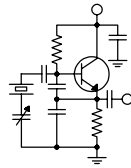


# The Local Oscillator



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

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### **One-String Guitar**

Over the past year, I confess to being at times a “one-string guitar.” Copper theft has been the topic du jour during this period. CBC facilities have been hit time and time again, that those thefts continue today.

The latest hits have occurred at the KLVZ daytime site north of Brighton, Colorado. Amanda first discovered the theft on Tuesday, October 14 when she noticed that the strap at tower #1, the tower farthest from the entry gate and the county road that runs alongside the site, to be unearthed and cut. I went out there to look at it with her a couple of days later and discovered that the problem was much, much worse than just cut strap. The radials for that tower had been pulled out of the ground, evidently from the ends back to the tower base fence. Inside the base fence, the radials has been hacked from the communing ring around the base pier and pulled from the ground.

A look at the other two towers revealed similar damage, although not quite as severe. A large number of radials had been pulled up and taken, but the strap around the base piers was largely intact. But the truth of the situation was that the KLVZ daytime antenna ground system had been damaged beyond repair. Our only option would be to replace it.

Then a couple of weeks later, Amanda discovered that the copper thieves had been back for another round. They took additional copper from the ground and tower 1 base area, leaving that tower without a single intact radial. That was reflected in the operating parameters, and the Burk logs allowed us to pinpoint the time of the additional theft.

So how, you may well ask, did the copper thieves get the radials out of the ground? The answer lies in the location, topography and geology of the site. The KLDC daytime site sits on the north bank of the South Platte River. The soil is largely bentonite, which when wet is a hard, sticky clay but when dry is a loose powder. It does not support plant life well, and while in the spring the site is covered in weeds and grass, by summer’s end it is bare dirt. To make matters worse, floods every couple of years have eroded the topsoil so that the radials are only a few inches below the surface.

The sheriff’s investigators found where the thieves evidently used a metal detector to locate the end of the radials, then dug down to find the wire and then pulled it out of the loose dirt all the way back to the tower base area. This was evidenced by small holes at many of the radial ends. At some point the thieves likely figured out that the radials are grouped closely together near the tower base and simply started there, pulling the wires out toward the ends. See page 21 for photos of the damage.

Just as with the WXJC (Birmingham) copper thefts of last February, the problem at KLVZ-D is chronic. Clearly, the thieves view the site as a virtual copper mine. They will no doubt keep coming back again and again until there is nothing left to steal. And so replacement of the ground system must be a careful process, one that carefully integrates effective security measures with installation of new copper.

So also just as at WXJC, we will install new ground screens and blacktop over them to make them impossible to steal. We will plant the radials much deeper than normal, a full twelve inches, to make



pulling them out of the ground or even locating them with a metal detector a very difficult process. But we know that won't completely protect them, so we must rely on technology and some crime prevention measures to help us out.



#### **Entire radials were ripped right out of the ground**

We will start with high-output security lights on each of the towers, positioned high enough on the towers to keep them out of easy reach and produce a good field of illumination. Then we will install an array of surveillance cameras, one directed at each tower base area and one steerable pan-tilt-zoom camera that we can remotely direct wherever we want.

Next, we will install four electrified fence wires on the insides of the tower base fences, beginning at about 12 inches above the ground and spaced evenly to within a foot or so of the top. We have found in Birmingham that this as much as any other measures has been an excellent deterrent.

Finally, we will tie the tower base fence gates into the monitored alarm system. Over at the KLZ transmitter site (which is also the KLVZ night site), we had a local security company install a long-range wireless system with contacts on each of the six tower base gates. The contractor was not sure whether this would work in the high RF fields of the tower base areas, and he also wasn't sure that it would have enough range to span the 1,000 or so feet from the farthest tower to the building, but so far so good. We are presently watching to see whether we get any false alarms on windy days. The situation at KLVZ-D is much tighter, with the towers less than 300 feet from the building and with the RF fields much lower, so we don't anticipate any problems there. The wind may still present a problem, but we should be able to take care of that at both sites by keeping our gate hardware tight.

In addition to all the ground system and security measures, we are also in the process of installing a new prefabricated transmitter building at the KLVZ daytime site. We have a building permit and will start excavations early this month. In preparation for this new building, we are having the general contractor install PVC conduits between transformer pad and new building location before any radials go in, and we're having him install 4-inch conduit from below the ATUs to just beyond the edge of the new ground screens. Once we lay four inches of blacktop atop the screens, there would be no way to get new transmission lines, sample lines, control or power cables to the towers.

We hope to have all this done by Thanksgiving.

#### **Welcome!**

This month, we welcome Pete Chamberlain to the engineering staff of CBC-Denver. Pete has been at Entercom-Denver for some time now, working in production and marketing, but he has a good technical aptitude and wants to pursue a career in radio engineering. He comes to us on the recommendation of Jack Roland, former engineer at CBC-Denver and present CE of Entercom-Denver.

We are glad to have Pete and look forward to watching his skills grow as he learns the broadcast engineering trade. Please join me in welcoming him and extend him every courtesy and assistance as he settles in.

#### **Electric Barn**

Over at the KLZ site, Amanda and Pete got a lot done during Amanda's first month as chief engineer of CBC-Denver. One of the big projects was the completion of the electrification of the storage barn. An electrical contractor was retained to trench and run two conduits from the KLZ transmitter building and the barn and install both a 110-volt lighting circuit and two low-voltage (CAT5) wires.

High-output sodium lights were installed over the front and back doors of the barn, and an interior light was also installed. For the first time since the barn was built back in the early 1960s, we can actually see in there at night! This will be very handy when backing the trailer into the barn late in the day. Until now, that little exercise has been akin to backing a 24-foot two-axle trailer into a cave with just a few inches of clearance on either side.

One of the CAT5 wires was used to add the barn to the site's alarm system. A keypad was installed just inside the front doors so that it is not necessary for Amanda or Pete to go to the main

building to disarm the alarm before entering the barn. In fact, they can disarm the barn alarm without disarming any of the tower bases or the main building, a very cool feature.

The other CAT5 wire will likely eventually be used for video surveillance at the barn. We don't intend to do this unless we have to, but we had one opportunity to get the wire pulled in and so we did.

### Modeling

The Report and Order changing the AM technical rules to permit method-of-moments modeling as a means of performance verification of AM directional antennas was published in the Federal Register in mid-February. At this point, it appears that the new rules will go into effect in February of next year, just three months from right now.

In preparation for this, I am enrolled in a modeling seminar to be held at NAB headquarters in Washington, DC toward the end of this month. I have been modeling AM arrays for a long time, but this

seminar will teach me how to do it the "FCC way." I anticipate modeling quite a number of arrays in coming years, relicensing many of our directional arrays under the new rules and doing away with monitor points once and for all. I need to know how to properly construct and modify the model to get it to match the measured impedance matrix.

A Notice of Further Rulemaking came out of the modeling proceeding to deal with potential reradiating structures near AM antennas, directional and non-directional. We will file comments in this proceeding both under the CBC masthead and as part of the Coalition sponsoring the rulemaking. The idea is to achieve much more control over potential reradiators. At present, only other broadcast, wireless and common carrier licensees must take steps to protect nearby AM antennas. Part 90 (Public Safety) and other licensees can simply ignore them. We have had our patterns wrecked by such structures in recent years, and we have no recourse to deal with them. The new rules will, to some degree or other, bring all towers under the AM protection rules.

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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!

In January of 2009, my SBE certification will expire. Before I took the Certified Broadcast Radio Engineer exam back in 2004, I hadn't given the SBE much thought. I had a lot of pre-conceived notions of what the Society of Broadcast Engineers stood for, mainly a chance for a bunch of local engineers to get together once a month, eat lots of pizza and shoot the breeze on how horrible their jobs were. After becoming a member and attending several meetings, I discovered that my notion of what the SBE stood for was totally out of phase.

In Buffalo, mostly television engineers attend the chapter meetings, with only a couple of radio guys (myself and one other) in attendance on a regular basis. What I have found is that although we face different scenarios in our daily duties, we share a common goal,

which is to do our jobs to the best of our abilities and keep our respective facilities on the air.

I have spoken with the chiefs of the other market radio stations in an attempt to get them more involved in our local chapter. I'm sure that a greater radio presence will help each of us to do our jobs better. So far I haven't had much luck in getting these folks involved, but I believe persistence will eventually pay off.

