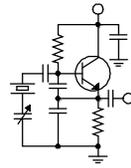


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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National EAS Test

Last month's national EAS test was a real eye-opener. I'm not sure what we expected, but I'm fairly confident when I say that it's not what we got!

After all the post-mortem analysis, the consensus is that there was trouble at the very highest level (FEMA), and that trouble made its way down to local stations with different reactions by EAS decoders, depending on any number of factors.

I was in the car and monitoring the LP-1 station here in Denver when the test began, and as soon as I heard it begin I tuned to each of our local stations in turn. The header was followed by retransmission of the attention signal on each station... and then silence. About 25 seconds later, I heard the EOM, and programming resumed on our stations. So it appeared that the header was decoded and that the retransmission of the EAN message at least got started, but then something happened.

Back at the office, I went over to the studios and talked with both Amanda and one of the operators. They both told me that there was a confusing message displayed on the Sage 3644

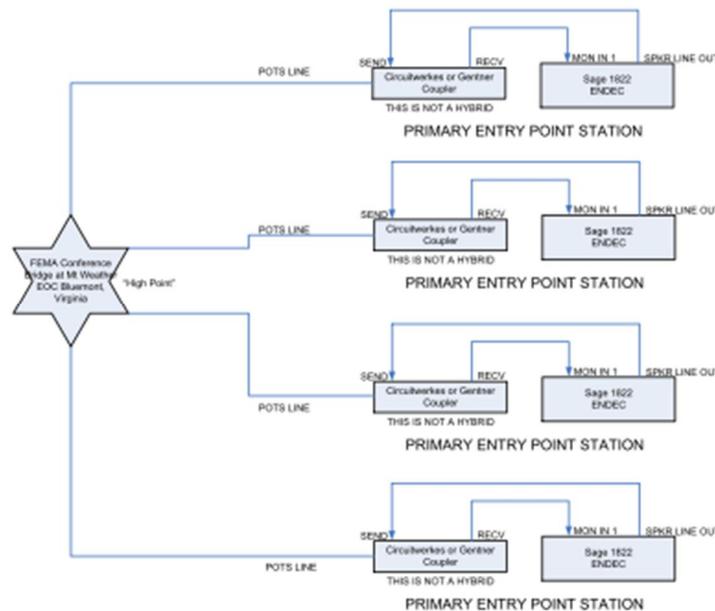
Digital ENDEC units: "No Audio Limit ABORT." I later found out that "No Audio Limit" means that there is no limit on the message length of an EAN (whereas there is on an RMT and perhaps other alerts). The "ABORT" reference was actually a soft-key label for the leftmost button, which if pressed would have aborted retransmission of the EAN.

Almost immediately I began hearing from

our people in the field with all kinds of reports: no audio, low audio, bad/distorted audio, no test at all. Those stations that did get audio from the LP-1 all reported the same thing: The initial header and attention signal was followed by the announcement, but under (or over) the announcement was another header and another attention signal and another announcement... and the whole thing went one more generation so that

by the time the EOM was transmitted there were three messages being retransmitted. What a mess!

I think a lot of us were scratching our heads over this, but the root cause was very well explained to me in an email from Paul Sakrison, CE of KLAA in Los Angeles, who was CE of KFWB in L.A. for many years and as a result is very familiar with the architecture of FEMA's EAS system. The issue, as it



turns out, crosstalk in a number of phone couplers – not hybrids! – that FEMA uses to couple POTS line feeds from primary entry point (PEP) stations back to their conference bridge in Bluemont, Virginia.

According to Paul, the outbound path goes to the PEP station's coupler, and the coupler's output goes to the ENDEC's Monitor Source 1 input. The return path is the PEP ENDEC's Speaker Line Out going to the coupler's input and that audio going back up the line to Bluemont. This cannot work and because of the high audio levels and crosstalk in the couplers, will cause several levels of contamination of the inbound alert audio message.

This system was tested with an RMT in 2006 or so late one night to see what would happen. What was heard was exactly what was heard during last month's national test: a mess!

I also talked to Harold Price of Sage Alerting. He told me that the issue with many ENDECs at the station level was that some got clean enough audio to actually decode the second header, which caused the audio received thereafter to mute. Evidently this produces an illegal or error condition in the ENDEC. Stations that had crummy audio from their LP-1s probably didn't decode the second header and those stations passed the nasty audio through just fine.

So... was the test a "success"? In a sense it was. It showed us – the entire industry, from FEMA at Bluemont, Virginia to the smallest operation in Nowhere, Alaska, where the weak points are.

FEMA has some work to do and has got to break the backfeed loop from the PEPs so that audio cannot contaminate their outgoing audio. How hard can that be (and why didn't someone point that weakness out back in 2006 or before)? I think the manufacturers have a little work to do in that there should be a provision in their equipment for handling multiple headers. I think that a second header should not stop the retransmission of the EAN audio. Several states, including Alabama and Oregon, didn't retransmit the test at all for various reasons, and the underlying causes have got to be addressed. And the Illinois test audio was reportedly all in Spanish – what's up with that??

I hope that all the affected and responsible entities will take the required steps and get this thing fixed. We're sure to have another test here in a few months, and this one has got to work, providing clean, understandable EAN audio to every listener. If the system does not do that, it's just about worthless, at least as a national emergency alerting system.

New Transmitters

We ordered a couple of new transmitters last month and will be taking delivery on both this month, the idea being to get them in service during 2011 to take advantage of a significant tax break available only during this calendar year.

In Chicago, WYCA will be getting a new 2.5 kW VS2.5. This is one of the new "BYOR" ("Bring Your Own Rack") transmitters that Nautel is offering these days. It has an integral digital exciter, HD engine, IP audio I/O and USB backup audio automation. Provided we keep the internal library up to date, should we lose the STL to that site, the transmitter can continue to play the hits all by itself! The new WYCA VS2.5 is slated to ship December 5.

WYCA's aux transmitter is a 1960s vintage Gates FM-5 that works but for which we can no longer get parts. That old beast is coming out of service and going to the scrap yard, and a new Middle Atlantic rack is going in to house the new transmitter. That arrangement will provide us with a brand new main transmitter and a full-power digital aux system (Nautel FM-4 and BE FMi73 high-level combined).

KLTT in Denver is the other recipient of a new transmitter, this one a Nautel NX50. It's hard to believe that the existing main transmitter is almost 17 years old. I clearly remember unloading that thing off the truck, uncrating and installing it – and the tower crew lived in the empty crate during the rest of the project! The station originally used the ND50 during the day and an ND2.5 at night (1.5 kW), but when we began HD operation we used the 50 24 hours a day (at the proper power level at night, of course).

