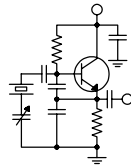


# The Local Oscillator



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

FEBRUARY 2009 • VOLUME 20 • ISSUE 2 • W.C. ALEXANDER, CPBE, AMD, DRB EDITOR

### **A Mixed Consist**

I love trains. They have a name for folks like me: I am a *railfan*. Maybe this comes from growing up within a couple of hundred feet of a Rock Island spur, or maybe it's just a mild obsession with big, powerful equipment. Whatever the underlying reasons, I'll go out of my way to watch a train. My basement has a model railroad layout in it, complete with sound and digital command and control (DCC). Maybe I need a 100-watt subwoofer down there to shake the floor!

One of my favorite transmitter sites in the company is that of WPWX in Chicago. The site is bordered by a Norfolk Southern main line to the north and an Indiana Harbor Belt spur to the east. You have to cross the IHB spur to get in, and if you're really lucky, there will be a road switcher there blocking the driveway. I once visited with the "hogger" (engineer) of one of the IHB locomotives as he waited on a switchman and I waited to get into our site. That's was fun. And if you're really, really lucky, you'll get to feel the floor in the transmitter building vibrate as a Norfolk Southern unit train passes by at track speed with turbochargers screaming. It's probably a good thing I don't have Art's job... I would no doubt spend a lot of time at that transmitter site and probably not get a lot done!

In the railroad world, multiple locomotives are often coupled together to produce enough tractive effort to pull a heavy train. You've seen it many

times, I'm sure. When several *different* locomotive types are coupled together, it is called a "mixed consist." The controls of the different locomotives all speak the same "language," so the trailing locomotives can all be controlled smoothly from the cab of the lead unit by a single engineer.



**A BNSF mixed consist pulling a coal unit train passes the KLTT transmitter site**

We've used *mixed consists* of a sort for years in the broadcast world. Mixing up equipment types in the broadcast environment has, for the most part, not been a big deal over the years. Standards were created in both the analog and digital domains to make things compatible. In today's digital studio and transmitter sites, we use the AES/EBU standard to convey digital audio, and although there are different sample rates, most equipment is designed to be adaptive to the incoming

AES stream.

Last month, we ran into a situation wherein a mixed consist of equipment presented us with a real challenge. As reported in last month's *Local Oscillator*, we received a new Nautel NV-40 solid state FM+HD transmitter for WMUZ in Detroit. This new transmitter was equipped with Nautel's new Exporter Plus, an integrated HD exporter that operates with no hard drive, no operating system – none of the PC architecture that the older BE and Nautel HD generators, exporters and importers were built on. There is no boot-up cycle – you turn the little 1-RU unit on and it plays, period.

The problem is that the Exporter Plus (and *all* new-generation HD Radio gear) is built on the

iBiquity version 4.x architecture. This is a completely new and different system, and that fact quickly became evident in a number of areas. The one that was the most vexing, however, was in the area of PSD – *program service data* (formerly PAD or *program associated data*). We could not get the RCS NexGen system to talk to the Exporter Plus with song title, artist et al.

What we eventually figured out was that the export format for PSD had completely changed from what it had been with the older HD generation equipment. Somewhere along the way, someone forgot to tell someone else and they in turn forgot to tell us. As a result, we were totally unprepared for it. And as a further result, WMUZ and WMUZ HD-2 (“Z2”) went for a month without the PSD scroll – and this in the Detroit market, arguably “ground zero” for the HD Radio rollout.

Once we figured out what was happening, we got RCS and iBiquity talking and our friends at RCS quickly responded with a NexGen beta (v. 2.8.5) that solved the problem. Another PSD export option is offered in this version that corresponds to the iBiquity v. 4.x architecture. It took some experimenting and there were some false starts caused by miscues at iBiquity and RCS, but by late January, Tom Gardull and Larry Foltran had things humming on WMUZ.

Amanda had run into a similar issue in Denver. KLZ received a new Exporter Plus and AM IBOC HD generator from Nautel in late December. I looked over her shoulder as she installed it and tried to get it to work. The first thing she noticed was that the old NE-IBOC Mag Delay and Mag DC Offset parameters did not translate to the new unit – she dialed in the same numbers and the transmitter did not like it at all! Once she figured that out and got things in the ballpark so that there was an HD lock, we saw that there was no PSD scroll on the Day Sequerra monitor (“No Text”). She spent a couple of hours trying different things before she gave up and reinstalled the old NE-IBOC. A few days later, she figured it out – the problem was incompatibility between the NexGen PSD export and the v. 4.3 Exporter Plus architecture. At that point, she shelved the Exporter Plus and AM IBOC HD generator,

opting to wait until Nautel, iBiquity and RCS got things worked out.

The good news is that the RCS update does allow us to individually select the export format for each station within a cluster. In Detroit, they were able to select “iBiquity PSD” for WMUZ with its new Exporter Plus, and they were able to select the old PAD export format for the other stations still running the old architecture HD equipment. We should be able to do that in other markets as well.

During the course of 2009, we anticipate replacing all the old NE-IBOC units in the company with the new Exporter Plus/AM IBOC units, so we’ll face the issue in most every market at some point during the year. Clearly we’re the “test pilots” here. As we have learned throughout the HD Radio rollout process, figuring stuff like this out on our own goes with the territory when you’re on the “bleeding edge.” I can’t help but wonder if the early railroads had to deal with compatibility issues like this.

#### NV-40

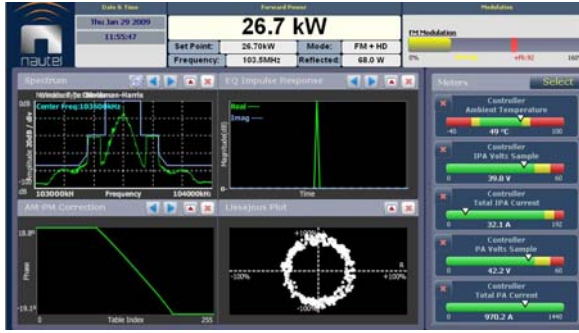
I made a trip to Detroit late last month to get a peek at the new Nautel NV-40 transmitter there. Tom Gardull provides some details on the installation in his column herein.

One thing we were unprepared for was the amount of heat that the NV-40 puts out. Very little advance information was provided with the transmitter (it was, after all, a brand new product – we got the first unit shipped). The plan all along was to vent the transmitter exhaust to the outside, but I wrongly assumed that the amount of hot air to be vented would be on the order of 500 c.f.m., similar to what the tube-type transmitter it replaced exhausted. Imagine my surprise when I found that we will need to vent 3,000 c.f.m. to the outside!

Needless to say, that changes everything. That volume is well beyond the ability of the existing HVAC system’s make-up air/economizer to supply. We will have to cut another hole in the transmitter building wall to provide filtered make-up air of sufficient volume to replace what is being vented overboard.