By networking together through the SBE, we can help each other out by sharing ideas, past experiences and assistance when a difficult problem arises. There is not another member in the local chapter that I wouldn't help when called upon, and I would appreciate the

assurance that they would also return the favor if needed.

As I prepare all my documentation for



recertification for the next five years, I realized that I haven't contributed a lot to our profession since certification. Aside from writing a couple articles for *Radio World* and offering free consultation to a couple of college radio stations, I haven't taken an active role outside of my daily duties at CBC. As I look towards the next five years, I hope to help build up our local SBE chapter and in the meantime, bring back some engineering camaraderie that has been missing in our market for far too long.

### **WDCX – Buffalo**

Several weeks ago, while listening to the station late on a Saturday night, I noticed several audio dropouts in the middle of our programming. I called the on-duty board op to see if he heard them also. At the time, he was listening to the HD-R air feed and reported that he did not hear any. While monitoring the station the following day, I again heard the same dropouts, lasting for only a second or two, and then everything sounded fine.

On Monday, I began the search to find out the cause. Everything at the studio looked fine, but once I got to the transmitter site, I quickly discovered the culprit. I noticed that we had an alarm on the BE exciter, which indicated a loss of the composite signal on its input. Further investigation revealed that the 12 volt coaxial switch, which switches the composite STL signal between the analog and digital receivers, had fatigued the BNC connector's solder connection on the input of the composite DA. I could wiggle the connector and cause the composite signal to break up. A re-solder of the BNC jack, along with adding a 7/16" nut on the jack, did the trick.

If any of you are using the Excalibur brand of composite distribution amplifiers, I would highly recommend adding a mounting nut on the input and output jacks. The model we have has never had a retaining nut on the chassis, which over time caused the solder connection to crack.

Each year, in the late summer, we also experience some signal propagation anomalies on our digital STL path. This interference usually lasts between three to six weeks. In order to alleviate this, we have ordered an 8-foot parabolic dish to replace the existing receive dish at the WDCX transmitter site. Don Boye of Western Tower Service will be installing the new dish within the next few weeks, hopefully before the snow flies.

### **WDCX-AM & WLZG – Rochester**

On Tuesday, October 7<sup>th</sup>, the WDCX-AM board operator reported that the audio was breaking up excessively beginning at sign-on at 6:00 AM. By

the time I arrived in Rochester, the problem had mysteriously disappeared. The next morning, the same thing happened again, and by the time I arrived on site, the problem vanished again. For the next several days everything seemed okay, with only a few dropouts noted. Late on Friday night, I received a call from the board op that the signal had dropped out completely. I jumped in my Jeep and headed to the transmitter site to try and determine what was causing this, and by the time I got there, all was good. I decided to spend the night at the AM transmitter site to perhaps catch the cause of the problem. Early into the morning hours, the audio began breaking up again, and I noticed that the receive level on the STL receiver was extremely low, about 10uV, and the digital decoder was showing constant BER errors. I swapped out the receiver with a spare one and noted that the levels were the same, so I ruled out a receiver problem.

I next went to the FM transmitter site where the STL transmitter is located, and checked the output of the transmitter with an inline wattmeter. The RF level was at 7 watts with approximately 1 watt reflected. A check of the transmitter into a 50 ohm load showed 7 watts forward and no reflected, so I knew the problem had to be either in the coax, pigtail or transmit antenna.

On Wednesday the 15<sup>th</sup>, Don Boye climbed the tower and installed a calibrated 50-ohm load on the feed line, which was measured on the other end to be correct. Don did note that when he removed the 3-foot pigtail between the coax and antenna input, some water dripped out of the N connector. We replaced the pigtail and again measured the transmitter output power with the wattmeter. Forward power was the same, however the reflected dropped down to less than a half-watt. A check of the receive level showed an increase of 20uV of signal level, with no BER errors on the digital decoder.

While at the transmitter site overnight, I was leaving the building and after turning the lights off, I noticed several light flashes coming from the night phasor cabinet. I removed the front access panel, but did not see or hear any arcing. I turned the lights off again and checked the cabinet, and found the source of the arc. The contact wheel of the 20-amp variable coil on the tower 1 phase shift network was arcing between turns. I noted the counter reading on the coil adjustment counter and turned the adjustment one full turn to check the tuning wheel's tracking and found it to be extremely loose at one side of the coil and binding at the other side. I have ordered a replacement bar and wheel for this coil from Kintronics.

Another problem that has developed very recently at the WDCX-AM transmitter site is equally puzzling. On Saturday the 25<sup>th</sup>, the board op called to report a very loud hum on the carrier. He stated that he could hear it on the external monitor, but the program feed sounded normal. I made the drive back to Rochester and decided to check at the FM transmitter site first, to see where the hum was coming from. The audio leaves the studio via the Interplex (T-1) and then heads to the FM transmitter site where it then is patched into the Moseley DSP-6000 encoder and STL to the AM transmitter site. The audio from the studio was clean, and no errors were noted on the encoder.

My next stop was the AM transmitter site to check the receive audio from the STL. All there was okay, too. I entered the transmitter building and noticed that the NE-IBOC was showing an alarm and the non-operational indicator was flashing. I cleared the alarm and rebooted the computer, and all was back to normal. One thing to note, however: the NE-IBOC unit was still providing drive to the transmitter, although the unit was non-operational.

Two days later, the same thing happened

again. Instead of making another trip to Rochester to reboot the computer, I had Earl Schillinger make the trip out to perform the shutdown. After it rebooted, it came up and everything was good. I called Nautel to discuss the problem with tech support, and they have not received any reports of this happening with any other modified ND-5 transmitters. They recommended that I reseat all the cards in the NE-IBOC unit to see if perhaps that was the cause of the problem. On the next trip over to repair the phase coil, I will shut down the NE-IBOC unit and reseat the cards as instructed. For some reason, my gut feeling tells me I have not seen the last of this problem.

As far as WLJZ goes, things have been operating smoothly at both the studio and transmitter site, with nothing to report on.

That about wraps up this month's report. Have a happy and safe Thanksgiving and I'll catch you next month here in the pages of *The Local Oscillator*. Happy engineering!

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### The Motown Update

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

Last month, without warning, our FM main transmitter lost 30% power. There were no overloads and there was no smoke. The plate volts and plate current were at the expected values for the power indicated. The only parameter at variance was the PA screen current, which was near zero. We replaced the tube, worried about some internal inter-electrode problem, but there was no improvement. We started looking at the screen power supply circuit and thought we had the problem identified. There is a 3-phase diode bridge that had its DC output leads almost burned off. But after getting a new diode bridge and replacing the wiring connectors, there was still no screen current.

The techs at Continental Electronics said to look instead at the exciter and IPA. Their outputs



directly influence screen current. They wanted several tests performed. They wanted a portable wattmeter and load to measure exciter and then IPA output power independent of the transmitter. I have a portable Bird 43 wattmeter with a 50-watt load, but only a 50-Watt element for the FM Band. That would work only for the 50-watt exciter output test.

The exciter proved to be working normally. We could run its power up to 35 watts from its normal operating level of 20 watts. It should have been able to hit 50 watts, but 20 watts has been the setting for years.

The next test was the IPA.

The WRDT night transmitter site has a portable 1000-watt dummy load and that would work for the 700-watt IPA test. The IPA has its own directional coupler built-in. Since I had no element

for higher power in the Bird 43 wattmeter, I was going to trust the IPA on-board meter. I attached our AM dummy load and read an output less than half of what it should be. We tried raising the exciter output, but the IPA output had hit a plateau and no additional power was coming. The maximum was 190 watts instead of the usual 440 watts output.

Continental said the IPA was shot. Only half of its internal amplifier was working. A replacement was the only option. It was expensive and Continental no longer supplies that exact model. In fact, they had gone through several different replacement types since our transmitter was made back in 1993.

We ordered and received this vendor-built assembly. We got the new replacement dual module IPA physically into the transmitter easily enough, but there were some wiring changes to make it compatible. The changes were confusing because of differences in the printed instructions and the printed

IPA setup schematic. Continental uses this IPA in several models and versions and tries to have one schematic fit all. Once we discussed with them why the schematic had too many wires, we understood then where the correct connections were. There were also some connections we were to ignore for our 816R-4C model.