The plan is to remove the ND2.5 and install the NX50 in the same location (and almost in the same footprint!). To pull this off, we'll have our general contractor come out and remove the trim, then enlarge the opening for the new transmitter.

Amanda and I will have to remove the 7/8" transmission line from the ND2.5, enlarge the hole in the phasor to accommodate a 3-1/8" EIA flange and then move the ND50 to the aux port in the phasor. We'll use 3-1/8" rigid line to connect the NX50 into the phasor.

We will also have to completely rework the remote control wiring to the existing transmitter and, of course, install new R/C wiring to the NX50. The new rig features a remotely accessible GUI user interface (Nautel calls it the "AUI"), and we'll have that connected via IP back into the studio network.

Finally, we do plan to employ MDCL on the new transmitter and take advantage of the considerable power savings that offers.

The New York Minutes

By

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

Hello to All from Western New York! This time of year, you never really know what you are going to get, weather-wise. I have seen snow falling before October ends, and winter weather lasting until May. It is highly unusual that in Buffalo we have not yet had any snow to fall, and we're only days away from December!

The fact that we have not had any wintery weather has worked to our advantage, as we replaced our aging antenna on the WDCX-FM tower last month. We were keeping our fingers crossed that the fall-like weather would continue until the antenna project was completed. The crew from Great Lakes Tower arrived in Buffalo on Tuesday the 1st of November and had the project wrapped up the following evening.

I was very impressed with the crew from Great Lakes. I had never worked with this company before and did not know what to expect. From the moment they arrived, they did not waste any time in getting the project underway. The four-man crew worked efficiently and was able to complete the removal of the old antenna and install the new one in just a little over a day.

Right about the time that this project was starting, I was in the middle of installing a new Nautel NV-40 transmitter. The Nautel was not quite ready to go on the air with the new antenna, so I patched the Continental into the main transmission line until the installation of the Nautel was completed. In the meantime, I scheduled with ERI for a service tech to come in and fine tune the antenna. We were seeing about 74 watts reflected with a TPO of 21.6 Kw, which was moderately higher than the reflected readings on the old antenna.

As Murphy's Law would predict, right after the antenna installation was completed, we had several days of wind/rain, which stalled the tuning of the antenna. Watching the weather forecasts closely, we determined that Monday the 14th looked favorable

for Don of Western Tower to make the climb to install the ceramic slugs in the new antenna's tuning section. I made the arrangements with ERI, and they flew Mike Ahlert in on Sunday afternoon.

The forecast continued looking good for Monday, so we set a meeting time of 10 AM to get the tuning underway. A last minute check of the local



radar showed some shower activity well to the south, beyond the Pennsylvania / New York border, but weather forecasters predicted that this system would not reach us until late that evening. Well, Murphy moved in quite rapidly, as it began raining about 10:30 AM. I learned one thing: never trust meteorologists, and phooey on Doppler radar! We cancelled for Monday, and agreed to meet

again on Tuesday morning to complete the tuning.

As luck would have it, the weather cleared out and aside from a moderate breeze, we were able to get the antenna tuned almost perfectly! The reflectometer on the transmitter was showing "zero" reflected power. Mike did an excellent job with his measurements, and Don Boye got the 5/8" steatite slug in the exact location that produced a final return loss of -36dB / 1.02:1 VSWR. Now that the antenna project was completed, it was time for the Nautel project to wrap-up.

Over the past 40 years, I have installed dozens of new transmitters, and on only one occasion I can recall having experienced a serious problem that kept the transmitter from coming up during the final check-out. Well, now there are two. After installing the electrical service, ventilation, remote control wiring, and installation of the ancillary equipment (i.e. importer, exporter, network switch etc.), I was ready to fire up the transmitter for the first time. I energized the disconnect, providing voltage to the transmitter and... nothing! The IPA and PA supplies in the bottom of the transmitter were indicating voltage present, but the display and low voltage supplies were dead cold. I began checking

out the voltage runs on this new transmitter, but could not isolate the cause of the problem. I phoned Nautel tech support, and they basically had me check the voltages on everything I had previously checked on my own. Getting nowhere (and it was by then late into the evening), I decided to resume this in the morning as I was getting too tired to troubleshoot HV equipment by myself.

After a good night's rest, I called Nautel tech support again, and this time I got a different support person. I explained what had transpired the previous evening, what I had checked, in what order, and the results. He then asked if I had the UPS option on our transmitter. UPS option?? I don't know. He asked if there were two male power receptacles on the top of the transmitter near the left center of the cabinet. I replied, yes, they are there (I had been wondering what the heck these were; there was nothing in the manual about them). He then asked if we had them plugged in... well, no they are not. It seems that these two receptacles are what Nautel calls the UPS option. These two 110-volt circuits provide the voltage to the controller, front panel and the low voltage supplies. I obtained a suitable UPS, plugged it in, and the transmitter made RF without any further issues! With a little help from Nelson Bohorquez from Nautel support, we had the HD channels up and running in short order!

There is still an issue with getting the PAD data working. It seems that IBiquity has changed the platform in which it receives the data from NexGen. Our TRE software from BE had not been updated, so it could not play nice with the new IBiquity software.



WDCX-FM's new Nautel NV40

BE is having to rebuild our license for TRE, and it should be ready to go at some point this week. Once I install the new software on our TRE computer, it should be relatively easy to program the IP addresses and port numbers to get the importer, exporter and TRE computer talking with each other.

The transmitter has been on air for several weeks now, and I am still learning my way around the control and programming menus. I have yet to get the user interface operational (connection to the transmitter via IP), but this problem seems to be between the STL and internet router/firewall located at the studio. By next month's report, I should have found a solution to this and the PAD data up and running for both HD stations.

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 very Merry Christmas!

The Motown Update

By

**Joseph M. Huk, Jr.,
P.E., CPBE, CBNT**

Chief Engineer, CBC–Detroit

The Z/IP ONE Saga

About a month ago, we were blessed with a new client. Dr. Joe Canu joined our broadcast family for a daily weekday show. He is a chiropractor that had been participating as a guest in existing programs, and wanted to branch out on his own. The show covers not only the traditional chiropractic areas of interest, but the complete assessment of a person's health, well being, and nutrition. To share this valuable insight and knowledge with the world, we figured what better way to do it *with some style* (as Doc Brown once said) using a high-fidelity IP codec.

Certainly our first choice was the Telos Zephyr IP. It has a track record of being the premier IP codec of choice for broadcasters. We had originally slated the purchase of a pair of these units as a capital expenditure for this year. Early in April, we took delivery of the units. Since then they have changed the quality expectations of remote broadcasts. When we doing a remote, our general manager and sales staff prefer using the Zephyr IP codec equipment over the classic POTS (plain old telephone service) codec. Telos' proprietary codec is quite good. It dynamically adjusts itself for varying amounts of network and internet congestion. The remote unit has an integrated audio mixer which relieves the operator from the need to take along an out board mixer.

