The Local Oscillator

The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Where is the Truth?

As I write this in late October, snow is falling outside my office window. This is not the first snow of the season – we had a good snow the middle of October already. This storm has been a big one so far – more than a foot on the ground with another ten inches forecast here along the Front Range of the Rockies. While not unheard of, this much snow this early is unusual, and it sure makes one think about the validity of many of the "global warming" arguments.

From my perspective in this corner of the globe, things seem to be cooling down, not warming up. I don't think we hit 100 degrees at all here in Denver last summer, and there were very few 90+ degree days. Interestingly, the proponents of "global warming" have stopped using that phrase, preferring instead to use "climate change."

I think "climate change" is a good term. It describes what is going on now and what has been taking place since creation. But there is a big difference between the *truth* of climate change as a *constant* and the climate change that some think is being caused by (and thus must be preventable by) man and his activities on this planet. There is some element of truth to the proponents of the climate change doctrine, but it's far from the *whole truth.*

We can apply the same logic to the health care argument. There is an element of truth in the arguments of the proponents of nationalized health care, specifically that there are problems with the current system that need fixing. Tort reform is at the top of the list, and there is much wrong with the way health insurance companies do business. Those things need fixing, but nationalizing medicine is, according to the polls, not what the people of this country want (and I agree!). Politicians on the left are not giving us the whole truth, and neither are the insurance companies; reality lies somewhere in between.

All of this serves well as a lead in to the topic du jour, the proposed FM HD power increase. You've no doubt seen it all over the trades for the past few months, arguments on both sides. First was the proponent argument that HD Radio can't survive without a 10 dB power increase and that any interference caused to adjacencies would be minimal. Then came studies from the other side showing that much of the coverage of adjacent-channel stations would be destroyed by such an increase. The reality is that the truth lies somewhere between those two positions.

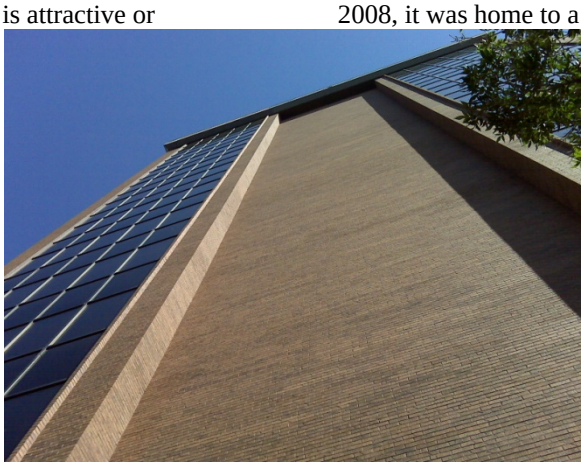
CBC's position is that we should proceed cautiously with an FM HD power increase. We *do* need such an increase to bring multicast coverage closer to parity with analog coverage, and I'm not necessarily talking about contour circles on a map. Building penetration is the big issue in my view. If multicast broadcasts cannot be received indoors on portable and tabletop radios, their value is very limited indeed. Does this spell the difference between survival and extinction for broadcast radio? I doubt it. But it may make all the difference in the world when it comes to the viability of multicast channels and formats. Without them, arguably, FM HD Radio has very little value on its own.

Will an FM HD power increase wipe out the coverage of adjacent channel stations? The answer is that it depends, and again, it's more than just contour circles on a map. Where stations are closely spaced together, usually east of the Mississippi and on the west coast, an increase in power in the digital carriers of a station will likely have a negative impact on adjacencies. Where grandfathered short spacing or grandfathered "superpower" exists, this effect will be much more pronounced. It doesn't take an engineering study to draw that conclusion.

But what about fully-spaced situations? In many such cases, there will be little or no effect on adjacent channel stations. However, as in real estate, the most important factor is often location-location-

location. Consider the case of the "rim-shot" FM that reaches into a nearby larger market with something less that a 54 dBu contour. In many cases such stations have a good number of listeners in the bigger market. What happens when the fully-spaced second-adjacent channel station located in that market cranks up its digital carriers by 10 dB? Will the adjacency's coverage in that market be impaired? You bet it will, and in such cases, those stations' business may be completely ruined.

So what do we do? Say "damn the torpedoes" and press on, regardless of the consequences to others? Ditch the idea entirely and let FM HD die? Neither option is attractive or acceptable. Just as the truth is somewhere between the two perspectives, so is the solution. We should forget about any kind of blanket FM HD digital power increase and allow stations to apply for a power increase on a case-by-case basis. As for the criteria to be applied in deciding the maximum power in each case, that's going to take some additional engineering studies and/or further scrutiny of the studies already done.



The Future Home of CBC-Denver

It remains to be seen what direction the FCC will go on this issue. In my experience, inertia will likely play a large part in their actions (it's easiest for them to do nothing), but doing nothing is ill advised. The FCC should do what it should always do – consider all the viewpoints, find out what the truth really is and implement a plan based on a compromise. At the end of the day, not everyone is going to be happy, but neither is everyone going to be upset. That's the way a good compromise works.

The Big Move

For the past five or six months I've been working on a new home for CBC-Denver and Corporate Engineering. The Denver cluster, since it was a single station (KLZ) back in 1992, has been housed in a historic old building on a bluff over the South Platte River just west of downtown. This building has been a good home for us, but it has increasingly become a challenge.

Moving a four-station studio operation is no walk in the park. Finding a location that will work is the first challenge. The new location must meet all the FCC's requirements for a main studio, it must be properly zoned, it must have the needed utility infrastructure, and if possible, it should have emergency power, line of sight to all the transmitter sites and space available on the roof for microwave antennas. That's a tall order – some would say impossibly tall. And yet, with God's help and guidance, we found a place that met all the criteria.

The new location is in the southeast part of the Denver metro area, near Cherry Creek State Park. We will have most of the 12th (top) floor of a high-rise. The space is ready-made for a radio station cluster. For a few months back in 2007 and early 2008, it was home to a now-bankrupt radio station. No expense was spared on the studio buildout (maybe that's part of why they're now bankrupt). The studios are huge – so big, in fact, that we will divide them in half to create control-talk pods for each station. Most of the office space we will use as-is (after repainting and minor repairs), and we will still have to do a tenant finish on about 900 square feet of raw space that we will use for offices.

Up on the roof there is an elevator penthouse that's tailor made for mounting microwave antennas. We have already started coordinations for three new 18 GHz licensed links, and I intend to use our existing 5.7 GHz PTP unlicensed link to the closest transmitter site (KLDC). There are already conduits in place to the roof.

As is the case with most modern office buildings, the HVAC system is run only during specified hours. This is a challenge for a 24-hour broadcast operation, and to deal with this, the prior radio tenant installed a dedicated 10-ton HVAC unit to feed the studios and engineering space. This unit was operated for only a few months, from November 2007 until April of 2008, so it's very "low mileage." That's one less thing that we'll have to deal with.

Unrelated to the former radio tenant, there is a 25 kW Onan generator that feeds the space. It was installed to provide backup power for an ambulance service that once occupied the suite. The building owner has maintained the unit, exercising it regularly, and we will have exclusive use of it.

So what's to do but move in? A lot. As mentioned above, we have some modification work

to do to the existing studio space, and we have to build out some office space. But we also have to install all the audio, control and IT infrastructure and get those four microwave links installed and running.

The real challenge is that because all the equipment in the Denver cluster is relatively new (certainly well within its useful life), we have to move it instead of building out the facility with all new equipment and moving in. That means that we have to somehow stay on the air with no studio equipment for a few days during the move. I have some ideas about how to do this; Amanda and I are working all this out right now. But it's still going to be a trick. I plan to use several of the engineers in our company to help with the move. These are folks that I can assign blocks of the project, such as moving the Wheatstone system or moving NexGen, without worrying about the outcome. We'll also bring in some local contract help.

The buildout is slated to start in March, but we won't move until July. Thankfully we have plenty of time, both for the buildout and the move.