**WMUZ's new Nautel NV-40 Transmitter**



### WMUZ NV-40 Remote Interface

That aside, this new transmitter is a really sweet rig. It is, of course, all solid state, and unlike earlier efforts of Nautel and others, it fits in the footprint of a comparable tube-PA transmitter. Control and monitoring are provided by a touch-screen graphical user interface, and everything that's available on the local screen is also available

remotely via the built-in web interface. For those who are nervous about computer interfaces, there is also a pushbutton control matrix provided behind the front door, offering local control of all remote control functions.

The transmitter sounds great and hums along at a solid 26.7 kW TPO (I didn't see that change at all while I was at the station). Installing it improved our HD Radio digital coverage considerably, moving the digital transmission to the main antenna at the top of the tower. Previously, the auxiliary antenna had been used for digital transmissions. The new rig also gives us the ability to transmit increased digital power should the FCC ever authorize that.

I look forward to a firsthand look at the new KCBC NX-50 transmitter this month. I'll provide a full report in the next issue of *The Local Oscillator*.

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

Hello to all from Western New York!

The Canadian government is at it again! Approximately five years ago, the CRTC (the Canadian equivalent to our FCC) issued a broadcast license to operate a station on 99.5 MHz out of Kitchener, Ontario. CIKZ went on the air at 1.6 Kw and was doomed since day one. The interference that 110 kW WDCX-FM caused them was insurmountable, finally forcing them to change their frequency to 106.7. Naturally, while CIKZ was on the air, our signal was marginal, at best, in the southwest quadrant of Toronto.

On January 6, 2009, CKKW officially signed on the air in Kitchener with a power level of 2.2 Kw and you guessed it, at 99.5 Mhz. CTV, who owns and operates CIKV(AM) at 1090 kHz petitioned to the Canadian government to move their programming from the AM to the FM band and shut down their carrier at 1090. Apparently, according to



the CRTC, the only frequency available to this region was 99.5 I don't understand, given the prior history, how the Canadian government would issue a license *again*, knowing that there would be interference issues to deal with.

Needless to say, we are again experiencing interference issues in this area, and our devoted listeners in the Kitchener area are extremely displeased. We have received well over one hundred complaints via e-mail and phone calls about the inability to receive WDCX-FM along the 401 corridor into Toronto. It is difficult to tell our listeners that our signal is only protected to the U.S. border and any interference received past that point, well, there is nothing we can do about it. Apparently, the CRTC and CKKW have been bombarded with calls and e-mails objecting to the station signing on at 99.5. According to one longtime WDCX-FM listener who contacted the management of CTV and complained, he was given

the following statement issued by Paul Cugliari, Vice President/General Manager of CKKW:

*99.5 FM is the only designated frequency available for this area as regulated by the CRTC and we're very aware of its past technical problems. Since we've been working on our new application for quite some time now, we've had our engineers assess and adjust for the problems that our predecessors had. WDCX has benefited from the fact that this frequency, while belonging to Kitchener/Waterloo, has not been in use, and thus their signal has come over the border and into Canada. I appreciate the high purpose that their audience has, but there's not much I can do in terms of moving.*

In today's economic situation, we need all the coverage area and listeners we can get. At this point in time, we are not certain as to how much of an effect this will have with our Canadian programmers, if any. There have been several blogs started on the net from concerned Canadian listeners about our situation. Check out the Christian Conservative blog at <http://www.canadaconservative.blogspot.com/>. You will find some interesting reading there. Once you get to the page, enter \* WDCX \* in the search window. I'll keep you posted on how this plays out in future reports.

I'm sure that one thing on every broadcaster's mind these days is the economic situation of our industry. With Clear Channel announcing recently the cutting of 1,850 jobs nationwide (which is almost 10 percent of their total workforce) it brings close to home the seriousness of our economic situation. This money meltdown has been fueled by a combination of events, including the mortgage bankers and housing industry debacle, the war on Iraq, fuel and transportation costs along with poor decisions made by our country's leaders. Yes, we are in a recession. It definitely is not our first, and it won't be the last. Perhaps our new President will be able to find a way to steer our country out of this, but it won't be overnight. Until then, the best thing we can do is to perform our jobs to the best of our ability and conserve resources and finances whenever possible. Remember, tough times don't last, but tough people do!

#### **WDCX-FM – Buffalo**

#### **WDCX /WLGZ-FM – Rochester**

The month of January has gone down as one

of the coldest we have experienced in the past ten years here in the Northeast. Along with the near zero temperatures, we have had the windiest January I have ever seen. These weather factors have delayed our getting the STL line replaced on the WDCX(AM) tower that was damaged by moisture back in late November. By the time you read this, we should be back up and running on our STL

On one of the coldest nights in January, with the mercury dipping down to -3 degrees, we had a queer problem pop up with the WDCX-FM Burk remote control. It continuously called me all night with false status alarms that indicated the power generator was on. I finally had to turn the alarm reporting off long enough to get a few hours sleep. When daylight came, I trudged out to the transmitter site to determine what was going on. All remote control functions looked normal. However, I reloaded all the programming data using the Burk AutoLoad program, and so far, no erroneous alarms have been received. I guess I got "Burked" again!

Another problem that has surfaced as of late is the WDCX-FM streaming computer. Several months ago, we began getting a continuous error message that said, "This program has been damaged, possibly by a bad sector of the hard drive or a virus. Please reinstall it." I notified Liquid Compass of the problem. They reinstalled the Auto Task Monitor and the error message went away, at least until the machine rebooted, and it was right back.

To date, I have run CheckDisk on the drive (finding no errors) and defragmented the drive, but the error message continues. I loaded Norton Anti-Virus 2009 onto the computer, but it puked immediately and would not continue the install. At that point, I resolved to reinstall "Winders XP." I did not have a Dell restore disk for this machine, so I obtained one from the Rochester stations that was the same make/model of our streaming computer. I plan to wipe the OS clean over the weekend and start fresh again. We had a hacker get into this computer back some time ago, and it has not worked well since. When I deleted all the programs he installed, I'm certain that a shared file or DLL was deleted also, causing a portion of the problems.

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, stay warm and happy engineering!



### The Motown Update

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

Our new Nautel NV-40 transmitter is working fine. After installation, we spent some time getting HD Radio back in proper form. Ibiqity has issued new code that makes interoperability between all the parts of the HD radio equipment standard. We can mix and match Exporters, Importers, and PAD Generators from any manufacturer. Our difficulty was that the code was so new that not every company has implemented it yet. Everybody will get there, but there is a transition where software patches will be needed until new equipment is purchased.

Our difficulty has resulted in great cooperation between Ibiqity, Nautel, RCS and BE. Each company is responding to make things work.

When we powered up our NV-40 transmitter, the Nautel IBOC components interfaced smoothly as expected. But our BE Importer would not talk to the Nautel Exporter. Thus we learned about Ibiqity new code version 4.3.0. Nautel got our HD-2 audio on by loaning one of their new Importers.

