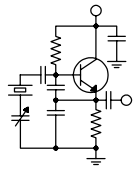
The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

JULY 2009 • VOLUME 20 • ISSUE 7 • W.C. ALEXANDER, CPBE, AMD, DRB EDITOR

Slowdown

I keep hearing that we are in the midst of a slowdown. Perhaps the economy has slowed down, but I sure haven't. In fact, I'm as busy as I have ever been. Why is this the case? Some of it is just timing – projects lining up on the calendar and conspiring against me with no relation to the economy or anything else in current events. Some, however, *is* because of the economy. We have to do more with less and find ways to economize. As we have said before in these pages, we are getting back to the basics of our trade, changing the way we operate. That makes us all busier. It also makes us more efficient, like the automobile engine that develops its greatest power output at high RPM.

We so very much appreciate each of our engineers and their efforts to save the company money. Not a week goes by that one or more doesn't come up with an idea, some means of operating more efficiently or stretching a piece of existing equipment past its useful life. We are blessed to have such a cost-conscious crew, folks that take the principle of *stewardship* very seriously indeed.

It is my hope that all this work is not just drudgery. I hope our engineers are having *fun*, getting their hands dirty doing the things we used to do all the time. There is a great deal of satisfaction to be had from repairing a piece of equipment or completing a project. In years long past, I lived for that satisfaction. The transition to "disposable" equipment and a "send it in" repair model has made such a misty memory for most radio engineers. It has been very enjoyable engaging some of you in email and telephone dialog about the proper plate voltage on a tetrode amplifier or what might cause the common point resistance to increase. And of course I have the privilege of helping Amanda with a hands-on project from time to time, showing her how to troubleshoot and repair a MOSFET H-bridge power amplifier or PDM modulator.

So… the economy may be in a slump, but radio engineering – at least within this company – is alive, well and busier than ever. And that's just the way we like it.

Changes

Most of you by now know that Tom Gardull has left our company to pursue other interests. We very much wish Tom the best in his future endeavors.

Joseph "Joe" Huk has joined our company as chief engineer of CBC-Detroit. Joe comes to us from the auto industry where he worked designing and testing automobile receivers for Visteon/Ford. This gives him a unique perspective that few other broadcast engineers have. Joe has an extensive broadcast background as well, having worked for John F.X. Browne and in private consulting engineer practice as well as working for a number of radio stations over the years. Joe is a Michigan registered professional engineer, a CPBE and a CBNT. We have the utmost confidence that Joe will settle in quickly and do a great job with the technical operation of our great Detroit cluster. Please extend every courtesy to Joe should he call seeking your wisdom.

We look forward to hearing from Joe in these pages in the near future.

Complexity

As I was doing a walk-through of our Detroit facilities with Joe last month, it occurred to me how complex those facilities are. Long gone are the days when a radio station consisted of source equipment, a mixer, an STL, an audio processor, an exciter, a transmitter and an antenna. In a modern state-of-the-art facility, there are multiple layers of infrastructure.

In our Detroit facility, there is the Wheatstone Bridge Router layer that serves as the

backbone of the entire plant. This operates over two separate Ethernet networks, providing both control and digital audio transport.

Then there is the digital audio layer that feeds into and out of the Wheatstone system. The analog audio layer runs in parallel with the digital path for microphones, headphones, monitors and other analog-only applications.

Then there is the NexGen digital media system with its file servers, audio servers, workstations, audio cards and software.

The Wheatstone feeds the STL paths for the remote and local transmitter plants. These include Moseley DSP6000 and APT Oslo units, each with its own complexities. The paths are 950 MHz RF and landline T1. Ethernet paths are provided either out of existing T1 bandwidth or by piggybacking Moseley LANLink units on the RF path.

Then at the transmitter sites are exporters, importers, Exgines, HD exciters, RF exciters and RF amplifiers. Following those are phasing and coupling systems, transmission lines and antennas. And then there are the remote control and monitoring systems, satellite antennas, receivers and transmitters, electrical, mechanical, HVAC systems, tower lights and backup generators.

As Joe and I were looking at the seemingly endless wall of equipment racks in the engineering room, Joe remarked that his first priority would be figuring out what the audio path of each air chain was. That, I said, was a very good place to start. Then I thought (but did not say), "Good luck!"

Don't get me wrong. Joe has no doubt figured out the audio paths by now. But I was thinking at the time what a special set of skills is required to be able to not only figure out but also maintain and care for such a complex facility. A person would have to have a good understanding of analog and digital audio; Ethernet, network architecture and transport protocols; file servers and operating systems; digital radio systems and architecture; compression algorithms and telco loops. And I haven't even mentioned RF, transmitters, receivers, filters, phasing & coupling systems, monitors, controls, internal combustion engines, power distribution systems and all that!

Our facilities are very complex these days, and this complexity requires a certain skill set on the part of the engineers to whom we entrust them. Just as the man piloting the airliner you bought a ticket on must have extensive knowledge of weather, aeronautics, engines, fuel systems, avionics, hydraulics, pneumatics, navigation, airspace, FAA rules *and* know how to fly the airplane, radio engineers must have a vast store of knowledge of a wide array of technologies *and* know how to operate the equipment.

And just in case you were wondering, that's why they call us *engineers* and not technicians.

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

Hello to all from Western New York!

To those of you who think that the only readers of *The Local Oscillator* are those closely associated with CBC, think again! In last month's *New York Minutes*, I wrote about the state of our nation's economy and how if we (our government) don't change our spending habits, we could possibly be on the brink of national bankruptcy. I heard from several readers via email both in agreement and totally against my viewpoint.

Now I'll be the first to admit that I am not either left or right wing, I am only concerned with the prosperity of our nation. The U.S. is still the greatest place on earth to live, work and voice your opinion without repercussions, and when those rights have been taken away or censored, our freedoms as spelled out in our nation's constitution will only be words on paper.

If nothing more, last

month's column got a few of you thinking that yes, something is wrong with our nation's way of thinking, and change starts with one man and one idea. We can learn more about the future by looking at the past. We have been through hard times before, and as a nation have always come out of hard times stronger and wiser than ever. Nothing lasts forever, and this recession will soon pass. What we do with the opportunity that awaits us will define this country for years to come.

As a company, Crawford Broadcasting has instituted tighter controls over spending, including wage freezes and capital expense purchases being deferred or cut out all together this year. Each purchase order request is carefully examined and a determination is made to the extent of the need for the request. Will it save us money in the long run? Is the purchase a *necessity* or a *luxury*? We as engineers are learning to do more with less.

In recent years, when a piece of equipment failed, we either sent it out for repair or took the easy way out and replaced a board or module where applicable. Years ago, we used to actually *fix* equipment down to the component level in our shop. We must get back to this way of thinking, for every dollar we can save the company by doing in-house repairs makes us stronger, and believe me, repair shop rates aren't getting any cheaper!

