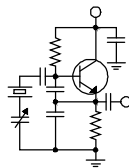


# The Local Oscillator



*The Newsletter of Crawford Broadcasting Company Corporate Engineering*

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MARCH 2010 ■ VOLUME 21 ■ ISSUE 3 ■ W.C. ALEXANDER, CPBE, AMD, DRB EDITOR

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## **A Slow Process**

When I put together the rather abbreviated February issue of *The Local Oscillator*, it did not occur to me that I would still be moving rather slowly and recuperating from the two back surgeries I had back in late January. The doctor initially told me "a month," but the second surgery no doubt extended that time frame and I have had a couple of setbacks as well. But overall, I'm doing well.

Thankfully I have been able to keep up with work during this slow recovery process. It has, thank God, been a time between big projects so that my workload has been relatively light. I hope and pray that by the time we get into the thick of spring and summer projects, I'll be feeling much better and stronger. In the meantime, I am more thankful than ever for an excellent support crew, including all our market chief engineers and my able administrative assistant. Each of you has been great through this process. And I am especially thankful for all your prayers. That is what has carried me through this arduous and painful process.

## **FM HD Power Increases**

Last month, the FCC gave the green light for FM HD power increases to -14 dBc. That means that we can double our digital power, something that is desperately needed in many markets.

The problem for many if not most stations is that they do not have the headroom in their digital transmitters to implement that power increase. We, like most, purchased digital transmitters sized for the needed TPO. We had no reason at the time to expect a digital power increase would be needed, much less granted by the FCC. So it is going to take much more

than simply hitting the raise button on our digital transmitters.

At this early stage, we are looking at all our HD transmitters to determine what headroom we do have. WMUZ's one-year-old Nautel NV40 supposedly does have the horsepower to run -14 dBc right now, but we are told that a modification to all the power modules must first be completed. We are waiting on publication of a field modification bulletin before we proceed. Still, it is likely that WMUZ will be the first in our group of stations to crank up the power.

WDCX-FM in Buffalo is a "super power" station and therefore does not qualify for the power increase. Right now, we operate the digital transmitter into the auxiliary antenna. Because the aux antenna is some distance down the tower from the main, we observe a big disparity between analog and digital coverage areas. We have for several years now been planning, pending an upturn in the economy, an upgrade to the WDCX digital operation, employing high level combining to get the digital into the main antenna. That will make a much bigger improvement than a 6 dB power increase.

We may have other options at other stations. At some, we may not want to bother with a power increase. At others, we may be able to add power amplifier modules to increase the headroom. And we'll consider other options as well, like a 6 dB combiner and circulator.

The bottom line is that it's going to take some analysis and work to get the digital power cranked up, neither of which will happen overnight. But we can look forward to much better digital coverage on most of our FMs at some point in the future.

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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!

Many years ago when I began my broadcast engineering career, the basics of broadcasting had not changed in a long time. Of course this was in an era of studio equipment consisting of reel-to-reel 1/4 tape machines, cart decks, turntables and tube-type consoles. At the transmitter end of things, there were numerous patch panels, dial-up remote controls, tube-type audio processors and an ancient early 50s model transmitter that could load into a set of bedsprings! As technology began to evolve into solid-state equipment, my teacher and mentor could not keep up with the changing technology, which in time cost him his job.

The early to mid-seventies was an exciting time for radio! Audio quality, especially on AM stations, was highly improved with the addition of the solid state versions of audio processors which could produce asymmetrical modulation that had the effect of making your station sound louder and made it possible to modulate the transmitter legally to a higher peak level. There are still a few of the old AM rigs still on the air around Buffalo. I can still remember the rich sound we had broadcasting audio out of our old Gates BC-1F transmitter. There is not a single solid-state transmitter that can match the warm sound of an old vintage AM transmitter with lots of iron in the modulation transformer.

On the FM side of things, FM stereo was coming into its own in the 1970s. I can remember some of the first broadcasts we did in stereo, and how full the audio sounded in comparison to the mono broadcasts previously heard. I do recall that we had a discrete processing system, separate processors for the left and right channels. Of course back then, there were two major full-line broadcast equipment manufacturers, Gates and RCA. The majority of the stations in our locale, the mid-south, used primarily only Gates equipment. It was not until I moved to

Buffalo that I was introduced to the RCA line of broadcast transmitters and ancillary equipment.