But we still did not have SongTitle/Artist PAD (called “PSD” in the new architecture) accompanying our audio. RCS NexGen would not communicate with the new Exporter Plus. But RCS had a solution since they had been talking with Ibiqity. They issued a new software version to bring us up to date. Unfortunately, the first try missed some elements, but newer software, downloaded a day later, brought success. Now on the NexGen Export pages under Format, we choose Ibiqity PSD instead of MPS or SPS. The port assignments also changed. We now use port 11000 for HD-1 and 10010 for HD-2.

With song titles/artists working on the PSD, we then learned how to change the Program Type (PTY) feature in the Exporter Plus. There is a Station Info menu which gives the usual PTY choices. We learned that a reboot is necessary to make a change in

PTY. Station Slogan also was changed from the generic HD Radio header to our marketing label.

Slogans can be changed without rebooting. The unit came sending the –FM callsign suffix which we turned off, both because that is not part of our FCC callsign and because it was showing up on HD Radios saying “WMUZ-FM2” for the HD2 transmissions. Now it shows 103.5-2. This Exporter Plus is a single rack unit and operates using embedded software without a hard drive

We want to get our own BE Importer back into the transmission path. BE is sending a software patch that will implement the new Ibiqity code for it. We will then return the loaned Nautel Importer which has been in service for a month. I still like

the BE IDi-20 “Dashboard” program which is an overall supervisor, providing an easy, user-friendly interface. We also have our better Orban “Optimod PC” sound card/processor in the IDi-20.

Nautel has software upgrades planned soon for the NV-40 transmitter. They discovered our inability to modulate the SCA channels was a software bug. Other fixes and enhancements will come soon.

Our stations also joined the Arbitron ratings Portable People Meter (PPM) project this month. They gave us a main and backup encoder, which sub-sonically adds data to the audio. Listeners participating in ratings have a decoder which hears what they hear plus the embedded coding. They then download their listening history direct to Arbitron. Our three main stations have the equipment. We also get decoders which we feed with an on-air pickup which verifies with a green LED when station is encoding properly. It must be working, and I cannot hear any artifacts in our signals. There are no A/D conversions. We use the AES version encoders for WMUZ and WEXL, and the analog model for WRDT.



### News From The South

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

Rain, rain and more rain. I know that you folks “Up Nawth” have been getting lots of frozen stuff, but here, it has just been wet. We’ve had flash flooding. Fields have become marshes. Marshes have become ponds. Best of all, it rains, then gets really cold and the roads become treacherous. Great fun ... especially when you consider that Alabamans just aren’t wired for that. We’re configured for 95 degrees at 80 percent humidity.

As a result and not surprisingly, a number of projects that we’d hoped to get done before the end of 2008 have been delayed. I reported last time that we were going to model WXJC’s 50 kW array. Thus far, we haven’t been able to even finish the base impedance matrix measurements. When it rains, that 40 acre field turns into a giant mud pit into which a vehicle can very quickly get stuck to axle depth. I’ve learned the hard way (read: I’ve had to call for a tow several times) that you just don’t try to drive around to the tower bases after a rain. The surveyors are also waiting for the clouds to go away so that they can take a sun shot to establish the precise bearing of true north at the site.

When that system was redesigned in 1999, Cris put the new transmitter building right in the center of the array. That’s good engineering: otherwise, you’d have one really long coax run to the most distant tower, with a really short run to the closest one. Since all sample lines must be the same length, you also end up with gobs and tangles of excess line on those closer towers. But believe it or not, the previous owner had just this arrangement when we bought the station in 1999 – the transmitter building was off to one side of the field and the distance to the farthest tower was over 2/3 wavelength. That’s one good reason why we rebuilt it. Another is the fact that the phasor looked like a high school science project gone awry (but that’s off

topic).

The only downside is that the center of the array is also one of the lowest spots in that field. More water, more mud and more fun. We have a wire vault in the rear of the building to store the excess sample line. That thing gets filled with water every time we have a heavy rain. I have a pump in there to bail out the water, and it has been running quite hard the past two months, believe me.

Ergo and therefore, there’s nothing to report on that project this month. As I type this, also we’ve been delayed

by more rain with getting the Canopy system between the studios and WDJC-FM’s tower at Red Mountain. We can actually see the tower from the roof of the building, so it’s a beautiful, clear shot. Putting in that Canopy will give us considerably more bandwidth. At present, we’re making do with a 512 kilobit LANLink, which, while useful, does come up short at times (especially when you’re trying to view video from two different transmitter sites). We’re hoping to get that done before the end of this week, but we’ll see. So ... having nothing else to write about, I figured I’d rant. (Again.) You have been warned.

### Thoughts on Open Standards, Open Source and Life in General

I know how to rescue the auto makers. Let’s have them design a special, weird fuel inlet. It’ll have a strange shape that only a new, patented type of nozzle will fit. Then they can license that patent to the highest bidding oil company for a hefty chunk of change. Of course, if you buy one of those cars, you’ll only be able to refuel at one company’s filling stations, but that’s free enterprise. Right?

Yeah, right. Most of you would instantly go ballistic if the automakers and oil companies even mumbled about such a scheme. There would be Congressional hearings and lawsuits. The



blogosphere would go livid and the talking heads on TV would natter endlessly. (Have you ever noticed that Bill O'Reilly leans sideways when he gets upset? In this case, he'd go completely horizontal. All you'd see is an ear, one eyeball and a shoulder.)

Here's the thing: most of you reading this accept a quite similar situation with computers and don't even realize it. It should be no secret now to those who actually read my fevered ranting that I'm a big booster of open source and open standards. I've been accused of being a Linux hardliner, but that's not true; like Linus Torvalds himself, I think that you should use whatever works best. For servers, yes, I prefer Linux and BSD. I personally use Opensuse and KDE for my desktop. But I'll grant that for some tasks – for example, editing audio or video – Windows (or a Mac) probably makes more sense.

However, even on Windows, I like open standards. What do I mean by that? When files are saved to disk or transmitted over the Internet, they should be in an open, documented format. Even if they're encrypted, the encryption scheme should be openly documented; the only thing that should keep that data secured is a strong password or passkey. The way I look at it, that data is *mine*. I created it. I own it. It should not be held hostage by some company's secret, proprietary file or transmission format. In plain English, I shouldn't need their software, and *only* their software, to view my own work. What if the company goes bankrupt? What if they introduce a new format and eventually declare all of my old work “no longer supported?”

Most Americans don't realize that this is largely a US-only phenomenon. Most other countries don't allow software patents, for starters. Did you know that? That's largely an American “innovation.”

In recent years, the European Union has been much more vigilant than we have with reining in Microsoft, whose classic approach to the digital marketplace is called “embrace and extend”; they'll take an existing standard, then add their own proprietary modifications to it, forcing you to use their software. (Just like the tricked-up gas tank nozzle mentioned above.)

Here's another one that I'll bet you didn't know: when software is submitted for copyright, the owner is permitted to redact anything that he considers a trade secret. This is analogous to a novel being presented to the Library of Congress with entire chapters removed(!), but believe it or not, this special exception is permitted for software. This raises a really interesting question: can I be accused of violating a copyright if I inadvertently copy something that was in that software? How in the

world can I know, when I can't look at the original? This is “closed source” in every sense of the term, as opposed to “open source,” where you can actually download the source code and examine it yourself, if you'd like to.