When it came to making a recommendation to our client, Dr. Joe, the decision was simple: we wanted him to buy a Zephyr IP. After contacting our distributor, I found that the Zephyr IP remote unit was discontinued. I found that to be a very alarming situation. Was the unit we purchased in April obsolete in September? I found that unit was replaced by the Z/IP ONE. When I inquired with

Telos as to why they discontinued the Zephyr IP, I was told that at the \$3,500.00 price point, it was very difficult to sell other folks on buying one. I guess many did not need the mixer feature set. So a simplified, stripped down version was more attractive. The Z/IP ONE became the solution at the \$1,500.00 price point.

At that point, my only concern was compatibility with our current Zephyr IP product. I was assured that the Z/IP ONE was completely compatible. The Z/IP ONE does not have a mixer and does not provide an audio feedback from the remote location's send input, so you need to provide your talent with a mix down of their audio and the

backfeed (IFB) from the studio. Other than that, I found the smaller footprint and simplified feature set most adequate for the majority of users. However, the unit must be reliable and work as intended, and that's where our problems began.

Out of the box, I noticed that the unit takes close to 30 seconds to boot up with no display indications of progress. When actuating the rotary encoder control on the front of the unit, the response time of a change to the display is delayed. I was told by Telos to upgrade the software. After upgrading the software, the Z/IP ONE seemed to be working better. When I delivered the unit to our client, it worked for a couple of days, then it locked up and would not reboot.

At this point, I believed we were in a precarious position with our new client. We had to work quickly to recover from this issue. I promptly loaned them our Zephyr IP for the next few weeks while we sorted out the issues with the Z/IP ONE. As expected the Zephyr IP worked flawlessly at our client's office. At this point we were promptly sent a new unit from Telos.



When I received the second Z/IP ONE from Telos, I powered the unit up. It again exhibited a sluggish response as the rotary encoder control was turned. I noticed this unit's software also needed to be updated. After the update, the unit behaved very well. After about a week of testing the unit at our facility, I noticed the Z/IP ONE would lose memory if it was unplugged. After a discussion with Telos, they suggested I update the software with a beta level available on their site. After this upgrade, it corrected the memory issue. I tested the unit for a few more days before delivering it to our client.

Back at the client's location, I plugged the power in and to my surprise, the unit did not boot! This was not a pleasant moment. I was told to ship the unit back to Telos, at their expense. The unit was examined and tested. I was told they reprogrammed the unit and it met specifications. My understanding is that they felt that the flash was corrupted.

Upon receipt of the repaired Z/IP ONE, I plugged it in and it worked just fine. I let it run for a few days and then set up an appointment to meet with our client.

This time, the unit booted up fine at our client's facility. Things were beginning to look very promising. However, the first broadcast with the unit was full of audio drop outs. This appears to be decoding issue. I had checked to make sure that the settings on the Z/IP ONE matched our Zephyr IP. All the settings were identical.

So at this point, I am losing faith in the Z/IP ONE. What looked like a really nice spinoff of the Zephyr IP family has turned into a large frustration. I think Telos has some really excellent products. However, I think they have missed the boat with this product. I hope to hear back from Telos to see what they may suggest. I will certainly keep you all informed as to what happens next.

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



Z/IP ONE at our client's location

[Editor's note: Since Joe wrote the account above about his struggles with the Z/IP ONE, Telos has responded aggressively, providing us with replacement equipment as it investigates what appears to be some sort of compatibility issue between our studio Z/IP and the new Z/IP ONE at the client's location.]

Telos Systems' Marty Sacks said: "We've shipped hundreds of our new ZIP/ONE IP codecs and have not seen the issue that Joe is reporting. We did just discover that Joe is running an old version of software which we believe might cause the incompatibility problem but we have not been able to confirm that. While we could easily ask Joe to test some more with the new software, we've decided that we need to do something special to take care of him and to take care of you, Cris."

We very much appreciate the good folks at Telos and their commitment to take care of their customers. More than the equipment itself, that's why we keep purchasing their products.]

News From The South

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

The Copper Thieves Have Returned

In the past couple of months, copper scavengers at 850 AM's site in Tarrant have caused several alarms. It goes without saying that this usually happens late at night or on a weekend, adding to the fun. But the good news is, our security so far seems to have worked. The ear-scorching alarms at each tower base, combined with flashing strobes at tower #3, have made them run off in each case, but man, it's annoying.

I've toyed with the idea of posting a sign: "DEAR COPPER THIEVES: how much do you make from this? \$20? \$30? If you're THAT desperate for money, please call me and I'll just hand you some cash.

"On the off chance that you actually have a brain and can employ something resembling logic, here's a suggestion: get a job at the local McDonalds. You will actually make more money. Added bonus: only a peculiarly inept person should fear that a *prison sentence* would result from flipping burgers."

It'd be a waste of time, but it might make me feel better.

More Trends: The End of Email?

I've mentioned here in the past that I frequent Slashdot (slashdot.org), a favorite Website among the geeks and IT crowd. Just this morning, they linked to an interesting story about Atos, the largest IT company in Europe. Within 18 months, Atos plans to be completely "email free." All employee communication will be via in-house social networking, chat and text on wireless phones.

Atos say that their internal studies show that only a small fraction of the email received in a typical workday is actually useful. They've also been watching the trends, which are most significant among the next generation coming up: among 11 to 19 years olds, only about one in ten even use email anymore. They have indeed moved to social networking, chat and text.



My wife Sandy works for the Social Security Administration, and they use chat as well – heavily. She says that most of her interoffice communication now is via their in-house chat network, and not via email.

I once had a friend insist that the elderly invariably tried to use regular postal service or telephones to communicate. Slightly younger folks would use phones or faxes. Middle aged people would use email or wireless phones, and the kids chose text and chat. He argued that he could guess how old someone was *just by how they contacted him*.

Yeah, that's worse than painting with broad strokes. I will mail or fax an important contract, regardless of how "old" it makes me look! But it's nonetheless an interesting look at the always-present generation gap. The fact is, the kids coming up now are far more "connected" (and more importantly, can't live without that "connection") than I was when I was a teenager.

But we are all becoming "socially connected," whether we like it or not. When my poor brother's wife Carol was very ill this past summer, I chafed at the lack of news from North Carolina. Then one of my nephews pointed out to me that everything was being posted on Facebook. Well, I didn't want to hear that. I had shunned Facebook for years just on general principle. But to keep up with things, I took the plunge and – much to my surprise – eventually came to like it.

