# The Local E Oscillator

The Newsletter of Crawford Broadcasting Company Corporate Engineering

# APRIL 2012 • VOLUME 22 • ISSUE 4 • W.C. ALEXANDER, CPBE, AMD, DRB EDITOR

#### Getting Closer...

The past month has seen a tremendous amount of progress on the KBRT site move project. Back in early February, we received about 20 pages of plan check comments and redlined drawings from the Orange County Planning Department. Many of these items were discrepancies that resulted from rounding to a certain number of significant figures and things like that, but there were quite a few that required considerable additional work on our part.

One monkey wrench in the works was that Orange County would begin utilizing the 2010 California Building Code effective April 1 of this year. Up to that point they had been using the 2008 CBC. We were completely unaware that since the new site would actually be constructed subsequent to April 1, it must comply with the new code. That sent us back to the drawing board on quite a number of things with respect to the transmitter building. We finally got all that redesign work done in late March.

While the towers and their foundations were properly designed to the current ANSI/TIA standard (and the 2010 CBC defers to that standard for communications towers), we did have to add a number of notes to the plans to indicate compliance with various elements of the use permit conditions. We also had to provide some additional documentation from the geologist showing that the tower engineer did in fact design the footings and anchors in accordance with the geotechnical report. I also had to purchase a copy of the ANSI/TIA RS-222-G standard and loan it to the county engineer for the plan check. All that also came together in late March.

And you may recall that I specified concrete masonry unit ("CMU," a.k.a. "concrete block") walls around the transmitter building and the tower bases to keep armed vandals from shooting up our building, ATUs and tower base insulators. These walls are free-standing and are not "retaining walls" as such, but the county wanted us to treat them as partial retaining walls and show that they can hold back up to 36 inches of soil. I presume this has something to do with building them on a slope and the possibility that a landslide might occur. Whatever the reasoning, we had to go back and make some calculations to show that the walls are, in fact, capable of retaining three feet of dirt and add those notations and calculations to the plan. The reality is that the seismic loading is far in excess of any forces that the soil might exert, so the CMU walls were implicitly compliant already. Like the other revisions, we got that completed in late March.

Finally, the county wanted a California certified electrical PE to seal the electrical drawings for the new building. All the electrical apparatus (distribution panels, conduits and circuits) is part of the prefabricated building which will be manufactured in South Dakota, and while the building manufacturer has a California certified PE on staff, it does not have a California certified *electrical* PE, so it was up to me to come up with one. Ben Dawson immediately came to mind, so I sent him my electrical design and drawings. Ben got out his three-phase reference books, the National Electrical Code and other reference materials and checked all my calculations, wire size, etc. and put his supervisory stamp on the plans. I had also enlisted my good friend Buc Fitch to provide a first screen for the plans, so I was confident that everything was as it should be. With two of the best and brightest electrical engineers around signing off on the plans, I know they are good.

So on Monday, March 26, all the revised plans and materials were filed with the county for round two of plan check. We are presently awaiting word that they have been approved.

And speaking of approvals, the county did approve our grading plans and demolition permit in late March, so we're good to go on those two items. The grading will be part and parcel of the overall construction project, so we won't be engaging in that work for a little while yet, but we do want to get the demolition work done this month if we can. That involves demolishing the old and heavily vandalized K6RR "hamshack" up on top of the hill (a 30' x 40' block building), all the old wooden poles used by Dr. Roaney for his amateur radio antennas, a chain link fence around the hilltop, an old and long-empty above-ground diesel tank and numerous other items of junk and trash around the property. That will leave the site clean and clear for the main event to begin, hopefully in May.

In late February, we met with the folks at Southern California Edison about the utility power run to the property. We got final plans from them and met with our contractor, their planners and inspectors and hammered out a plan. I had to put together an application for Orange County since the trenching work will actually take place under the roadbed of a county road (that the county does not maintain). I also had to put together an application and traffic control plan for the Forest Service, since about 800 feet of the trenching will occur under the roadbed of a Forest Service easement. The Forest Service folks have been very good to deal with so far. Our plans are to start the trenching on or about the 16<sup>th</sup> of this month provided that we have our approvals back from the county and Forest Service by that date.

With all that in motion and the time for actual construction work to begin rapidly

approaching, I now have to start thinking about materials, equipment and labor for installation of the technical plant. That means getting updated quotes on transmission lines, connectors, transmitter, rack, remote control, antenna monitor and all that. We have already ordered the phasing and coupling system from Kintronic Laboratories, so I can check that off my list.

As we continue to move forward with this project, I have to locate some engineers in the area that are available to help with the project. We'll need lots of muscle (with technical know-how) to pull in transmission and sample lines; power, control and fiber-optic cables to the towers; set up and connect ATUs; do RF plumbing in the building with rigid line components and all that.

Once we get everything built out, I will make the base impedance matrix measurements, calibrate the sample system and do all the other work necessary for the moment-method directional antenna proof. Since we're starting from scratch and employing nodal analysis in the design process, I anticipate that tune-up will be a snap, but time will tell. I learned long ago not to stand on predictions like that!

After all these years working on this project, it's great to think about actually moving some dirt and getting some steel in the air. What an exciting time!

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

Hello to all from Western New York! It did

not take long to transition from winter to spring this year, primarily because we experienced the mildest Buffalo winter in almost 120 years! Official snowfall records indicated that we had a total snow accumulation of 35.1 inches for the year, way down from the normal snowfall level of 146 inches through this time of year. Even temperatures seemed to be somewhat elevated this winter. I don't recall

having any length of time where temperatures stayed well below 20 degrees or more for more than a day or two at a time.



With the early coming of spring, also comes

spring thunder and lightning storms, one of which we had on Thursday March 15<sup>th</sup>. About midday, the board operator noticed that we had lost communication with the Burk remote control right after a strong thunderstorm moved quickly through the area. Unable to reestablish a connection with the Burk, I made the trip out to the transmitter site to see what had happened.

Immediately after opening the transmitter building door, I smelled that all too familiar scent of "letting the smoke out"! I knew right away that we had experienced some damage by lightning, but I was not prepared for the amount of damage I found! The remote control was damaged beyond any hope of a local repair, so it was boxed up and shipped off to Burk.

The next item was the Nautel NV-40 transmitter. It had folded back to about 15 Kw output due to damage to three of the RF modules. Further investigation found that five RF driver boards had sustained severe damage and would need to be replaced. A quick call to Nautel had the parts on the way, so it was on to the next problem, the C-Band satellite receiver.