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

Hello to all from Western New York! As I take a mental overview of all the IP-based equipment we now utilize in the broadcast industry, it is no wonder that we haven't been compromised in some way by hackers looking to make our lives miserable. With our automation systems, remote controls, IP-based remote broadcast equipment and even transmitters, we have to be cautious in the manner in which we attach our equipment to the Worldwide Web. There are thousands of Internet users out there just looking for a way into your equipment to install Trojans, malicious viruses and worms. Once these attacks are released, their destruction can cause thousands of dollars in lost revenue, not to mention the time it takes to clean up after an attack. Protecting our equipment from these malicious invaders is not rocket science. There are excellent programs out there that will protect your system from intruders and provide immediate updates to ward off a possible attack. Later on, I'll give you some tips on how to keep your system and network safe.

Let's take a look at some of the techniques viruses and worms have been employed in the past to avoid detection and deceive security tools.

- **Armored viruses and worms**: Armored viruses attempt to prevent analysts from examining their code by using various methods to make tracing, disassembling and reverse detection of their code more difficult
- **Stealth viruses and worms**: As the name suggests, these attempt to conceal their presence from anti-virus software in many ways. They gain access to your system by finding a known vulnerability and plant themselves in the root of the system. Once there, these viruses could almost completely obscure their existence. Most stealth viruses intercept disk-access requests so when an anti-virus application tries to read files or boot sectors to locate the virus, they present an uninfected image of the requested item, therefore making their presence almost invisible to the anti-virus software. One other way stealth viruses work is to hide the actual size of the infected file and display the file size information before the infection incurred.
- **Polymorphic viruses and worms**: Similar to most kinds of self-encrypted viruses, polymorphic viruses mutate, creating varied but fully functional copies of themselves as a way to avoid detection by using different encryption schemes, a variety of instruction sequences and even inserting random blocks into the virus code. By doing this they

modify their signature with every new infection. Each new mutation or variant of the original Polymorphic viruses can look like a completely different program to virus scanners and other security tools.

- **Self-encrypting viruses and worms**: Self-encrypting viruses try to conceal themselves from detection by encoding themselves differently each time they infect a new computer. Most anti-virus software finds viruses by looking for certain patterns of code, known as signatures, which are unique to each virus. A self-encrypted virus utilizes a decryption algorithm at the beginning of its code, followed by encrypted code that changes with each new infection. By doing this, it fakes out the anti-virus software that is looking for the signature.

These are but a few of the ways hackers can gain access to your network or computer. A lot of the programs now being written by hackers are targeting the anti-virus software itself in an attempt to avoid detection and enhance virus longevity. They do this by attempting to delete files that are associated with anti-virus and firewall programs and shutting down scheduled security processes, such as updates and patch installations.

What can you do to protect your network and personal computers? The safest thing you can do is to lock down your network. Before a worm or virus can do any damage to your system, it must be able to find a way to get in. After several failed attempts to get in, most hackers will move on to easier pickings. Here are but a few suggestions to help protect your computer or network from unwanted guests:

- Install and maintain an anti-virus program on each computer or network gateway. Regularly check with the software provider for updates and security patches. Most will query for updates on their own if programmed to do so. NEVER turn off the auto check for updates function of the anti-virus program.
- Work with the least possible system privileges. Only use the root or administrator privileges when absolutely necessary.
- Turn off all unnecessary services and programs.
- Never open an e-mail from an unknown source, or one that has an attachment that looks suspicious. This is the easiest way for an attacker to unleash a virus or worm into your system. Most will compromise your address book and send the virus out to every e-mail address contained in your mail address box.
- Apply and enforce strict password policies to each of your computer users. Never use simple words or plain text as a password. Use a combination of letters/numbers in your password, and to make it even harder for a hacker to decipher your password, use random capital letters along with lower case letters.
- For critical systems, such as servers or streaming encoders, install and run the anti-virus software from a disk so that no executable code from the machine can be run.
- Utilize additional security tools such as Tripwire or Chkrootkit for Linux systems and other intrusion detection systems (IDS)
- Periodically check your anti-virus software to insure that no changes have been made to disable or remove automatic updates to the software.

Following these procedures and tips will help insure a healthy and safe environment for all your broadcast data and programs. There is so much more involved with protecting your networks and computer systems from intrusion, and space limitations prevent me from going into further detail on site security, but installing and maintaining a good anti-virus software program is the first step in prevention of the possibility of an attack.

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

Friday October 23rd was perhaps the weirdest day I have experienced in quite some time. At about 5:15 AM, I received a call from the board operator at WDCX-FM that the TFT EAS-911 unit was sending out a weekly EAS test on its own every two to three minutes! I had him pull the plug that provides signal to the relay unit so the attention tones would no longer go out over the air. Looking back on the printouts, the problem began at 3:58 AM while we were unattended and tests were repeatedly transmitted from that point in time until he arrived at 5:15AM.

Once I arrived at the station and pulled the unit out, I couldn't readily find the cause of the problem. I opened the unit up and pulled U15 from its socket and grounded out JP2, which cleared all of

the unit's memory. Once I reprogrammed the EAS encoder, all seems to be working fine, and it has continued to work thus far. A call to TFT's service department did not reveal a possible cause to this problem. They basically told me to do what I had already done, which was to clear memory and reprogram.

Another weird incident occurred later on in the day, when the board op called to report strange readings on the HD transmitter. I called in to the remote control and found the BE transmitter to be down, i.e. no RF output. When I arrived at the transmitter site, I found that the screen on the IBOC signal generator, the FSi-10, was blank. I re-booted the power to the unit, but it would not boot up past the "No Video Input" screen. I pulled the Fsi-10 from the rack and removed the top cover to do a visual inspection to try and determine the nature of the failure. Everything appeared normal, with the exception of the processor fan located on top of the large heat sink of the processor. It was barely turning, and the heat sink was pretty hot to the touch. Once the unit cooled down, I was able to get it to reboot and come up to the normal operating screen, and it stayed up for about three minutes until the processor shut it down on a thermal overload.

Thinking that this was the source of the problem, I called our local parts supplier to see if they had in stock a 12-volt variable speed fan. They did not have a direct replacement, but did have one that would get us by until the exact replacement could be obtained. Once I installed the temporary fan, the FSi-10 was put back into service and re-booted. Now the processor was re-booting continually and would not get to the main screen. While re-booting, I noticed that the platform had changed from G2 to G3, which was causing the boot failure. I then re-installed the Ibiquity software, which returned the platform to G2, but the unit still would not boot properly. I knew that all the programming would be destroyed once I reinstalled the software, and I had all the original configuration written down in case of a major failure. I began to reinstall the system configuration, but quickly found some fields could not be programmed, I was getting numerous errors indicating that the station configuration file was missing or that the unit had to be in "BER" mode to continue. Also the audio bypass was stuck in bypass A/B mode. Aside from getting the network address programmed and the station information in such as station name, parity code etc., nothing else would work or program properly. A call to BE technical support was no help in getting us back on the air in HD. We did determine that the unit would have to be sent in for repairs, that I had gone as far as I could go in the field.

To get us back on the air, Joe Huk has shipped us his spare FSi-10 from Detroit. Once it arrives, I will be able to re-program it for our station and get us back on the air until our repaired unit returns from BE.

In Rochester, we have now come full circle. Beginning in November, all of our Rochester operations will be conducted on the second floor in the building in which we have occupied since starting the station up back in 1994. We began with the FM station only, and in 1999 CBC purchased the AM station. With the addition of another air and production studio, space was at a premium and we had to look for a way to accommodate the additional staff. When the space became available downstairs about eight years ago, we moved the business and sales offices there and have operated with the business offices on the ground floor and studios upstairs since that time.

As the economy began to deteriorate this year, our staff was cut back to bare essentials to keep our operating costs down. With the reduction in the number of staff, the additional space was no longer needed, so the lease was renegotiated to include the upstairs only, which will save us thousands of dollars annually.

That about wraps up another month here in the great northeast, and until we meet again here in the pages of *The Local Oscillator*, be well and have a happy Thanksgiving!

The Motown Update

By
Joseph M. Huk, Jr.,
P.E., CPBE, CBNT
Chief Engineer, CBC–Detroit

We Need More Data Capacity without Frustration

In October, we have been researching using the local cable company for Internet service. What we thought would be a simple request for a quote turned into a project of disappointment.