Yep, there's a lot of cruft on Facebook. There are also folks who want to post every detail of their day – whatever pops into their minds. (I haven't tried Twitter; I can only imagine that it's even worse.) But I am able to keep up with family and with old friends on Facebook, some of whom I haven't spoken with since high school. That's kind of nice, to be honest.

But (this makes a nice segue into the

“cloud” thing that I’ll mention next), here’s some advice: you’d better keep a close eye on how Facebook wants to grab and share your personal information. For example, if you have a “smart” phone with a Facebook app on it, by default, it will try to mine your data. The first I knew of this was when I looked at my online profile and saw, not only my Verizon wireless number posted there for everyone to see, but the addresses and numbers of all of my contacts. Fortunately, a little tweaking took care of that, but how many people will even bother?

Some won’t even try. For them, being “socially connected” is even more important than privacy, I guess. The key point here is that the way we communicate continues to change, often rapidly and unpredictably.

As usual, some are even predicting the end of radio. I still believe that this won’t happen until fast, reliable wireless data is available over most of the country, and that’s still quite a few years off yet. But even if I’m wrong and it happens tomorrow, remember our strengths: we have the talent, we’ve been entertaining and informing people for decades, and we know how to do it. We know how to create advertising that actually works, too. Whatever the delivery method in the future, if we’ll keep that in mind, we’ll still have a job to do.

The Cloud!

Years ago, the standard methodology (or *paradigm*, if you’re truly a geek) was a central server with a host of terminals. You hired IT staff to keep the server running and to carefully control who had access to it. Applications were executed on the server; users had terminals that simply displayed what those server-based apps had done. All data was stored on that central server, too.

Along came the personal computer: people now executed their own applications. You would insert a floppy, or (later on) load the program from hard disk, and execute it. Everything was stored locally. In a sense (and I admit that we’re stretching the term), each of these personal computers was a “sovereign” entity.

Networks were developed to allow these personal computers to communicate with one another and to share resources (such as a central printer), but the *individual sovereignty* of each PC still existed. If nothing else, at the end of the day, you could always disconnect your network cable and continue to use the computer.

NexGen is a great example of this. Even though it has a central server, it takes advantage of the fact that each “workstation” is a full-fledged,

“individually sovereign” PC. If the connection is lost to the central server, the control room and audio server machines will continue to operate, keeping you on air, from a backup database stored locally. It’s a good balance.

There have been many attempts over the years to move everything back to the old server-terminal paradigm, but none have ultimately proven successful. The Cloud is only the latest attempt, and I’m not so sure that it’s any more likely to succeed. The only exception might be with small portable devices: if you have an iPhone, a Blackberry or an Android, you’re already on a “cloud,” whether you realize it or not. While the apps themselves run locally on your smart phone, a good bit of your data is actually stored on a central server that might be way across the country.

(And one again, beware of those apps! Some of them want to mine your data, your location and other personal information, sometimes without your explicit consent or knowledge!)

What exactly is “The Cloud?” You’ve probably run across this term lately. In truth, it isn’t rigidly defined. But generally speaking, it is indeed a return to the “central server - terminal” paradigm. That’s not necessarily a bad idea, per se; if you have an *in house* “cloud” and can control security, it might be worth exploring. We do something very like this with our Linux Terminal server, and we may treat our new mail server (more on that next) as more of a “cloud/collaborative” system.

The global, public “cloud” over the Internet is what makes me nervous. The idea is, you can go to Google Documents (or some other “cloud” service), create stuff, and then store it centrally. You can access it from any computer with very little effort, so the staff memo that you worked on at home is available once you get to work. No more need to email things to yourself, or carry files around on a thumb drive!

Sounds good, huh? But what’s the reality? As I just said, my biggest concern is security. Our own company is afflicted with a severe case of corporate *itch* at the very thought that sensitive contracts, emails and correspondence might be stored on a third-party server somewhere. We are by no means alone in that opinion, either.

Second, while The Global Cloud might be a good idea for some (especially personal users), the “individual, sovereign” personal computer has strengths, too. Think of our traffic software: aside from security concerns, it just makes sense to run that on local PCs within the traffic department. There’s no need to put that on a central server. Automation software is another good example, and other

specialized apps, from AutoCAD to Peachtree Accounting, also need to be run locally.

Finally, even for personal use, I predict that the excitement will be quite dampened once the first big data breach occurs. (Please note I said, “when,” not, “if.”) All it will take is for one of these big central servers in The Global Cloud to be compromised, and I assure you, people will start thinking twice about it.

Finding the Right Mix: Zimbra

... or, bridging the gap between the average employee’s desire for convenience, and the corporate need for reliability and security. We are also looking to the future, to when email has perhaps indeed become a dinosaur.

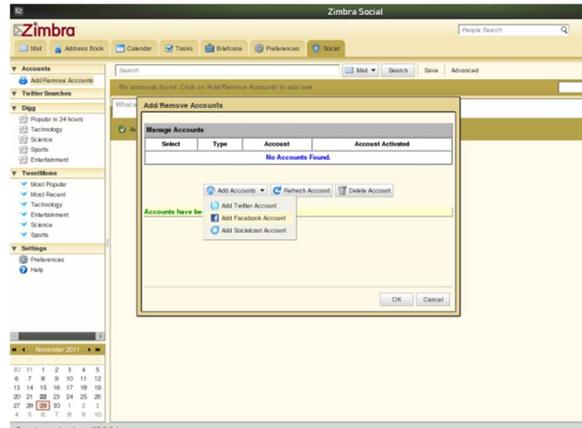
We have accelerated our plans to move to a new email server in the next year, but we want more than just “email.” The one we’re looking at is from VMWare, Inc; it’s called the Zimbra Collaboration Suite.” Our engineers and some key employees in each market are currently doing the final beta test on this system. So far, so good.

Zimbra lets us have the best of both worlds. Because we (and not third party vendors) control the servers, we feel more comfortable about it. All connections will be encrypted and very secure. To bridge the gap between email for us “old folks” (heh) and “the kids” (heh again... and louder), though, Zimbra offers a lot of collaborate features: sharing files, “to do” lists, calendars and other information. In some ways, it’s like an Exchange Server, but to my mind, it has some improvements. For example, the Zimbra Desktop (pictured below) even has social

networking built in. There are add-ons and plugins that we could install to help improve workflow, too.

To make the transition as smooth as possible, we’re only going to use the email function at first. In fact, the only folks who will notice a difference will be those who use Webmail; they’ll see a new interface. Those who use Outlook and Thunderbird won’t even notice the change.