The display on the receiver was in permanent carrier searching mode, and a hard re-boot did not produce any results. I next checked the external DC voltage supply that provides power to the LNB, all there checked good. The next item to be suspect was the LNB. A quick check revealed that DC voltage was present at the dish, so I replaced the LNB with a spare, and the receiver came back to life.

Next on the repair list was the Fostex rack-mount audio monitor and Denon RBDS tuner. Neither would power up, so a quick look at both showed to be minor repair, such as diodes and capacitors in the power supply. Both were repaired with parts on hand.

The last thing to tackle was the tower light controller. It was constantly showing a fault, so I assumed that the SAS module had taken a hit. On a hunch, however, I checked the calibration of both current sensors and found that the SAS sensor for the tower beacon had simply lost its calibration constant. A quick performance of the calibration procedure brought the controller back to life, so the spare sensor went back onto the parts shelf!

One other thing to make note of that was damaged by this storm is the magnetic switch attached to the front door of the transmitter building. The contacts make only when the door is opened, and that closure lights a status LED on the Burk remote control. The door open alarm was on constantly, so I began investigating the cause. I found the contacts in the door sensor were welded shut from the lightning strike!

I am perplexed as to how this lightning damage occurred. When I installed the new transmitter building several years ago, special attention was given to grounding procedures, to insure that all of our equipment was protected from lightning strikes to the tower, power source, or utility lines. As of this writing, I still have not figured out how this damage occurred, I can only chalk this one up to "unknown." There was no immediate "path" detected from the lightning strike, and the only common denominator is the remote control. I can only hope that the annual spring ritual of "letting the smoke out" is done for us here in Buffalo.

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

Not to be outdone by the March 15<sup>th</sup> lightning strike, on Sunday the 25<sup>th</sup>, Western New York experienced the heaviest fog I have ever seen! You couldn't see more than 50 feet in front of you, and the fog seemed to linger for hours.

Now, normally you would not think anything about fog, but this one was so thick that we lost our STL path! The board operator called me that Sunday morning about 8:00 AM stating that the audio was breaking up. As my family and I had just left a restaurant after having a Sunday breakfast, I called the remote control to switch our STL to the analog equipment, thinking that the fog was too thick for the digital signal to get through. The analog signal was just as bad as the digital, and in a short time, was gone completely!

The quickest way for us to get back on the air was to drive to the studios and get our Comrex remote unit and hook it up at the transmitter site via the phone line. I thought, okay, we can do this for the next couple of hours, the fog will burn off and everything will come back to life. Well, after the fog did burn off, the STL would *not* come back up; we were showing almost no receive signal level at all!

I knew that both Moseley STL receivers could not be down at the same time, so I called Western Antenna & Tower to climb the WDCX-FM tower and investigate why we had no signal on the STL. It wasn't long until the tower worker reported that he found a hole in the 1-5/8" air dielectric line, caused by rubbing on the tower leg due to some broken stainless standoff clamps. He also found that the pigtail that connected the dish to the feed line had arced to the tower in several places and would need to be replaced (leftover lightning damage?).

The parts were ordered, and the tower crew returned on Tuesday to make the repairs to the line and replace the pigtail. After patching the hole in the line, and replacing the broken hangars that supported the line, Don removed the burned coax and replaced it with new super flex <sup>1</sup>/<sub>2</sub>" pigtail. A check of the STL receivers showed almost NO receive level at all, but would occasionally "burp" and show moderate signal for brief moments.

Thinking that there could also bad a problem with the studio STL setup, I removed the STL transmitter and put it on the repair bench to have a look at it using my IFR communications monitor. All looked good with the transmitter, so I re-installed it and checked power levels at the tower using a calibrated 50 ohm load and wattmeter. All looked good there, so I buttoned everything back up, and came to the conclusion that the 1-5/8" feed line on the tower was bad and would need to be replaced. In the meantime I switched the antennas of the inner city relay to the STL equipment to get us off the Comrex Matrix and back onto the STL. As of this writing, we are back up on the main STL, using the TSL antennas and feed line. I will need to get the replacement feed line ordered, but will have to investigate which one is cheaper, air dielectric or foam filled.

At WLGZ-FM, I was able to make the repairs to the Tascam DM-3200 Console in the WDCX(AM) production room. This console had been out of service for quite some time due to a faulty control screen in the monitoring section of the console. You may recall that we were in need of a shipping container to ship the console back to the manufacturer, but Tascam could not come up with one.

The original intent was to have Tascam make the repairs, and ship back to us the repaired console. After talking with the service representative, they strongly recommended that no service work was to be done in the field, that they were the only one that could make this repair sufficiently, so I finally just ordered the display, taking the chance that there was no other damage, and that no more parts would be needed to get this console back into working condition. As luck would have it, replacing the display brought the console back to life, and I was able to do it without incurring the costs of shipping and expensive tech bench labor hourly costs.

On Tuesday, March 27<sup>th</sup>, I was fortunate to receive a visit from Gary Liebisch, our sales representative from Nautel Inc. I have known Gary for a number of years, and it was nice to get together again, and learn more about the Nautel NV-40 transmitter. Gary was interested in seeing first-hand my installation of the NV-40 and the (new) WDCX-FM transmitter plant, which I built almost three years ago now. I hope it held up to his high standards, and I would really like to thank Gary for the Nautel hat. Sure would be nice to have a polo shirt to go along with it... Just kidding, Gary. I would not take the shirt off your back.

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

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

As I mentioned in previous editions of *The* 

*Local Oscillator*, we have made significant improvements to the lightning avoidance and suppression measures at our studio and WMUZ transmitter facility. We have put in a new ring ground system and new Stati-Cat arrays. In addition, we have been studying the present grounding system layout of the facility to ensure we have the most effective ground topology. Even though we have an existing internal ground system within our facility, it may not be optimized to effectively minimize differential

voltages between equipment racks or equipment during a high current lightning strike.



After discussions with Cris, we decided to

provide or create a central point or single point ground system for the broadcast facility. This would ensure that all of the equipment and the enclosures are at the same ground potential. The plan is to install a low resistance ground bus from the tower's ring or halo ground to a copper ground bar within the facility's transmitter room. From that point to every equipment rack we can attach ground conductors. Since all of the conductors are attached to one

point, their potential will be tracking together. Hopefully by the next addition of this newsletter, I will be able to report back to show you how the installation turned out and any lessons learned.