As a programmer, I'll be the first to tell you that software patents are just plain dumb. In many cases, there's only a few possible ways to do a given task – open a file or create a window on the desktop, for example. And yet, we've actually had court cases where a plaintiff tried to “prove” that someone had copied his software because it contained the same instructions, in the same order! The same could be said of so-called “look and feel” patents. Really, be honest: how novel is it for someone to be able to click a single button on a Website to be taken to the checkout? That's an obvious no-brainer. And yet, court fights over those silly patents are raging even now.

Like our rigged refueling scam, this represents an artificial barrier to competition. At a time when our economy is in the doldrums, it depresses me that this great nation is no longer a producer of goods, of new ideas and of new inventions. Instead, American “enterprise” has become a squamous *mélange* of lawyers who argue endlessly about fine points, looking for some way to scam one more nickel or dime out of each end-user for their clients. This ain't how it's supposed to work, folks.

You might think that this is all theory and principle, but it has practical effects in everyday life. For example, in our own jobs, look at remote control units. Most of them either have a built-in Web server or include a software package so that you can display transmitter readings in a graphical interface. It's neat ... but to date, every system I've run across has been proprietary. What's the big deal with letting me know how that unit transmits its data to the remote software? It's like some deep, dark secret, with each manufacturer using a different (and incompatible) scheme. Most of them aren't interested in supporting Linux, so why not let me know how that data is transmitted? That way, I can write my own software, if I want to. But at present, that option is rarely available (one notable and laudable exception is Telos, which has published the complete interface specification for their studio telephone units).

My belief is that business models that are built on the old “per seat” or “per user” licensing, with artificial barriers and tie-ins like proprietary file formats will eventually become obsolete. As I said above, this is already becoming true in Europe and Asia, and more so with each passing day. American

technology businesses need a new paradigm; whether it's the current "the software's free, but you pay for service and support" approach used by companies like Red Hat and Suse, or something else entirely, I can't predict. But I do believe that it's inevitable. It's just a matter of time, and I wish America would take the lead on this.

And finally, I wish our industry would take the lead in America. One more time, I call on iBiquity to release full and detailed specifications for HD Radio, from codecs to containers. That would help it take off as quickly as anything else.

### Copper Theft

I'm knocking on wood (meaning: my head) as I type this, but for the past couple of months, copper theft has slacked off a bit around here. The prices paid for scrap copper and aluminum have plummeted, making it less attractive to thieves. However, that didn't stop us from hanging the signs that Cris sent for that purpose. This picture comes from the huge and happy metropolis of Pumpkin Center, AL, where WXJC-FM's transmitter site resides. The addition of this snappy-looking sign



undoubtedly increased the property values there at least a bit.

We're going to continue to keep an eye on our sites, as well. If the economy continues to head south, even depressed metal prices will look attractive to the thieves.

I'll hopefully have a lot more to report on next month. In addition to the matrix measurements and the Canopy link, Tom Gardull's old Continental has arrived, and we're itchin' to put it in as an auxiliary for WYDE FM in Cullman! Until next time!

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### Gateway Adventures

By

Rick Sewell, CBRE

Chief Engineer, CBC-St. Louis

You may have seen the episode of *The Simpsons* where Homer buys Marge a bowling ball for her birthday. Not only was it an odd gift because Marge wasn't much of a bowler, but when Marge opens up the gift she finds an engraving of the initials H and S. You can imagine her reaction was not good. And then the holes didn't fit her fingers at all, but miraculously they fit Homer's perfectly!

Now while I would describe myself as a much better gift-giver than Homer Simpson (certainly I have improved after nearly 28 years of marriage), I was a little concerned that the gift I gave my wife this Christmas might be viewed in the same way Marge viewed the bowling ball. I gave my wife an iPod Touch this past Christmas. It's basically the



same thing as an iPhone, only it doesn't have the phone. It does have WiFi, so you can connect it to the Internet wherever you find an open Wireless Hot Spot.

No, I didn't put my initials on it. After all, that would probably mess up the screen anyway. In fact, I refused to touch it for the first few days just because of the Homer factor. Finally, after two weeks, I couldn't resist anymore.

I got to play with it when she left it lying around when she was out shopping one day. I was really impressed by the Internet speed, which of course was related to the speed of my home wireless network. It didn't take me long to wonder if this could be a real handy device for logging into station computers in emergency situations (we use VNC to



log into the computer at the office and transmitter sites). I then searched the Apple store for applications. Sure enough, someone had written a VNC application for it already. Not only that, but it was a *free* one as well.

A quick download and I was ready to see if it would work. It took me about three minutes to set up the IP address, port number and password of the computers that I wanted to log into. I first went to the automation network.

I was in, but honestly, it was a bit clunky to get through a screen. Remember, you are doing all of the “mouse” work with your fingers on a two-by-three inch screen. You wouldn’t want to have to do a lot of log manipulation with this, but you could start up an idle audio server. That could save a lot of time getting a station back on the air if you’re not near a computer but could get to a Hot Spot.

I next logged in to the computer at the transmitter site. We use AutoPilot on this computer to run most of the functions of both transmitter sites along with tracking almost all events that take place at them. This computer was not as clunky to use as the one on the automation network. I could quickly scan all the readings and use the controls. Now since we have phone access to the remote controls, I could do this through any phone anyway. The advantage here is that it allows me to also scan the events remotely, and I can still get into the computer should we have difficulty with the phone line (copper thieves), because the Internet access at the transmitter site is a wireless connection.

You can see in the picture that you can view the readings of the station. In this case, KJSL’s Day

Pattern is in need of some minor tweaking because this photo was taken during a recent ice/snow storm. You can also use it like a mouse and touch the screen to push any button that you would with the mouse. In this instance, you could adjust the power controls or

take the station to the auxiliary transmitter or STL, etc. I could also use it to scroll through the events.

If I was really wanting to, I could open up web servers on this computer to look at other equipment attached to this network like processors, satellite receivers or even the Canopy radios we use for the STL.

The idea of being able to diagnose and fix problems with a hand held device from virtually anywhere is quickly becoming a reality. With the iPod Touch, all you need is a WiFi Hot Spot and you’re in business. These are becoming very common, even on buses and trains.

I know that a few years ago in a *Local Oscillator* column, I predicted that being able to remotely control our stations with a wireless handheld device was on the horizon, but it certainly has happened much quicker than I originally thought.

So yes, you can use the iPod Touch to get email, play games, view maps, surf the web, view the latest viral video on You Tube or even use it to listen to mp3 files, but now you can justify the purchase price because it just may become an invaluable work tool. Of course with many companies slashing budgets right now, I doubt that very many of them would be willing to cover the cost. However, I know with my birthday coming up in few months that the hinting will commence around my household.