Once everyone is comfortable with the basics, we’ll start adding the buzzers and bells. We could add chat, forums and shared calendars very



easily once all of our users are connected and are familiar with Zimbra. Frankly, I think that’s going to be both exciting and fun... but then, I *am* geek, so what do you expect?

Great things are coming in the future. I hope everyone has a blessed Christmas, and looks forward to serving Him even more faithfully in the coming year. Until then!

Valley Notes By Steve Minshall Chief Engineer, KCBC

A Little Time Off

The last several years have brought quite a few projects my way. I take care of seven radio stations, pretty much all by myself. I do have an IT guy that takes that burden off of my shoulders. Nevertheless, I have plenty to keep me busy without any extra projects. I had finally come to a point



where there were no more major projects on the horizon. I desperately wanted to take some time off to get some personal things done. So I made a check-off list of must do items to accomplish before taking a couple weeks off.

At one of my AM sites I have three Kintronic ATUs located inside doghouses. These three

doghouses were hastily constructed in 1991 and were of poor quality even at that time. 20 years later, these doghouses are literally falling apart. The antenna tuning units were designed to be mounted outdoors, so there was no reason to have put them in doghouses in the first place. My plan was to mount the ATUs on stands inside the fence line and then remove the three doghouses.

A trial run was started on a night tower and all was going well. I disconnected all cabling from the ATU and I moved my newly constructed stand inside the fence. While doing some final positioning of the stand and I heard some terrible noises emanate from my right arm. I had ripped loose a tendon attaching my bicep to the bone in my forearm. This was an unexpected and anomalous event!

So there I was, by myself, at 10:00 AM with all of the connections pulled out of the doghouse, the ATU pulled halfway out of the doghouse, and the new stand not quite in place. I did not feel that quitting at this point was an option. I needed either to put things back the way they were or to continue on to completion, I chose the latter. I called my IT guy for assistance.

We spent the rest of the day moving the ATU into position and reconnecting everything. It took a long time to get it all accomplished since I was of little use except for giving directions. We had to make a trip to my house to get an engine hoist to lift the ATU.

Since I was filthy, tired, and hungry, I went home after the job was completed. I called my Health Care nurse and she directed me to go to occupational health first thing in the morning. That was the beginning of a series of events.

What followed was a series of doctors' appointments, x-rays, and an MRI. Emergency surgery was scheduled for several days later. The surgery went very well, but effects of the anesthesia caused much grief to my internal systems which resulted in two trips to the emergency room. A few days later, it seems that I came down with the flu on top of everything else.

As I write this I am about 2-½ weeks out from surgery and I'm feeling much better. However it is my right arm that is immobilized right now, and since I am right handed, it makes everything difficult. I am typing this column using the voice recognition

software in Windows 7. It is somewhat frustrating, but I imagine that with practice it will get better. I don't think I'm going to be able to use a keyboard for a few more weeks.

I wanted a couple of weeks off, but this is not how I wanted to do it. I will not be able to do any of the things I was planning on. Perhaps I will get a little more into ham radio while I am otherwise limited.

MDCL

KCBC is now on the air using Modulation Dependent Carrier Level (MDCL). We also continue to run our HD digital carriers. The NX50 transmitter already had MDCL capability built in, but it required a software upgrade to run HD and MDCL at the same time. We're using the AMC scheme at present, which reduces carrier power as modulation increases. The scheme tends to have the least negative effect on the received signal by maintaining a high signal to noise ratio. So far we have not received any negative signal reports and I don't really expect any.

I remember as a young engineer doing audio proofs in the wee morning hours and checking the carrier shift to make sure it was not exceeding 5%. Back then, we consider carrier shift a bad thing. Now, MDCL creates vast amounts of carrier shift and we consider that a good thing! How times have changed.

It will be interesting to see how much of a reduction in power cost we will achieve. Certainly we will be consuming considerably fewer kilowatt-hours, but there is more to the equation than just that. We pay for our electricity not only on a kilowatt-hour basis but also by a peak demand multiplier. Since carrier power is reduced when we modulate, peak power consumption from the transmitter will also be reduced. Third, our heat dissipation from the transmitter will be reduced, thereby reducing the amount of electricity required to cool the transmitter room. I expect significant savings in power costs from the three pronged scenario.

Voice Recognition Software

Now that I have written this column with voice recognition software, I have one thing to say... *never again!* It did not prove to be anything more than a huge frustration. Typing left hand only is still far superior, at least for me.

Catalina Tales
By
Bill Agresta
Chief Engineer, KBRT

Greetings from Santa Catalina Island! As we push forward here at the KBRT Ranch, I have now begun to dig deeper into the job of going through all the *stuff* that has accumulated in storage here over the years, to prepare for the move to our new transmitter site. When I first arrived here at the KBRT Ranch back in 2000, we filled several large forty yard dump-bins with trash that had accumulated at the site, and since then I have kept this place in a lot nicer and more organized condition. But now that we are faced with moving off this island, we must dig deeper.

During my tenure I have held on to many items that I probably should have tossed, because being so isolated here and having no parts on hand, even old parts can come in very handy in a pinch. Now that we are moving to a new mainland site and installing new broadcast equipment, most of these parts are not worth the cost of barging to the mainland and holding on to. This also goes for the vast supply of personal pro audio equipment and parts that I have amassed while I ran a small audio/visual company here on Catalina Island. This job has proven to be a lot more time consuming than I thought it would, and it has brought back many old memories, some of which have made me realize just how much things have changed in a very short time.

We continue to experience and work to position ourselves better to deal with the awful electrical utility power we seem to receive here on the island. Last month, I wrote that I was working with Tom Bazer, our generator service tech, to give us another layer of backup in case of long-term power issues. Tom is preparing to install a switch box beside our Onan propane-fueled generator that will take us from the Onan to a set of Cam-Locks. This will allow me to connect our portable 70kW trailer-mounted diesel generator to our building in case we experience another long-term power issue as we did a few months ago. We have still not received any propane and I am afraid we might not be supplied with any through the remaining of our stay here on the island. Our tank remains full enough to handle a

short-term outage, but if we need generator power for more than a few minutes, we will be manually switching to our portable diesel generator to keep us on the air.

I have continued to work on minor modifications to our Nautel XL12 transmitter. Several months ago, you might recall that Steve Braley from Nautel came to visit me here on the island and we spent several days working on our XL12, reconfiguring some mistakes that were made during manufacturing. Our XL12 ran

great after that work was done, at least until we began to see this recent wave of electrical power issues. I believe they put our XL12 through enough stress to reveal yet a few more issues, things that were fixed in the later XL12 designs. One of these issues, a pretty obvious one, is that on these early designs they mounted the fuse holder that is inline with the low voltage power supplies directly to the top of the main power transformer. Especially with a daytime station such as KBRT, which operates the transmitter running full power during daylight hours then turns it off at night, the daily heat-up and cool-down cycle eventually opens up the electrical connections in the fuse holder, causing the fuses to eventually arc and creating all kinds of intermittent issues until it finally fails completely.