We first inquired about cable Internet service about a month ago. At first, the customer service representative said that as a business we could obtain residential service. The only caveat is that we would not have a four-hour turnaround on repair calls as we would expect with business service. It would be approximately 72 hours before we would get service restored. Since this service would supplement our existing commercial DSL data circuit, that would not pose an issue.

The idea both Larry Foltran, our IT director, and I have is to split the office LAN and streaming loads. The streams would remain on the commercial DSL service and the office would be on the new cable Internet. At first they came back with a price of $29.95/month for 10 mbps service. The price seemed too good to be true. And of course, it turned out that it was.

When we were more serious about purchasing the service, I was told that that I could get a 6 mbps service for $69.95 per month. The $29.95 service was less then 1 mbps. So at the point when we were ready to purchase the service, I called back to the same service representative that I spoke to about the residential service. Now the story changed and I was told I was only able to obtain business Internet since I don't live at the station. Well, I was thinking in my head, I do spend a lot of time here; maybe I would qualify if I bought a cot for the office (smile). So, the frustration mounted.

Then I was told that our street address does not show up in their database. I told the customer service representative that our street name "Radio Place" is our parking lot. I imagine the thought was that it had a sexy sound to it at the time and our own street was born. Well, they finally found us on a map and told me that they needed a site survey to determine how much construction was needed to bring the cable to the building. I told the representative, "I think you are making more out of this project then you need to." He said it was necessary.

A third party installer surveyed the site and found that the cable needed to be run from the center of our property to the building. He said it would not cost more then $1,800.00. When I received the proposal from the cable company, they told me that it would cost more than $1,900.00. It seems that they padded the project a bit. The bottom line was that the cost of installation would be waved if we signed up for three years of service. A month of comparable business service would be $89.95/month. So, the story changed again.

At this point, to justify the added expense of service, we are going to have to do a study of how the current limited bandwidth is hurting our ability to make money. In addition, we are investigating a wireless EDVO card and companion Linksys router for added internet bandwidth for the office LAN.

So, the morals of the story are, if you think your getting a great deal that is too good to be true, it most likely is. Also, don't expect to get the correct information when you first inquire. It will most likely take you more discussions to ensure you are buying what you want.

Until next time, be safe, and if all goes well, we will be reporting to you from the pages of *The Local Oscillator* next month. Best regards.

News From The South

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

Gittin'erdone in Cullman

When I left you last time, we were in the middle of repairing some major problems at the WYDE-FM site in Cullman, Alabama. Lightning struck on the evening of September 20th, causing catastrophic damage to the BE FM-30T main transmitter, and – as it turns out – quite a bit of other stuff.

Figure 1 continues the saga from last month. With the damaged multiplier cover removed, we discovered a hideous gash approximately one inch by three to four inches in the RF cavity. I used a hole punch to eat out most of the sharp edges, then used a rasp on a cordless drill and some hand files to smooth it as much as possible. To cover the hole, we used an aluminum plate cut from a piece of stock obtained at Lowes. Brass screws (also from Lowes) were used to provide a tight mechanical seal. We then used Solder-It aluminum brazing paste to "spot" around the patch to ensure a good connection in the future. Figure 2 shows the result, viewed from inside the RF cavity (the tube chimney is to the left).

If you ever have to do this, don't waste your time looking for an easy way. Go ahead and yank the tube, remove the plexiglass shelves and pull the exhaust chimney. In other words, gut the cavity so that you can get at everything. This also makes it easier to apply plastic sheet and duct tape to keep metal filings out of the rest of the transmitter. (The very thought of aluminum dust drifting around inside a cavity with 10,000 volts in it should make you cringe.) Fortunately, this wasn't as hard as I feared it would be, but it did take time. All told, we put about two days in the repair... and that just took care of the most obvious problem. Next, we had to repair everything else that had been damaged by the lightning strike.

All of us have things in this business that we don't like. Two of my top three are now gone, thankfully – turntables and cart machines. The third – high voltage arc-over in a transmitter – is unfortunately still with us, at least until the high-powered FM market finally completes its conversion to solid-state. I'm always skittish about applying power to a transmitter that has arced, because it's hard to tell what other damage there might be. You can easily undo your repairs and add new damage in a matter of seconds.

Here's a tip: kill the AC main to the transmitter and carefully "safe" it. Discharge all caps and double-check that there's no AC going in to it whatsoever. Using the schematic as your reference, temporarily disable any shorting bars or other low-Z paths to ground on the high-voltage supply. (The bleeder resistors are high-Z and won't affect this test, so don't worry about them.) Your first test can be made with a simple ohmmeter on the high voltage supply line: you should read a high resistance (ideally, the value of the bleeders and nothing else).

If you pass that test, with the transmitter still cold and unpowered, take a 24V AC transformer – I used a simple "wall-wart" from Radio Shack – and connect it to two of the primary input leads on the plate transformer. BE CAREFUL. Even though you're only using 1/10th of normal AC line voltage, you can still get more than enough high voltage to cause a lethal shock. Make the connection and THEN plug in the little transformer. Insert hands in pockets and have your assistant note the plate voltage on the front panel meter, then unplug it. Discharge the capacitors and undo the changes you made for the test.

Depending on how your plate circuit is wired, the result will typically be about 1/10th of your normal unloaded plate voltage. In our case, we got about 1200V -- high enough to check for major faults, yet low enough to avoid serious damage if something was still wrong. We didn't experience any arcing, voltage drop or unusual heating, so we were

encouraged.

Of course, that little 24V transformer just provides a static test of the unloaded power supply. For the next test, we wanted reduced power. With some transmitters, you have to play with the HV supply to lower the voltage (for example, by

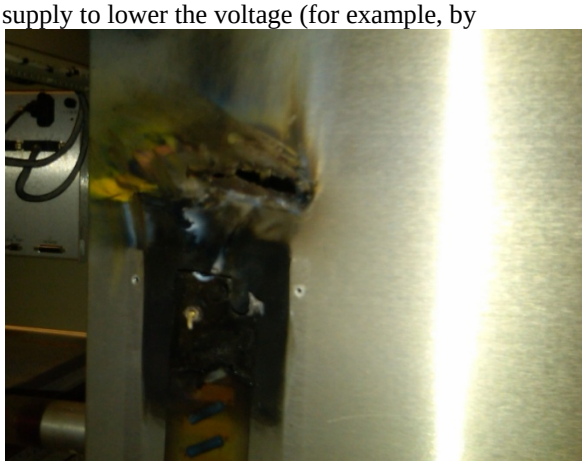


Figure 1 – The arc burned a gash through the FM-30T cavity wall

Figure 2 – The gash repaired

disconnecting two of the three primary phase inputs on the HV transformer, or by temporarily using 110V AC on a single primary). The BE FM-30T makes this a little easier: there's a "half-voltage" tap, so we used that. As soon as we hit "plate on," though, some resistors began smoking and glowing; they had been damaged by the original arc. The high voltage contactor froze again; I thought I'd freed it and made it workable, but it wasn't reliable. The opto-isolator on the HV relay had failed, too. We ordered replacements, installed them, and the BE was finally good to go. The patch on the RF cavity worked like a charm!

But More Utility Issues...

In the meantime – as also reported in last month's issue – the Continental aux had problems of its own. We were able to get it on air at reduced power, but it was badly mistuned. The procedure in the manual isn't exactly comprehensive; it left us in a state where efficiency was too low. The output exhaust air was getting way too hot and we couldn't make full power.

While I was working on a new exhaust vent for the aux (on a bright, sunny day), the power suddenly went crazy. We were obviously losing a phase, but it wasn't constant: the power was pulsing on and off. While I watched in horror, the BE said, "bang, bang, BANG!" a few times, the blower started growling and lugging and the high voltage contactor froze in place. (Again. Sigh.) Then the generator finally came up and I quickly switched us over to the Continental at reduced power while I checked for damage. My heart was in my stomach; we had already spent many, many hours rebuilding the BE, and I prayed that there wasn't any serious damage. Thankfully, there wasn't. This time, I was able to "unstick" the HV contactor and it worked fine.