We were very pleased when the transmitter powered on and we had screen current. Continental had told us to set the exciter output to our normal 20 watts, and that let us raise the final transmitter power output to 100%. Everything was back to normal.

I figure the burned leads on the supply diode bridge were caused by the IPA pulling too much current as its internals went bad while the IPA was pushed to keep our overall power output up. There was no salvaging the defective IPA. Continental did not want it back.

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### News From The South

By

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

#### We're In the Wrong Line Of Work

An RF output transistor in one of our BE FMi-73 HD transmitters recently failed. This is a specialized dual RF MOSFET in a single package; you don't find these on the shelves at the local supply houses. Broadcast Electronics will sell you a replacement for a mere \$475(!). Unfortunately, BE doesn't provide any information about adjusting the bias on the module once this unit has been replaced. They prefer that you use their module swap program for \$1,683, not including shipping (! again).

Below is a picture of the old transistor, framed by a standard 12" hacksaw for scale. This is what our \$475 (also not including shipping) purchased. After looking at it, maybe you'll understand how I feel – I think we should have gotten more. Sure, high-powered dual MOSFETs aren't cheap – especially not the ones rated for RF – but...



well, still. They could have at least put a birth certificate in there with the thing. The way I look at it, if I pay almost half a grand for a transistor, it ought to have a name and lineage.

Component prices are going up all over. Some of this is the cost of materials; some of it is handling (or pre-selection – I can only hope that BE tested that transistor before shipping it to me). But other than that, the extraordinarily high prices that some suppliers charge nowadays is inexplicable. You buy the equipment in good faith, only to be horrified (lobotomized) (anesthetized)

when you call them a few years later for a replacement component. In my opinion, Harris is one of the worst, but their fellow Quincyites at BE appear determined to emulate them.

If this keeps up, I may get out of the engineering business and just supply components to everyone else. We'll see who retires first and with the

most money.



**This power MOSFET cost us \$475!**

### **Back to Tarrant**

Leasing tower space has pluses and minuses. The plus, of course, is that you get a tidy bit of extra revenue each month for tower space that wasn't doing much to start with. The minus, though, is that when the renter needs to do work on his system, you're presented with at best an inconvenience, and at worst, a major headache.

The company that leases space on one of the WXJC(AM) towers in Tarrant lost the AC feed to its transmitter shed a few months ago. After trying to repair it a time or two, they gave up and decided to run a new electrical feed from our new building. Obviously, we would have to do a good bit of ground system repair.

Being a highly skilled and experienced engineering manager, I know most of the tricks required to fob this kind of thing off on my assistants, but in this case, I decided to help. Here's a picture of



**On occasion, I do actually work!**

the Old Man himself on hands and knees repairing one of the damaged ground straps. The next image shows Todd and Jimmy brazing radials back together.



**...and so does my able crew.**

I was impressed with the state of the ground system out there. The late Steve Delay told me that he had installed all new copper just before we bought the station, and it certainly looks like it. We have straps between the towers, as well as straps running perpendicular at the joints between each tower's radials. The radials themselves are all good solid copper, well-laid in the ground.

### **Server Move... And Spam**

With Ed Dulaney's departure, it has fallen on Todd and me to maintain the Corporate servers. We're moving the mail and Web units to Birmingham; our company FTP server will stay in Denver for the time being. In fact, by the time you read this (assuming no problems), the servers will have been moved. Amanda will be keeping a precision eye on things in Denver this coming Saturday (Nov 1st) as we make the switchover.

Naturally, I've been boning up on Apache, MySQL, the Scalix Mail system and the Barracuda Spam firewall that we use. Given that all of us still receive spam from time to time, you probably wonder: how effective is that thing, really? Well... just take a look at this snapshot of one of the status screens.

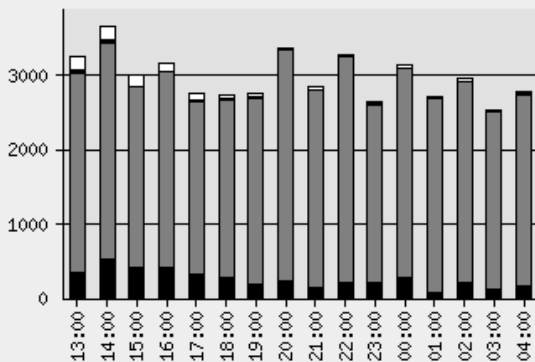
The numbers at the top tell the story. When I took that snapshot, we had received 36,460 total emails, of which a whopping 1,263 were accepted as legitimate. Even if we add in the "accepted but tagged" mail (35), that's about 3.5%(!). The ratio of good email to bad is really apparent when you look at

the bar graphs at the bottom of the image. The “legitimate” email is the small white box at the top of each bar. At some times of the day, it’s almost invisible above what was blocked!

#### Email Statistics [inbound]

	Total	Day	Hour
<b>Blocked</b>	16,201,723	32,332	686
<b>Blocked: Virus</b>	58,278	2	0
<b>Rate Controlled</b>	3,347,296	2,659	108
<b>Quarantined</b>	58,550	169	5
<b>Allowed: Tagged</b>	453,240	35	1
<b>Allowed</b>	2,413,134	1,263	28
<b>Total Received</b>	22,532,221	36,460	828

#### Hourly Mail Statistics



Therefore, the next time you see some spam in your inbox, remember this image and have pity on that poor Barracuda firewall. It’s actually doing an excellent job. The real problem is that there’s so much spam on the Internet nowadays, some of it’s going to get through no matter what. The spammers are sneaky, too: they’ll try to imitate legitimate email addresses; they’ll fake IP addresses; they’ll automate the process of changing each email slightly so that simple “pattern matching” blockers won’t work – you name it. The fact that Barracuda is able to block the vast majority of it is actually quite impressive.

I’ve seen estimates that claim that almost half of all traffic on the Internet now is nothing but spam. After looking at the Barracuda logs for a couple of weeks, I believe it. It’s a shame, too – we all pay for that. And you might wonder: why in the world do the spammers keep doing this? Sadly (believe it or not), yes, there are actually some people who respond to spam messages – even though they’re just as likely to be “phished” for credit card info as anything else. I’ve certainly never ordered any “V.i.AG-rA” from these scammers, but apparently, someone has. They wouldn’t keep sending the stuff

otherwise.

It’s a simple matter of economics. A spam “bot” is criminally easy to set up and costs the spammer almost nothing. Even if he only gets one response out of a million emails, he’s making money. Until we change that, we’ll continue to battle unwanted email in the inbox. One proposal that I’ve seen is to actually charge a small fee for each email. Even a tenth of a cent would be enough to make spam uneconomical, without inconveniencing the rest of us too badly. I’m all for it.

#### Finally: If You Fail to Plan...

Heaven knows that my wiring isn’t always as neat as it should be. (Cris knows it, too, and has pointed this out to me more than once ... cough, cough.) But folks, I’m Mr. Clean compared to our local telco, the redoubtable ATT. I thought of taking a picture of some of their wiring in the “phone closet” here inside the studios, but I just didn’t have the heart. Instead, the following image should suffice:



**This cable has been hanging since Ivan came through several years ago!**

If you fail to plan – or in this case, to measure – you plan to fail, and you’re looking at the proof of it. This cable has been as you see it in that picture for months, too. Shoot, there’s a trunk cable up on Red Mountain, near the WDJC site, which has been on the ground since Hurricane Ivan came through years ago; ATT still hasn’t bothered to fix it. Our T1 line to WYDE-FM in Cullman ran across the ground for several weeks last year, after ATT made emergency repairs... and on it goes.

We have had repeated problems with our ATT T1 lines. I know that their technicians are capable; I’ve talked to them and they say that the real problem is that they’re simply overworked. They can’t get to everything that needs to be done, so I



guess stuff like this just falls through the cracks. I'm not picking on the field techs. But the fact remains: after seeing stuff like this all over the area, I can understand why we have trouble with our T1 lines.

The mystery is solved.

Until next time! Be sure to pray for America and to VOTE November 4!

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**Gateway Adventures**  
**By**  
**Rick Sewell, CBRE**  
**Chief Engineer, CBC-St. Louis**

Over the past month, I have had several projects that have been completed and now, thinking about it in hindsight, I realize that we have changed much of the studio infrastructure of both stations here in St. Louis over the last six months.