In addition, to make the changes to the fundamental grounding topology, we have been looking at the existing ground connections around the facility. What we found was that under most of the wire nuts, the copper wire had developed an oxidation on its surface. In addition, the building was painted a number of years ago and paint made its way into the connection. This certainly can create resistance at these points and render the ground system ineffective.

I obtained a wire brush attachment for my

drill motor and remove all of the oxidation and paint from these connections. Then I installed some new wire nuts and firmly tightened them to make sure there was a good mechanical bond. This was typical of many of the connection points around the facility. After realizing this issue, I believe that this process should be included as a yearly maintenance task. Most importantly, these connections should not be painted.

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

As I write this, the NCAA tournament is headed for the Final Four showdown and I'm a happy man. This is my favorite time of the year. The folks here in Alabama are all about football, but I was born and raised in NC. Roundball country. It's a beautiful thing.

All of my ACC teams have been eliminated, but the Wolfpack deserves a special mention. Some of the pundits thought they were seeded

too high and certainly didn't like their chances for the Sweet 16. The coach of the NC State Wolfpack, Mark Gottfried, was fired by Alabama a few years ago. While most devout Christians (which Gottfried is) try to avoid gloating, it's probably a bit difficult for him. Some of those same pundits had said that his coaching career was over after Alabama. Gottfried (and God) had different ideas. (Heh.)

#### The New Mail Server

Also as I write this, we're taking the final steps to get our new Zimbra mail server in place. The software that we've been using, Scalix, has done a good job, but its future is very uncertain. Scalix started life as HP's OpenMail many years ago and has changed hands several times. When we picked them up, they were owned by Xandros, producers of a Linux distribution. However, Xandros apparently hasn't been doing too well; they haven't released a new OS in several years and in July of 2011, Xandros announced that they were selling Scalix to Sebring



Software.

Scalix's Website still shows Xandros as the owner and in the Scalix forums online, you can hear crickets chirping when people post support requests. These are not signs of health. Most frightening are forum posts from registered (i.e., *paying*) users: "I want to renew my subscription ... hello? I have a check here ... no one is answering the phone!" This does not inspire

confidence.

The software that we've chosen, Zimbra, was owned by Yahoo! from 2007 to 2010; it's now part of VMWare. Both are robust, healthy companies, so we don't think it'll be going away any time soon. It has some nice features that I think everyone will like, too. In the months to come, we'll introduce the Zimbra Desktop suite, which is a Groupware application that will let each user form groups, share calendars and contacts, and do other things that'll make us more productive.

Again, Todd and I will have a more complete report on that next month, Lord willing.

# Switch Mode Power Supplies (SMPS, If You're Cool)

How old am I? Old enough to remember when "switching power supply" and "MOSFET" were curse words. Early in my career, if a new piece of equipment came out with either inside of it, I avoided it like the plague. They were accidents looking for an intersection.

This is another version of the old tune, "How Times Change." Nowadays, MOSFETS are extremely reliable and are the device of choice in many power circuits. And SMPS? They're everywhere, too, and are an integral part of the "small and smart" electronics revolution.

Years ago, if you needed power for portable equipment, you simply loaded it with enough batteries to get the job done. As the batteries weakened, the output might drop, or the audio might become distorted. But users expected a gradual loss of function as the batteries were used up. You also expected that people would only be able to use a



#### Figure 1 - Linear vs. PWM Regulation

portion of the total available energy in that battery. Nowadays, you'll often see small portable devices that work fine all the way to the "low

devices that work fine all the way to the "low battery" indication. Then they'll suddenly start complaining for a recharge. There's probably a little "buck-boost" SMPS in there that maintains a constant voltage as long as possible. The device only hollers when the available battery drops so low that the "boost" can't pump it up anymore. The battery can actually be made a bit smaller for the same service life.

We radio engineers have good reason to view these "switchers" with a gimlet eye: they're notorious for causing RF interference. They can be made clean and noise-free, but that costs money; especially with today's economy, manufacturers are under pressure to keep costs as low as possible. With the wholesale move to alternative, "greener" lighting like compact fluorescent and LEDs (which typically use little built-in SMPS), this will only get worse, too.

But whether you like them are not, SMPS are here to stay. They're smaller, lighter, less expensive and considerably more efficient. Like you, I've replaced quite a few of these switching supplies in my job and, being a naturally curious fellow, I wanted to know more about how they worked. There's a personal angle, too: I'm building some tube amplifiers and I'd love to do away with the heavy (and expensive) power transformer. I thought I'd share some of what I've learned here.

#### The Old Linear Approach

Modern digital circuits need a rigidlycontrolled and ripple-free power supply. Microprocessors operate at lower voltages nowadays for a reason: if you reduce the supply from 5V to 3.3V, for example, if everything else stays the same, you've cut the power consumption in half. But you can't go lower than that, or the chip won't function properly. Go higher and the power dissipation goes up dramatically. Regulation is essential.

Historically, these have been series linear regulators such as the familiar 78xx and 79xx devices. In the left half of figure 1, we're deriving a +5V supply from a "raw" input of +12V. These are typical numbers from the real world; the 7805 needs a raw input that's considerably higher than the regulated output to do its job properly. But at 200 mA output, more power is being dissipated in the regulator than in the load: 1.4 watts vs. 1 watt! That's not very efficient, but it's typical of linear supplies (and explains why they typically radiate a lot of heat!).

# Switching Supplies: Pulse Width Modulation (PWM)

A typical SMPS (the right half of figure 1) uses Pulse Width Modulation, which you're no doubt familiar with already. Many AM transmitter manufacturers (notably, Nautel) use PWM, for example. Regardless of application, the principle is simple: a fast switch sends pulses of current into an output filter. By varying the pulse width, you vary the output voltage. Since the switch is fully on or off at any given moment, the efficiency is theoretically 100%. Even in the real world, 80%-90% is common on commercial units. A hobbyist can build one with 555 timers that's at least 70% efficient.

While there's no requirement that an SMPS use a high switching frequency, most of them do. In any AC-to-DC supply, rectifier diodes provide pulses to an output filter (typically a large, bulk capacitor). The filter smooths the output and provides current between pulses. In a classic 60 Hz line-operated supply, the pulses are simply the tops of the AC sine wave; they're relatively smooth and rounded.

With PWM, though, the key to high efficiency is to switch on, switch off. This means that your output filter is being hit with brief, sharp, highcurrent pulses. By using a high frequency, the size of the filter components can be reduced dramatically. You might see 2000 uF in a given 60 Hz linear supply, but an equivalent 100 kHz SMPS might use only 2-3uF ... and still offer better filtering. High frequencies mean that the inductors can be made much smaller as well, further reducing cost and weight.