When the utility arrived, I asked them what in the world could have happened. As it turns out, one of their primary line fuses on the pole out front had gone intermittent, then finally burned open. Normally, when these things blow, it's as loud as a gun shot, but I didn't hear anything this time. Nor was the fuse wire inside the thing melted. We surmised that the lightning of a few weeks ago had weakened it, and that it had finally decided to let go while I was there.

(Incidentally, in one of life's perverse coincidences, I was using a drill with a 6-inch hole saw on the ductwork right when it happened. Naturally, my first thought was: "what in the WORLD is wrong with this drill???")

This naturally made me wonder if similar failures had happened in the past. We have replaced the blower in that BE, and we've had the high voltage contactor freeze up before as well. I pulled out the schematic and traced through it, and discovered what I think is a design flaw in the FM-30/35T series: the phase loss detector's main function is to simply open the blower relay. The microprocessor controller apparently won't realize that there's a serious problem until the blower finally stops. Plus, Broadcast Electronics has designed that transmitter to automatically come back on after a power failure, and it will do so... aggressively. Normally, this is a good thing, but in this case, you can see how damage could occur. The "bang, bang" that I heard was the HV

contactor rapidly pulling in and out... and this time I was there to actually witness it with my own eyes. A light dawned and I understood how we could have had so many problems over the years.

I'm working on a circuit that will actually switch the plates off if there's a problem, but note to manufacturers: please add a little hysteresis and/or a timeout to your "failsafe" and "alarm" functions. I wrote some years ago about the alarm relay on the Harris Aurora system: if you've got a marginal signal, it will chatter like a monkey. That's wholly unsuitable for failsafe work, because whatever it's connected to will be chattering on and off as well! This most recent example with flaky utility power and the BE just underscores my point.

At any rate: with assistance from Cris Alexander, Brian Cunningham and Art Reis, all three of whom have spent a lot more time in the Continental 816-R4 than I have, I got it tuned well enough to trust. The only thing that worries me about that transmitter in general is the old tube driver stage; it's extremely flaky on a cold start. It's fine as an aux, but we won't be using it as a main transmitter for that (and other) reason(s).

But enough about Cullman (we've certainly spent enough time and money here; I haven't even mentioned the $2,100 repair to the air conditioner!). Back to another familiar topic…

The Mail Server

We keep promising to move from Scalix to the Zimbra mail system. We obviously got knocked off schedule by the problems in Cullman, but we still plan to do this. We've got Zimbra running right now on a test server and hope to go live with it in November. The big issue, of course, is ensuring that we don't lose any mail. Ideally, we'd like to migrate all mail and user names, but that's proving very tricky (different mail servers don't store things the same way; in some cases, they don't even "speak" the same "language").

All of this takes careful planning. In those rare moments of respite when he hasn't been helping me in Cullman, Todd Dixon has been working on a good bit of this, easing my load significantly. We've got the Scalix server running in a VirtualBox client at present; we hope to put Zimbra on the very same computer to allow us to quickly migrate the mail information from the old to the new. We'll put out an email a few days in advance to warn everyone when the changeover will occur, but for now, you can do us a favor: warn your employees of two things. First, when this happens, obviously, the mail server will be down for several hours (just as obviously, we'll do this on a weekend). But second, tell them to be really aggressive about keeping their mailboxes cleaned of old mail messages. People who need to save important messages should use a client like Outlook or Thunderbird, and should NOT depend on the Scalix server itself to store everything for Webmail access.

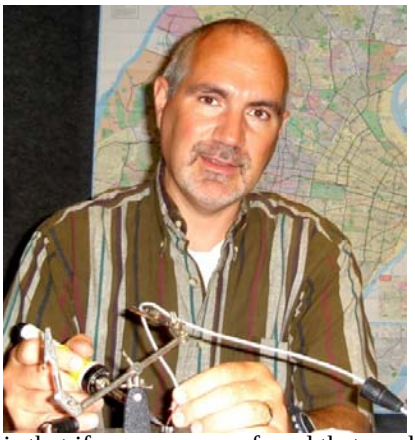
Finally: Congratulations to Jimmy Parker!

Jimmy is now a married man; as I write this, he has returned from his honeymoon in the hills of Tennessee with his lovely bride Stephanie. I wish them the best, and ask all of you to do the same, and to keep them in your prayers. We sure missed him last week, but we were happy for him. Until next time, may God bless, and keep America in your prayers!

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

I've been working with Burk AutoPilot 3 (AP3) for about four years now and I have certainly obtained some skill in working with many of the features of the software. AP3 is the transmitter site monitoring and control software that Burk Technology has created to work with their ARC 16 remote control system.

I have written in the past about the features that I really enjoy about AP3, especially the email capabilities and the virtual channels. With these you can get really creative with the monitoring and control of your sites. However, my experience with AP3 has not all been smooth sailing. I discovered the hard way that the software can become corrupted somewhat easily if you're not careful, and you will have to reinstall it to get it working again.



The biggest problem with that is that if you did not backup your configuration file, you will have to recreate all the configurations. This includes the connection and ARC information, labeling, channel meter views and your calendars. Depending on how many ARCs you have connected and how elaborate you have gotten with the software, this can take a lot of time and work to recreate. Trust me – I found this out the hard way, more than once. I guess I have to be burned a couple of times before I learn.

Now I have learned how to avoid the corruption of the software and the need for to reinstall it. I will share that with you later, but first, the best thing you can do is to take a few minutes and back up your config file. You can do this by going to the Program Files folder of your "C:" drive, then go to the Burk Technology folder (C:\Program Files\Burk Technology). Open the AutoPilot folder. In there you will find a file labeled "config.mdb". Make a copy of this file and place it somewhere else on your drive. Making a copy on a thumb drive or CD would also be a good idea as well, since hard disks are not forever.

While you are in the folder, you might as well back up your work like virtual channels, email lists, scripts, custom views and reports. Backing the "history.mdb" file on a regular basis is also a good idea, since this contains all your telemetry, status changes and alarm information. You should also back up the "config.mdb" anytime you make changes to calendars, status labels or meter views. When you create or change a script, back up those changes as well. This will keep your backup updated and ready to go should you have to reinstall.

I found that with all that backed up, the reinstallation goes quickly and is not that big a deal. Still, I didn't want to have to do this a lot, especially since the corruption has tended to happen after a reboot.

I haven't had to do a reinstallation of the software for over two years now. Here's my secret. Make sure every bit of the AutoPilot 3 software is turned off before turning the computer off or rebooting the computer.

Here's the procedure that I found that works for me. First, I disable the three AutoPilot modules on the Windows task bar. This would be the "AutoPilot Scheduler," "AutoPilot Emailer" and the "AutoPilot Logger." Just right-click on each one and click disable.

Now go to "File" on the AP3 software and log off. Answer yes when it asks if you want to log off, and then hit cancel with the "AutoPilot login" popup comes up. This will get rid of the main screen of the software but not all modules of the software are turned off yet, so don't reboot the computer until they are turned off.

Go back to the Windows task bar. Right click on each of the AutoPilot 3 modules that you disabled earlier. After you right-click, click exit on each one and you will now have stopped all the AP3 processes running on your computer. You can check this by opening "Task Manager" on your computer and opening the "Processes" tab. You will see that there are no longer any AutoPilot functions running. If there are, you didn't get all the modules turned off.

By doing this procedure every time I reboot the computer, I have avoided having to reinstall the AutoPilot 3 software. Yes, you can reboot the computer without going through the procedure I have described, but eventually it is going to catch up with you. Trust me on that.

Valley Notes

By
Steve Minshall
Chief Engineer, KCBC

My contributions to *The Local Oscillator* have been absent for much of this year. The main reason is that I have been swamped with things to do. It seems that there has been a never ending stream of project to do a work and at home.

The economy has been an interesting ride. I have seen the impact at work for sure, but the projects continue. Keep in mind that I work for more than one broadcasting company. The main impact in my work environment is one of ever increasing efficiency.

My latest project is a joint Crawford/Clear Channel project that benefits both companies as Cris has covered in a previous issue. On the Clear Channel side of the project, I find myself squeezing the highest efficiency out of each budget. I refer not only to monetary budgets but also budgets of power, HVAC, building and tower space.

One of my tasks is to put two transmitters, two aux transmitters and an FM combiner in a building that was originally designed for a single FM transmitter. This will be my first installation of a Nautel FM transmitter, an NV-10. The transmitter fits the price, space and power budget (with overhead for future HD power increases).