**The iPod Touch**

**Catalina Tales**

**By**  
**Bill Agresta**  
**Chief Engineer, KBRT**

Greetings from Santa Catalina Island!

As I sat to write this article, reviewing my month and pondering what fine island happenings I should write to you about, *BANG!* The generator transfer switch put us on temporary generator power. I went back to check the transmitter and sure enough, it went into cutback, probably because we rode Edison's generator all the way down once again, frequency and all, so I reset it and we were good to go – or so I thought. Then I noticed we had lost our T1, and when I went to call the studio, I found all of our POTS lines were dead as well. Thank God we are still using satellite for our STL, or at least the audio portion of it. Our remote control is still running on the T1, but since I was standing in front of the transmitter, that was not a problem.



The issue here is that I have encountered this problem each time our power goes out, and every time, I call AT&T and am told the problem has been resolved. This time when I called the technician and told him that all of our lines were dead, he replied, "But we fixed that problem the last time we had a power outage." I tried to keep my cool and replied, "Obviously not. The power is out and all of our lines, including the T1, are dead!" Then he replied, "This is becoming a pain in the a\*\*!" Well, that got under my

skin just a bit!

We have had nothing but problems getting AT&T to simply give us what we pay for here on the island. After the fire, we lost our DSL and after going round and round with them, we went to a satellite Internet provider at a much higher cost to us. We are still in this same situation with our T1 as we continue to pay for it, and yet we are forced to run a satellite STL next to it because of situations like this. We keep the T1 in case of issues with the satellite, but the satellite STL has been solid and flawless for over a year and the T1 encounters issue after issue.

Well, the AT&T technician got under my skin enough this time that I stayed up on the hill (there is no cell phone coverage in our plant, so I must drive up on the hill over our plant to use the cell) with my cellphone, calling supervisor after supervisor on the mainland to put this issue clearly up on their radar screens. Let's see if they can actually find and repair this issue before our next power outage.

The weather here has been strange as it has been around the country, but instead of sub-zero temperatures, we have been experiencing 80 to 90 degree summer weather! The weather forecasters have not had an accurate forecast for a long time now. As I write this, they called for rain and yet we have a sunny, 70-degree day. This weather has allowed me to catch up on some outdoor maintenance and basic cleanup, and our plant is looking pretty nice these days.

This used to be a major focus for us, as our plant was viewed by hundreds of tourists each day as they passed by on the tour buses. With the economy in crisis, however, our tourism has dropped to the point that only a small handful of tourists pass by each day, so it seems that I lost some of my motivation for awhile. The last few weeks felt pretty good, however, working outdoors in the heat. Our tower field got mowed and is now probably one of

the biggest fire breaks on the island, and we planted lots of ice plant to complete filling in our fire break around our building. So, if nothing else, the fire department is very happy with us.

Our mechanic and I got to dig into some tractor repairs back in January, and it was a big change of pace for me. We needed to remove one of the back wheels, and with the old-style inner-wheel weights, it was a pretty tough job to deal with. While we were at it, we decided to give the whole tractor a good going through and found a few more repairs that

needed to get done. Gladly, we realized that one of the injector feeds was beginning to leak and we caught it before it decided to set the tractor on fire! This old Ford tractor is quite the vintage vehicle, but as long as we diligently maintain it, it continues to serve us well.

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.

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### The Chicago Chronicles

By

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

After what I've been through the last six weeks, my mind has been going in a dozen different directions, so it seems that, for the moment at least, I should stick with some short subjects and forget the long stuff.

#### They Won't Talk to Each Other...

You've seen this rant from me before, but since no one seems to be interested in doing anything about it and the problem has gotten bigger, maybe it's time to revisit this issue of manufacturers and developers not talking to each other.

Tom Gardull may be talking about this in his article this month, but he discovered when he put his new Nautel NV-40 on the air that some of the things he'd had before didn't work. First, his new Nautel Exporter wouldn't talk to his BE IDi-20 Importer. So, no multicasting. Nautel loaned Tom one of their own Importers, and that worked, but the problem wasn't Nautel vs. BE, but rather the new Ibiqity software version which came as part of the NV-40 package. This is the newest Ibiqity software, apparently not fully released yet, and just out of beta testing, but it isn't backward compatible with earlier versions like you'd expect to see. Worse, in talking with other manufacturers about this, they don't even know that this new Ibiqity version exists, and they are in contact with Ibiqity on at least a once-a-week basis.

So, we're at an impasse, at least until this new Ibiqity software is in general circulation.

As he mentioned last month, Tom is also having trouble with getting PAD data on the air in HD. There is no such problem with RDS, just HD. This again is an issue of NexGen vs. the new Ibiqity PAD data standard, and while I don't see any particular blame involved here, I just wish that these two companies, and manufacturers in general, would

just talk to each other more about those issues of compatibility which allow or prevent us as broadcasters from doing our jobs in serving the public. Before software is released, just make sure that every other entity which has to interface with that software is on board with whatever patches it takes to make the system work, right out of the box. Because, and make no

mistake about this, we consider such little things as PAD data and format data (talk, classical, R&B, etc.) to be a service to the public, it isn't frivolous!

#### The Tanks Work!

Some months ago, we tried putting our Moseley StarLink STL system on the air at WSRB, and we ran into nothing but problems with bit errors. Turns out there were two issues. First, we have two other co-channel STLs, one our very own WPWX STL, both of which transmit from the same tower but in two very different directions, over 110 degrees



apart, and cross-polarized. Both are one-watt installations. The other STL also transmits with a StarLink, from a point some twelve miles southwest, shooting east across our STL path (but south of our Lansing receive point) to receive sites at Crete and Portage, Indiana. That STL uses almost 10 watts of power to cover the nineteen-mile path distance to Portage. The interference was likely coming from both other STLs simultaneously, but it didn't matter which STL was interfering. The result was the same.

In talking to the CE of the station with the ten-watt STL, he mentioned that he cut his interference issues almost entirely by switching from the RF passband filter supplied by Moseley to a larger, three-can array made by TX/RX.

Anyone who is into ham radio repeaters or two-way commercial duplexed stuff is familiar with TX/RX. Now a part of Bird Electronics, these folks have been making top-notch stuff of this sort for years. This particular filter type appealed to my fellow CE because the design reduced the group delay of the signal going through it. That greatly increased the filter's effectiveness. I discussed this with Cris and he agreed that this would likely be the case, and we should order a set. It took awhile for the filters to arrive, but when they did and we plugged them into the line, the bit error rate as seen on the StarLink receivers dropped markedly in comparison to what it had been before. Apparently, we had a winner.

With that victory in hand, we turned the StarLink on the air to co-exist with the other two co-channel StarLinks on the frequency and got... interference to the WPWX STL *from the WSRB STL!* Remember, the WPWX STL still had the older type filter hanging on it, and it got the interference. The WSRB receiver, with the TX/RX cans attached, did not. Game, set, match. We are now in the process of obtaining a second filter set for our STLs, and this one is going into WSRB, because the original is in now in place at the WPWX site, guarding the StarLink receivers out there, and it isn't leaving. We like that extra protection which the cans provide for our biggest station.