#### **Beware Those Brief, High-Current Pulses!**

Brief, short, extremely sharp-edged pulses are the norm in modern SMPS – so brief that with a light load, you can barely see them on an oscilloscope. This introduces a new set of problems. If you're like me, the first time you see a warning about this for an SMPS, you'll probably chuckle. "Why, my XL60 transmitter has pulses in the *kiloampere* range! What's the big deal??" The big deal with an SMPS is that those high-current pulses occur in a very small area, on relatively-thin copper board traces. Losses and heat buildup are very real problems.

For this reason, my first tip is this: if you have an SMPS that shows obvious signs of overheating (capacitors becoming "undressed," with peeling plastic covers and bulging tops, discolored resistors, and so on), it should be replaced. I'll just tell you now that physically-small supplies, such as the 3" x 5" chassis-mounted units typical in our equipment, are difficult to repair. It's usually not worth the time and expense.

If you insist on trying, here's the next warning: you can't just buy an assortment of electrolytic capacitors and diodes from Radio Shack for your SMPS. Don't try to rob parts from an old piece of equipment to stick in there, either. The capacitors must have a low Equivalent Series Resistance (ESR) and be non-inductive at the switching frequency.

Likewise, the switching transistor and rectifier diodes must be able to turn on and off very quickly, and to handle brief pulses that can be many, many times the output current draw. To keep these devices cleanly switched on and off, the driving signal must be a sharp, "squared" pulse. Replacement transistors and diodes must be the same type or better. One reason why I said it's better just to replace an SMPS with a burned circuit board is because clipleads, tacked-on replacement wiring and "twist and tape" are *definitely* a no-no in a switching supply. Stray inductances of only a few microhenries can dramatically increase the voltages across the switched components.

Dump that supply and buy another. You can probably find a good replacement for under \$50 at Digikey or Mouser online. If you need an odd combination of voltages (for example, for a satellite receiver that needs +24V LNB voltage), simply buy two supplies to get the values that you need. You may have to do a little cramming or mount one above the unit in a plastic case, but believe me, that's preferable to attempting the repair of a burned out, obviously-overheated SMPS.

#### The Runaway Freight Train

Figure 2 is an LTSpice simulation (discussed last time) of a typical SMPS using Linear Technology's LT1070 monolithic regulator. The PWM generator, the regulator and switching transistor are all built into the chip, making it easy to create a "boost" regulator circuit. I'm taking a 25V input and "boosting" it up to 50V into a 500 ohm load, or 100 mA of current.



Figure 2 - A typical SMPS in "Boost" mode

" $V_{IN}$ " and "Gnd" are the supply and ground pins, respectively. "SW" is the collector of the switching transistor, "FB" is the feedback voltage that tells the regulator what the output is up to and " $V_{C}$ " is the compensation. More on that in a moment.

The theory is simple: the "SW" pin turns on and briefly grounds the right side of the coil, L1. A magnetic field builds up. The "SW" pin turns off (goes open) and the magnetic field collapses. This results in a "kickback" spike that is higher than the applied voltage. This is rectified by the diode D1 and filtered by the capacitor, C2.

The output voltage is set by the resistive divider R1/R2. The regulator chip has a built-in 1.24V band-gap reference; you simply select resistors that will give 1.24V when the output is the desired value. The LT1070 will adjust the switch "on" time (i.e., the pulse width) to keep the voltage on the FB pin at 1.24V, giving the desired output.

The properly controlled and regulated output

is shown in the left top trace. We are indeed getting 50 volts. The top right trace is the result with C2 removed, just to show you the *potential* voltage that could be created by that coil. I actually trimmed the image to make it fit here better; it went over 500V(!!) on the peaks. If this was a real circuit in real life, the LT1070 chip and half the other components would have already fried.

This illustrates why I view a typical SMPS as a runaway freight train on a tight leash. Most are capable of making an output that is considerably higher than the rated value; the regulator then reduces the pulse width as needed to keep it there. (A typical SMPS runs at considerably less than 50% duty cycle.) This gives plenty of headroom for sudden increases in the load.

Now for that  $V_C$  pin. The correction circuit in a typical analog SMPS controller IC is a comparator that outputs a correction voltage to the

PWM circuit. It runs at very high gain (60-100 dB is common). Any high gain circuit can become unstable ... and SMPS are worse than most because of the reactance at the output (in this case, the filter cap, C2). R3 and C3 provide phase and frequency compensation to keep this thing from becoming unstable.

My final observation is that not all SMPS are the same. The supply that comes with your laptop computer, for example, will be designed for a wide range of operating conditions – from no load in an ice storm to Junior shorting the outputs with a paper clip while the house is on fire. That's one reason why they cost so much. A less-expensive open-frame supply that mounts inside a piece of equipment is going to be pickier about its operating conditions: load, temperature and so on. Read and follow the manufacturer's specifications.

Until next time, keep praying for this nation!

# Catalina Tales By Bill Agresta Chief Engineer, KBRT

Greetings from Santa Catalina Island! March had periods of both quiet and challenge for me here at the KBRT Ranch.

The good news is that things have stabilized somewhat here on the island, and we seem to have more support and a warmer relationship with most of the locals than we have for some time.

This comes with prefect timing as I prepare to move KBRT and myself off the island and face challenges with site cleanup and the logistical issues

of moving a lot of big and heavy equipment off the island. All I can say here is that God's perfect timing seems to once again be very evident here as He moves us forward to a new transmitter site, and that is very exciting to me!

On the challenging side of things this month, things were getting almost too quiet up here until we got hit with a pretty good downpour followed by some very strong winds towards the end of last month. Though all of our equipment worked flawlessly, we lost power to the entire interior of the island, and that took out AT&T's entire system. Our back-up generator came up as it should, but we had no remote control since both our T1 and POTS lines were all dead.

> I was on my way back from the mainland after spendin

from the mainland after spending Sunday with my mother and immediately called my island back-up techs. Since some of them were also scrambling with other tech issues because of this widespread outage, I continued to call down my list until I reached our good friend, Ralph Morrow. I hated to bother Ralph since his hands are already so full of life

issues that he seems to juggle on a daily basis, but once again he agreed to drive up the hill ASAP and put KBRT back on the air until I could get back to control the station.