The FM combiner has been a tough one to fit in the budgets. A lot of phone calls and emails yielded an array of choices, most of which were too big, too small, and often too pricey. The one that fit all criteria comes from Jampro. Jampro is about an hours drive from the transmitter site, so we will probably go get it with a pickup truck.

The Crawford side of the project is interesting as well, especially to me since my big interest is building things. I will be building a night phasing system and will be installing control wiring and new sample lines to the KCBC towers.

The installation of the control and sample cables has been an interesting endeavor so far. My first investigation into the existing wiring gave me every indication that the present lines were all direct buried. This would mean that about a thousand feet of trenching would be required to install the new lines.

I was getting all geared up to get the trenching done before the weather changed and before we had a field of mud. I wanted to locate the existing lines and determine the burial depth before we put a trencher on site.

Now I must say that I hate digging – always have and always will – but I do it when I have to. So I dug and dug and dug. I was delighted to find that the lines were all in conduit after all. I was not so happy to find that there was no pull string to pull more through.

My conduit runs are between 250 and 550 feet long. My electrician friend says that there is no way to push anything that far. I may try to use a shop-vac to suck a plastic bag and string through but with the cables, dirt and moisture present, I have doubts that it's going to work. Trenching still may be the only option.

There is one more option that I am exploring. My friend at the CIA has used trained mice to go up the drain pipes at various embassies around the word to place listening devices. He says all we need to do is place a block of cheese in each ATU and an ordinary mouse will pull a string through the conduit from the transmitter building.

I have the flu today, which has slowed me down enough to sit down and write this column. I write this using my laptop set to font 22. Rather giant font but there is a reason.

I used to have ridiculously good eyesight. Time takes its toll on our bodies, however. Thirteen years ago, when I turned 40, my arms became to short. Reading glasses were the answer for up-close vision. As the years went on, I became far-sighted, which makes the reading even more difficult.

I had to admit that I was no longer the young kid with perfect eyesight and made a visit to the eye doctor. He started to talk about glasses. I said NO!

We aren't doing glasses! I hate glasses, maybe even more than digging. By the way, the worst thing is digging with glasses on a hot day. The sweat falls on the glasses and they keep falling off in the dirt… but I digress.

I wanted contact lenses. I got my first set of contacts, bifocal contacts. They were not bad, but it was impossible to use the computer at any resolution, and there were no glasses that fixed it.

I tried a second set of contacts. This was interesting. I drove home and I knew these were not going to work when I realized that the two guys crossing the street was only one guy. I didn't know which one to aim at.

Now I am on my third set. These are the best so far. I can go pretty much all day without any glasses, but the computer screens still give me problems.

Next time I will continue the conduit saga and hopefully have a contact les update.

God Bless you and yours.

Catalina Tales

By
Bill Agresta
Chief Engineer, KBRT

Greetings from Santa Catalina Island! It's been a wonderfully entertaining month here on the island. To begin with, our Nautel XL12 transmitter has been working like a champ, not showing one sign of the control issues we began to see last month. I guess that is to be expected here – just one more thing to keep me on my toes.

The Airport Road saga continues as well and became really "fun" towards the beginning of last month when we got a small shower and parts of it became so slippery it was like driving on ice. After it has dried, it was like driving on a giant old fashioned washboard! Then the winds came and there was so much dust from that road that a friend of mine who works at FOX TV and was here visiting me began having sinus issues. He asked if I knew what the stuff they sprayed over that dirt was made of. I only wish I did. All I know is that it's not good for much, except for getting people sick – in more ways than one.

I am keeping food and water stocked very well up here as I expect to get stuck at the transmitter site if we get any kind of substantial rain this winter. I will keep you all updated on this entertaining Airport Road saga as it continues.

In other news, our friends at AT&T have been back at it again. You may remember that after the fire, AT&T refused to reinstate our DSL service that we had with them. We had copper lines running from the KBRT transmitter plant to the AT&T microwave tower at Dakin Peak, but the fire burned down many of the supporting poles and damaged or destroyed the cables. They reinstated our phone lines utilizing a channel from their fiber node that is just above our driveway. The only issue with this is that we are sharing this channel with the camps down below, so the channel runs down to the shore and all the way back on old copper lines – too far to get DSL or even reliable phone service. In fact, since the fire, even POTS service has been intermittent much of the time.

Then late last month, I began noticing an increase in the outages. My phones and T1 would go dead for several minutes, come back up and then go dead again. I called our local repair guys and they could not seem to catch the problem till a few nights later when they got a major alarm around 2:00 AM. They responded with our local Southern California Edison crew in tow, as it appeared that they had completely lost power to their entire system and all back-up power had failed.

By 3:00 AM, we had quite the show out in our driveway and I was wondering what was going on. The issues at the tower got repaired, service in the town of Avalon came back up but all service in the interior of the island was still out. They had no alarms and no answers to why.

The phone guys drove all over until finally, around 5:00 AM, someone decided to check the node near our driveway. Sure enough, it had failed and did

not alarm. In fact, it smelled like it burned up pretty bad, and to make matters worse, they could not find parts for it anywhere.

Then I remembered the story one of our local AT&T guys told me after the fire of how this was a four-channel node that was built as a prototype to test fiber here on the island. It is the smallest node AT&T has anywhere and the only one of its kind. It is also the reason we did not get our DSL restored here at the transmitter plant and have had to fumble around with satellite ISP and other ideas since the fire. Well, finally it had come back to bite them on their backsides!

We finally got our phones back, at least for the time being. They were able to make a power supply they got sent over from out of state to work with this node, but it still has some other issues. Now I understand that this issue has made it all the way up to AT&T corporate and the engineer who made the decision to leave this node in service might not have a job soon. They have ordered a new node, and after all this, we may finally get our DSL service restored, nearly two years after losing it. Now, that's slow service!

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

Project Sheherazade

Our question for last month, which came from Cris Alexander, involved the tuning of an RF Amplifier in FM service which has a grounded screen configuration. The question was: What is the best indicator for tuning an amplifier using such a configuration? The answer is, *Screen Current.* In a properly neutralized amplifier, lowest plate current, and highest screen current and RF output should all coincide. If they don't, you might have neutralization issues.

Our question for this month also involves FM transmission systems, but moves to the antenna . This one came from our friends at ERI. ERI's new antenna for simultaneous transmission of the analog and HD Radio RF energy allows use of two separate transmitters without the need for a high level injector or reject load. The two antenna systems are interlaced. That is, each of the digital RF antenna elements is separated by a half wavelength from the analog antenna elements both above and below it. What is the secret to preventing interaction between the two sets of antenna elements? The answer next month.

The Behringer Untramatch Pro SRC2496

When M Audio discontinued the famous Flying Cow D-to-A and A-D converter a few years ago, I mourned. I was bummed out , because this was the one box which could do bidirectional A-D/D-A conversion at a reasonable cost. Most all the other alternatives were either pricey or not able to do the job I wanted done.

Well, happy days are here again, and even better than before. The Behringer UltraMatch Pro SRC2496 is both better and lower in cost than the old Cow ever was. Produced in Germany for more than a year by Uli Behrenger, the box features the kind of workmanship which long ago made the Germans famous. And how do they do it for under $200? I dunno, but I'm not going to argue with it.

Like the Flying Cow, the UltraMatch Pro is usable for analog in and out and AES in and out, in both XLR and S/PDIF (RCA) formats. Aside: Unlike the Flying Cow, the Audio output XLR connectors are male, which is the way it's supposed to be. Several digital audio rates are available on both units, but the UltraMatch Pro has more, ranging from 32 k to 96 k. The Flying Cow went only to 48 k.

The UltraMatch Pro has a number of features and uses that the Flying Cow did not have. Digital resolution can be adjusted between 16 and 24 bits. S/PDIF optical input and output are. Sample rate synchronization can be done by either word clock or digital input. There is an anti-aliasing filter built -in, to help prevent those awful artifacts from showing them up on the air (ever hear a muted trumpet improperly run through an A to D converter?). There

is even a built-in headphone amplifier.