The TX/RX filters we got are model number 11-90-96222-P-M, iris-coupled, three cavity, 3 MHz bandwidth, and tuned to your frequency. Price with shipping is a little short of \$1500. TX/RX is in Angola, New York.

### **Ed Buterbaugh**

Some time last month, I decided to veg out with a little reading of *Radio World*. I grabbed the

November 19 issue, which featured a cover story on the late, great Ed Buterbaugh – in his career the CE of two stellar radio stations, CKLW Windsor and WJR Detroit. Both stations are legends and one of the reasons is their audio. Absolutely impeccable, and in the case of CKLW back then, *loud*. I saw the picture of Ed in the midst of the article, and then it hit me. *I'd met this guy before*. It was only one time, but it left such an indelible impression on me that to this day, I remember the exact circumstance. I share this story with you now to give you an idea of Ed's passion for perfection.

It was some time in the early 70's, right in the middle of CKLW's heyday, and I was working for the only job I ever had in my career which didn't involve engineering, as morning disc jockey, writer and producer for WHMI(AM) in Howell, Michigan, now long gone (as are a whole bunch of Michigan AM stations). Anyway, I happened to have been visiting my parents in Royal Oak one day, and had just started heading back toward Howell at dusk, with CKLW on the car radio, when the unthinkable happened – *CKLW went off the air!!*

And they didn't come back on the air for about *15 minutes!* Intrigued, because there was still that bit of engineer inside of me, I turned the car south on Woodward Avenue, and as fast as I dared, I headed over the bridge into Canada and headed onto the south leg of the QE Parkway toward Amherstburg, where I'd heard that the CKLW transmitter was located. Sure enough, in about twelve miles or so, there it was, the five-tower array of The Big Eight, and there was a small car parked in front of the transmitter building. The station had come back on the air by that time, so I didn't feel any big trepidation about interrupting the frantic process of getting the station back on the air. Believe me, even in those early days, I knew what that was like, having worked my way through college as a TV transmitter engineer myself.

I rang the bell and presently a man with what I'd call a sea captain's type beard and cutoffs answered the door, and he looked none too pleased. I hastily introduced myself as a fellow engineer from outstate Michigan who was in the area and had heard what had happened and was curious to know why. At that, Ed introduced himself as the chief engineer and invited me inside. The first words out of his mouth after that were, "Damned Eimac tubes. I've had it with those things." We then walked around the corner and I saw my first Harris MW-50 transmitter. If memory serves, it was among the first of the breed to be delivered, and it was a beauty. There was a huge RCA transmitter behind it, but it wasn't even on at



the time. The whole site was very impressive, even to one who had seen 50 kW transmitters before, both radio and TV.

Ed went on to explain: "This transmitter is great, but the tubes we got with them are crap. It seems that the external anode is milled out to make the heat sink for the air flow. But they didn't take care to remove all of the millings from the tube. The air pressure in this transmitter is so high that the millings were blown out and ended up going across the high voltage. That took down the HV breaker and I had to come out here and reset it. That's why we were off the air for awhile. After this, I'm going strictly to EEV for my tubes for this rig." To prove his point, he produced for me the remains of a burned out milling shard, all blackened by now. In telling this story to a friend recently, said friend responded that the high voltage power supply on an MW-50 put out a solid 27 kV. I'd forgotten that. Now I see the point about a piece of any metal creating a short in there.

Ed told me that the vintage 1949 RCA was down for a much needed renovation. Of course it would be going into backup service, but I'm certain that he couldn't get it to do audio the way that he wanted it done, and the MW-50 could. I wish I could remember if the old girl was an Ampliphase or a high-level plate modulated version, but I don't. I just remember those huge tubes in there. In any event, the station had bought this (then) brand-new piece of Harris cutting-edge technology, and in the main it worked out well for them... except for those tubes. And Ed, being the perfectionist that he was, wasn't going to have anything less.

Just thought you might like to know another "Ed" story.

### Re-plating a Coil

I have a few Harris RF coils, the kind that you would use in AM ATU or phasor. Thing is, they're old enough to have that rather off-beat plating on them that Harris was fond of using for years, not the silver plated kind that we all know and love. I'd love to silver-plate them, but have you priced products like Kool-Amp lately?

Well, one of my best friends, Len Watson, has figured out a solution. Literally. Find a photographer who is still into doing black and white with the darkroom and all that, and ask if you can have (or buy) his *used* fixer, not the new batch, but one that's used up, ready to throw away. If you're lucky enough to find such a photographer, and he or she has the old stuff, take it off their hands and throw the (*freshly-cleaned*) coil in there. Wait an hour, and

go retrieve it. The coil should be beautifully silver plated, and without any need to use any DC current on it whatsoever. Thanks, Len! Now, if we can just find a photographer out there who has the stuff.

### Great Gadget Catalog

I just had a great little catalog cross my desk this month. Remember a couple of months ago when I told you about DIN rail technology and mentioned a number of manufacturers making things for it? Well, I didn't mention this one, but if you've never heard of them, you should. B&B Electronics is an outfit from Ottawa, Illinois which makes all sorts of useful things for Ethernet, USB, serial port, wireless, remote I/O, control, and other related items. Their new catalog is out, and it's a great one to look at from your easy chair, to think up projects you could do with their items, or to solve a problem which has been bugging you.

I've used one of their products in the past, a serial (RS-232) to RS-422/-485 device which extends the reach of a serial device from way beyond serial limitations. It worked well when we were using it back then, but I need to get another one since one of the ends to my original is lost. But my point is that the array of products available from this outfit is almost dizzying, and enough to really excite the imagination for a new project or two. Anyway, give them a try. They make a lot of little problem solvers. Web address is [bb-elec.com](http://bb-elec.com). Phone is 815-433-5100.

### 26 kW Dump

Finally, I guess that I owe a big apology to Tom Gardull for this one, but he had his chance to tell this story last month in his column, and frankly, it's a story that's just too good to not tell.

Tom's transmitter plant at WMUZ is one of the few which has an actual water-cooled dummy load in it, and as you would expect, the load is totally unforgiving if you put real RF into it without putting real water into it first. The element will fry in three seconds flat. Trust me on that.

After losing three of these elements in the past (and Cris tells me he was there when it happened once), the plumbers were called in and a new pressure sensor switch was installed, interlocked to whichever transmitter is attached to the load. That solved *that* problem, but there was an unforeseen consequence. The interlock worked too well. At the slightest drop in water pressure, the interlock would trip and the affected transmitter went down. And I mean, the *slightest* drop, as in when someone flushed the toilet in the restroom down the hall.

So, here we were, four of us trying to commission this new, state-of-the-art Nautel NV-40 transmitter, an hour after lunch, and the rig dumped four times in 15 minutes. Same reason each time. Oh yeah, it was for only maybe five or ten seconds at a

crack, but you can just imagine the disruption. Still, it was a rather funny disruption, if you don't mind my saying so!