Once I got back on the island later that morning, I realized how bad the situation might be and was told that we might not have working phones lines for some time to come. The question always arises when there is any problem with phone cables: are they really trying to restore our services, or like the situation with our DSL after the 2007 fire, are they just going to ignore us because they don't want



to put forth the effort or resources to get our service restored? I was actually quite amazed when our power came back, then our T1 returned followed by the regular phone lines, one then another all before we signed off that evening!

I know the old cable going from the AT&T microwave tower at Dakin Peak to our plant is quite old and in bad shape. Many of the pairs are dead now, leaving not many more to switch to with each outage. I continue to pray, "Please Lord, let them find another working pair!" because by experience here on the island, I know that cable will not be replaced before we are long gone from here.

Now on to deal with the mess the wind left behind. I already realigned two of our satellite dishes and cleaned up some debris from the area around tower three, but since I had already begun a large scale site cleanup to help facilitate our move, much of the junk I had piled up from that got blown all over the tower field, so my job is set for the next couple of days. Once that mess is cleaned up and put back into a pile, it's on to the continuation of getting rid of all the stuff that has accumulated here over many years of operation, then working out the details of moving most of my own personal items off the island so we only need deal with minimal stuff upon our final shut down of this site.

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

#### PAD (aka RBDS, PSD) revisited

Those of you who read last month's missive will remember that I made a pitch to create an

addition to the PTY codes for the "Urban" format, of which our own WPWX is broadcaster. Well, lo and behold, I spoke too late. The process has already started.

Among our many readers was Barry Thomas, VP Engineering of Lincoln Financial Media, based in Atlanta, and the chairman of the NAB

Radio Technology Committee. Also responding (to an email I sent) was David Layer, Senior Director of Advanced Engineering at NAB, The gist of what they told me was, "We've already started the ball rolling, and it started last year."

Well, hallelujah, and I don't mean that in a sarcastic sense at all. I'm truly glad to see the list updated in this fashion. And that's not all. Two other formats, Spanish music and Spanish talk, have been added. These two would read out on car radios in Spanish. The PTY codes, in order, are proposed to be #24, for Spanish Talk, to #26 for Hip-Hop.

Note that I said, "Hip-Hop," not "Urban." As Barry Thomas, in his email, correctly points out:

"We've learned a great deal since the original PTY list was drafted in the 1990s, which was generally based on the Arbitron format list at the time. We have a better idea of the way receiver manufacturers us the RBDS features like PTY, PS,



RT and we have developed a greater understanding, particularly in a post-PPM, about how persons choose radio. A few of the lessons.... can be summed up:

> "--RBDS PTY is used by compatible radios essentially as a as a search field. "Urban isn't a widely used music genre, or a searchable description using similar environments like iTunes, Tune-in, etc.

> > "—'Urban' is an industry

'insider' term but isn't really understood publicly. I for one have never heard a non-industry person describe a radio station, much less make a choice station using the term." [Me neither, Barry. Point very well taken.]"

Barry goes on to make several other arguments for the use of "Hip-Hop" over "Urban," but you get the idea. And, sadly, space limitations prevent me from going further.

The new RBDS standard incorporating these codes was actually accepted at the NAB RBDS Standards Subcommittee meeting at last year's NAB Convention. I didn't hear about it until now, and a friend of mine who was at the meeting had actually forgotten that the standard was enacted! Again, not a criticism, but now that the PTY list has been changed to incorporate these new codes, we can hopefully get these new PTY codes standard into the car radios, and into our own encoding and decoding equipment as well. That is the desired outcome, after all.

#### Taming Camp Desolation (well, somewhat...)

A long awaited project is now moving on to conclusion. The Burnham guy anchor pathway project (which was called "BGARP," for what reason I've forgotten) is nearly complete.

This is no small deal. Since long before I arrived at what was then the WYCA transmitter site, the place had earned the name "Camp Desolation." It is hard to believe that at one time, more than 50 years ago, the site actually had a large hog processing plant on it, with railroad tracks going into it. We've found pieces of the old building on the property. The plant's been gone since about 1960, the site lay fallow until Mr. Crawford bought it in 1964 and put the WYCA transmitter building and tower on it in 1965. By then, and to this day, the weeds were so tall that... well, look at the picture to get the idea. We don't have weeds out there, we have *jungle*, and I'm estimating the height of the biggest ones to be 14 feet.

A couple of years ago, I decided to build pathways through all that monster foliage, from the fenced-in building compound to the guy anchors. Now, the outer anchors, which are located near the road running around the site, are no big deal to reach. We didn't even have to run a path to them from the building. And the inner southeast guy anchor, located within twenty feet of the east side of the compound fence (as enlarged in 2004) was not a problem. But the other two inner anchors are real challenges, period. Although the area is not a designated wetland, it *is* spring now, and the soil in a bunch of places is just soft enough to cause even a "trackhoe" to get stuck... which is exactly what happened. A couple of



Weeds around the compound fence at the WPWX transmitter site

times.

We strove to do this project the right way, with anti-foliage cloth underneath, which still allows moisture to get through to the soil underneath. The asphalt grindings that we used act as a kind of natural plant killer in their immediate area. We don't anticipate those nasty old weeds to take over the path again.

But we're not quite finished yet. The path to the near-north guy anchor is not complete, and it has to run from the compound fence out, not from the outer anchor in. Why? Because right underneath the north guys are some trees, and they're growing rather fast in that environment. Getting to them to cut them down (which we will leave to the professionals) will require a path. Easy answer. Now let's see how easy it is to accomplish it.

#### **Report-IT Live (and Lite) – First Blush**

There is no escaping the fact that the Apple iPhone, in its various incarnations, is an amazing device. Only slightly less so are the iPhone's competitors, Droid, Android, et al. This is hardly news, but remember that it's the iPhone which gave life and rise to a whole cottage industry which caters to the Apple-created concept called "apps"; the digital world has been forever changed because of it. Oh, to have Alexander Graham Bell alive today to see all this! Or for that matter, Chester Gould, the creator of the Dick Tracey comic strip, which featured that futuristic wrist radio. Both would be blown away by what Jobs has wrought. The sheer variety of apps runs the gamut from the sublime to the, well, not ridiculous, but let's just say, the esoteric. Probably closer to the esoteric is the new app from Tieline, called Report-IT Live.