And, this is interesting: the UltraMatch Pro allows for direct manipulation of emphasis and copy-protection bits. While not applicable to most applications involving radio stations (especially at transmitter sites), handling of copy-protection in professional situations does create a need for this sort of at least temporary manipulation of copy-protect information. A single front panel switch, and a read of the manual covering the subject, is all you need to do what you need to do.

One of the endearing features of the UltraMatch Pro is that, once you've set the box up, it will 'stay' where you put it, and not reset itself to some 'default' mode if a power glitch occurs while you're away – great for transmitter site applications.

There are a lot of other features which could be covered regarding this box, but suffice it to say that the Behringer UltraMatch Pro has the most marbles for the moolah, and everyone should have one somewhere in their stable. Don't even bother to have it in standby mode. Someone is going to find a use for it.

Fun and Games with the Fire Inspector

We have four transmitter sites and three offices here in the Chicago market, which keeps us rather hopping. There's something going on at all times at most of these places. Of the transmitter sites, three are in what could only be called rural settings, and that's including our beloved "Camp Desolation," WPWX's site in an old disused (and misused) industrial park. The fourth site, in Lansing, is really urban, a neighborhood of mixed housing and businesses, and one of the busiest freeways in the Midwest, I-80/94 east of the south edge of the Tri-State Tollway, and the Bishop Ford Freeway. It is here that we have the biggest bane of our lives – the Lansing Fire Department's Fire Inspection Unit.

In the LFDFIU, I've found the perfect place to cut out-of-control government spending. This bureaucracy is bloated, arrogant and selectively picky. We can count on a visit from these blokes about once every six months. Our studio in Hammond, which is an even bigger city and with a location on an even bigger street, hasn't been inspected in several years. Our other sites have *never* been inspected. These folks have obviously too much time on their hands and not enough places to inspect. I'll tell you one thing: They really like to harass us. We may not be alone, but I have no idea about that.

Our Lansing building is so big that we rent out about 65% of it to a pneumatic tool business. Now the office staff there is about the nicest, sweetest bunch of gals you could ever want to find, a credit to their employer. This, unfortunately, makes them easy prey for the jerks for the LFDFIU. Their supervisor told us after their last nit-picky inspection that the guy we got this time was new and likes to work strictly by the book. Liar! This "newbie" strode into the site like he owned the place, refused to show his ID or credentials and proceeded to write things up. How's that "by the book"?

Here's the thing: This guy is finding things wrong that no one has flagged before. That's not the first time that has happened, either. Some years ago, the inspector found out that one of our building's gas meters, located at the front of one of the building parking spaces, did not have the proper barriers in front of it. Okay, not an issue there... except that this particular gas meter had been sitting in that same spot for over *thirty years!!!!* Where were these guys' heads before then?? In short, they *don't* play it by the book. Last year, we got a clean bill of health. First time ever. This year, the guy found maybe twenty things wrong, and we hadn't changed a thing! The bloke even chastised us for not having "direction arrows" on our door locks so that one would know which way to turn them to get them unlocked! Well, why *should* we? After all, *we* know how to lock and unlock their doors. "Well," responded the fire inspector, "maybe *you* do, but when our firemen are inside and need to operate the locks, *they* don't." Well, what the heck's up with that? The door lock knobs operate in only two ways, clockwise or counter-clockwise. If these guy can't figure out which way is "unlock," can we even count on them to put out a fire? To put it succinctly, "*Get real!*"

And another thing… this particular guy's attitude toward our renter's office staff was nothing short of high-handed. They couldn't get us over there before the guy was gone, and the following day I got a phone call from the LFDFIU supervisor asking us what the deal was. I started asking him the same thing. He said he wanted to see everything cleared up within two weeks, and that they would be coming back.

Here's my point: Government at all levels, even down to the local entities, have picked up on the attitude coming from the White House and everywhere else in government from there on down. In my experience, they are no longer thinking of themselves as public servants, but rather as masters. I don't care what the public safety issues are. The behavior I'm seeing from these folks transcends that. Those who occupy the role of "inspectors" need to realize that these are human beings that they are dealing with. Further, if they are there to do their

job, then they must *do their job*. That means finding and helping to correct *all* the real problems which might exist, the first time, and not overlook stuff which is obviously wrong per the fire code, for years. That is unprofessional in any event.

Maybe we should get the book that these jokers go by, if there is one, and conduct our own inspections, find the problems ourselves, and fix them on our own. We do that with FCC self-inspections, so why not? It's a great way to get rid of a bloated local government bureaucracy, and obviously save some public money in the process.

Better the individual do that sort of thing than the government. Hey, why not get the fire insurance companies involved by getting them to print the inspection guides. Or are they too busy defending themselves against nationalization, like I've been hearing?

Not So Fast!

Cris is gonna kill me for this one. Okay, maybe not.

One of the great enjoyments of my life is the occasional side job I get, doing out-of-town jobs doing directional proofs of performances on AM stations which are about to acquire cellular towers as neighbors. The pay is good, the travel restorative and the job is, frankly, a lot of fun. Both my FIM-41 and my RCA/Nems-Clark WX2E have paid for themselves a dozen times over in the last eight years. Both Cris and I really enjoy working with AM directional antennas, and Cris' work and the work of others with the method-of-moments system for AM directionals is truly stellar. The FCC apparently has agreed, after a too-long deliberation on the subject, and method-of-moments is now in the rules. This story is one which Cris has chronicled in these pages since way back when. The new rules took effect on February 5. So be it.

There has been a considerable amount of gloom-and-doom talk amongst the folks who do the kind of directional proof work that I do as a semi-hobby, saying that the days of such work are now past. Well, so *not* be it. In other words, not so fast, brother.

When a cellular or other such tower is constructed within a certain distance of an AM directional array (or even *real* close to a non-DA – I've done a few of those), the effect on the AM station's pattern(s) must be assessed both before and after cellular tower installation or modification. If the station is *not* proving its pattern shape based on method-of-moments, then the pattern still has to be measured the way mother used to do it. However, if the station has already discerned the shape of its pattern due to method-of-moments, all bets are off and the station does not need to be measured.

But here's the rub: Not all stations will find it practical to do the things which are required to utilize the method-of-moments procedure. The requirements are rigorous. The base impedance of each tower in the directional antenna system must be measured with all the other towers in the system grounded, then again with all the other towers floating. This must be done with the station off the air (obviously) which means overnight work. If the station has a contract engineer, that engineer must be well-trained in how to prepare the station for application to the Commission for method-of-moments. The sampling system, which is key to the operation of the method-of-moments system, has to be found to be in total compliance with the Commission's rules on method-of-moments, or it must be modified to be so. This may cost an AM station a lot of money, and leads to the open question of whether MOM is worth it for a number of stations.

The next station I'm measuring for the cellular tower company happens to have a 12 tower array in its yard, six towers for day and six towers for night. With that many towers, and a (very good) contract engineer, it's going to cost a lot for that station to prove its compliance with the rules for method-of-moments, and apply for that kind of operation. It isn't worth it to them, and they aren't going to do it.

Now don't get me wrong – Cris has convinced me that method-of-moments is an ideal way to ascertain the performance of a given AM station's directional antenna system, and anyone contemplating a new station or a major upgrade, move or repair of an existing AM facility would be rather out of their collective minds to *not* set up an AM array for HD radio and proof it using the method-of-moments. For any station which has the resources with which to set up their MoM system, then by all means do so. But the majority of directional AMs will not be on the MOM system for quite some time, which means that for many of us, including those working AM DA proofs of performance, before and after installation or modification of cell phone towers, directional proofs will still be norm for now.

Don't sell your FIM's yet.

[Editor's note: There is a rulemaking in the works dealing with cell towers and other radiators near AM antennas that will permit the use of MoM analysis of such potential reradiators.]

No moving parts!

Now it's Larry Foltran's turn to kill me, since I'm stepping on his turf with this one!

I got a call as I was finishing up this month's column from a dude named Jerry over at Sun Microsystems, asking me to join a seminar about a new product offering they have. The concept is not new, but the application is. I'm referring to flash memory.

