the HD carriers. And KLDC (1220), well, I'm still not sure if HD Radio is even feasible for their signal at night, since they run a mere twelve watts!

I have a feeling that the rock dwellers will be screaming to high heaven when the broadcasting begins. It's just too bad that their rock is built upon quicksand.

### A Windows Rant

I never cease to be amazed at the various bugs within Microsoft Windows! Every time I think I've seen all the possibilities, another bug jumps to the surface.

The latest one was with the Burk AutoPilot computer. When I ran AutoPilot under Windows 2000, the system would occasionally go berserk. The mouse cursor would dance all over the screen and cause windows to move, minimize, reappear, and change size. Then, to make things interesting, menus would open and close, the desktop icons would shuffle all around, and on one occasion Windows actually shut down all by itself!

The problem is caused by Microsoft's incredible lack of forethought in planning their "plug-and-play" operating system. They assume that any device plugged into a serial port is a mouse! Therefore, when the system boots up and sees activity on the serial port, it will install a generic Microsoft mouse driver.

Of course if that data that arrives is from one of the Burk ARC-16 units, the serial data causes the phenomena detailed above. This is so absurd! I could understand the problem happening in the days of Windows 98 and, to a lesser extent, Windows 2000. But now it's happening under Windows XP as well!

I used to be able to fix the problem easily in the past. Simply edit the registry key that "enumerated" the serial ports and tell it to skip the

enumeration. All it took was a simple addition of a variable to the registry. Apparently Windows XP ignores that data! I've entered it into every instance of the ARC-16 ports and the mouse still goes haywire!

Another fix was to add the switch "/noserialmice" to the C:\boot.ini file. I guess that one doesn't work either. I tried that and I still get the same results.

Finally, to try and find a more permanent fix, I deleted the serial mouse driver from the Windows installation. That didn't help either, as it simply found a way to reinstall it.

When was the last time you saw someone using a serial mouse? The very fact that Microsoft still has this "feature" in its operating system is indicative of the backwards thinking within the company! I'd be willing to bet that Microsoft would be one of the HD Radio naysayers if they were involved in broadcasting!

So if anyone has found a more permanent fix for this problem, I'd love to hear about it. For now, we're back to operating the Burk the old fashioned way – by dialing up the remote and issuing the commands through the phone.

Until next month... press on!

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

**Spam**

Spam. The mere utterance of the word can turn a computer user's stomach in an instant. No, I'm not talking about canned meat, although that can bring about the same reaction in many people. The fact is that email spam is a nuisance and has become the one thing that the majority of the world's email-using population can agree on unanimously. Recent statistics show 90 billion spam messages are sent per day. Yes, that's billion with a "B," and that's per day with a "holy cow." Statistics also show that 89% of email messages received are spam emails. Just one look at one day's worth of messages in my inbox and I can easily attest to that.

Spam messages advertise a variety of products and services, some innocent, others not so innocent, anything from prescription drugs to mortgages; software products to dating sites. People must obviously be responding to these calls to action, making spamming profitable. In fact, estimates show approximately 8% of spam targets have opened their wallets to purchase the advertised items. Although 8% may not seem like a large percentage, it's more than enough to keep spammers in business.

In response to this digital plague, the CAN-SPAM Act (Controlling the Assault of Non-Solicited Pornography And Marketing) was signed into law in 2003. Although it did little to stop or even slow the volume of spam, it did put in place some requirements for these emails. One is the "opt out" link that is required in all spam messages. In reality, clicking on this link only confirms your email address as valid to the spammers and opens the flood gates to more messages. My personal suggestion is to simply delete the message.

Other requirements set in place include clear labeling of adult-oriented messages, legitimate "from" addresses and a valid subject line. Spam messages that do not comply with these requirements are considered illegal...but only in the United States. The US does lead the world in spam messages sent,

but this law does little to bridle the messages sent from China, Russia and other countries.