Sorry, Tom.

Until next month...

## The Portland Report

By

John White, CBRE

Contract Engineer, CBC-Portland

The verdict on the tower light repair is in. The source of the failure was a short in the lighting choke. I suspect that with the major snow and ice storm, some moisture got into the windings of the choke. The choke was originally wound with number 12 cloth insulated wire and then doped with varnish. Moisture would easily start a leakage path consistent with a winding to winding short.

Because the tower is skirt-fed with the base grounded, at first I thought to simply remove the choke. But sometimes a grounded tower is not "grounded." In our case, the base of the tower is on piers 10 feet in the air and the tower light conduit is about five feet above the base. The tower



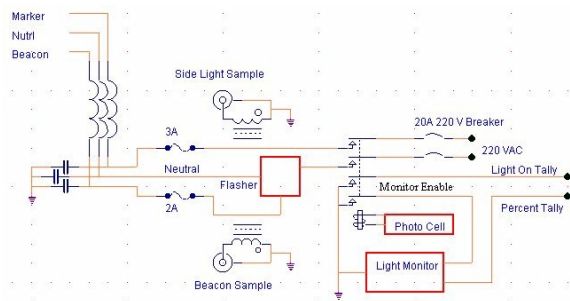
light conductors are above ground for RF. It's not a lot, but it's enough to impact the directional parameters and induce RF currents in the tower light wiring.

After considering replacement options, I chose to rewind the choke. This was possible as the new LED lights require less current and I was able to

use smaller wire for the windings. I chose to use AWG 16 THHN wire. The choke is a three-winding 110/220 with neutral configuration, and the results are shown in the picture.

The next step in the repair was to add low-current fuses in the beacon and side light circuits. I reworked the wiring, including the low-current fuses as shown in the diagram. After turning on the lights, all looked good... for a while. Until the side light fuse opened. I checked the 1A fuse and found that it was a slow overload failure. A 1A fuse wouldn't hold but a 2A did.

The Diallight spec sheet specifies the power consumption as 15 watts times 4 lamps is 60 watts total, well below 1 amp. Something didn't make sense. During the monitor repair, I had noticed the



side light current was not at all a sinusoidal wave form. Back to the spec sheet.

The maximum consumption is shown as 17.5 Watts. That's 70 watts total, still below 1A. There is another spec, however, for VA. That's volt-amps and not power in watts. That spec shows 46.5 VA. The bottom line is side light current is much higher than expected based on power consumption. That needs to be taken into consideration when

selecting current protection fuses.

Repair of the tower light monitor wasn't as bad as it could have been. All four channels were damaged. The input is a simple half-wave diode rectifier and series charge resistor feeding an IC comparator. On all channels the diodes and series resistors failed due to the high sample voltage.

Fortunately the ICs were socketed, so repair wasn't that difficult.

The lights and monitor are now back in service. My experience however does show the need for more thought when making the transition to LED lamps.

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

**Housekeeping**

January ended up being a slow month for me. I had to do very little driving, which was nice because it saved the company some money. I stayed in the office most days, getting office work done and getting some small things done around the studios.

I did have one big project I wanted to get done. I had been looking through all the production category in NexGen a couple months ago and noticed audio from early 2000s. This irked me a great deal. I gave all the managers fair warning in November that in January, I'd be deleting production. I let them know again on the 5<sup>th</sup> of January in a meeting. On the 16<sup>th</sup> I started the process. This proved to be a long and tedious task, as there was no easy way to delete production – it's one file at a time. The only way to do a mass delete, according to RCS, is by the audio number. The numbers for everything differed so greatly that this would not have worked.

I noticed a filter and decided to filter each category by the last modified date and date last played. I wanted to delete anything that had not been played or modified since 12/31/2007. If there was a 2008 date in either the last played or last modified category, I was going to leave it alone. I started with songs, deleting several thousand that had not been played in years. Then I moved on to shows, bits, beds, spots, etc. I deleted well over 10,000 items in production in a little less than a week. After spending all that time deleting old stuff, I have decided that

every January, I will be deleting production older than a year.

**Projects**

When Keith Peterson started back at Crawford, I gave him a projects list. This list included many different things, such as getting the tires on the John Deere tractor fixed, hanging up the spare transmission line sections at KLTT, moving spare copper into a more secure area, getting the KLVZ generator working, replacing broken door latches an ATU, fixing the light in the barn, etc. This was all

pretty easy stuff, but it had to be done and I couldn't do it alone.

I must say, Keith has been doing a great job getting through the list. One thing we have needed to do for years was to make the gate at Tower 1 at KLTT easy to open. The ground screen and surrounding area there is covered with a thick layer of 1-inch river rock. The area was a wetland before we built on it, and the rock is needed to keep it accessible. But rocks continually fill in the area under the base fence gate, making it difficult to get into the tower base. Keith was able to make a frame of landscape timbers for it and fill it with sand. This created a "rock dam" that allows us to open the gate as well as not kick rocks in to the area.

There is still much to be done, but I have no doubt that in time, we'll get through the list. We still have to get an electric fence put up in each tower base area at KLVZ. We also still have to fix the electric





fence at KLZ, which was installed by my predecessor in a way that is not at all effective – it is currently a good distance away from the fence and it would be very easy for someone to cut the chain link fence and then step over the electric fence to gain access. We are trying to find a way to better way to configure the electric fence there and at the other stations so people cannot get in unless it is through the gate. We are thinking chicken wire might be the answer, but are

unsure how to get it to attach to the fence on insulators. This will be a fun problem to ponder in the next couple weeks.

One major accomplishment this month was getting power to the new transmitter building at KLVZ. It has been a long wait, but very worth it. We now have access to the new building. We have heat and lights. We have power! The next step will be getting things moved over when the ground thaws. It will be a learning experience for me. I am eager to get this done and learn all I can for future projects. The month of February will no doubt bring some minor projects around the office. It will hopefully allow us enough time to finish up with several other projects on our “To-Do” list. I already have a couple of projects waiting for me. One is installing the new Exporter Plus and AM IBOC units at KLZ. The other is getting the wireless network working better at the office. There are so many people using wireless Internet throughout the building that it is bogging us down. With the help of Stephen Poole, I hope to get this working constantly instead of sporadically.

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### Digital Diary by

Larry Foltran

Corporate Website & Information Technology Coordinator

#### More Power!!!

I was very happy to receive a number of responses to last month’s article related to building a PC. As a result, I’ve decided to stick with that topic one more time. Although this time around, I thought I’d cover the topic of overclocking your processor. For those who have never done it or who aren’t too familiar with computer setups, overclocking can seem to be a somewhat mysterious and seemingly magical practice performed only by someone with a pointy wizard hat. You’ll see that it’s really not that magical, but can be somewhat mysterious.

Let’s start from the beginning for those of you who have never heard about overclocking. Overclocking is basically boosting a component’s clock rate higher than the default manufacturer’s set

rate. You can overclock the computer’s CPU, RAM and video card, although in most cases doing so instantly voids your warranty. In my case, I decided to overclock my processor mainly because my goal is to run Flight Simulator smoothly and FS relies heavily on the CPU.