I used to make fun of the small market engineers (I actually used to be one) who had to do everything from equipment repair/maintenance to HVAC work to unstopping the plugged-up toilet. Many highly-paid broadcast engineers are now out looking for work because they either forgot how to do this or have become so complacent in their jobs that they refused to once again get their hands dirty. This is our opportunity to show our employer our true worth. How we handle our job duties during the tough times will make us better engineers, and will define our employment opportunities, for years to come.

WDCX-FM • Buffalo; WDCX(AM) & WLGZ-FM • Rochester

As I stated in last month's column, I reported that the tube in the WLGZ-FM Continental transmitter had to be replaced soonest, and I was reluctant to purchase another Econco rebuild due to the numerous problems I have experienced in the past. On several occasions, I have gone through two and sometimes three rebuilds before I got a tube that would work. This is not only time consuming, but costly in making numerous trips back and forth to the transmitter site – not to mention the wear and tear on the tube socket by inserting and removing the tube numerous times.

Taking the recommendation from Art Reis, I purchased a new rebuild from Freeland products in Covington, Louisiana. The tube I installed was a 4CX15,000 EEV, which is slightly different from the standard 4CX15,000A tube.

The main difference is in the way the tube filament is constructed. The EEV tube utilizes a filament mesh instead of the normal tungsten filament wire used in standard manufactured tubes. There are other differences in the tube construction, which are way above my technical tube rebuilding knowledge, so I won't go into detail on those differences.

On Monday June 15th, I installed one of the EEVs in the WLGZ-FM transmitter, and I am happy to report that everything went extremely smooth. The new tube tuned up exceptionally well, and the transmitter readings were almost identical to the factory readings. As we were soon to need a tube replacement for the WDCX-FM transmitter, I ordered another one from Freeland. I was curious to see if this one would perform as well as the one I installed in the Rochester transmitter.

On Saturday night, June 27th, I arrived at the WDCX-FM transmitter site to install the new rebuild. The first order of business was to get the auxiliary transmitter fired up into the aux antenna, but it would not come up at all! I had plate voltage (about 8.6 kV) but no plate current or output at all. I first checked the exciter to see if there was output. This was okay, so I next checked all the power supplies to insure that all were working. No problems were found with the screen, bias and control supplies, so I again attempted to bring the transmitter up, with no success. As it was getting late into the night, and I was getting tired and nowhere fast, I decided to abandon the tube installation until the next day.

On Sunday afternoon I again addressed the auxiliary problem. I suspected that the tube was not getting drive. However, I found that the two 4CX250B tubes were working, as noted by the multimeters readings for the left and right driver K readings (about 170 mA). When I muted the exciter, the driver cathode reading would drop about 30 mA on each tube. This assured me that the IPA was working, so I looked further into the PA section of the transmitter. All the components in and around the tube socket looked good, so, with the plate energized, I turned the PA grid tuning capacitor about 1-¼ turns and the transmitter came to life!

After about a minute of run-time, I heard the familiar snap and flash from underneath the PA cavity. I shut down the transmitter to investigate, and

found that there was some corrosion around the cavity door that caused the arc-over. A quick cleaning took care of the problem, and the transmitter was up and running once again. Once I was sure that the auxiliary would stay on the air, I began changing out the tube on the WDCX-FM main Continental transmitter.

This was the second Freeland tube I have installed, and I am happy to report that it went just as smoothly as the WLGZ-FM installation several weeks earlier. The only thing to note was that the new rebuild required more screen voltage to make power, so I had to re-tap the screen transformer to achieve licensed power.

It took me several tries to get the shorting plane in the proper position to achieve a definitive peak in the PA screen current reading… I was either too high or too low, causing the PA tuning to reach the limit before obtaining a peak reading. Remarkably, I was only about a quarter-inch off in cavity height from my initial adjustment, to get the capacitance right, and reach the "sweet point" for the PA tuning control.

Thus far, I am highly impressed with the two Freeland tubes I have installed and would not be reluctant in recommending them for your next rebuilt tube purchase. Not only were the tubes good, the price for the rebuilds were several hundred dollars cheaper than Econco built tubes.

If any of your stations are using the cheap LCD caller ID boxes on your incoming call-in lines and you are not happy with the hard-to-see displays, I have found a really nice LED caller ID unit at Home Depot online. These units' displays are 11inches wide by 1 inch tall and use LED technology. They are manufactured by Telnote Technology and cost a mere $49.95 each. They display the caller name and phone number, and they will store the information from the last 25 callers.

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!

News From The South

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

HOT! And Humid...

It has been oppressively hot here, with temperatures in the mid-to-upper 90s and air quality so bad that your throat gets raw just walking outside. It's extremely humid, too. If you sit in an air-conditioned room for while and then go out to your car, your clothes will literally become damp.

Naturally, this affects the equipment. Thankfully, we converted WDJC-FM to a sealed air system when we installed the new building last year. WYDE-FM is the only site that remains vented to the outside world. The holdup has been the HVAC contractors: this time of year, they're so busy just handling service contracts, they don't have time for anything but emergencies. Todd, Jimmy and I have been looking at what's required to do it

ourselves.

A Certified Rant ™®©

You have been warned: I'm really going off this time because I'm frustrated and angry. Put your helmet on and open a window, then I'll get started.

Old-timers like me came up troubleshooting, building and modifying circuitry at the component level. We basically had no choice; the older tube equipment, in particular, was both bulky and heavy. There was no practical way to ship it "back to the factory."

Not that we did that very often, anyway. We were expected to repair it in the field whenever possible; in fact, a station engineer who couldn't soon found him or herself out of job. We were expected to understand tubes, transistors and the (then-new and revolutionary) integrated circuits that were starting to appear (particularly op-amps).

Back then, it was just taken as a given that, when you ordered a piece of equipment, the manufacturer would include

1. An accurate and complete schematic

2. A "theory of operation" that walked you through how the unit operated

3. A detailed parts list

4. A detailed wiring list (if applicable)

Basically, you received all of the info that you needed to troubleshoot it in the field. You were encouraged to call tech support if you just couldn't figure out the problem, but in general, you ordered the parts and you replaced them.

Times have changed... and not for the better. To be fair to the manufacturers, I realize that there are some engineers who barely deserve the name nowadays. These are people who simply don't have the background or training to properly troubleshoot a piece of equipment. I freely acknowledge this and it's one reason why I have been proud to work with Cris on the SBE's Education Committee. We not only need to attract young talent into our industry, they need to understand what's really going on inside the "Magic Boxes™" that we use to make RF and audio.

So, I'll grant that much: in the old days, when someone called tech support, the guy at the factory could reasonably expect that the caller at least knew how to use common test equipment and tools; that the caller could follow along on the schematic and help them find the problem. Nowadays, as often as not, they'd have to literally tell the local engineer where to put the red wire thingy from the meter and which scale to use – with no assurance that the measurement will be done properly.

But that's as far as I'll go to be fair to the manufacturers. There are also plenty of us who design, build and repair equipment all the time. We're called "engineers" for a reason: we're not just repairmen; we craft unique solutions to one-of-a-kind problems. We have years of experience (yes, even with SMT components), know the theory, can read schematics and can troubleshoot down into the guts of the equipment...