There have been countless changes and



improvements to broadcast equipment through the years, and keeping up with those changes has become a regular part of our job. Unlike my mentor, I have embraced these changes and read and studied all I could about the new technology, equipment, and ways to do our job better. Today's radio is bigger and better than ever. With all the means we have at our disposal to get our broadcast messages

heard 6 ways which we could not envision even 20 years ago 6 to what was once a limited audience and coverage area, we can now realistically broadcast to the entire globe. I cannot recall a period of time in my broadcast career when technology has changed so fast and developed so quickly. We are indeed again, experiencing an exciting time in radio engineering! Keep up with those changes! Your job may depend on it!

**WDCX-FM – Buffalo, WDCX(AM) / WLGS – Rochester**

To date, the winter months have not been too harsh here in the Northeast. For a change, the majority of the severe winter storms have missed us and hit areas such as Philadelphia, Washington D.C. and New York City. That's not to say that we have not experienced any bad winter storms, but what we have received has been milder than usual, and the power outages and related problems accompanying the bad weather have been non-existent. Areas farther south have also had unusual and extreme weather events for their locale, and those places are not prepared to handle the excessive cold and snow.

As far as problems, there is not a lot to report on from the Buffalo and Rochester stations. One item of interest is a problem reported from

WDCX(AM). Earl Schillinger noticed that the AM audio was breaking up at various times of the day. These blips were quick, and you had to listen closely to hear them.

Checking the audio path from the studio to the transmitter revealed that everything was okay there, so the problem had to be transmitter related. I spent several hours at the AM transmitter site watching the transmitter's meters for any anomaly in the parameters. After a while I would see a quick dip in the RF current and output meters, followed by an alarm for high RF current. These dips coincided with audio peaks as noticed on the modulation monitor.

When I replaced the AM IBOC unit with the new ones last year, no adjustments were needed on the audio portion of the IBOC engine. The transmitter seemed happy with the audio levels. However, I did see an occasional alarm when I performed maintenance at the transmitter site, and never did the alarm trip while I was there.

I called Nautel tech support to talk with them about this, and they suspected that something in the tower array was off, perhaps an arc gap was too close and on modulation peaks, was arcing, causing the transmitter to fold back momentarily. A check of the daytime towers revealed no obvious problem. Everything there appeared normal.

To rule out the possibility of an array or network problem, I ran the transmitter full power into the dummy load, and noted the same symptoms as when the transmitter was into the antenna network. By reducing the audio peaks by 2dB, I would see the alarms and blips disappear entirely.

After several hours of watching and making minute adjustments in the audio levels to see where the audio peak would trip the RF level overload, it suddenly dawned on me that the Nautel ND-5 transmitter was setup and installed with an output power level set for 5 kW and a common point impedance of 54 ohms. The network impedance was changed to 50 ohms, therefore increasing the transmitter output power by 400 watts to achieve

10.39 amps on the common point meter. The additional wattage was just enough to trip the high RF alarm which was originally set for a power level of 5 kW. I was not able to find a procedure in the ND-5 manual for adjusting the high limit on the RF current detection circuit, so next visit I will have to contact Nautel tech support for this procedure.

In Buffalo, things have been running fairly smoothly. We have been dealing with an issue of noise on one of our phone lines used to put callers on the air. Normally, this problem would be easy to fix, but this particular phone line, which is provided by Verizon, also piggybacks our 800 number for our out-of-region listeners. When the problem first showed up, I contacted Verizon and they sent a technician to try and determine the cause of the noise. He switched some pairs around in the building's phone closet, and the noise went away for a little while. Then it came back with a vengeance. Verizon was called in again to check it out and stated that the problem was on the long distance carrier, not on Verizon's end. Our toll-free service provider is Deltacom Communications, so they were contacted to assist in eliminating the problem. To make a long story short, Deltacom eventually had to change the routing of our 800 line to eliminate the noise. So far, the line has been noise-free.

One other problem to note is that one of our side markers on the WDCX-FM tower has gone out. We replaced all the lighting on this tower with LED lighting last year, and it is very unusual for one of these Dialight fixtures to fail this soon. Western Tower Service will be climbing the tower to investigate the problem within the next week, and I suspect that he will find a wiring issue instead of a bad LED fixture. Hopefully it will be a quick and easy fix.

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

## The Motown Update

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

### Engineering Status and Life in Detroit

This month I have been implementing a wireless WiFi link between my Mosley LANLink, located in one of the WRDT ATU buildings, and the WRDT transmitter building. Ultimately, this link provides Internet and LAN communication between our Detroit office and studios and the WRDT transmitter site.