I just recently completed taking the audio chains of both stations to all digital all the way to the transmitter site. No longer will we have audio going back and forth from analog to digital then digital to analog and so on. These conversions add noise and other problems with each back and forth that takes place along the path. Now, once a given piece of audio is digitized, it will stay that way until it gets to the analog output circuits of the processor into the transmitter's exciter. The one exception to this right now is the satellite feeds coming from the transmitter site. They are in analog form going into a digital STL/TSL system and then they are routed in analog form at the studios to their various destinations. This is something that will most likely be addressed in the near future.

In the spring, due to the fact that we were switching to an Ethernet-based transport for our backup STL, we changed the automation equipment audio switching to a hybrid digital/analog switch knowing that we were taking the chain to all digital in the future. We used the Broadcast Tools ADMS 44.22. This audio switcher has four digital inputs and four analog inputs with two digital outputs and two analog outputs. This allowed us to use the analog side for the analog chain while feeding the new back up STL a digital feed.

This summer we were scheduled to rotate in new control boards in our control rooms. We went with the Wheatstone D-75 digital consoles. Once again, they have a configuration of both analog and

digital inputs and outputs, allowing us to live in both worlds until we get everything switched from analog to digital.

The main areas we had left in the chain were EAS insertion/switching and profanity delays. Then we needed to distribute this final audio product to the main digital STL, the backup STL, the Internet streams and the automation equipment recording computer (DRR) to be used for rebroadcasting programs. Of these four final destinations, except for the backup STL, all were getting an analog feed but were capable of accepting a digital feed. So the goal was to get through the EAS

insertion/switching and the profanity delay with no switching back and forth between analog and digital.

The Profanity Delay would not be a big deal, since we had the Eventide BD500 broadcast delay that could work in either analog or digital modes. With one configuration change and new cabling, it would be good to go. The EAS insertion was a different matter.

Our current EAS encoder/decoder only has an analog output, so to insert any EAS audio into the chain would not only take a conversion but a switch of the chain to that converter as well. I could have just purchased a relatively inexpensive analog-to-digital converter and then set up some relays to make the switch. However, I found that Broadcast Tools has a device that would do both for around the same cost.

We purchased the Broadcast Tools BDCS III and ran the digital output of the automation equipment audio switcher into the digital input of this device. The BDCS III also has an analog input that it will convert to digital audio. You then can set it up to switch this converted digital audio to its digital output momentarily when it receives a contact closure from



the EAS encoder. This worked perfectly for conversion and insertion of the EAS audio, and our main program audio stays in the digital world throughout this process.

For the next stage, I used Omnia 3 processors that I had on hand as backup processors at the transmitter sites. They accept a digital audio feed and then put out the processed audio in both digital and analog forms. I ran the processor as an easy limiter because I did not want to “over process” the audio at this point in the chain.

The digital output from this processor was then fed to the profanity delay, and from there to a digital distribution amplifier which took the post-delay audio to all of the four above mentioned destinations listed previously. I used the analog outputs of the processor to send audio back to the studios. This way they could get a post-EAS-insertion but pre-delay feed of the program audio. So the operators could verify EAS insertion in real time.

Since the audio coming from the transmitter site is delayed considerably, the operators and hosts can no longer monitor from that feed in real time. This means either listening to themselves on the console’s program bus or using the feed that was created from the Omnia 3 processor. For many of them, the feed from the processor is the only way

they will listen, because most jocks and hosts cut their teeth in live radio listening to themselves in their headphones with a processed feed from an off air monitor. Listening to themselves from an entirely unprocessed audio source can cause some to have an identity crisis or something like that. Giving them a processed feed like this can help them not be so grumpy, or at least that is the hope.

Now as for the installation, I had two choices: construct the new chains in parallel or tear everything out and install the new equipment in one quick overnight session. Rack space was tight, so it was tempting to do the latter, but I knew that if I ran into any unexpected problems, time to get the stations back on the air would be critical. So I chose to find some rack space and do one station at a time in parallel. This worked well, allowing me to create the rack layout as needed as I went along and let me tackle unexpected problems without having a station off air. I was able to do this using the backup STL without losing any air time or Internet Stream time.

The sound of both stations is definitely cleaner since the switch to the digital chains. I definitely need to adjust the final processing now to get the sound just right. I am also giving thought to how keep the satellite feeds from the transmitter sites from going back to analog.

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### Catalina Tales

By  
**Bill Agresta**  
Chief Engineer, KBRT

Greetings from Santa Catalina Island!  
With the Presidential elections only days away, this has become a very interesting time here on Catalina Island. This island, where I came to live in 1990, has certainly changed. In fact, this once little family-oriented, very conservative community has gone through some exponential changes over the past few years, and it’s mind blowing for me to not only find myself now in the minority but angrily attacked for my political viewpoint. Many people who were once close personal friends now turn up their noses at me and treat me like a dolt



because I am open and still proud of my conservative political viewpoint.

I was in town a few days ago, minding my own business while doing a mail run, and one of these old “friends” decided to stop me in the post office and tell me that I am a “hate monger” because I am voting the conservative ticket. He was not friendly; he was loud and spiteful and quite frankly, his accusation and demeanor was childish and immature. I responded with a chuckle, telling him to explain that to the many charities I support. But he just went on to say that I am against the

environment, against free choice and on and on without listening to a word I said in reply. I finally asked him what good were his accusations if he was not able to back them up with any substance or even hold a dialogue with me over them. Then he decided it was time to get really rude, as if we were not there already, and begin adding nasty words to the mix. I told him that he was just spewing forth empty words and the noise pollution he was causing was bad for the environment. At this point I walked away, leaving him angrily going on and on at me.

As I got back to the truck and drove back up the hill, I was amazed at how ridiculous the whole encounter had been. I used to have dinner with this guy and shared a common vision with him to better the youth here on the island. I was amazed at the anger when I did not even initiate the conversation nor react physically to any of the name-calling or rude remarks about my character. My final response, while not being nearly as rude or personal as his attacks on me had been, seemed to escalate his anger even further, even though the comment was more comical than hurtful.

When I got back to the transmitter site, I had email waiting for me, more political attacks. And since this person really does not want to reason, I decided to ignore them.

When I go into town and get coffee (which I seldom do now), I find myself sitting out of way by myself or being verbally attacked by several people at once. Since I am a pretty decent debater, I used to purposely put myself in such a position, hoping to induce reasonable thought into these people, but I have found that they merely spew forth empty words and accusations while not even listening to any reply or having any intent of holding a mature dialogue. They have resorted to the old elementary school type bullying and peer-pressure tactics that most of us outgrew before high-school, and they try to convince themselves that they are somehow more educated and caring for doing this. What a sad place this has become!

Last week I had a very sad and gut-wrenching experience. I was preparing to drive into town for supplies when I noticed smoke in my rear-view mirror as I got to the end of our driveway. I called the sheriff's department and turned the truck around to go see what was on fire. What I found was not a pretty sight!

A small plane with four people inside crashed just after takeoff from the "Airport in the

Sky," and by the time I got there, the plane was fully engulfed in fire. One person somehow managed to escape and was being tended to by local passers-by, but three people were still inside the fiery wreckage. From my vantage point, I could make out the silhouette of at least one person, but there was no way to get near and they were likely already dead. Since there were already enough able-bodied responders on the scene, I decided to stay back and pray over the situation instead of getting in their way.

They got the fire out before it spread into nearby trees and brush, and flew the survivor to a mainland hospital where he arrived in critical condition. I have seen so many crashes at our little airport that they don't upset me as much as they used to, but seeing people burning up makes quite an imprint on your mind no matter what you have been through.

Our Nautel XL12 main transmitter developed a strange issue last month. All on its own, it decides what power level it wants to operate at and even when it wants to go on air. We have watched the power levels in memory change by themselves and the transmitter has been caught turning itself back off after sign-on and even turning itself back on after sign-off, even with the remote control unplugged. Needless to say, this is a major issue for us, and I have had to open the interlock each night to be sure KBRT does not go back on-air during the nighttime hours. This seems to be a case of the transmitter literally *losing i's mind* as many seem to do here on this bizarre island. Nautel has sent a replacement control board that we are hoping will resolve this issue indefinitely. Now, I need to hope that I'm not next!