Flash mem has been around long enough to not cause much of a ripple of interest in the concept as we've all known it, but apparently two things have been quietly happening within the technology to merit a more respectful look. First, flash memory module sizes have gotten steadily greater (I mean, you can get 128 MB sized mem sticks for virtually nothing these days, if they still make them – 8 GB is more the low end now), and second, but more important, the reliability of these devices has been steadily improving. Two years ago, I asked my friend, Jim Meinell at PC Mall, if we could back up a hard drive on one of these things if the memory size wasn't too great. He said no, there is yet too much danger of data loss with the technology. Apparently, the times have done a-changed, since the concept of servers with *no moving parts* and an electrical consumption of less than half that of current technology is now here (this is what is used in the new generation of HD importers, exporters and exgines). And no fan noise. Can you see the revolution this could spawn?

It's already happening. The original iPod configuration, which relied on a tiny spinning disk hard drive and which was introduced (what?) seven years ago, is now out of production, and the new iPod technology is all flash memory based. The storage capacity for these things is coming close to the amount of storage capacity one would get from a reasonably sized hard drive. And, it's less fragile, kinder to batteries, with no moving parts – hey, what's not to like?

In short, the next big step in the evolution of the computer is now ready for prime time. After that, it's computers that will have the memory and reasoning capacity which approaches that of the human brain. *That's* when we will really start to wish for the good old days. Mark my words on that.

Finally...

Many readers of my contribution to this newsletter will likely recall the column I wrote for the January issue this year, following the passing of my dearly beloved wife Susie in December. I have had more reaction to that column than I've had for any other, and the love and support I've received in the wake of that article and her death has been so thankfully received. I would be remiss if I didn't tell you the sequel to the story, in as short a form as possible.

I have met the lovely lady with whom I will spend the rest of my life, God willing. Sheila and I knew each other from both junior and senior high school choir. We went our separate ways after graduation, and met again this summer on Facebook. She is now living in Arkansas, a single lady, working as a care-giver, and we started a conversation which has lasted almost three months and over 90 hours on the phone, in chat, and on email across that time. There is almost nothing which we now don't know about each other. Her candor, integrity, courage and loving heart, for both Jesus and for me, has captured my own heart, and I have asked her to marry me. The date isn't yet set, it won't be for a little while, but her family approves, her care charge loves me, her closest friends approve, and my family doesn't (which is a plus). So, you take me off your prayer list for happiness. God has seen to it, for we are convinced that it was He who brought us together.

I love a happy ending, don't you?

Until next month....

The Portland Report

By
John White, CBRE
Chief Engineer, CBC–Portland

When is orange not red? That may not be as weird a question as it sounds when it comes to tower painting. For years, I, like many, referred to the colors as aviation red and white. Looking at any tower, the red band is red. But is it really? The true name is "aviation orange."

I hadn't thought about it that much until recently, when we had the towers repainted at KKPZ. The red band is orange. Really it is. The topography at the transmitter site allows bottom red band to be viewed against the vegetation background. In that environment, the paint truly is orange. Looking further up the tower, things change. The next band is true white. Then red. Red? Yes, red. The third band does look red. But it's the same paint. So how did orange turn red? Simple: it's an optical conclusion. The third band against the blue sky really looks red, even though it's really orange. I had never considered the impact of the background until that moment.

I wish that were the entire story. It's not. Part way through the painting, I was driving to the transmitter site for the start of the day. Creeping might be a better description; it was heavy fog that morning as I attempted to stay on the road. Lee, one of the paint crew, had arrived just before I did as we drove in. With the fog and wet, we weren't going to be painting for awhile.

I was talking to Lee when he asked, "Should the tower insulators be steaming?" Huh, I thought. Lee's truck was parked between me and tower, so as I walked past the truck I saw that steam was in fact rolling up from the insulators on tower 3. I also noted a blue electric arc at the base of the southwest insulator. I knew immediately that this was not good.

Immediately I switched 1640 (which diplexes into that tower along with KKPZ) to 1 kW night power and the arc extinguished. Upon closer inspection, I could see fog sweat from the tower steel structure trickle down onto and across the surface of the insulator. Once on the surface of the insulator, the water began to sizzle and steam. I could also see tracking and carbonization on the insulator surface.

At this point, it was clear we had significant surface contamination on the insulator which was conducting RF current across the insulator. I got a natural bristle brush and we brushed down the

surface of the insulators. This stopped the sizzling and also exposed cracks in the SW and NE insulators.

The tower in question had the bottom band painted the prior day. Several things are clear at this point. It took a combination of fresh paint and moisture to create the problem.

Rain, even heavy rain, isn't a problem. Rain is basically distilled water, which is a nonconductor. The tower crew wiped the paint residue off the insulators at the end of the day before, but evidently they didn't get it all (or perhaps in the cleaning process, the residue was smeared into a more cohesive mass on the insulator surface). Whatever the case, the combination of paint residue on the insulator in combination with the fog sweat created a conduction path across the insulator. Once the arc started, hot spots created thermal stress which cracked the insulator.

The previous day we had stopped painting at 3 PM so 1640 could return to air. Temperature at that time was in the low 80s. According to the paint label, this new latex paint dries in one hour and can be re-coated at three hours. The paint should have been well cured when the fog rolled in the next morning. Nevertheless the paint residue clearly caused a problem.

All that day there was a flurry of activity. I contacted Cris Alexander and we contacted Tim Wolden (structural engineer), Bob McClanthan and Ben Dawson (broadcast consulting engineers) and others. To make a long story short, we were able to find a pair of used insulators at Magnum Tower. The owner there has stockpiled a few of the older insulators as he has replaced towers over the years. Steve Minshall (KCBC) went to Sacramento to look at them for us and pronounced them to be serviceable. We now have them on site at KKPZ. Stay tuned for the rest of the story. As Cris said, he would like to observe the jacking of the tower… from Denver!

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

Something Missed and Fall Cleaning

The month of October was actually a good month. For once, no T-1 problems! It was nice not having to deal with Qwest.

With no T-1 issues to chase down, I was able to finally spend time at the KLZ transmitter site cleaning, something that should have been done in the spring. The process took two days total. The first day I cleaned all the modules in the ND-5 main transmitter and made sure all the hardware and connections were tight.

I have now officially learned to not mess with the modules unless they need to be messed with. It seems that every year we have one module at each transmitter site fail after cleaning. This time was no different. I didn't have the right schematic to look at for the unit and we didn't have the right spare (our spare was not IBOC-ready). I called my dad, who was in Birmingham, and he told me what to do. I replaced what needed replacing but did not have the heart to put the module into the block since I didn't know what to test.

As I said, the spare we had was not IBOC ready, but it worked until my dad got back in town and we could fix it. We tested everything and replaced what was bad. Plugged the unit in and found that it would work for a few seconds but then show PA Fail and shut down. We ended up having Nautel send us the right spare PA module and we sent the broken one back for repair.

My mom was kind enough to help me with the cleaning process at KLZ. She is very good at organizing things that seem un-organizable. We took a trip to Home Depot and bought some plastic bins. While I went to work cleaning the modules, she began organizing. It was amazing. I can actually find things now. The site looks great! It hasn't been that clean in well over a year. I definitely would not have been able to get it looking that good without

Mom's help.

Fire!

On a Friday in late October, we planned on doing a burn of the reeds and grass in the irrigation canal out at KLTT. This canal is on an easement on our property, and as part of our agreement with the easement holder back in 1995, it's up to us to maintain the canal – this keeps the canal company from tearing up our ground system. The canal evidently hadn't been maintained by Ed in a couple of years and the growth was considerable, impeding the flow of irrigation water to farms on Colorado's eastern plains.

The flow to the canal had been turned off a few weeks prior. Our burn permits was only good until November 1, and the canal had run all through September, giving us a small window to burn. A few days before the scheduled burn, we had a nice, wet snow/rain mix. There was also still standing water in the canal, so the vegetation was not particularly dry.

With a lot of gasoline and a propane torch, we made a few big fires that burned for about thirty seconds but then went out because it was still so wet. I watched Keith almost lose some hair because the fire came a little too close.

We learned a few days later that Ed used to have the rancher that leases the property for grazing deal with it. After talking to the rancher, he agreed to do the burn in the beginning of spring. That will be a huge relief. With our 250-gallon water tank and 2000-gph pump, we're well set to fight any spot fires that get going outside fo the burn area. We hope.