...and we're being left out in the cold. More and more frequently nowadays, this is what happens:

1. You open the manual ... and there's no schematic.

2. You call the factory: no, sorry, they won't sell you a service manual (or even a schematic).

3. Can they at least tell you which voltages to look for on these components? Uh... no, sorry. They expect you to send the unit to them, or to buy a replacement module, or do a "module swap."

I've tried explaining to these people that I'm a certified engineer with decades of experience in building, troubleshooting and repairing all sorts of electronic gadgetry. The best I've gotten is, "well... most people don't have your skill and we don't want to take the chance that they'll butcher that multi-layered PC board with a soldering iron."

Sorry, I'm not buying that, for several reasons:

1. It's not only written into the warranty, it has always been understood that if a customer butchers a piece of equipment, all bets are off. The warranty is void and they're on their own.

2. Now, replacing a 128-pin PLCC isn't for the faint of heart; I acknowledge that. But that's still no excuse for not providing a schematic. There are many other components on that board that could easily be replaced in the field -- even the surface-mounted ones. It's just not that big of a deal.

3. I wouldn't object if they put common-sense limits on this: maybe require factory service while the unit is in warranty, and/or require that parts and service info only be sent to certified engineers. I have an FCC General Class license (that I earned the hard

way) and I'm SBE-certified. Nor am I boasting when I say that; the fact is, most of our engineers are certified in one way or another, with many years of experience in the field. We're not "kids off the street."

4. If the manufacturers were really serious about this, they would charge rational prices for replacement modules and factory service. They're not fooling me for a minute: the economy is tightening up and they're looking for another source of revenue. It's just that simple.

Case in point: I have an Omnia processor here with a bad AES chip. I can't be 100% certain that this is the problem because they don't include a schematic (and will not provide one – I asked). I had to trace the trails on the PC boards and I could have missed something. But as far as being able to replace a 20-pin CS8420 SOIC chip? Good heavens, that's just a no-brainer. The kids that I was training 20 years ago were able to do that with solder wick, a toothpick, a fine-point iron and a little patience and care.

According to factory service at Omnia, my choice is to send the unit to them. Not only will they charge a handsome fee to replace that chip, I get to do without the processor for weeks while it's at the factory.

I'm not picking on Omnia; they're certainly not the only offender. What really sparked this rant was my recent experience with the BE FMI-73 HD transmitter. This is actually their FM-1C1/500C1, modified for HD-R transmission. BE includes the manual for the FM-1C1 with it, but with little documentation of the modifications. I called and asked for the correct documentation, and/or for tech support to replace an output transistor (certainly within my skill set!), and was told that my only option was a $1,700 module swap.

Contrast this to Nautel, who still (bless their hearts) not only provides detailed service information, but their tech support actually expects you to repair it in the field (though they're happy to do it for you if you choose that route). They even include vendor information for most small parts; you don't have to buy a common chip from them, you can order it from Digikey or Mouser if you like.

That's just good business, as far as I'm concerned. And... boy, I hate to put it like this!... but guess which transmitter company will be *far* more likely to get our business in the future?
Okay, glad I got that off my chest. That's it for this time; short and sweet!

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

I had a silence alarm on KJSL on a recent Saturday evening. I was at the local Olive Garden, celebrating my birthday. When I looked at the timing of the alarm I realized it coincided with the time of a network newscast.

Since the satellite receivers all reside at the KJSL transmitter site, that was the logical place to start. Since it was summer, I figured that my pesky friends the wasps had probably taken up residence in the LNB of the satellite antenna. There's nothing like a trip to the transmitter site to celebrate your birthday.

When I got to the transmitter site, the first thing I noticed was that the satellite receivers were all working. After checking the Intraplex, the multiplexer used to transport the satellite audio back to the studio, I found it was working correctly.

After going through the chain feeding the satellite receiver audio, I found that a switch used to route the audio feed from one satellite channel or receiver to another so that we can access multiple channels and receivers on one path to the studio, was no longer putting out audio. The control and status channels were

still working; it was just the audio circuit that was the problem. It was nice that it still switched the channels and gave a status output but the most important part of passing through the audio was a definite problem!

Since we had a couple of different feeds to accomplish over the weekend, I found a way to get all the feeds that would be used for the weekend using a spare Intraplex channel and some creative finagling at the studio.

I decided to retire the old switch, since I had already planned doing just that on my long-term project list. Recently we had taken the stations to an all-digital chain at the studio and had freed up a Broadcast Tools ACS 8.2 analog switch that only had a four years of service and offered more channels and many more advantages over the older switch at the transmitter site. Obviously, I moved that project up to the top of the list since I didn't want to constantly go to the transmitter site and manually change satellite feeds. Since much of the wiring would be very different from the older switch, I decided to completely rewire the whole satellite receiver/switch wiring. This included the control, status and audio wires.

We have four receivers at the site, each with multiple channels of audio, so having this switch in line will give us greater flexibility in the future as programming changes occur. One great advantage of moving to this switch is that you can add another switch on the expansion input so that we can handle even more varying feeds if necessary.

As for the birthday celebration, even though it was cut short a bit, it worked out okay because I had plenty of leftovers the next day.

Valley Notes

By
Steve Minshall
Chief Engineer, KCBC

The subject of my last column in *The Local Oscillator* was tower lighting. The adventure continues. KCBC had one beacon lamp failure and the towers were due for re-lamping, so we had a crew come and take care of the lamps. KCBC runs 50 kilowatts, which does not allow for any tower work, but we have an hour and a half in the afternoons where we can run low power without losing any revenue.

We decided to finish our LED side marker retrofit at the same time as the re-lamping of the beacons. In order to replace the side marker fixtures on two towers and replace the beacon lamps on all three towers in the time available required three climbers, one for each tower. It all went like clockwork. The tower companies are quickly becoming more expensive – all the more reason to go with LED fixtures.

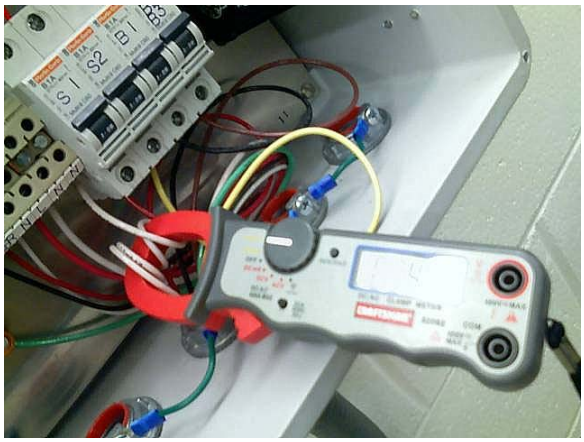
The KCBC beacon flashers are an old-fashioned variety. They are actually sign flashers. I installed these new in 1991 and now they are just plain worn out. I have begun to retrofit each flasher with a solid state unit. The relays are 20 years old and are also at the end of their lives. I am replacing the flashers and relays in each unit. I have found that the fuse holders are also in poor condition, so they will get replaced too.