Our weather here on the island has been quite strange for this time of the year. After having a very mild summer, the weather has now decided to give us the hot summer days and nights it forgot to serve up when they were due. This has worked out great for my workload here, however, since I still have plenty of outside work to get done. I've even begun to do some of my bench-work outside on the concrete pad, enjoying the great weather. There's nothing like soldering outside in the presence of buffalo or in the evening under the stars.

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

The Chicago Chronicles

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

**DIN Rail: An untapped resource?**

I believe that the secret to being a wizard is in knowing where all the other wizards are. I have been blessed in my career with having a number of wizards whom I consider both as mentors and friends. One of them edits this newsletter. You may have heard of him.

I'd like to introduce you now to a third one, one of the most creative men in the business, Al Antlitz, who works for a station here in Chicagoland, and who for years was the CE at one of the best engineered stations in the country (to this day), WFMT, and later at Chicago Public Radio's WBEZ. At WFMT, a classical music station of considerable renown, Al spent over 20 years designing and constructing the

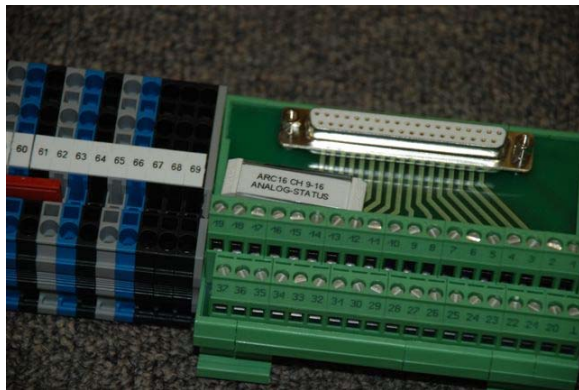


Figure 1 (All photos courtesy Al Antlitz)

station from the ground up – consoles, switchers, even audio processors. His Antlitz Moduplex audio processor is a legend in the business, especially among classical and public broadcasters. I had one at a station in suburban Chicago 30 years ago. It was the cleanest audio processor I've ever heard, and it was all analog – including a real analog computer built in. At about \$3,000 in 1977 dollars, it was pricey, but oh, the sound! I'll never forget it.

Al is quite past retirement age, but still working in the business, and he's still one innovative

Broadcast Engineer. Recently I've spent an otherwise idle hour or two helping him rebuild his transmitter site near my Joliet area home. And once again, he's the old dog who is teaching me some new tricks.

I wonder how many of you have ever done anything with DIN rail. It's a European innovation (the 'DIN' part gives that away) which is used for interconnection and control. Of what? Well, of anything, really. The concept is simple enough: Start off with a framework which is both inexpensive to obtain and modular in concept, and add to it

devices, designed to fit the framework, in any configuration that suits your fancy. The beauty of this is that the design is limited, for the most part, only by your imagination. There are literally dozens of things which are designed for DIN rail service, including color-coded terminal blocks, D-subminiature connectors, relay sockets of many configurations, and even power supplies. A partial list of manufacturers and suppliers of DIN rail-compatible components may be found at the end of this column.

The implementation of DIN rail is relatively inexpensive and requires virtually no metal work. Forget any chassis, metal or otherwise. Such is the

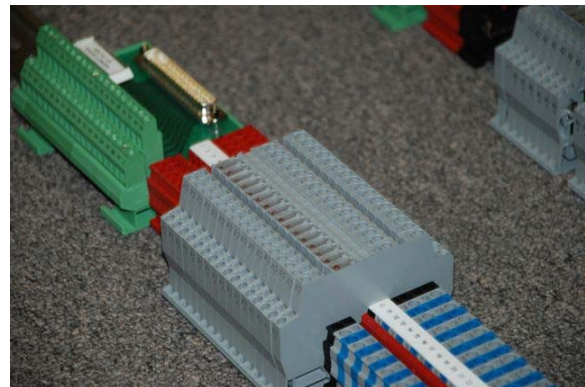
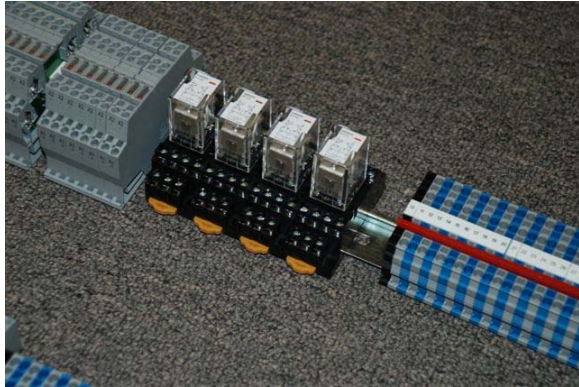


Figure 2

nature of the system that you can build an entire control and interconnection network down the side of rack cabinet, next to the wire trough, the AC outlet strip, or both, without any metal work at all. That is indeed a time, effort, space and money-saver.

DIN rail technology has been the standard of electronic control design in Europe for many years. Here in the states, Al tells me that DIN rail is heavily used in the automation and control industries. However, to this point, it hasn't caught on all that well in the broadcast industry. Why? Maybe this:



**Figure 3**

Earlier I said, "The design is limited, *for the most part,*" for a reason – availability. While just about everything for DIN rail is made in Europe, many of the parts are not available here. Phoenix Contact, a German company which is one of the biggest suppliers of DIN rail components, will send you their catalog for free, but their American distributors (among the biggest of which are Allied Electronics and Mouser) may not be able to get them for you. For example, the catalog may list devices in any number of colors, but only two or three of those colors are available here. The unavailability of certain items may be enough to drive a saint mad, but I suspect that within a few years, the selection will become much better as DIN rail popularity increases.

Because of its modularity and the issue of availability, DIN rail installation requires nothing less than good planning. What goes where can be of great importance when it comes to design. Let's look at an example.

For over three decades, for better or worse, the Burk family of remote controls has been something of a standard of the industry. At least they are the most ubiquitous. Until the relatively recent advent of the ARC-Plus, the ARC-16, and before that the TC-8, has been built around the same basic platform, a single box at the transmitter tied to one or two relay chassis (the IP-8 interface panel) at the

transmitter, with an optional box located at the studio. The thing is, the IP-8 has been not just pricey (at about \$500 a throw), but also a little clumsy, since the thing takes up three rack units of valuable rack space just sitting there. And with a pair of IP-8s, that's potentially six rack units. Whether the IP-8s are mounted in the front or the back of the rack, any placement is less than ideal. Many of you know exactly what I'm talking about.

What if you could replace the IP-8 with something less expensive and a little more convenient, and reclaim all that rack space, whether front or back? That's where DIN rail comes in. Just set up about five or six feet of rail down one side of the cabinet, populate it with the proper breakout connectors, power supplies, relays of whatever type suits your fancy, and other modules, and wire it up. Oh, yeah, and mark them all, too, with the marking accessories designed for the DIN rail system, even plotters.

Take a look at some of the things you can do with DIN rail design. Figure 1 shows Phoenix Terminal blocks on the left. Several colors are manufactured, but not all are available stateside. On the right is a 37 pin D-subminiature connector configured to a terminal block. Note the identifying labeling available for the connector. DIN rail mounted 'D-submin' connectors are available in pin sizes from nine to 61.

Figure 2 shows a 16-place terminal block with LED indicators, ideal for status work.

Figure 3 shows four relays on a DIN rail-mounted terminal block. Pick your relays, be they momentary or latching. Relays are extra.

Other items used in DIN rail technology include power supplies and fuse holders. Power supplies specifically for DIN rail use tend to be pricey. Radio Design Labs make less expensive supplies, and they have DIN rail brackets available for those.

One thing I've learned is that there don't seem to be that many manufacturers of DIN rail devices out there. In the Allied Catalog I saw six. Newark has about thirteen. Add to that the line of DIN rail products from RDL (who are apparently far ahead in the DIN rail game among broadcast equipment manufacturers) and you have around twenty.

I have learned though hard experience that many Internet catalogs are merely a confusing shell of their paper counterparts. In the DIN rail game, that is true as well. I've seen both the online and the paper version of the Phoenix Contact catalog and I'll take the paper version anytime. Actually, the

distributors' catalogs are a lot better, you can't order it if they don't have it, although in a few cases they do list items they don't have. Go figure.