The fix for this is quite easy, however, since the power leads have plenty of slack in them. I simply moved the fuse holder to a location on the panel above, thus putting it in a more constant temperature environment and hopefully preventing this situation from occurring again.

I hope you all enjoying a blessed Thanksgiving and are doing well this holiday season! I am looking forward to an awesome Christmas and to the opportunity to shine the light of Christ to the world through any door that He might open for me to do so.

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

This final missive of the year will be a bit shorter than usual, and will be a collection of little this and that. It's how I handle writer's block.

First things first: May the blessings and joys of the season and of the Christ-Mass be with you and yours throughout the coming year, and please, never forget not only Who it was who came, but also *why* He came.



over radio and TV stations, without the station's control or consent. Now, this raises a whole bunch of questions as to how they would go about it. Considering how the EAS system is built, they'd have to "take over" a state EAS entry point or an LP-1 in order to have the ability to do it, then issue the official EAN code, which would "take over" the EAS boxes of all stations automatically. And,

while making this happen could be a real challenge for anyone, it's not out of the question that these jerkweeds *could* pull off such a thing, in which case, they could be on *our* air, putting out *their* filth (of which none of us would approve), and causing issues that would make the Allstate Mayhem Villain all sorts of proud.

"In case this ever happens to us, wherein our air audio is suddenly 'hijacked' by these 'Occupy Wall Street' (or whatever) fools through our EAS boxes, there is only one way to stop the silliness, and that is to unplug the blue Sage EAS box from the wall." [I then proceeded to bore them, but not you readers, with the gory details.] "That should restore our program feed to the air. After ten seconds, you may reverse the procedure: Either plug the power cord back in, or press the 'on/off' button again to re-start the EAS box...."

I would suggest that you readers institute the same sort of contingency plan for your own stations as well, and don't forget to tell your market/station managers about this, too. It could save a lot of problems if you did. In case you're running totally automated at night or on the weekend, well, good luck if the 'Occupy' jerkweeds do it then.

Solving At Least One Arbitron Encoder Problem

I stumbled on this one within the past couple of weeks when we had a power problem at our Beecher site.

The 'B' phase feed from Commy Ed had died that morning, and our site generator came on automatically, as it should. Although this incident occurred during the day, the weather at the time was extremely wet and dark, so the tower lights were on.

National EAS Debacle, Parts I and II

I. Enough said, by everyone, on this one. Everyone has analyzed the causes of the problems of the November 9 Super EAS test, ad infinitum. All I can say from here is that the whole experience was really very bizarre. WPWX got the beginning of an announcement from our Indiana LP-1, then something like a minute of silence, followed by the EOM tones. On all of our Illinois stations, it was even weirder, with three seconds of announcement in English, followed by the EAS announcement by a woman, in Spanish. I'd love to find out how *that* happened. I didn't bother to over-think all this because people who really have better EAS minds than mine were onto this scenario like ducks on a June bug.

II. There was actually something else which got me more concerned, and it showed up in print exactly one week after the test. *Inside Radio* (among other media outlets, I presume) ran this story:

"Street protests get attention, but imagine if some of the people behind the Occupy movement were able to take over radio and TV stations. That's one idea being considered, and it would reportedly use the Emergency Alert System to get the job done."

What?? I saw red, and wasted no time in taking action regarding this. Here is an excerpt from a memo I sent the next day to our Chief Board Operator, for distribution to the on-air-hosts and the board operators:

"It seems that the "Occupy Wall Street" crowd is working on a plan to hijack local radio and television stations by taking over the EAS system and using it to transmit their views and commentaries

Our Beecher site generator is a 20 kW job, and the tower lights consist of six LED obstruction markers, and three incandescent lamp beacons, which of course were cycling on and off simultaneously, at 1,320 watts per. That highly varying load was alternately sucking down one phase, driving the generator totally crackers, which in turn was causing a back and forth variation of several Hertz in the generator output frequency. The result was predictable. Evil things were happening to our equipment, from the transmitter on down. We were off the air for over *45 minutes!* I had to shut off the tower lights in order to get the station back on the air. In particular, our Arbitron encoders took it on the chin big time, and all of them went into ‘Fatal Error, mode 0002—Power source failure’.

To their credit, for once, ComEd didn’t need me to get them on the stick. All of Beecher was affected, so they got to the point, semi-pronto, and did their job. After the power was restored, about an hour and a half after it died, I turned the tower lights back on and reset everything, but I could not bring the Arbitron boxes back to life. So I started to play games with them. I tried rebooting the units by killing the AC to each of them for about five seconds, with no success. I was about to call Arbitron for their help when, in a bit of serendipity, I started to play with the two little square, black buttons on the front panel of one of the units, the ones labeled “Enter” and “Step.” After pushing each one in turn, I decided to push both of them in at once. That didn’t work, so I decided to try it again, for about five seconds or so. Hey, it’s done all the time with digital equipment—why not? Well, lo and behold, the encoder went into warm reboot, and in a few moments, the little LED was green and all was right with the world. I did that to the rest of the units, with the same results.

I’ve never seen this fix described in any Arbitron documentation, so I decided, with little urging from Cris, to tell you about it here. Two more notes: First, when I called Arbitron on another pretext the same day, I mentioned this little fix to the Customer Service Rep, who informed me that the method I described is exactly what he would have told me to do.

Second, this solution only works for failure mode #0002. Of the some-50 possible Arbitron box failure modes, only three seem to be prevalent; the other two (including #0003, which is DSP failure) require return and replacement of the Arbitron box itself. Just thought you should know.

Oh, and the present filament-based tower beacons? They are being replaced with LED models next year. It’s a lot cheaper than buying a new 30 kW

generator!

SBE CBNE Note

There have been a number of folks who’ve asked me what is happening with the Certified Broadcast Network Engineering exam. Apparently many were expecting to be taking the test by this time, myself included, but so far there’s been no sign of it, and no CertPreview for it, either.

Well, be patient, folks, they’re working on it. At the last SBE Chicago Chapter meeting, the word was passed that the exam had been beta tested with several savvy folks taking it. No one passed. Yeah, it sounds scary, but this is the way it goes with these things sometimes. Test questions which looked good when they were first written may not stand closer scrutiny at beta test time. Some questions may be found to have ‘trick’ aspects to them, or whatever. And, until such a test is developed and fine-tuned to the point where it can be released for general use, there won’t (can’t) be any Cert Preview, either. Just be patient and, by the way, study up good. This test is much harder than the CBNT test, and without the old-school stuff in it.