At another company we recently acquired a 400-foot tower. This tower actually had the wrong lights on it for 20 years. The one beacon (it should have had three) was never very bright, and as far as I can tell it ran for years without replacement; the reason being is that it was fed with #10 wire. I have not calculated what the voltage at a 1240-watt beacon fixture is with more than 800 feet of #10 wire, but it must be low.

It's not very often that you get to completely replace a tower lighting system – conduit and all, but that is exactly what we did. The new system is all LED and supplied by TWR Lighting.

The controller is very nice with alarms for each level of the tower plus a power fail and flasher failure alarm.

The new LED beacons are even more efficient than their predecessors – way more efficient. The current draw on the individual fixtures turned out to be so low that it was difficult to read with a clamp-on ammeter. My solution, as pictured, was to make three turns in the neutral wire feeding the tower. By switching on individual breakers I can



measure the current at each level of the tower without moving the ammeter. The current indicated is three times the actual current, which gives more accuracy on a meter that was designed to read hundreds of amps. By the way, the meter shown also reads DC amps in the clamp-on mode. I have found that feature very useful.

Even more exciting than tower lights are HVAC systems. 15 years ago, we installed our Nautel ND-50 transmitter. We also installed a new 12.5 ton cooling unit to handle the transmitter and building requirements. This provided us with a closed system that provided cool, clean, and dry air to the transmitter. This was a huge improvement over bringing in huge amounts of hot and dirty air in the summer and moist air in the winter.

The one problem with the new system was that the unit was either a lemon or just a poorly engineered air-conditioner – probably both. From the very beginning it had problems. Over the years it had coils, fans, motors, relays, and compressors replaced again and again. For this reason I was truly excited to see it removed and replaced by a new – and hopefully better – unit.

The new air-conditioner arrived at the right time. The day before delivery the old unit quit working. Oil was coming out of it and it blew fuses. That would have cost four figures to repair. Fortunately the weather was moderate and the air outside was still clean, so we just ventilated the room with the old blowers while the new unit was installed.

The new air-conditioner appears to be built much, much better than the old unit and the cost was quite reasonable. I look forward to reliable and uneventful operation.

Catalina Tales

By
Bill Agresta
Chief Engineer, KBRT

Greetings from Santa Catalina Island! Though our great move forward of last month continues, it has not been without the usual island oddities. Just as we got deep into a project, painting the wood trim around our main building, our friends at the Conservancy decided to tear out the asphalt road that goes past our place and begin experimenting with concoctions that they are spraying over the dirt in the hope that it will harden similar to pavement. So far, all they have accomplished is to create lots of dust that has not made us very happy, especially during our painting project.

That project in itself brought on quite a surprise as we began scraping the wood only to find most of it was either rotted or termite eaten. This of course has made a job that we planned to be quick and simple into a major headache. As goes most things here it seems, this job has put the brakes on a few other small projects as we focus on getting things into shape for summer here on the island. Keep in mind that our transmitter plant is one of the tour-bus stops that hundreds of tourists visit each day during the summer months, so we always gotta look great!

We did manage to complete the much-needed maintenance on our water tank that had begun to rust. One of the things I have found up here at the KBRT Ranch is that the salt air has a major effect on any and everything! If you leave your tools outside for even a couple days, you can count on finding them rusted! Because of this, I try to use stainless steel hardware whenever possible. Still, however, the rust seems to eventually find its way even into rust-resistant material.

Another interesting aspect of our painting projects is that they all must follow a Conservancy color scheme, that is, they must basically blend in with the surroundings. So, this leaves us with a choice between the color of dirt and the ever-changing colors of the weeds. Because of the weeds' seasonal color changes, we almost always just match the color of the surrounding dirt, a very beautiful tan color that yes, does become very boring.

I have not spent much time inside the transmitter plant this month other than dusting weekly to help offset the clouds of dust coming from the road that remains torn up as they experiment, trying to find something that works. Of course, I guess repaving it with asphalt is out of the question?

I look more like a mechanic this month than a transmitter engineer. As Pastor Enrique and friends paint and repair, I have been bouncing between helping them and some needed maintenance on our generators. The good news is that both of our generators are now running well and ready for the summer. Our tractor also got a good going through and though it is quite old (1964-vintage), it continues to run very well. We tore up our fire road and re-leveled it, making the fire department very happy with us. They have stopped by a couple times in the last month and expressed how happy they are with our above-and-beyond brush clearance and building upkeep.

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

Left over from last month....

In our last episode, I mentioned my problems with the filaments not coming on in our BE FM-30T main transmitter at Power 92, and I mentioned, as follows: "...the final amplifier filament transformer is one of the more overbuilt parts of the transmitter. There's a reason for that. I'll let you figure it out. If you can't, I'll tell you next month."

Well, that's now, and here is the answer: The final filament transformer has to be built to handle two things: The rather sizable amount of power handling which goes into *properly* heating the filament of a massive final tube, and the need to handle the possibility of plate potential between filament and ground. Read that, the hi-potting of that transformer is of critical importance. Between those two factors, final amplifier filament transformers are built like tanks – and cost like it, too. But then again, when was the last time any of us had to replace one? Don't look at me. I'm totally innocent of the experience. The one that gets me is the filament transformer for the RF final on the old Harris MW-50 rig. Hi-potting to 27 kV *and* handling AC power, sometimes in excess of 1200 watts of direct filament roasting power, all on its own. Massive responsibility there. I'm impressed.

Now, here's my next trivia question. Why is it advisable to raise the filament voltage on a new high-power beam tetrode utilizing a thoriated tungsten filament to its full rated voltage for the first 100-200 hours of operation? Do you know the answer? If not, look it up if you can. If you can't find it, and you don't know it, don't despair. I'll tell you next month.

More Leftovers

It's uncanny that both Brian Cunningham in Buffalo and I had the same tale of woe to tell about the 4CX15,000A tubes we use in our respective Continental rigs in last month's *LO*. Brian asked in his missive that anyone who was using Freeland Products as their rebuilder, please drop him a line and (funny thing about that!) I'd gotten off the phone mere moments before with Randy down in the bayou about my own issues. I called Brian and told him what I'd learned. Since then, Stephen Poole from Birmingham has checked in with something like the same experience from a couple of years ago. Bottom line: We aren't losing our minds. This *is* real. Now, what do we do about it?

To put it succinctly, the '15,000A has an apparently unique issue in that the Eimac tube design has changed slightly over the years, and this has made rebuilding that bottle kind of a 'hit or miss' proposition. Add to this the fact that the 'A' version utilizes a 'hairpin' filament structure design which is actually harder to rebuild. Randy over at Freeland recommends either the Eimac 4CX15,000R tube, or the English Electric Valve version of the 'A' tube, both of which incorporate a mesh filament design, which is easier to rebuild and, according to the Eimac web site, a better choice for FM use at 108 MHz due to lower filament inductance. Either way, I'm giving one of them a try, likely an EEV tube, and next month I'll let you know how that turns out. Brian already has, and he loves his. Mine came in but had an anomaly so, unless the story progresses before the end of June I'll have to write the final evaluation for the August issue of the *Local Oscillator*.