A Bit of a Refresher with Some Learning to Be Done…

I have recently had the opportunity to work on the NexGen logs for KLZ. Operations manager Charlie Grimes has been in the hospital in the ICU with pneumonia. He's still not doing that great. Until he gets better and back to work, Randy Frongillo is taking care of KLZ. Randy has very little experience with running many of the shows on KLZ. I guess no one has ever really been shown how to do the logs for the various satellite shows we have on the station, so I decided to step in and help out. I know how we set everything up and I also know Randy is overwhelmed with doing his regular work plus Charlie's. It has been fun figuring things out and getting the station to sound good.

One problem we have had is that the local breaks we take in the satellite-delivered programs were always late by a second or so. As it turns out, since the Starguide relay contacts back to the studio through the network, there was a delay. We ordered a 25 Hz tone decoder and set it up at the studio for The Laura Ingraham Show. It took some work, but we finally got it working. The breaks are now on time and sound great. We ordered a couple more tone decoders for the other satellite feeds and will get them in early November. Until then, I am helping fine tune each show, making sure no mistakes are made. We've had a few train wrecks because things were moved around in the logs. I must say I am learning a lot about how certain things work and don't work.

Snow!!!

As I write this, I am looking out the window at 16+ inches of snow on the ground. The photo above is me standing in the snow up to my knees in our yard Maybe I'll get some good use out of the snow shoes the company bought me a few years ago when I had to get to a tower at KLTT and there was a couple of feet of snow on the ground.

That's all I have for this month, so until next time, that's all folks!

Digital Diary
by
Larry Foltran
Corporate Website & Information Technology Coordinator

How to Make Lost Data a Thing of the Past

It sometimes seems as if my cell phone number is top on the tech support list for the vast majority of my family and friends. Quite honestly, I'm the type of person that will lose sleep at night when I know someone has an unresolved computer issue. That's simply the way I am. I've handled numerous hard drive crashes and corrupt memory card recoveries for friends, family, on work computers, on my personal computer equipment.

I think it's a safe assumption that most, if not all, computer users fresh from a complete hard drive crash spend some time struggling with whether there are better data storage options available or what can be done differently to prevent another similar incident. Typically, the sting of losing data quickly disappears and in no time it's back to business as usual. But in some cases, I'm asked what can be done to prevent another crash. A shrug from me in response to that question is often followed by a frown from the computer owner.

In reality, hard disk drives aren't bullet proof, although there are some things that can be done in concert with frequent backups to limit or prevent data loss. I suppose the best place to typically start is at the beginning.

Data Storage 101

I believe I can safely make the leap and say that the vast majority of computer users currently utilize a traditional hard disk drive within their computer case to store 99.9%, if not all, of their data. Trust me on this one. There's no need to open your computer case to check. Only a subset of these users would be able to find the hard disk drive if assigned this task and an even smaller subset could tell you how a hard disk drive actually works. It's time to shed some light on this subject.

In simple terms, within the hard disk drive case you will find rotating platters that feature a special magnetic surface, an actuator arm, two motors, and a controller board. One of the motors is used to spin the platters very rapidly, approximately 7200 rpm depending on the drive, in fact. The more platters a hard disk drive contains, the more data it can hold. The second motor moves the actuator arm, which holds the read/write heads used to… well… read and write the data on the platters. The controller or logics board feeds information to the motors and read/write heads, controlling the spin and movement of the mechanical components as well as converting the data to be written or read. The board is essentially the conductor of this finely tuned orchestra. Easy enough? Let's move on.

Traditionally, data is stored on the hard disk using sectors and tracks. There is a potential that a specific sector can go bad and data will be lost, although modern hard drives technically provide safeguards against most cases of this. Based on my experience, hard drive crashes are most often related to a mechanical issue rather than a corrupt sector. Either the logics board goes bad or the actuator arm becomes immobile. In some instances, the platter motor goes bad and the drive won't spin. In the event of a mechanical failure, the data is still on the platters. The trick is to repair the mechanical issue without damaging the data.

Life Beyond the Backup Drive

For most computer users, it's much easier to invest in an external or internal backup drive and simply either dump your important data to the drive on a regular basis or invest in backup software that will do it for you automatically. There are also options for mirroring your hard drive and other software based strategies. For more advanced users, I sometimes suggest configuring their data storage in a RAID configuration. No, we're not talking insect control here. RAID is an acronym for **R**edundant **A**rray of **I**nexpensive **D**isks that came about from the University of California, Berkley in 1987. It essentially involves taking two or more hard disk drives and configuring them to store data in such a way that they provide a certain level of redundancy

with one exception, which I'll touch on in a bit. There are several different levels of RAID configuration that utilize a varied number of drives, although I personally have only ever used RAID 0 and RAID 1 which use 2 hard disk drives.

In a RAID 1 configuration, the data from one hard disk is automatically mirrored onto the second hard disk in the pair. Please keep in mind that using a RAID configuration is not a way to eliminate the need for back-ups, but it will save your behind in the event one hard disk suffers a mechanical failure. Because the data is mirrored on both drives, a software glitch that results in bad data will still cause problems because the data is mirrored.

RAID 0 is a bit different and unique because it does not offer any data redundancy. I suppose it should be called AID rather than RAID. In a RAID 0 configuration, the data is "striped" between two hard disk drives or applied to a single drive using a hardware RAID controller. The benefit of RAID 0 comes in the form of data access speed and performance. I have often used a RAID 0 configuration on my flight simulator computers with noticeable results because of the large amount of land class and general scenery data loading necessary during a flight. Where RAID 0 suffers is in the event of a hard disk crash. Yes, just like using a single hard drive your data would be lost and, in most cases, it's even worse because it typically can't be recovered. Would I recommend RAID 0 to anyone? Sure, but only in certain cases.

Other RAID configurations involve striping data on 3 or more drives or striping and mirroring combinations. I believe there are benefits to using RAID configurations, but it doesn't mean you don't have to back-up your data at all. A good back-up strategy and a RAID configuration does help you get some sleep at night though.

The World of Solid State Storage

As I mentioned earlier, the majority of crashes I've encountered are mechanical in nature which means that the introduction of Solid State Drives is a reason to rejoice. Solid State Drives use either flash memory, SRAM, or DRAM to store data rather than platters. In other words, there are no moving parts on an SSD. Further benefits are that they are silent and have very little latency during data read and write. The down side is that they are expensive in comparison to their mechanical counterparts. For example, I recently purchased a 320 GB, high performance hard disk drive for just over $100. To compare, the largest capacity SSD I've seen was a 250GB model going for just under $800.

I believe SDDs will excel in laptops where most hard drives tend to die quickly because of the bumps and jostling that comes with mobility. Various tests and reviews show that they will provide a speed advantage during drive intensive tasks and will take a bit more abuse than mechanical hard disk drives. Of course, as popularity increases and use expands, we will definitely see the price decrease to a level that's easier to swallow.

Wrapping Things Up

In today's computerized world, it's no secret that data storage is important. But safe and redundant data storage is essential. Even when either using a redundant storage configuration such as RAID 1 or moving into the world of solid state hard drives, external data back-up should not be dispensed with. Although some prefer the use of an internal back-up drive for one reason or another, I have always recommended the use of an external back-up storage solution simply for the reason of mobility. In an extreme scenario, it's much easier to pick up and walk out of a burning building with an external drive under your arm than disconnecting a PC tower and carrying that out. I also feel that an external drive, or other external data storage options such as a flash drive, is essential equipment for every laptop user where installing a second storage device is not possible.

I will admit that there are plenty of other dangers your data is susceptible to aside from equipment failure. Your files are in danger from malware, viruses, hacking, or equipment loss. In fact, statistics show that data loss associated with stolen laptops has accounted for 21% of the total data lost thus far in 2009. This is a vast majority over equipment failure and other instances. Even though keeping your data secure will require your attention on a regular basis, problems can still occur. But knowing your options and ensuring you are armed with the right storage and back-up tools will make getting back to business much easier.

…until next month!

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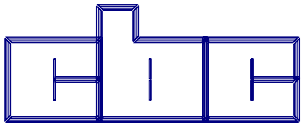

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