I can safely report that I was on the ground floor when RIL first saw the light of day, or at least on the mezzanine. I was talking with Mary Ann Seidler, then the International Sales Director for Tieline, one afternoon at the Madison Broadcast Engineering Conference, when word came that the Report-IT Live had been approved by Apple for sale. Since then, two other versions, Report-IT Enterprise Edition, and Report-IT Lite, has joined the fold, as has Report-IT Live Enterprise Edition. As I write this, word has come in that the Android version of Report-IT has become available as well.

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The beauty of Report-IT Live is that it produces audio from the iPhone (and iPan and iPod Touch, et al) at full fidelity, that is, 50-15,000 Hz. It is designed for use in news gathering, and as such, many major group owners have already made it a tool of the trade, including CBS, CNN, Cumulus and Clear Channel. But it's not just news where Report-IT Live shines. It also does very well in originating live remotes from places like stores. The remote talent sounds like they are actually in the studio, except for the crowd in the background.

But I'm going to present two caveats in utilizing Report-IT Live. First, and you can bet on this: Using Report-IT Live changes the way in which remotes are done, which creates both an opportunity and a danger. Here's why: What we in the station envision as a remote and what the client who spends the money may envision as a remote are not necessarily the same thing. More than likely, the client wants and pays to see a mega amount of station presence. He or she may likely remember the days of the station-logo-decorated 'remote truck', with the tall mast and the Marti antenna, banners galore, the table with speakers and equipment all over and wires everywhere, the engineer hovering over his equipment, and station personnel handing out the goodies and playing "wheel spin" with the assembled listeners. Report-IT Live, however tends to *reduce* the amount of perceived station presence, taking away all that equipment, mast, wires, speakers and heck, folks, with Report-IT Live, there may not be any *need* for an engineer at the remote site itself anymore. I'm here to tell you, folks, that loss of presence may *not* be the ideal situation for sales of remotes.

So, I'm just suggesting this: the day that Report-IT Live goes into service is the day to consider increasing the presence of the other station staff, and stuff, be it the station car or truck, premiums/prizes for listeners, and for heaven's sakes the *big* banners and the other visual stimuli. Or else. The good station remote should always have been less of an Engineering feat than a triumph by both promotions and sales. They're the ones who are really responsible for the overwhelming station presence in the community. That's one thing we're banking on here at CBC-Chicago.

I mentioned earlier that there were two caveats to the smart phone remote. The second is the kind of phone you use. I got my copy of Report-IT Lite for use with my iPhone 4, which does not use 4G technology. But hey, I'm not planning on using it for more than training and demonstration. Alone of all the smart phones at present, the iPhone 4S *is* 4G compatible, and due to the limitations of 3G, which have been divulged in these pages before, unless you're in a really small market or 4G doesn't exist yet in your area or both, don't try using Report-IT Live in a remote which is being really heavily attended, *unless* you're using a smart phone with 4G capability. I promise you, bad things will happen if you do.

Other than that, I can't help but recommend Report-IT Live, or Report-IT Lite, both of which, by the way, are available at the iTunes store. A variety of plans are available to pay for the airtime. The Super Deluxe one has permanent free air time, but it does cost. Contact your equipment supplier, or contact TieLine sales at 317-845-8000.

Until next month, blessings to you all!

# The Portland Report By John White, CBRE Chief Engineer, CBC–Portland

I want to talk about a security issue at KKPZ. The consolidation of studio and transmitter has worked well while creating a problem controlling

access to the grounds. The solution to that problem is to close the motorized entrance gate, limiting access for unknown individuals. Expected visitors and the public would ring the bell at the gate and intercom for access.

At first that seemed like a simple task. I have two conductors in place to the gate and front door. Almost immediately I ran into both a

market and a marketing problem. First let me frame the requirements in the form of a typical simple residential application.

Mrs. Smith would like an intercom at the front and back doors as well as the garage. Inside, the family would like the intercom master unit mounted in the hallway between the kitchen and living room. The doorbell is mounted there now with a two-conductor cable going to each entry point.

That seems simple enough, and possibly the problem is that the need is simple. I began by visiting the "big box" home stores. That resulted in a rude awakening when I asked to look at the intercoms, a request that universally resulted in the response, "Huh??" That wasn't a good sign, as I now had to describe what an intercom is. That resulted in an answers to the effect of, "We don't have those – let me show you what we do have."

What they had were cameras, web and wireless. Of course that's interesting and might even work if the visitor had been a Boy Scout with a semaphore to signal his need. But I don't think that will work for our application. So that was the first problem: the market products have gone off in a direction that doesn't meet the user needs. I suppose that would be okay if the need was to look at the KKPZ gate from Florida. And it would be even better if our location didn't have numerous commercial and government communications



installations with high power transmitters near the wireless ISM bands.

So that was just the first problem... finding

a product on the market which would work, if such a product exists. I did a great deal of research on the internet looking for that elusive product. Some small percentage of the market is in wired devices, making the challenge finding one that will do the job.

That brought me to the second problem, executing the search itself, looking for one master and two remotes

connected by two conductors. I found possibilities and very little detail. Web info and literature was vague at best. I had to bring in product to local wholesale outlets for inspection. Opening the box and examining the product in one case revealed the unit was a single remote with two masters, not at all evident from any literature.

The real eye opener is the website presentations. Limited information was just one problem. Another was searching out possible products from a list. The presentation is a page per product, requiring multiple page views for each product just to get a vague idea of product capability.

But those were the worst presentations. Those are the pages that implement all sorts of whizbangs, pop-ups and write-overs. Moving the pointer to look at a product produces an explosion of screen activity that rivals the largest 4th of July fireworks display finale.

Which brings me to the wider question: Do our website presentations provide a welcoming, comfortable and helpful environment for our clients and listeners? Do our telephone auto attendants attract or repel callers? When whiz-bangs and tech dominates our presentation, we effectively drive listeners and clients away. A case where nothing might well be better than something. Food for thought. The Local Oscillator April 2012

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

#### MDCL

Last month, we got FCC approval for MDCL operation on KLZ and I updated KLZ's Nautel AM-IBOC exciter to allow MDCL operation. As soon as I had the mod done, I turned it on, and it worked just as expected.

Updating the Exgine went much smoother than it did for the ND-50 AM-IBOC at KLTT. Nautel's instructions were not complete and missed a critical step: do not reboot until you reset the network settings to what you had them at before. Otherwise, upon the required restart, you won't have access to the unit. I think the update took about a half hour total, which

definitely beat the well over an hour we spent at KLTT.

I am curious as to how much will be saved on this 5kW station. I am sure my dad will let us know when the next electric bill comes for the site.