The Silver Bullet – An HD Update

The Chicago Chapter of the SBE (Chapter 26) had, as its June program, a demonstration about HD Radio from Ibiquity Radio's Tom Walker. This is the third time in the last six months that HD Radio has been featured on the SBE 26's program list. The difference this time was that it came directly from the horse's mouth. I won't go through all that was talked about. However, the current economic malaise notwithstanding, there is progress to report.

First, the drought of truly portable HD receivers is about over. We of the SBE chapter who

attended this meeting got a demonstration of a real gem of a radio, an FM/HD thing that's less than a quarter inch thick (by my guess), smaller than an old-fashioned Sony floppy disk, and cute to look at with its digital readout that takes about 60% of the front of this thing.

But the big news is that this radio is *hot!* By this I mean, the sensitivity and selectivity of this thing beats every other HD receiver out there. Many of the SBE Chapter 26 meetings, this one included, take place in WKQX/ WLUP, which is located in the middle of the second floor of the Merchandise Mart in downtown Chicago. That place is notorious as an RF black hole, even with the Hancock, Sears and Aon transmitter sites less than a mile and a half away. Analog is, on most radios, noisy, and HD has been heretofore in 'forget-it' mode in there. Not on this little hummer! On this radio, HD-1s -2s, and -3s are quite listenable inside those walls.

The sound, even on the very non-primitive ear bud phones, is excellent (better than the speakers on a few of the HD radio models I won't name). And the price? Tom's guess is something around $60. The only knock so far? No AM. Not yet. Otherwise, so good a value is this radio that I already have a name for it: The Silver Bullet. It is one of the three things which HD Radio needs the most right now, it will be available within 60 days, and it should make next Christmas much brighter for the medium. We'll see.

Second, and on the HD Power increase front, let's just say that it's moving steadily through the regulatory pipeline. Understand that the proposal is for an increase of HD power of anything *up to* 10db below the *unmodulated* FM carrier. A station can opt to raise its HD power from -20 dBc, on up to the full -10 dBc allowed. In practice, things might just work out something like this:

For major markets, to get proper penetration into all those big downtown buildings, most stations would probably go all the way to the full 10 dB increase. The name of the game there is building penetration. Out at the more rural areas of the country, however, where there is hardly anything like that sort of man-made terrain, a more modest 4 to 7 dB increase in HD power levels may tend to make more sense. The ball game is even more complex down below 92 MHz, where interference contour rules are on the NPR, et al set, are a whole lot different than they are above the 92 divide. Look for HD power levels, in most cases, to be much more modest "down there." Bottom line: Everything depends on the situation, and each situation is different. Profound.

Finally, and this came out in the meeting, there's a lesson for those who are non-engineering types: Understand that HD radio is *technically* superior to either satellite radio or to the MP-3 technology that are so in vogue these days. While all three popular forms of digital audio media employ some measure of digital compression, HD's compression is much less aggressive than is the case with the other two. The MP-3 algorithm, in particular, removes so much of the digital information from the bitstream, in the interest of storing the most digital audio in the least amount of digital space that the audio which comes out of it tends to sound gritty and fatiguing. I will contend until three days before they bury me that that's *not* why digital audio exists, and *to this day*, I don't own or operate an MP-3 device, and for just that reason. My ears have enough problems without having that sort of thing to fight with.

Additionally, because both of HD Radio's competing technologies have inherent data rates of 32 kbps or less, the frequency response on both is limited to 50 Hz-15 kHz, period – not CD quality. HD Radio's data rate is not limited to 32 kbps although, in some cases, some of the HD services could be such, particularly those services which offer primarily talk programming. On most of HD-R's music formats, the data rate is usually set at 48 kbps, which is above and beyond CD quality. This is not rocket science. Everyone in the technical side of the business already knows this.

So why, then, does MP3 have such a devoted following, even with its technically inferior platform? And why does satellite radio survive despite the fact that it has never earned a dime in profit? That's not rocket science, either: Because with the wide variety of formats and music types available on those media, people can tailor their listening to only what they want to hear. Yes, that tends to make listeners more provincial in their music outlook, but it also makes those two media more competitive and popular. The absolute variety available is intended to give the public what they want. It adds up to "niche" programming, and within their own realm, MP3 and satellite own all the formats. Traditional broadcasting *must* adapt to confront that business model. If it does, it will survive and thrive. There should be no alternative.

There's a dent in satellite radio's armor on that issue, you know. With the illegal consolidation of the two service companies earlier this year came also the *reduction* of available audio formats on the air, much to the consternation of those folks who used to love to listen to them. That scenario

comprises an opportunity for broadcasters using HD, especially with multicasting on the FM band... *if* they choose to pursue it.

Putting it another way: The future viability of our beloved medium is in the hands of the programming departments. Engineering, industry-wide, has done its job in perfecting the quality of the sound which folks can hear. It's up to those who put all those formats on the air to (bottom line) give listeners what they want.

A final observation and a question: Remember, two decades ago, that there were two, not one consumer videotape formats, VHS and Beta. Beta was far and away the superior system, technically. But it was VHS which became market-dominant. There's a lesson there which should not be ignored. As to the question: Is there an organization for radio format programmers, like we engineers have with the SBE? I suspect not, but maybe, just maybe, there should be now. That's because it's not the station down the street that's the real competition anymore. It's the kids' MP3 players, and the satellite radio sets in the cars. We have to aim our response at *them*. It's the only way the broadcasters can win the hearts and minds (or re-win, shall I say) of the people. That is key to our future viability.

Putting our UPS on the Network

This is just your basic, "Why is this?" rant.

In past issues you've heard me extol the virtues of our Caterpillar (Active Power) 150 kW flywheel UPS, which is presently in action at the Power 92 site to keep the power to the transmitters clean, and thus the station on the air. The box has eliminated over 900 outage incidents and counting. As such, it is a very valuable member of "the team," and you'll have to pry the thing out of my cold, dead fingers. All five tons of it.

Having said all that, there is a kind of "fly in the ointment" issue with the thing, and that is the difficulty in being able to monitor it via the Internet for possible problems and "off-line" incidents, which have happened a little more often in the last year or so.

The UPS 150 and its ilk, as delivered, have a couple of ways of being remotely monitored. One is via phone modem, which is a well-developed system that's reliable, stable, and just about unusable anymore, except by the UPS's factory customer service department. They just flat-out love it. Thing is, who, in their right laptops, out here in the real world, has the ability to go on-line with a phone modem anymore? No one who's not running Windows ME, what with the Internet now being so ubiquitous.

Which brings us to our next issue. Yes, there's an RJ-45 Ethernet ready port on the UPS (two, actually) with which one can hook the UPS right into a switch, and thus put it on-line. Brian and I spent a lovely rainy afternoon recently, running the cables with which to make that connection. But while the phone modem setup was designed and implemented during the golden era of dial-up Internet access, the Ethernet system was designed at precisely the same time; that is, quite a while before the present 100-Base-T system was as well known and developed as it is today. And it shows.