I for one am intrigued about the idea of DIN rail technology and the possibilities it holds for proper rack wiring management. With proper planning and execution, you can lessen the rats nest in there and make for a much better organized wiring job. I may be revisiting this subject again in the future, as my experience warrants. Stay tuned.

DIN Rail Component suppliers include:

- Phoenix Contact ([phoenixcontact.com](http://phoenixcontact.com)) – You name it, they make it. But not all are available in the US.
- Altec Corp. ([alltechcorp.com](http://alltechcorp.com)) – Second only to Phoenix. They have a good assortment of jumper strips, for B+ or grounding buses to the connectors.
- American Electrical ([americanelectrical.com](http://americanelectrical.com)) – DIN Rail
- TYCO Electric ([tycoelectronics.com](http://tycoelectronics.com)) – One item, a DIN Rail-mounted 44-position card edge card interface.
- IDEC Corp. ([idec.com](http://idec.com)) – Terminal Blocks and end rail connector
- WECO Corp. ([weco.ca](http://weco.ca) [German Co., Canadian web site]) – DIN Rail and terminal blocks for DIN Rail
- Radio Design Labs ([rdlnet.com](http://rdlnet.com)) – DIN-rail-based mounting hardware for their various lines of electronic products. Virtually all of their products may be DIN rail mounted with their seven available mounting devices.

Suppliers include:

- Allied Electronics ([alliedelec.com](http://alliedelec.com))
- Mouser Electronics ([mouser.com](http://mouser.com))
- Newark Electronics ([newark.com](http://newark.com)) – Stocks several manufacturers but not Phoenix. Magnecraft and Omron DIN sockets are major lines.
- Crouse-Kimzey and other major broadcast equipment suppliers – RDL products

### Notes from the SBE National Convention

The National Convention of the SBE, which this year was coupled with the Wisconsin Broadcasters Association convention, was one of the best I've ever attended. The seminars were stellar, the exhibits likewise, and I only have so much time and space to describe it all. I can only touch on some of the highlights.

I found a few really interesting exhibits

there. One vendor, for instance, was Lights by H&H. One of their lines is tower lights, and after looking over examples of their wares, I'm sold on them as a vendor. They sure beat what we've been using. We bought six of their 700 watt beacon lamps right off the floor and took them straight to Kirkland that night. Their demonstration convinced me that, when it comes to tower lights, there *is* life before LED beacons.

The envelope is actually made of Pyrex, not just glass. The base is not brass alone, but nickel plated brass. No more seizing in the socket, since the nickel is a lubricating metal. The incoming wiring is insulated to prevent flashover failure. The filaments are supported at seven points, not four. The supports are strategically placed to prevent filament sag failure. The stem is not just made of glass, but of Pyrex and (mostly) spring steel, so it's not brittle and thus is less subject to breakage. If vibrated, the whole assembly moves together to minimize vibration damage. And even the mica heat reflector, which is supposed to keep filament heat away from the base, is locked in place by a couple of tiny wires extended from the incoming wires. This bulb is designed with a lot of thought, but is still competitively priced. We got a special deal for buying at the show, 40% off, which made the pot even sweeter. It's one product I recommend. No more of the 'DT's'! The ones we bought are already installed. We'll see how well they work. Lights by H&H is at 110 W. Main in Elmwood, Illinois, 61529. On the web at [lightsbyhh.com](http://lightsbyhh.com). I should note that these same bulbs are available from Crouse-Kimzey Company at a competitive price.

Another product I liked was Padapult, a PAD data software/hardware product by Enco, located in Southfield, MI. They have the power to take virtually any source you can name for PAD data, and turn it into data formatted for either on-air RDS, HD PAD data, or webcasting, and send it to up to ten different destinations. They can also help out with I-Tunes tagging. They can take your music library from the database on your automation and set it up for doing I-tunes. Unfortunately, as I write this, I can't locate their brochure, so I can't get any more detailed than that, but Cris saw their products, too, and he was also impressed, and may have their contact information.

RCS Sound Software (the folks who market Selector, and what used to be known as Prophet Systems Innovations automation) has a recent product which should make music programmers happy. Using the now-active Arbitron People Meter system and RCS latest Selector-G software, a programmer

can actually track the popularity of any given song played on the station at any stage of its popularity, and send back a graphical report on whether that song is worth keeping in hot rotation, or not. In short, it shows in real time how the folks are reacting to what you're playing. We recently had that product demoed here, but I don't know yet if we'll be picking it up. If you don't, it's likely that your competition will. RCS is on the web at [rcsworks.com](http://rcsworks.com).

The seminars, as I said, were mostly excellent, and though I'd like to mention them all, a couple stand out. Gordon Carter's seminar on "Efficient Troubleshooting" was all common sense, play to a situation where, in most cases, pressure unto panic replaces that very commodity. Gordon's presentation was a primer in how to replace the latter with the former, as a learned mindset. Maybe, in a future issue, I'll go over this in more detail. Again, time and space issues prevent me from doing any more with it.

The last seminar I attended was about one of those subjects which we don't want to think about, but have to: Disposal of electronic waste, in particular, old CRT's and computer boards. Two of the three presenters, Toral Jha of Cascade Asset Management, Inc., (Toral's a lady, in case you're wondering) and Jeff DeGarmo of CRT Processing, Inc., reminded all of us that, particularly with the demise of analog TV in February, a whole lot of old CRT-based television sets are about to be kicked to the curb. Problem is, as solid waste, they are full of hazardous materials, particularly lead, and mindful of all this, a number of states have passed laws regarding disposal of those things, and a lot of electronic items as well. Thus, you're local trash collector may no longer be taking what you're kicking. Wisconsin has one of the tougher laws in the nation, wouldn't you know. As a result of all this, new companies, dedicated to recycling the old CRT's and other electronic waste, are now springing up across the country, but there are not nearly as many as are needed and not all of them are properly trained

or equipped to handle the wastes they are processing, but they are there, and the new reality is that disposal of electronic waste is coming into its own as a major industry, and none too soon. I'm not big on regulation governing our lives, but I'm going to have to make an exception here, as the proper disposal of all this stuff cannot help but benefit us all in the long run, by saving us from having to find new sources of some very precious materials that we would otherwise be throwing away.

Two footnotes to this subject, by the way. I specifically asked the panelists, after the seminar, what they thought of plasma technology television screens. Their answers rather paralleled my knowledge in that area. Plasma TV's are not a recycler's best friend, on two counts. First, the materials used in plasma are potentially toxic; and second, recyclers don't quite yet know how to safely dispose of them. Since my sources also tell me that the average lifespan of a plasma TV is something like seven or eight years, which is shorter than that of an LED screen or even a good Trinitron® CRT, and given that LED technology is catching up to plasma in the area of latency, one wonders what business anyone has these days in buying a plasma TV. Just musing.

The second footnote is that with the rise in value of many materials which we as a society have for years been throwing away, look for a new industry to rise from the ash heap, so to speak: mining old landfills for valuable materials. This may, within the near future, become profitable enough to be widespread.

For more information on electronics waste recycling, you can reach CRT Processing at [crtprocessing.com](http://crtprocessing.com). Cascade Asset Management is at [cascade-assets.com](http://cascade-assets.com).

Next month, the subjects will be "When the Hard Drive Crashes on your HD-2 machine," and "What to do with squirrels in your microwave dish" – or something like that. Until then...

### The Portland Report

By

John White, CBRE

Chief Engineer, CBC-Portland

When is a tower light brighter and can't be seen? That's one of those trick questions, so let me explore. This last month, as part of a multipurpose project, KKPZ replaced the top beacon on our center tower with a new LED beacon. Earlier, we had replaced the side lights, so I had a bit of bias which said the LED lamps are much brighter.

Contributing to that bias is the ongoing transition of broadcast TV to digital. Here in Portland, the West Hills TV tower sports several new towers side by side with the old towers. The old towers will come down when the analog signals go dark next February. One of those towers sits side by side with the old tower and provides a direct comparison of LED and incandescent beacons. The LED beacons are obviously much brighter.

When I was bench testing the new beacon, Cris warned me not to look directly at the beacon. Good advice... it's very bright. It's advice I passed on to the tower crew installing the beacon.