Study using what? Anything on networking design and implementation that you can get your hands on. There is as yet no recommended reading/study list for the CBNE test. Anything harder than “Networking for Dummies” ought to do. Look for the first CBNE exams to be administered either in February or in April at NAB. I’m betting on the latter, frankly. When I get a list of suggested readings, I’ll pass them along.

Sad Note

Despite the economic malaise in this country (and we can’t call it a recession, now, can we?—politically incorrect), until recently I hadn’t heard of any of the well-known or even lesser known broadcast equipment supply emporia which have actually gone out of business.

Alas, one now has, and it’s here in Chicago, no less. Roscor Enterprises closed up shop the week of November 7 without notice, at least to the employees. I’m sorry to see that happen, especially since one Chicago radio station whose name you’d know was looking to Roscor to provide and install all new consoles for their operation. Now they have to look elsewhere. I’m sending several of my console-building friends their way, and I wish them all luck.

Hard Drive Shortage

Tried to buy a hard drive lately? Have you seen them getting a little pricey, maybe a little harder

to find? Here's why: the floods in Thailand. Huh? Well, if the connection eludes you, then you probably don't know that about 90% of the world's hard drive supply comes from – that's right – that little Southeast Asian nation. This sounds like an opportunity for us Americans to exploit. Think we can make 'em as well as they can? Hey, if they can't make them right now, for whatever reason, then it's a

good time to start those old assembly lines and find out. In the meantime, you might want to put off any 'discretionary' hard drive purchases until the world supply improves, and the prices come down.

Until next month, a Joyous Christ-Mass, and a Happy New Year to you all.

The Portland Report

By

John White, CBRE

Chief Engineer, CBC-Portland

This last month I had an opportunity to revisit AM HD adjustments and learn something new, at least something I hadn't thought about previously. To recap, both the old NE-IBOC and the new Nautel exciter are capable of generating a perfect analog plus HD signal. That "perfect" signal is then fed to the transmitter where it is manipulated, and amplified to the full power signal at the transmitter output.

Along the way between exciter input and transmitter output, the components and circuits all introduce their own anomalies, creating a less than perfect signal at the output. Built into the exciter is an ability to adjust the exciter output to compensate and eliminate the results of the transmitter anomalies.

That's quite an accomplishment when you think about it. The adjustments are able to correct for the sum of all those many anomalies and unwanted signal distortion products to levels in the range of minus 60 dB. I hadn't thought about that much until I had an alarm indicating a failure on one of the ND5 power modules.

Initially, I switched off that module and removed it for inspection. I also noticed that the HD monitor was no longer locked. With a module failed or removed, I didn't find that surprising. The sum of all anomalies would be expected to be much different.

To make a long story short, inspection of the "failed" module found nothing suspicious, so I swapped it into another position (slot A). Finding that the module was fine pointed to something external but related to that one particular module slot (slot C) in the transmitter. Knowing where to look, I

found the problem was simple and easy to correct.

I installed the known good module into the transmitter and powered up. The transmitter came on

line with full power and everything normal. Except – don't you like that word? – except the HD monitor would not lock up, not even close.

That required some thought, until I realized that while testing, I effectively swapped the A and C module positions. That seemed worth exploring, so I swapped the two modules back to their original positions. That simple change

resulted in a good HD monitor lock.

So it appears that seemingly minor variations in drive, modules, and combiner ports may cause significant changes in the overall HD performance. That's something to keep in mind when performing repair and maintenance procedures.

In other news, the national EAN test is now history. Aside from the obvious problems, the task now is to move forward with solutions. For me, the results explained an observation and question I had earlier this year. I was occasionally missing one of the FM RWTs from one of the local LP stations, a problem I had not seen with the old TFT. The audio was coming through to the ENDEC just fine, although the artifacts of multipath were more evident on the ENDEC's speaker. I took steps to reduce the multipath which corrected the problem.

With the recent Sage EAN analysis, I leaned that the ENDEC sets a more rigorous standard for detecting a valid EAS header. That explains my earlier observations.

Meanwhile, here in Oregon we are following up on the EAS national test, lessons



learned about the equipment used, delivery systems, PEP station expansion and how we improve the local parts of system.

CAP implementation is moving forward. At the next Oregon SECC meeting we will review the launching of Oregon's CAP Plan.

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

Snow

The month of November started off with a nice little snowstorm. I woke up to there being a foot of snow outside the front door at my condominium. After watching traffic reports and hearing all the school closings, including Aurora (the town where our studios are located) Public Schools, I decided to stay home.

What is the significance of Aurora Public Schools being closed, you ask? In the five years I was in the system, the only time they *ever* cancelled school was the Great Blizzard of 2003, and that was during fall break. They rarely cancel, even during some pretty bad storms.

The day was not lost, though. It cleared up fairly quickly, and I was able to take my dad to the airport to go to his corporate meeting in Pennsylvania. The roads were treacherous going to pick him up, though. Even the private toll road we took to the airport was iffy. We saw several spin-outs. Even though conditions began to get better as the day went on, I still stayed home.

I had planned on being at a SBE-SMPTE-48 boot camp to hear Chuck Kelly of Nautel discuss a few things: the new power saving techniques the FCC is now allowing (MDCL), the NX-series of transmitters and implications of increased manmade noise floor levels on radio broadcasting. The whole schedule was messed up because of the snow, so I ended up missing it. Thankfully, Nautel had done some webinars with Chuck about the very topics he was going to discuss. The only thing with no webinar was the noise floor levels, but Chuck sent me the PowerPoint he created for it. I must say, it was all very interesting. I really enjoyed learning more about the NX-series transmitters, as we will be getting one for 670 KLTT later this month. I find it

amazing where transmitters came from to where they are now.



NexGen Server Update

We finally did it. After weeks of preparing, we got the new NexGen server installed and running. Our prayers were answered as the transition went smoothly, with only one hiccup to speak of.

We started off with nearly a terabyte of data in our database. After installing a second hard drive to a

workstation and mapping it to the other NexGen computers, we were able to move 400GB of non-essential files to it. These were mainly audio files, some shows and other various things the board ops use on a daily/weekly basis. Then I gave everyone a week to delete any production files that had not been modified or played in a year. From my desk, I cleaned up another 300GB of space. This left us with just over 200GB to move to the new server. I must say, this helped a great deal as instead of it taking the full two days NexGen said it would, it took a mere 10 hours.