Back then, knowledge of how an Ethernet system was wired and set up was not assumed, even for the techno-masses. So, Active Power, in its infinite wisdom, made the decision that initialization of the Ethernet system on their UPS line would be something that only a factory-trained person could do. That's right. We have to bring out a UPS technician to do something that normally we of the Crawford Geek Squad, or even the real Geek Squad, could do blindfolded.

Case in point: The system requires both an IP address and a port number. However, the only way to enter either from the front panel of the UPS controller is to press the up or down arrow keys on the controller until the port number or IP address you want comes up. There is no numeric keypad on the unit. That means that if you want to get to Port number 7500, you have to press the 'up arrow' key *that number of times* until you get there! Seriously! And there is no place on the front panel to set subnet mask, gateway, or DNS. It's enough to turn a thumb drive into a thumbscrew.

Well, it's 2009, folks. May I be so bold as to suggest that maybe it's time for a software update from y'all which would allow those of us, who know what we're doing, who wish to use the real Internet to monitor our local UPS for problems (using Active Power's software package, "CS View"), to do it? Even if it cost something remotely semi-reasonable, I think that would be worth it to have such an update on the rig, just for the convenience and peace of mind that monitoring the UPS the way that everything else is remotely-monitored would provide.

On the other hand, the thought of paying several hundred bucks for a service call just to set up this UPS for Internet control and monitoring, and then for the same service person to come back and deal with it in case anything goes wrong with it, just leaves me cold. Sorry. The problem is, the Customer Service Department down at Austin (the Lone Star State Austin, not the Minnesota "Spam" Austin) has

less than no use for the modern Internet. Their attitude is, "The phone modem at 56 kBaud is the fastest, most reliable way we have to control *all* of our product out there in the field. That Internet way is just too slow."

Well, I have news, folks. It's 2009, as I've said, and we've just upgraded our incoming ISP connection with the addition of several new IP addresses, and the new engineering IP address, now split off from the actual Internet connection, and the one which handles the UPS feed is working just fine now, thank you very much, even through our non-licensed LANLink 900. It's ready, we're ready, and you should be ready. I say, it's time to get with the program. Let's go.

Wherefore Art Thou, Clipboard?

Finally: I had an occasion, recently, to be involved with a program which developed a problem during installation, which generated a rather involved error message. The manufacturer, in its instructions, requested that the automatically-generated error message be found in Clipboard, blocked, copied and pasted into an E-mail and sent to their customer service E-mail address. It was then that I began to realize that Clipboard, long ago a staple of the Windows operating system, had somehow faded into oblivion. Finding out even how to *access* Clipboard was taking on the dimensions of finding out how to give a cat a pill or put two drops of nose drops into a baby's nose. It all sounds so easy, heh-heh-heh...

Long after I'd lost the error message (about two hours) I got both frustrated and a small inspiration: Google. To make a long story short, I found myself face to face with the Andy Rathbone website (andyrathbone.com) and a clue as to what had happened to Clipboard. Oh, it's still there, within XP, but getting to it is almost problematic. Almost. I'll give the Cliff Notes version of how to resurrect it here, but do go and look the whole thing up on Andy's website. It's rather fascinating:

1. Click the start menu button and open My Computer.
2. Open your C: drive.
3. Double-click on the Windows folder (click on the line which says "Click Here to Show Files.")
4. Double-click on the System32 folder (again, if need be, click on the line which says "Click Here to Show Files.")
5. Scroll down the page until locate a file named "clipbrd."
6. Drag and drop the clipbrd file into your Start button menu.
7. You may also put a copy of the clipbrd icon onto the desktop, of course.

Note that you may also find the file in the I386 directory, in a compressed form with the file name of clipbrd.ex_. Go to the command prompt, and navigate to the I386 directory, then type in this command: **expand clipbrd.ex_ clipbrd.exe.** Copy the file that is produced to the "system32" directory and work with it from there.

Double-click the clipbrd icon to display the contents of the clipbrd, then highlight and copy it to wherever you want.

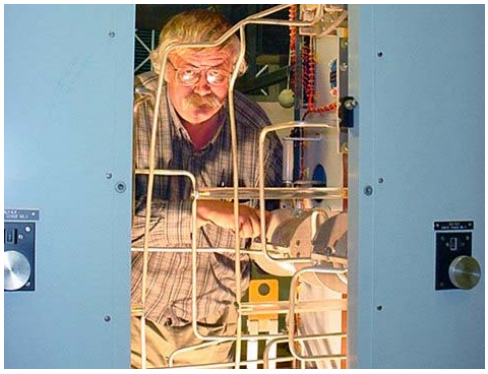
The AndyRathbone.com web site is yet another one of those neat little "tip line" web sites that you just might want to book mark for your own good.

Until next month.....

The Portland Report

By
John White, CBRE
Chief Engineer, CBC–Portland

I hate to complain about the weather. Rose festival is over, so the rain has stopped. But don't you know, some people are never satisfied. Now I want both sun and a calm day.



Some recap is in order. Some years ago we had an earthquake near the Portland metro area. It did some significant damage in the Scotts Mills area about 45 miles southeast of Portland. It snapped one of the rafters in my garage (at a knot hole), but there just wasn't any extensive damage in Portland.

Fast forward a year or so. The towers were painted (14 years ago, time flies), and the center tower was converted to a grounded-base skirt-fed tower. The skirt system was later replaced in an upgrade. There were numerous lamp replacements along the way, and don't forget the LED conversion. All in all, we have had tower crews on the tower on a regular basis.

Then this last fall, while evaluating another project, we discovered some warped diagonals on the tower. The warping wasn't extreme and there was no event to point to for an explanation. Thus began the visit to the mystery detective.

With a photograph I had from 2000 and one that Cris had from 1996 or so, we enlarged that area of the tower and were able to show the damage had existed for some time and just not been noticed. We believe the damage is a result of the Scotts Mills earthquake. We can't be sure, and in the final analysis the real goal is to implement a repair. Here is where the tower structural engineer enters the picture.

We are working with a local engineer who is quite familiar with our towers. He was involved with the original modifications to install a 7-bay FM antenna (since removed). I want to talk a little bit about that process.

Our structural engineer's recommendation was to upgrade the damaged members. In order to maintain structural integrity during the repair, we wanted to avoid removing any diagonals if possible. The ultimate decision was to mate new diagonal sections with the existing diagonals leaving the originals in place.

I talked some last month about the process of the tower company, tower engineer and myself working through all the steps while looking for problems. I won't repeat those steps here, but I do want to highlight the need to pre-work problems as much as possible.

Tower work has now begun and below is a pic of the new parts, lazier cut and drilled, galvanized and painted prior to installation. As a precaution, all work is being done with wind less than 10 mph. Now all I need is sun, no rain, and no wind.

I have talked about the transmitter building at Mt. Scott. Built originally in 1948, and extensively remolded in 1985, the building is quite large by today's usual small container standards. The building has restroom and kitchen along with a fair bit of floor space.