Here at KKPZ, the installation process was complicated by other work on the tower being done at the same time. We did arrange to replace the beacon to avoid overnight outages. However, I knew that after installation the beacon current monitoring would not be operational, so a visual conformation was required. As dusk approached that first night, the tower lights activated and the side lights came on. But I saw no beacon. What happened? Did the crew do something wrong. We did test the beacon while they were on the tower and the crew reported all looked good. Yet I did not see the beacon.

Down in the basement, I used my clamp-on current meter on the beacon conductor. I did see current, a very low current. It's just registering on the lowest range of the clamp-on meter. Well, compared to the 1,240 watt incandescent beacon lamps, the LED current is expected to be low, but I did see some current. Back outside I still did not see the beacon.

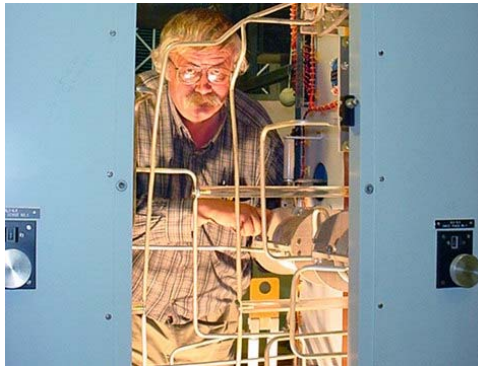
So I made a quick call to the tower crew chief on his way back to the shop. Yes, he confirmed they visually checked the beacon and it was working.

No they didn't do anything to the beacon after the check. So I scratched my head and wander out to make one last check. It was fairly dark by then, and yes, I did see a bit of red light flashing at the top of the tower.

So what is going on here? Well, this has to do with the nature of LED lamps, particularly beacons. They concentrate the light at the horizon and the aircraft for which

the tower represents a potential collision hazard. Very little light is seen at the ground or high in the sky. At dusk, the waning sunlight is much brighter than the beacon for an observer on the ground below the tower.

I originally thought dealing with the current sampling for a conversion from incandescent to LED beacon conversion would be simple. The power of the old incandescent beacons was 1,240 watts; the new beacon is 48 watts. I thought it would be as simple as adding a few turns on the current sample inductor, so I added several turns. That resulted in a small sample increase, but not nearly enough. I again





added several more turns. That was better, but still not anywhere near enough.

I was using 12-gauge wire, and several more turns has nearly filled the sample toroid inductor. So off to the wire store I go. Searching the shelves, I found some 16-gauge THHN wire. After several more attempts, I found that nearly 40 turns was required to bring the sample voltage to the normal value. I expect the 96 percent reduction in beacon current may be a significant challenge for most retrofit installations.

The other related tower task was removal of the now-unused ERI FM “Roto-tiller” antenna and three-inch feed line from the tower. Next month I will discuss some of the reasons for undertaking the removal.

KKPZ is a three tower directional. All three towers are self-supporting with a large correctional area. The center tower is taller with a Pirod pillion with a 20-inch face for mounting the ERI antenna. Prior to the removal, Cris and I discussed the potential impact the removal of the FM antenna would have on the directional. Based on the large footprint and past experience, we thought probably not much. That, of course, was speculation.

Over the years, I have observed the major indicator of proper operation of the directional antenna is the center tower to southeast tower

readings. If these readings are good, the pattern is “healthy.” That nominal number is 137 degrees and 60 percent.

So what happened in real life? The tower crew removed the FM antenna over a three-day period. Removal started at the lower sections of the FM antenna working up. At the end of day one, with the bottom five bays removed and only the top two bays still on the tower, there wasn’t much change. And I wall feeling confident, prematurely as it turned out.

On day two, the top two bays came down and the new beacon went in place. Now things changed radically. Tower 1 to tower 2 phase went from 137 to below 120 and the ratio from 60% to 76%. That’s a huge change. The picture no longer looked so nice.

Day three involved removal of the feed line and some reallocations. That brought the tower 1 to tower 2 phase back up to 130 and ratio to 65%. All this tells me the tower RF sensitivity is a lot larger than I thought.

The bottom line is that at the end of day three, I was able to bring the array back in without too much trouble. Partly luck.

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## Rocky Mountain Ramblings

### The Denver Report

by

Amanda Alexander, CBT

Acting Chief Engineer, CBC - Denver

What a month it has been! Honestly, it seems like just a couple of weeks has gone by. I have been busy non-stop. My first week as the acting chief engineer involved a lot of chaos. I was driving Pete Chamberlain, my new and able assistant, to each transmitter site, and while doing this I decided to check the tower bases at all the sites. Ed and I never really kept up with checking the bases of the towers, so I wanted to make sure things were okay. Well, they weren’t. While we were at one of the tower bases at



the KLVZ transmitter site, I noticed that something looked odd. I lowered the power and walked inside the tower base fence and realized copper thieves had hit. They dug up one side of the copper strap and cut all the radial wires.

From the looks of the antenna field, we assume they came in from the end of the radials with a metal detector, found the wire, and just pulled it up. Most towers they stopped before getting into the base fences, but at the tower by the river they broke off

fence pickets for access and cut the strap, radials and everything. Why they didn't take the copper strap beyond me, but I'm not complaining.

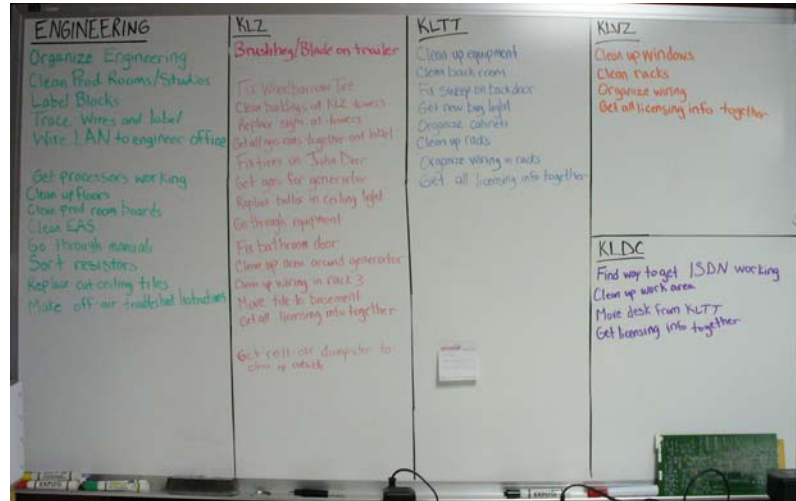
This has been my first experience with copper theft. It has been an 'experience,' and it continues to be one as we are dealing with having to get a new ground system installed for the KLVZ daytime site as well as secure it. We will be doing something very similar to what Stephen and Todd did in Birmingham. We got the cameras in on the 28<sup>th</sup>. I am going to be buying the supplies for an

electric fence for all three towers. We will be blacktopping inside the tower bases. We will also put up security lights to light up the area around the towers. Most of this I won't deal with directly as we have hired a contractor to deal with it, but still, it is an exciting experience for me.

On Saturday the 25<sup>th</sup>, my dad and I were at the KLVZ daytime site again, and while there, I noticed something looked odd in tower one, the tower by the river. Closer investigation revealed that sure enough, the copper thieves came back to that tower to finish their evil work. They dug up all the copper strap and cut the remaining radial wires from it. This time wasn't much as before they had stopped at the fence on all but one side. This theft knocked the antenna parameters way off. While I was reporting the theft to the Weld County Sheriff, Dad and I worked to get the parameters back to what they should be. After waiting a while for the sheriff we gave up and I called back and told them we'd give them a call that next Monday. Sure enough within minutes of me calling, they were there taking the report.

We are doing an experiment of sorts at KLZ. After having the barn broken into (again by copper thieves) and having it trashed and one of the towers getting robbed of some of the copper at the base, we have secured the entire site with an alarm system. We now have alarm contacts in the barn and in all six towers at the site. This is all being done via wireless,

which is where the experiment comes in. We are testing to see if RF will prove to be a hindrance to keeping it secure. If this experiment works, we can also use the same method to keep KLVZ and other sites secure.



Amanda's dry erase board

Before we could secure the site, we had to get power out to the barn. This involved a week's work for Berg Electric. They dug a trench from the building to the barn. They put a breaker box and a light

inside the barn as well as two security lights

outside the barn, one in front, and one in back. The guy working on all of this was kind enough to look at our security light on the front of the transmitter building. He fixed it and now the area is completely lit. It's nice to go out there at night and not get too freaked out by the darkness (and boy is it dark out there!). Those new lights are bright.