One benefit of building your own PC is that you do have the ability to customize and overclock certain components. The majority of OEM machines do not allow the user to modify these settings, and you’re basically limited to the out-of-

the-box specs. My computer features an Intel Quad core processor that is completely unlocked and just waiting to be boosted beyond its 3.0 GHz default speed.

My first step was to improve the CPU cooling scenario. Although this processor ships with



a rather impressive stock Intel heat sink/fan combo, there are better options available on the market. Because my plans were to “moderately” overclock the processor, I opted not to sink a small fortune investing in a liquid cooled system and instead went with the traditional heat sink/fan option. What I did get is the Arctic Cooler Freezer 7 Pro. This CPU cooling unit is extremely tall, but I had plenty of room in my case.



Prior to installing the new fan, I checked the core temperatures on the CPU as a benchmark. This can be done through the system BIOS or via external applications such as Real Temp. I tend to rely on Real Temp a bit more because the BIOS temps can sometimes be unreliable. At system idle, I was getting an average of 35 degrees Celsius across the four cores. Keep in mind that Celsius is typically used when reporting or noting CPU temperatures.

Time to see what the new fan can do. Out with the old, apply some arctic silver thermal grease, and I was ready to install the new cooling unit. Oddly, my first temperature test with the new unit actually showed a temperature increase. I was fairly confident that I had applied the thermal grease properly, so I took another look at the fan installation instructions. With the fan installed as the instructions specified, I decided to visit the manufacturer’s web site for some help. After only spending a few minutes on the site, I realized that the instructions on the site were completely opposite from those included with the fan. I performed a simple “hand check” to check the air flow and, sure enough, the fan was blowing the hot air into the case instead of out. Duh!

After removing it, cleaning off the grease, and going through the installation again, I took another quick check of the temperatures. This time I was averaging 26 to 27 degrees. Nearly a 10-degree drop over the stock fan. Not bad at all!

My next step was to search around online and see what sort of success folks have had with this CPU, if they had any issues, and if anyone posted their BIOS settings. BIOS settings are extremely useful and can save quite a bit of time and guesswork. The best place to start is on the motherboard manufacturer’s users’ forum, if they have one. In this case, EVGA has an enormous following and users are generally very helpful.

After adjusting a variety of BIOS settings and taking the fans off of automatic control and boosting them to 100%, I was ready to start the actual overclocking process. In a nutshell, overclocking is a careful balancing act between boosting the Front Side Bus speed while maintaining acceptable temperature levels and system stability. As you increase the FSB, the system may become unstable. If the system is unstable or the OS won’t boot up, you can increase the voltage provided it is kept at an appropriate level. In my opinion, overclocking should be done in steps, bumping the processor a little bit each time and then testing the results. I initially took the processor from 3.0 GHz to 3.2 GHz, tested the system and monitored the temperatures. I also performed a system boost test using an external application, which I will go into a bit more detail a bit later. Everything was fine, so I proceeded to 3.4 GHz.

I eventually made it to 3.6 GHz with no issues. Although some folks were boosting their systems to nearly 4.0 GHz with air cooling and 4.7 GHz with water cooling, I prefer to play it safe instead of heading to the store for a new CPU every 6 months.



As I mentioned earlier, I use an external

application to perform a boost and temperature test on the system. I like to use a free program called OCCT to perform the system boost test. This software tests your CPU core temperatures at idle for a minute and then spends the next hour essentially pushing your processor to nearly 100% to ensure the temperatures do not get too high. Although I've read of some folks pushing their processors to 90C, I prefer to keep it below 70C. If the core temperatures reach a danger level, the test stops immediately. If after an hour there

are no issues, the program provides a set of graphs that show the computer's performance during the test.

Although I may someday overclock the RAM and the video card, I'd like to leave things as is for the time being to ensure everything is working as it should. For now, and after a very lengthy Flight Simulator and related add-on install process, I plan to enjoy some virtual flying.

...until next month!



*Westward departure from Denver International - A scene that I'm sure Cris knows well!*

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The Local Oscillator  
February 2009

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**KBRT • Avalon - Los Angeles, CA**  
*740 kHz, 10 kW-D, DA*

**KCBC • Riverbank - San Francisco, CA**  
*770 kHz, 50 kW-D/1 kW-N, DA-1*

**KJSL • St. Louis, MO**  
*630 kHz, 5 kW-U, DA-2*

**KKPZ • Portland, OR**  
*1330 kHz, 5 kW-U, DA-1*

**KLZ • Denver, CO**  
*560 kHz, 5 kW-U, DA-1*

**KLDC • Brighton - Denver, CO**  
*1220 kHz, 660 W-D/11 W-N, ND*

**KLTT • Commerce City - Denver, CO**  
*670 kHz, 50 kW-D/1.4 kW-N, DA-2*

**KLVZ • Denver, CO**  
*810 kHz, 2.2 kW-D/430 W-N, DA-2*

**KSTL • St. Louis, MO**  
*690 kHz, 1 kW-D/18 W-N, ND*

**WDCX • Rochester, NY**  
*990 kHz, 5 kW-D/2.5 kW-N, DA-2*

**WDCX • Buffalo, NY**  
*99.5 MHz, 110 kW/195m AAT*

**WDJC-FM • Birmingham, AL**  
*93.7 MHz, 100 kW/307m AAT*

**WEXL • Royal Oak - Detroit, MI**  
*1340 kHz, 1 kW-U, DA-D*

**WLGZ-FM • Webster - Rochester, NY**  
*102.7 MHz, 6 kW/100m AAT*

**WRDT • Monroe - Detroit, MI**  
*560 kHz, 500 W-D/14 W-N, DA-D*

**WMUZ • Detroit, MI**  
*103.5 MHz, 50 kW/150m AAT*

**WPWX • Hammond - Chicago, IL**  
*92.3 MHz, 50 kW/150m AAT*

**WSRB • Lansing - Chicago, IL**  
*106.3 MHz, 4.1 kW/120m AAT*

**WYRB • Genoa - Rockford, IL**  
*106.3 MHz, 6 kW/65m AAT*

**WYCA • Crete - Chicago, IL**  
*102.3 MHz, 1.05 kW/150m AAT*

**WYDE • Birmingham, AL**  
*1260 kHz, 5 kW-D/41W-N, ND*

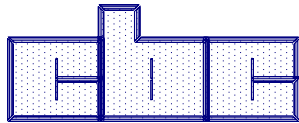
**WYDE-FM • Cullman - Birmingham, AL**  
*101.1 MHz, 100 kW/410m AAT*

**WXJC • Birmingham, AL**  
*850 kHz, 50 kW-D/1 kW-N, DA-2*

**WXJC-FM • Cordova-Birmingham, AL**  
*92.5 MHz, 2.2 kW/167m AAT*

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CRAWFORD  
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COMPANY



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