For quite some time we have had the desire to consolidate office and transmitter facilities. Beyond the cost savings, quite a few other logistical advantages make that attractive. In the last few months, everything has fallen into place to allow that to happen. Given just the regulatory issues alone this was no small task.

I have plumbing, HVAC, tower painters visiting on near daily basis in preparation. It's going to be an interesting summer.

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

Thankfully, the month of June was a fairly quiet one at work. T1 problems were at a minimum. We did have some torrential rains the beginning of the month. One storm on June 7th brought an EF-1 tornado dangerously close to me.

I had been out running errands for my parents while they were on their way back from Grand Lake, Colorado. I noticed the drop in temperature at my first stop but didn't think anything of that and the black sky. As I left the neighborhood I was in, it began hailing pea sized hail. Yet again, I thought nothing of it. You'd think that after living in "tornado alley" for thirteen years, I'd have figured out what this meant. It looked darker to the west, so I figured the storm was moving west to east, which is the usual pattern around here.

I heard the tornado sirens go off as I was nearing Quincy Reservoir, a few miles from my next destination. I immediately begin looking up at the sky while driving. I was thinking that if I kept driving east, I would get out of this. What I didn't see was how dark it was *southeast*. The houses were in the way of my view. I got to an intersection probably less than a mile from where I was going, and the hail really picked up and got bigger, too. I noticed fences were blown down and in the road. At that point, I just floored it. I noticed rotation in the sky and knew I needed to get to shelter. I was trying to make it to my friends' house, which was my second destination.

I turned down a feeder street and just as I turned, the tornado came down and landed in a field less than a quarter of a mile away. I had no idea which was this tornado was going. I just knew I didn't want to be stuck in a car when it hit. I turned down the first street I came to and saw two people outside. The wife had been doing the same thing I was. She saw the tornado and wanted to get home. She apparently sped all the way home with her young daughter in the back. They waved me into their house so I could have some shelter.

It began "snowing" hail, or so it seemed. It was coming down fast and hard. While the rest of us huddled in the basement, the husband stayed outside, captivated by the tornado that was passing by. Thankfully the tornado passed us completely.

Too close for comfort! Amanda took this photo from the front yard of the house where she took shelter.

If I would've gotten to where I was going, I would have encountered golf ball size hail and would've had a lot of damage to my car. The tornado went through the Southlands Mall, an outdoor mall with lots of people. This mall has everything you want, a Lowe's just up the street, Wal-Mart, Best Buy, Petco, Ross, and several other small shops and restaurants. They ended up having to close the mall down for two days as several HVAC units were ripped off the roofs of these places, causing gas leaks. Only one place has yet to reopen. I can only assume it took a direct hit

from the tornado as an entire wall is gone.

Cars were turned over, windows blown out, HVAC units tossed around like baseballs, a construction trailer was thrown across a road, but thankfully, God protected everyone. The only injury to speak of happened to a man who was videoing the tornado from his condo. He was thrown and received a broken collar bone. I am very grateful for God's protection and pray the people that experienced this tornado realize it is only by God's hand they were saved.

Waist-high weeds were a real problem at the KLZ site

We had several days of this kind of weather. This is something Colorado hasn't seen in ten years. My dad and I were at Coors Field for a baseball game on the fourteenth of June. We had been watching the sky get darker. It began raining and we decided to walk around the concourse because our seats offered no cover. As we were walking, we heard the tornado sirens go off. About ten minutes later, after a funnel cloud was spotted several blocks away, they evacuated everyone to bathrooms and the stairwells. We stayed there for thirty minutes or so until we decided ourselves it was safe. We were just on the edge of the storm system that was moving away from us.

We had over a week of torrential rains, and out of that week; I think the KLTT T1 failed us twice. The first time was the beginning of the month, the week the bad weather started. The KLTT ISDN also went down during this episode, so we could not get KLTT on the air. We ended up using my dad's notebook computer to put KLTT on the air. He has a Blackberry with unlimited tethering, so we were able to use his phone as modem, connect to the KLTT Internet stream, hook up an audio cable to his computer and put that on the air. It didn't sound perfect, but it worked! The T1 and ISDN were down several hours, evidently due to rodents chewing on the telco cables in the splice pedestals near the site. This ended up saving us hundreds of dollars.

The only other T1 problem we had was the last Friday in June, the 26th. The T1 went down that morning and Qwest had it up by 5:00 pm. I have no idea what the problem turned out to be.

After dealing with several computer problems, I decided to take a break and start mowing at the transmitter sites. The growth at the KLZ and KLTT sites is becoming a real problem because of all the rain. We have waist-high grass and weeds at both sites. While Keith ran the tractor and brush hog, I mowed inside the tower bases. The string trimmer, a late model Troy-Bilt, quit on us for some unknown reason in the middle of my work. We ended up taking it in to a repair shop and should have it back early this month. Then, as I was mowing inside the fenced area around the KLZ barn, I ran over a tree stump that was hidden in the tall grass. This bent the crank shaft of the mower. Boy was I mad! We had several trees cut down around the area so it could be painted and a fence could be put up. The tree cutters left all the debris there. With the ivy that has been growing around the entire property at KLZ and the tallness of the grass concealing everything I couldn't see anything on the ground. We were able to order

Amanda's car is irresistible to the horses at KLVZ

the parts needed to fix the mower and will hopefully have it fixed and working shortly so I can finish my work. First, though, I will comb the area for stumps and other debris in hopes of removing as much as I can. I am slowly learning about mowing and trimming as these are things I have only done at work. Thankfully I have a father who tells me what not to do while mowing (typically after I've done

it…at least I know now!). I also learned that I cannot wear shorts. Ouch!

While visiting KLVZ several times, we noticed the horses kept eating our wood tower base fences. Jerry Ford, the owner of the horses, ended up putting livestock fence panels around each tower base fence to keep the horses from eating them. That worked great until one day, when a horse got stuck in the panels around the new building and ended up pulling the panels apart. This allowed the horses to get under the building. The horses did some damage to the conduit there, and we were able to fix it ourselves. On this particular day, my dad and I went on the roof to adjust our cameras. While on the roof, the horses decided they liked my car. One horse decided the antenna topper would be a snack. I looked down and the entire antenna was bent over! We were able to get the horse to stop but not before the yellow cap off my Jack-In-the-Box head was gone!

The month of June is over and I pray July brings less tornado warnings and more rain. Until next time, that's all folks!

Digital Diary
by
Larry Foltran
Corporate Website & Information Technology Coordinator

The Best Thing Since XP?

Ever since Microsoft announced their latest contribution to the operating system landscape, Windows 7, the IT community has been watching each status update with very skeptical eyes. Why? We've been here before with the release of Vista. We hear them talk about all the great things it will do and how great our computers will run with it, but the end result is basically a disappointment. I find it very interesting how nearly three years after Vista was released, educated computer consumers still look to use its predecessor on their systems. In fact, based on statistics released in May of this year, XP still holds the majority of the market share nearly eight years after its public début.