Ultimately, the responsibility of filtering or blocking these messages comes down to the

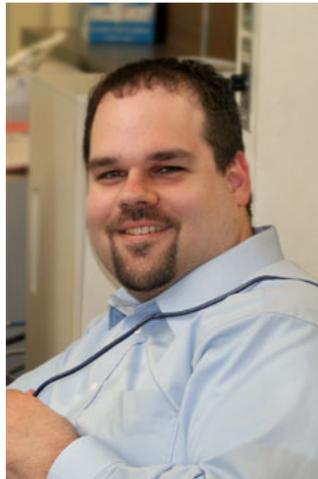
individual email user. With a variety of hardware and software based products available on the market, it comes down to personal preference and the each product's effectiveness. I personally use a software filter that moves all spam messages to a specific folder to be deleted later. There are other options that filter out the messages before it even reaches your email client.

Fighting spam has become a virtual arms race. As spam-fighting software gets "smarter," the spammers use new ways of getting their messages through our defenses. Last year, spammers realized that they could get

through text filters by using graphics instead. Spammers have also become creative in their spelling of related products or keywords. As an example, the word email can be typed as "ema11," "em@il," "emaile" or a variety of other ways to get through filters set in place.

On the more sinister side, spam goes further than simply advertising a product. Many spam messages have the primary intent of tricking recipients into providing email account passwords, bank account information or other sensitive data. These "phishing" schemes (yes, spelled with a ph) have become quite advanced in their methods. A relative of mine recently acted on a message she received informing that her email account may have been compromised. The message provided a link where she entered her account username and password to confirm she was the proper user. Within hours of that message, she received another message, this time from the actual ISP. It stated that her email account had been shut down because it was being used to send spam. Yes, it happens that quickly.

Within the last month or so, spammers have been using several new methods to ensnare their victims. Whether they are PDF files featuring



advertisements, online greeting cards containing a virus or a membership welcome message with a phishing link, all email users should be very careful when determining what is legitimate and what isn't.

One common rule is to consider any unexpected attachment, especially when received from an unknown address, as potentially virus-laden spam. I recently had to perform digital surgery on a laptop at the station after an online greeting card was opened. In my opinion, 30 seconds of warm and fuzzy accompanied by a quick laugh is not worth the hours you could potentially spend trying to get rid of a computer bug.

Any emails you receive from your credit card company or Paypal that ask you to login through a link provided in the message should be considered suspicious. If there is a problem with your account, it is safer to either call or log-in through their actual site than to use the link provided. Keep in mind that the vast majority of legitimate credit card and Paypal related messages will include your full name in the greeting and not simply "user" or your email address.

The key is to prevent spammers from getting your email address in the first place. This is an

extremely difficult task, especially considering the different methods that are used. One method I have found that works to keep new spam to a minimum is getting rid of the chain emails. Many people enjoy forwarding chain emails to friends and family. They simply hit the "forward" button, add a long string of email addresses and off it goes. Take a look at all of the email addresses contained in these messages the next time you receive one. The message may have been forwarded a dozen times before reaching you. Spammers love seeing these messages in their inbox. A better way is to add all of the contacts in the BCC list or blind copy. The recipients will appear as "undisclosed recipients," keeping everyone's email addresses under wraps.

Unless something drastic is done in the near future, I believe spam messages are here to stay and will only increase in frequency. Unless email users globally decide to not support the spammers and stop making purchases linked to these messages, we will continue to see mail servers clogged with spam. Of course, what's one person's spam is the other 8%'s ticket to a "great online deal".  
Until next month...

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The Local Oscillator  
Sept 2007

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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*

**KLVZ • Brighton - Denver, CO**  
*810 kHz, 2.2 kW-D/0.43 kW-N, DA-2*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

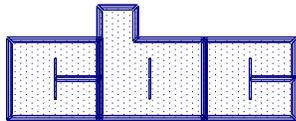
**WYDE-FM • Cullman - Birmingham, AL**  
*101.1 MHz, 100 kW/410m AAT*

**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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