AutoPilot

It seems AutoPilot has been the source of discussion for many issues of *The Local Oscillator* this year. This time, though, it's not about the program but instead the computer. Over the last two months, I have found the AutoPilot computer shut off, usually right around power/pattern change time.

I get hourly emails as well as confirmations that the sites have changed pattern, and I noticed I hadn't gotten these emails and went to log in to the computer via VNC and found I could not access it. I had decided it was someone logging into the computer from home to check their station and

mistakenly shutting down the remote computer instead of their own.

The problem wasn't happening in any type of predictable fashion. It happened on a Wednesday two weeks in a row, then not again for several more weeks, and then again on a different day. After the third time, I restricted access to the computer to just myself. When the issue happened again, I began to dig in to it. I called Dell and their guy did the troubleshooting and decided to send a tech out. The tech replaced the motherboard and power supply after not finding any issues in the logs. So far so good, hopefully it will hold out. This is a fairly new computer, an Optiplex 390 that's just a few months old, so it should be reliable.

Day Sequerra

I have been trying to find a way to implement a silence sense for our stations, mainly because KLTT has gone off air overnight and we don't know about it for several hours and by then, missed several paid shows. The issue is that we cannot reliably monitor the stations from the studio overnight because of skywave interference that

occasionally comes in. We need a reliable way of monitoring from the transmitter sites themselves, where adequate signal is never an issue.

We use the Day Sequerra M2 modulation monitors at all our sites, but have learned to not rely on them because even if they are plugged into a UPS, they will often freeze up and require a reboot. Obviously with the sites being in all different parts of the Denver metro area, it wouldn't be a good idea to use these to monitor the off air signal. I decided to contact Day Sequerra about our issue with the units not working all the time, and they believed a firmware update would fix the issue. They sent us the new firmware ICs and I replaced the chip in each unit.

Only time will tell if the units hold out. If they do, the next step would be to set up something to trigger a Burk alarm so we can be notified.

That caps off another month here in Denver. December is looking like it will be a busy month for us. With the new transmitter installation, Christmas, and several other smaller projects, I will definitely be a busy gal! So until next time... that's all folks!!!

Digital Diary

by

Larry Foltran

Corporate Website & Information Technology Coordinator

The Kevlar Mac

I've never hidden the fact that I prefer PCs over Macs. I have nothing against Macs. It's simply a fact that I grew up using PCs, working in DOS and Windows and... well... I haven't found a significant reason to switch. I certainly don't shy away from using a Mac when the opportunity presents itself and often read about them to ensure I'm at least within the vicinity of "in the loop."

Program guests or programming partners often bring their personal laptops into the station, requiring access to our wireless network. In many cases, I receive a call prior their arrival at the station. My typical questionnaire includes what type of anti-virus software they have on the computer. There was a time when I would ask if they had any anti-virus software on their computers, which the response was

always yes. The problem was that this wasn't always true mainly due to the user's lack of technical knowledge rather than attempting to be deceitful.

The reply that always concerns me is, "Oh, I have a Mac. I don't need any anti-virus." Really? Can any piece of computer equipment be completely impervious to attack? The answer is "no," with a "but" thrown in as a disclaimer.

Needless to say, the Windows operating system has been around for some time. Each subsequent version has been built around the original framework, which is becoming a bit long in

the tooth. It can be argued that the relatively newer Mac operating system is technically even older than Windows because it is built on the UNIX platform. In its true form, UNIX is extremely secure. But the Mac OS isn't entirely UNIX, thus increasing the likelihood of security holes. With Mac's built in



security features, the holes are protected quite well.

Regardless of its lineage, the Mac OS can still be considered newer. Although its user base is growing exponentially, there are still more Windows OS users in the world than there are Mac OS, making Windows a much larger target for hackers. The predominance of Windows-based tools used in developing viruses and malware also plays a big part. Simply put, four out of five hackers prefer Windows when developing viruses or as their primary target OS.

So is it impossible for a Mac machine to become infected with a virus or malware? No. Although that statement also comes with a small disclaimer. Based on my research, the potential for malware infection is much greater than of infection by a virus. One prime example is the Trojan that struck Macs earlier this year called Mac Defender. Although some will say that the media greatly embellished the scope of the attack, it still proves that the Mac is not completely bulletproof.

As another level of defense, the release the OS X 10.5 Leopard offered a user prompt via a dialog box prior to executing a downloaded application. In the vast majority of PC infections I have dealt with, the user is the weak link. Apparently, this is no different on the Mac platform. With the reported increasing number of Mac-targeted malware floating around the internet, an infection is only a click away.

The other hole in the supposed Mac armor comes in the form of Windows software on the Mac. Whether the user utilizes Boot Camp or some virtualization option, the fact remains that the software is more exposed to infections that plague the PC world. I presume that any infection would remain within the virtual Windows environment, thus making the infection less of a catastrophe than on a true PC.

There are several other aspects of the Mac OS that make it susceptible to malware infection that

I won't go into. These include the unprotected application folder, a centralized open address book and others. Again, these risks are generally low especially compared to Windows users. Needless to say, I don't believe anyone will get rich any time soon developing a Mac-exclusive anti-virus bundle.

The biggest concern I have in regards to Macs is that they can be carriers of infections. Working within a Windows network environment, an infected Mac sharing infected files to network PCs can result in a very busy day for me. Just because the infection remains dormant to the Mac user, it can still be a real danger for the PC users on the network. Unfortunately I can't force guests to load anti-virus software onto their Macs and I'm not typically too worried about the one-time guest to the station. For those that will be accessing our network on a regular basis and may be exchanging files, I will typically recommend that they install one of the various free options for Mac users and ensure there are no sleeper infections lying in wait. As usual, a bit of caution can make a big difference in the long run.

Hackers tend to go where the money is. The days of simply writing malicious software for the sake of giving someone a bad headache are mostly gone. Hackers now write their applications with the goal of financial gain. As the number of Mac followers continue to grow, I suspect that the efforts to break the armor will also increase. The virus/malware arms race on the PC has been raging for some time and will continue for some time. I believe we will soon see the opening volleys in the Mac theater of the war between hackers and anti-infection developers.

On a closing note, I would like to wish everyone a safe and joyous Christmas. It's a time of year that I look forward to spending with family, practicing the joy of giving and truly enjoy overall. Be blessed.

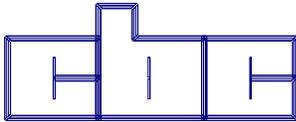
...until next month!

The Local Oscillator
December 2011

KBRT • Avalon - Los Angeles, CA
740 kHz, 10 kW-D, DA
KCBC • Manteca - 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, 3.8 kW/126m 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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