I must admit that I have had three computers under my roof that run MS Vista and I haven't had too many issues. Although it can be a bit cumbersome to work with at times and is a major resource black hole, it is very stable. Blame my stubbornness or simply my desire to use something I paid for, but I have fought the urge to downgrade back to Windows XP for quite some time now. But with the release client of Microsoft's newest OS, change was on the horizon.

Back in January, the public got a glimpse of Windows 7 via Microsoft's released beta version. Although I had the opportunity to play around with the beta on a friend's computer, I wasn't completely ready to take a leap of faith and install a beta OS on my machine. In fact, I typically try to stay away from any new OS for the first year to ensure all of the bugs are worked out. That all went out the window (pun intended) last week.

My "uber-power," home-built computer dedicated to running Flight Simulator had been running on Windows 64-bit Vista Ultimate since its first boot up. While recently chatting with a friend of mine, he asked why I hadn't tried the recently offered Windows 7 Release Candidate (RC). My 64-bit Vista system had been giving me some software compatibility problems recently and the frustration probably showed. I decided to do some research and see what I came up with. If it wasn't going to be Windows 7, I was sincerely considering moving back to the comforts of XP.

Reading through a variety of related message board posts and other resources, I was pleasantly surprised to hear very positive comments about Win 7. It seemed to be a stable platform and its resource usage is more like XP than Vista. I was even more pleasantly surprised, border line ecstatic, when I discovered that the 32-bit version utilized all 4gb of RAM unlike the 32-bit version of Vista. Better resource management and the broader compatibility of a 32-bit system? I'm in.

Download of Windows 7 RC from the Microsoft site was relatively easy. After a short form that is required to be completed, you are provided with a download link and certificate number for Win7. The download is actually an ISO file or disc image, so software that accommodates burning the ISO to disc is required. I should also add that a blank DVD and DVD burner is needed.

With disc in hand and the data from the computer backed up, it was time to install. Based on my experience, it's always best to do a clean install (format) when dealing with a new OS. Yes they do offer upgrades, but that typically results in added frustration down the road. I changed the boot order in the computer BIOS and restarted the machine, booting from the Win7 installation disc. As expected from Microsoft, the setup wizard was easy to use and I was humming along on Windows 7 within 15 to 20 minutes.

At first glance Windows 7 looks a lot like Vista with some subtle differences, although I'm sure there will be some changes by the time it hits shelves. Some of the most noticeable differences are in the task bar. The colorful icons to the right have been replaced by very basic looking white icons. Instead of only displaying the current time, the date and time are now present in a very compact arrangement. The text in the task tabs are basically gone, replaced by compact icons. Multiple associated windows, such as your Internet Explorer and a download window as an example, are now grouped under the Internet Explorer icon on the task bar. Hovering will expand the list of items open with some descriptive text next to it. In general, it seems as if one of Microsoft's goals with Windows 7 was to make the interface more compact and less obtrusive.

In terms of system resources, Windows 7 runs like a dream. Flight Simulator runs as it should on a computer with such high-end specs as opposed to how it did on the same computer under the control of Vista. Software compatibility has been no issue and I've actually been surprised to see many manufacturers already providing system drivers for Windows 7. If a certain application won't work in Win7, I've read that there is a XP mode that can be used, although I haven't experimented with that at all.

Unfortunately, with Microsoft, there is always bad that comes with the good. No longer available on Windows 7 compared to Vista are Windows Mail and Windows Calendar. It's not a huge problem if you're a fan of these tools because they will be offered in a separate package called Windows Live Essentials. What's even better is that this package from Microsoft will be free. Yes I did use the works "Microsoft" and "free" in the same sentence.

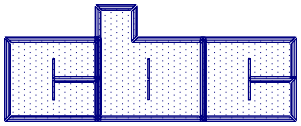
Anyone considering upgrading to the Windows 7 RC should keep in mind that it will expire early in 2010 and you will be required to either purchase full license of the operating system or install a different one. Current reports show that the full retail version of Win7 Home Premium will be $199.99 and the more robust Ultimate edition will be $319.99. Microsoft has also announced that only their Basic and Home Premium versions will be available to the average consumer, but I suspect some specialty computer retailers will have it available. Further, Windows 7 will have an instant upgrade feature. In other words, all of the "perks" of the next version up will already be stored on your computer. Using the upgrade tool will simply enable the next version's group of features.

Based on what I've seen thus far, Windows 7 is a welcomed improvement on Vista. With consumers basically tapping their feet and saying, "this better be good", it seems as if working under pressure worked for Microsoft. In my honest opinion, another stray shot from Microsoft in the battle between PC and Mac would have resulted in a mass exodus to the Apple side of the field. Although I don't believe that this will end that debate, it may help preserve the current army of Microsoft driven PC users. But did I mention that Windows 7 will run on a Mac?

…until next month!

KBRT • Avalon - Los Angeles, CA
740 kHz, 10 kW-D, DA
KCBC • Riverbank - San Francisco, CA
770 kHz, 50 kW-D/1 kW-N, DA-1
KJSL • St. Louis, MO
630 kHz, 5 kW-U, DA-2
KKPZ • Portland, OR
1330 kHz, 5 kW-U, DA-1
KLZ • Denver, CO
560 kHz, 5 kW-U, DA-1
KLDC • Brighton - Denver, CO
1220 kHz, 660 W-D/11 W-N, ND
KLTT • Commerce City - Denver, CO
670 kHz, 50 kW-D/1.4 kW-N, DA-2
KLVZ • Denver, CO
810 kHz, 2.2 kW-D/430 W-N, DA-2
KSTL • St. Louis, MO
690 kHz, 1 kW-D/18 W-N, ND
WDCX • Rochester, NY
990 kHz, 5 kW-D/2.5 kW-N, DA-2
WDCX • Buffalo, NY
99.5 MHz, 110 kW/195m AAT
WDJC-FM • Birmingham, AL
93.7 MHz, 100 kW/307m AAT
WEXL • Royal Oak - Detroit, MI
1340 kHz, 1 kW-U, DA-D
WLGZ-FM • Webster - Rochester, NY
102.7 MHz, 6 kW/100m AAT
WRDT • Monroe - Detroit, MI
560 kHz, 500 W-D/14 W-N, DA-D
WMUZ • Detroit, MI
103.5 MHz, 50 kW/150m AAT
WPWX • Hammond - Chicago, IL
92.3 MHz, 50 kW/150m AAT
WSRB • Lansing - Chicago, IL
106.3 MHz, 4.1 kW/120m AAT
WYRB • Genoa - Rockford, IL
106.3 MHz, 6 kW/65m AAT
WYCA • Crete - Chicago, IL
102.3 MHz, 1.05 kW/150m AAT
WYDE • Birmingham, AL
1260 kHz, 5 kW-D/41W-N, ND
WYDE-FM • Cullman - Birmingham, AL
101.1 MHz, 100 kW/410m AAT
WXJC • Birmingham, AL
850 kHz, 50 kW-D/1 kW-N, DA-2
WXJC-FM • Cordova-Birmingham, AL
92.5 MHz, 2.2 kW/167m AAT

CRAWFORD
BROADCASTING
COMPANY



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