The next step for our security at KLZ is to get the tower base area security lights fixed on the two KLZ towers. One fixture is busted and irreparable and the other we suspect is just a dead bulb. Last month, someone evidently put a bullet into the top beacon on the west KLZ tower, breaking the red filter and one of the lamps. As soon as our tower guy gets the new beacon filter in, he will climb to fix that and then fix the security lights for us. The garage at KLZ has been a mess for several years. Pete and I went out there to wait on a delivery guy to bring the new copper for KLVZ. I had to run to Home Depot to get several things for the site, so I had Pete stay and wait while I went. I asked Pete to get the garage cleaned up while I was gone. I told him what I wanted done, it included getting the left side of the garage cleaned up, and spraying off the generator some, and getting the mess left by the mice cleaned up from under the generator. So I went to Home Depot, was gone maybe an hour and when I got back, that garage was beautiful. Really, it was. I have never seen that garage so clean. The mess from the

mice is gone, the garage floor isn't spotless but it is much cleaner. A lot of the junk we never used and didn't need is gone. Major kudos to Pete for doing such a great job on the garage! I wish I had a picture to show you.

One thing I am doing differently is using our big dry erase board to keep a list of the things we need to get done in the shop and at the sites.

As you can see, there are a lot of things that need to get done. There are a lot more things I should add to this list, but with the busyness of work, I haven't had time. There are a few empty spots on the

board now where we have finished up something. It definitely feels good to see the progress on the board. Sometimes I feel we will never finish, but with the spaces in the board I know we are getting somewhere.

The month of November will be another busy one as the holidays arrive and projects continue here in Denver. This has definitely and will continue to be a growing experience for me as I continue to learn as well as train Pete in the land of engineering.

Until next time, that's all folks!

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

Well, I finally did it. Reluctantly and apprehensively, I made the move to Windows Vista on my home machine. You know what? I actually like it! I'm sure Mr. Poole's eyes are rolling as I type this. It's actually not a bad operating system and seems to be much more stable than Windows XP. In some cases, application crashes under XP would cause the entire OS to lock up. A few years ago, someone used an airline analogy to describe Windows XP. The terminal is pretty and colorful, with friendly gate attendants, easy baggage check and boarding, and a smooth take-off. After about 10 minutes in the air, the plane explodes with no warning whatsoever. Vista seems to be immune from this and the dreaded occasional "Microsoft Moments" are actually close to non-existent.

Vista can be a bit irritating for the advanced user. Its insistent desire to confirm each and every move you make can be extremely annoying and reminiscent of HAL 9000. Double click on a shortcut..."are you sure you want to run this application?"

Change a setting..."are you sure you want to change this?"

"Are you really, really sure?"

"I'm sorry Dave, I'm afraid I can't do that."

That lasted about 24-hours before I began

digging for a way to disable that "feature."

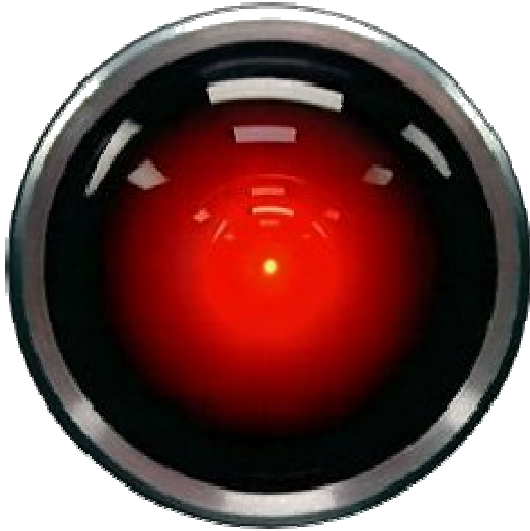
Thankfully it can be easily shut off, although doing

away with Vista's User Account Control results in Windows Security Center to squawk at you. A constant warning is displayed, informing you that you obviously must have made a mistake because the warning system is here to help you. Needless to say, that sent me on another mission to learn how to disable Vista's Security Center warning. Mission accomplished.

One feature I truly enjoy in Vista is the dock that can be placed anywhere on the desktop and can remain hidden until needed. I'm the type of user who likes his desktop shortcuts and the screen area can become quite cluttered. The dock system allows me to move the shortcuts into an organized area, grouped by association. These can easily be accessed quickly, similar to the theory behind desktop shortcuts. Although I do have some items on the desktop, it's definitely not as bad as my XP desktop and I can actually still see the photo used for my wallpaper.

Microsoft also did away with Outlook and Outlook Express, introducing Windows Mail instead. Users who have grown accustomed to Outlook Express will have no problems. In fact, migrating your messages from Outlook Express to Windows Mail is a breeze. Those who have become accustomed to the calendar functions of MS Outlook may be a bit annoyed. Windows Mail has no calendar





directly within it, but it does have an icon that launches Windows Calendar. Very similar to the calendar within Outlook, Windows Calendar is considered a separate application that runs independently of Windows Mail.

Email identities have also been eliminated. Under Windows XP, identities allowed the user to have several different mail accounts organized in completely separate Outlook accounts. For example, you could have all of your personal emails coming into one identity and have a separate and unique identity for your work related messages. Without the ability to set separate identities, I've been forced to store all of my email accounts in the same system. Although you can easily redirect messages to different folders using the mail rules feature, I still prefer the identities system of XP. There are applications popping up on the scene that mimic XP's identities feature, but expect to open your wallet for those.

Another annoyance is how Vista seems to operate entirely in the web browser world whether you are searching the web or simply accessing files on your computer. Any local file you access will appear in the browsed history within Internet Explorer. Some may find this a handy feature to quickly access frequently used files. I personally find it irritating, but very minor in my opinion. I suppose you sometimes need to take the bad with the good.

The final area I'll touch on is networking within Vista. The folks at Microsoft must have spent a lot of time behind a Mac while developing this area of their operating system. Connected network machines can be easily accessed through the "Network" link in the Start menu, each displayed as an individual icon. As long as the sharing settings are

set properly in each machine, you can easily and quickly access the files on each networked PC. Not that this was a difficult task under XP, but Vista provides a much improved graphic type interface that can be helpful when navigating a large network.

It seems as if each year around this time, I start receiving calls and emails from family and friends who are shopping for a new computer and would like my recommendation. With XP options quickly disappearing from OEM machines, most folks will be experiencing Vista for the first time. That also slightly changes which hardware components should be upgraded and which can be left alone. Although opinions relating to what components to focus on can vary from computer geek to computer geek, when faced with Vista, my opinion is to boost your system's memory. The minimum requirement, as stated by Microsoft, is 512 MB of RAM for Vista Home Basic Edition. Quite honestly, if all you plan to do is turn on your machine and let the screen saver run all day long, you may be fine with 512 MB. No guarantees though. If you plan to get any use out of your Vista machine, I would recommend at least 2 GB of RAM. If the cash flow allows, upgrade to as much RAM as you can. You won't regret it. Anything over 4 GB of RAM is overkill and won't be utilized by your OS unless you plan to use the 64-bit version of Vista. How much RAM also depends on how you intend to use the computer. 2 GB to 3 GB will be fine for someone who uses their computer to do research on the web and use some basic word processing applications. If you plan to play games or use high-end graphics software, go with either 3 GB or 4 GB.

The other area to boost is your processor. Paying for a better processor now will ensure you will be happier with your computer's performance in the long run and you can push back the need to upgrade again in the near future. A faster processor will run applications... well... faster.

Finally, with Vista taking up between 5 GB and 10 GB of disk space for its core components alone, upgrading to a larger hard drive isn't a bad idea either. Again, this depends on what you plan to use your computer for. If you intend to store some word processing files, some photos, etc, you can probably get away with a smaller drive. If you're like me and you store everything and the kitchen sink on your hard drive, go big or stay home. Some things that do you no good in life: a wallet left at home, half a second in history, the runway behind you in a plane, and disk space you don't have.

...until next month!



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The Local Oscillator  
November 2008

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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*

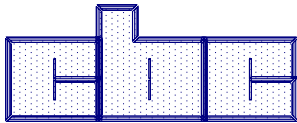
**WYDE-FM • Cullman - Birmingham, AL**  
*101.1 MHz, 100 kW/410m AAT*

**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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