#### **KLTT Issues**

At the KLTT transmitter site, we have an irrigation canal that runs through the middle of our tower field. We have horses on our land to help us mow during the year as the site is so large. They don't have the option of going out to the road, crossing the canal on the bridge, then going on over to the other side. Instead they use the canal. After many years of the horses crossing at their favorite spot near tower #3, the banks had really crumbled around that spot, to the point where the widened canal was beginning to encroach on the tower base area.

We finally decided something had to be done and hired Kilgore Construction to fix it. Mike Kilgore brought in riprap and dirt and rebuilt the bank so we now have a road again to drive on. He also put up barbed wire to direct the horses to where we want them to go. Posts have been in place for years but for some reason no barbed wire has been on them in well over ten years. We are hoping this will direct the horses in the direction we need so we can avoid this again for at least another ten years. As you may remember from January, we had an attempted break-in at KLTT. We hired the only locksmith I could find that would service us in the area in a timely manner (the same day). Unfortunately, the locks we got aren't all that great.



They charged us nearly \$700 for two deadbolts and two locksets, one pair each for our front and back door.

Early in March I went to check on the progress of the canal work and when I tried to go into our front door to check on things inside, I found I could not get in. I unlocked the deadbolt, and when I put the key in the lockset and turned it, it

didn't turn. Nothing happened. I noticed the whole knob would move as I tried to use force to get it to budge. I went around to the back door, and while I could get it unlocked, that door is temperamental and getting in is a pain. I was trying not to set off our alarm while I was beating the door, trying to get it to break free.

At that point, I called the locksmith we used because he said if we have any problems he'd come right out. WRONG! The company we used is very obviously a family business, or perhaps a place for Israelis local to the area to work. I don't mind that at all, but there is a definite language barrier that makes communicating with them difficult at best. I tried to explain what is going on, and the guy just didn't get it.

A few days later the company sent out a different locksmith. It turned out it was a stripped screw that made the lock quit working right. This was something the original installer did and therefore should be a free repair. The guy handed us a bill and we refused payment. The language barrier made it difficult to communicate our reasoning to him. We finally set the alarm, locked up, got in our car and proceeded to the gate while the guy was still on the phone with his supervisor. When my dad began to shut the gate the guy finally got the hint and left. We haven't heard anything since and I doubt we ever will. However, if something happens with these locks again, I will see to it I find a more trustworthy, reliable company to use.

For what it's worth, I did file a complaint with the Better Business Bureau, and when I did that I found a lot of other complaints. They were all from people who had very bad service by this company. I will remember to check the BBB before hiring anyone else again!

We did finally get all of our security measures in place at KLTT. We kept getting hung up at one of the towers. The wireless sensor the alarm company originally brought out did not work. The second sensor was the wrong one. I guess third time was a charm!

#### **KLTT Tower Light**

I woke up early on the morning of March 19<sup>th</sup> to a text from Autopilot saying tower 4 at KLTT had a beacon out. I decided to drive out there since it was still dark and found both levels of beacons were out. WHAT??? We had replaced the flasher not too long ago. We had used our spare flasher at KLVZ, so before heading out to KLTT to troubleshoot I decided to order another spare flasher.

A few days later, I shimmied up the tower and opened the lighting control box and found burned wiring and a partially melted solid-state flasher. The indications were that the push-on lug connectors had not made very good contact with the spades on the flasher and the 20 amps of beacon current had produced a lot of heat in the poor connection. We replaced all the wiring and the flasher, this time soldering the lugs to the spades and even soldering the lugs to the wires (in addition to the crimps). That ought to do it!

#### KCMN/KCBR

Last month I had the privilege of helping get Don Crawford Jr.'s two stations in Colorado Springs (which used to be CBC stations) up and running properly. For various reasons the site hasn't been taken care of as well as it should have been and any issues that occurred were patched around but never really fixed properly. This left both main transmitters with inoperative power modules and inoperative exciters and RF drivers. The HD Radio exciters were not working (one was not even in the rack anymore), and one of the night/aux transmitters had its exciter drawer pulled out with a box fan blowing on it to keep it working.

Don had asked if we (my dad and I) would take some time to get it working again. He gave us a deadline of March 31. That gave us one month to get this done.

Upon arrival at the site, we thought things looked a lot better than when we were there a year ago helping out with an interference problem. I remember many years ago when we first got the Nautel XL30 transmitters in. I believe it was a take your daughter to work day so I got to go with Dad. I wanted to help, but obviously I was too young to do anything with the transmitters. Instead, I got the shop vac and began cleaning up the floor. The vacuum was missing the filter or something so it was blowing all the dust back on me! When I was done cleaning, I needed to be cleaned! But I remember that site was in great shape, very well laid out, and very well maintained. When we first walked back into the site last month, things really didn't look too bad, but that feeling of the site looking good was short lived.

As we opened up the front of the two Nautel XL30 transmitters, we found that the "A" RF drive buffer was *missing* on both. Also, a power amplifier assembly was missing from one transmitter. These assemblies aren't small; they are very heavy and bulky, like an oversized briefcase. We saw on the other XL30 that there were faults in one of the PAs also. We began working on that one first as it was the closest to the work bench. We put it on the bench and attempted to figure out the issue without success. We decided to go ahead and bring the whole PA back to Denver and work on it in our shop there where we had more tools, test equipment and a nicer environment to work in. We also found some spare



KCMN/KCBR Transmitter Room – the XL30 with the doors open is KCBR's

modulators and RF amps and decided to put them in a pile to take back with us to the shop in Denver. Two looked brand new, and two others had heat sink goo on them so we know they were used. We also located the two missing RF drive buffer amplifiers and put them in the car. We found the PA assembly that was missing from the other transmitter, plugged it in and found that it had an "A" modulator failure, but the other three RF amps and modulators were working okay, so we left the PA in and running.

Back in Denver, we tested all the modulators and RF amps in the PA assembly and found everything to be okay. We found two 20-amp fuses had blown on the modulators, so we ordered several. On the advice of Steve Braley at Nautel we returned the two RF drive buffer amps to Nautel's Bangor facility for repair as well.

We got the drive buffers back from Nautel the following Friday along with the fuses we needed. On the 17<sup>th</sup> we headed back to Colorado Springs and began working. With the new fuses in place, we plugged the PA back in and held our breath. Bing... it came up with no alarms! We also reinstalled the two drive buffers and they both came back up (although we had to jumper the "A" RF synthesizers to "internal" because the HD exciters were offline and there was no external drive). Okay, that batch of problems was fixed. Now on to the other one.

The other XL30 still had the "A" modulator alarm to deal with. We pulled the PA and began digging in. The 20-amp fuse on that modulator was blown, so we began testing all the MOSFETs on the modulator and the downstream RF amplifiers. All checked good, so we replaced the fuse and reinstalled the PA. When we turned it back on, the alarm immediately returned and we again found the fuse blown. Running out of ideas, we replaced the "A" modulator with one of the spares we had and knew was good. Another blown fuse and another alarm, and now the two "B" RF amplifiers were showing alarms. Getting nowhere, we decided to bring the PA back to Denver to put on the bench and mess around with.

The "B" RF amps both had blown MOSFETs, so we ordered a replacement pair and new insulator for each. They came in a few days later and we replaced what was needed. We also found a wire, a big piece of enameled wire that feeds B+ from the modulator to the modulator filter and RF amplifiers, that had pulled out of the PC board. This was shorting somewhere and was what was causing the fuse to blow.

With the B+ wire reinstalled and the RF amps fixed, we took the PA back to Colorado Springs, plugged it in, and as my dad closed his eyes for fear something would blow, turned it on. Thankfully, there were no alarm lights and the transmitter power increased by the expected 5 kW. I quickly closed up the transmitter before something else happened.

We got both HD Radio exciters working and adjusted them for the proper RF spectrum. For the first time in who knows how long, both stations were operating in the HD mode.



#### KCMN ND5 – note the "fix" that the contract engineer had applied (exciter drawer open with a fan blowing on it). I guess it worked...

There was one more problem. The ND-5 for KCMN had what we thought was exciter trouble. Every time we have been out there the last couple of years, the exciter drawer has been pulled out and a box fan has been blowing on it. The contract engineer had evidently found that when it got warm in the room the transmitter would act up. We pushed it back in, turned the transmitter on into the dummy load and ran it at full power. It wasn't long before we began getting a Low RF Drive alarm. The weird thing was, it would flash several seconds before finally turning the transmitter off.

We had replaced U9 in the PDM driver, which was a known thermal issue in transmitters of that vintage (Nautel had unknowingly received a bad batch of those ICs back when the transmitter was made). That didn't work. With the help of Nautel's Jeff Welton, we zeroed in on the B-minus switching supply and found that its output was indeed quite low and got lower with heat. We were able to bypass the power supply to get the transmitter running, and we brought the power amp back to the office to troubleshoot. Everything tested fine, so we went ahead and replaced a capacitor and "shotgunned" all the active components (the MOSFET, two bipolar transistors and two ICs). Hopefully that will fix our issue and we will have both KCBR and KCMN back to 100% when we take the power supply back to Colorado Springs. I have been enjoying a change of scenery and the learning experience this has provided me with.

Well, that about wraps up another month. Spring is here, baseball is near. This time next month I will be a very happy person as I am able to get a couple Colorado Rockies games in for the month. So until next time... that's all folks!!!

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

#### **RIP PC?**

I'll start off by saying that Apple has created a giant thorn in my side by coining the marketing phrase "Post-PC Era." Because I'm the only techie in

some of the social circles I frequent, I tend to field the tech related questions which have most recently been related to the claimed demise of the PC. I certainly understand the fact that the exact meaning and context of "Post-PC Era" can be and has been argued. Some suggest that it refers to a transitional phase away from sole reliance on PCs

rather than "ding dong the PC is dead." Others believe that the lines will become so blurred that the separate designation will be unnecessary. As I explain to each person who asks me, my opinion is that tablets and PCs will continue to have their uses in specific applications. So let me give you my take.

Tablets, such as Apple's iPad, have obviously cemented a stake in today's business world. But are these tools superior to laptops in ability to increase productivity? As someone recently said to me, "people don't buy iPads to increase their productivity. They buy them because everyone else is buying them." That may be true in some cases, but I believe the strength of a tablet is accessibility which ultimately can result in productivity depending on the user and application. Consider a broadcast engineer's ability to quickly view web-accessible transmitter information from anywhere and as needed.

In my opinion, tablets have two significant advantages over laptops. The first is the capability to "boot up" almost instantly. A brand new laptop will still take 30 to 40 seconds to boot up completely, and even longer as more applications are loaded into



startup. Although this gap will narrow as the use of solid state storage drives may become more common, I believe the tablet still holds the advantage for now. The second advantage is ease of use and the

intuitive user interface. Casual use of a Windows OS laptop obviously doesn't require extensive user training, but it pales in comparison to the interface on many of the tablets on the market today. I think Microsoft's shift towards a more tablet-like interface for their upcoming Windows 8 OS speaks volumes in terms of the influence

tablets are making in development as a whole. Based on some articles and blogs I've ready, this move may ultimately alienate their core customer base...the PC user. But that's a topic for another day.

So I've presented two significant advantages tablets have over laptop PCs, but these are hardly reason enough to shift completely to these devices. The laptop PC still holds several hefty cards in its hand. The first is processing power. Because of the type of processing power necessary for application development, graphic or video work and design work, just to name a few, PCs are still a must. Perhaps some day we'll be using dockable tablets that can be used in tandem with a high powered workstation. But today, this type of work is simply better done by a PC.

The lack of CD/DVD drives and USB inputs on many of the popular tablets also make a tandem PC a required piece of equipment. I recently dealt with one individual who said he had donated his laptop and desktop and purchased an iPad as a replacement. It didn't take very long before I started getting frantic calls asking how to get data from a CD or flashdrive to his iPad without a computer.

Statistically speaking, some analysts predict the number of PCs being used globally by 2014 could top 2 billion units. That's 500 million more than today. Many of these will serve for applications such as CAD workstations, graphic and application development as well as computers for the consumer sector. In comparison, tablet sales are approximately 15% of the current PC market in terms of units sold. Although Apple iPad sales held 83% of the share in tablets sold, it still has a long way to go before reaching the level of PC sales.

Regardless, I share the belief that tablets are here to stay. Although some of the major PC

manufacturers such as HP and Dell have put their tablet aspirations on hold, they still see tablets as a fixture of the computing landscape. I do believe that the designers have some work ahead of them in regards to implementing input ports before there is any danger to replacing a traditional laptop.

I have a lot of respect for Apple's marketing prowess and their ability to make their products an apparent necessity for business today. But I also believe they need to play nicely with the PCs of this world because the relationship will continue to be symbiotic and they will be sharing the same sandbox for a long time to come.

...until next month!

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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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