### History

Our facility has an existing Mosley LANLink and studio to transmitter link (STL) installed between our Detroit studio and offices and the WRDT transmitter facility in Monroe, Michigan. Since the LANLink gets the data to our ATU building, we needed local infrastructure to deliver the data to the transmitter building. Therefore, I decided to try to implement a link using 2 WiFi router access points.

### Implementation

The Linksys WRT-54G is a very popular access point switch. The only concerns that I had in using the access point is stability and reliability. Through my experience using the WRT-54G for certain network tasks, I encountered many data integrity issues. So in searching the web, I found some very interesting third-party firmware for the Linksys WRT-54G and many other access point (AP) transceivers. DDWRT is an excellent web site and resource for modifying or updating your AP firmware. DDWRT has custom loads for many different applications. I wanted firmware that would allow me to use the AP as a "client bridge." The firmware allows for point to point or point to

multipoint communication. At the start, I just wanted to implement a point to point link.

The firmware uploaded with no issues. I found that the best way to obtain directions on how to configure the firmware was to use Google to search for the answer. Using the DDWRT website for configuration instructions was difficult for me. However, finding the right firmware for your AP, from the DDWRT site was simple.

One WRT-54G was set up as an AP and the other as a Client Bridge. The Client Bridge was located at the ATU building with the Mosley LANLink. The AP was located at the WRDT transmitter building.

The link is very stable. I am now able to send meta data (program tile, song tile, and artist information) from our automation system to the Nautel Exporter Plus at the WRDT transmitter site. Further applications of the link could be IP security

cameras, audio processing control, and internet capabilities.

### Locate Software

To find these programs, please go to the following sites:

<http://www.dd-wrt.com/site/index>

<http://www.dd-wrt.com/site/support/router-database>

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





### News From The South

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

#### More Snow in Dixie!

Let's all pray that Cris continues to recover from his surgery. Back surgery is no joke and it takes time to heal from it. Pray that God will speed his healing and get him out of the house as soon as possible.

I wonder if it would cheer him up to know that we had snow again in Alabama? For those keeping score, that's two significant snowfalls in February. I don't know if that's a record, but it's certainly unusual. This is something that we're just not wired for, as I mentioned in the previous issue – even though you old Nawthern Types will undoubtedly look at the image below and think, "What's the big deal? We get more snow than that in April!"



We even had a few people here attempt to make a snowman ... but I won't post pictures of those. They were too frightening – misshapen, short, muddy-brown ogres with spindly arms, – might come the closest to describing them. Practice makes perfect, after all, and we've had very little practice!

#### Building the Loops

So far, we've saved the company thousands

of dollars by making our own sample loops rather than buying them ready to hang. But I first want to clarify something that I said last time. I might have

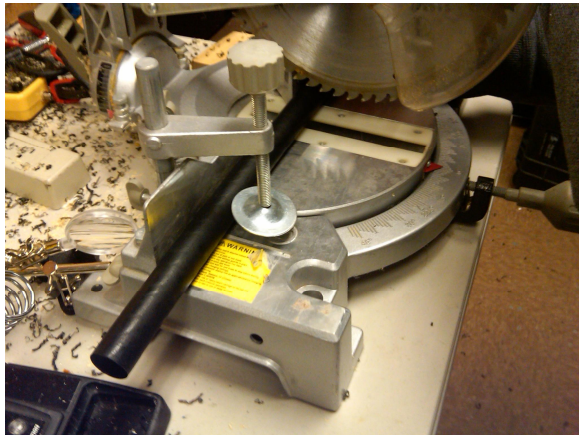
mislead some of you into thinking that ultra-high molecular weight polyethylene (UHMW) is *inherently* UV-resistant; that's not the case. The completely opaque grades will work for the simple reason that the ultraviolet rays can't penetrate deeply enough to attack the molecular bonds.

The type of UHMW that we're using for insulators, as you can see in the photos that follow, is the black, UV-resistant type. Be sure to

specify that if you order any for outdoor use. I was able to get a 60x 10 rod from Grainger for less than \$20. When compared to the price of standard ceramic insulators, this was a win-win for two reasons: (1), the total price for the 60rod was less than the cost of two or three standard ceramics, and (2), the UHMW should be more tolerant of the wild, wacky weather swings that we have here. It's aggravating enough when an insulator breaks in an ATU, but it's downright expensive when one breaks 1200up on a tower.

As for making the actual insulators, if you have a few power tools handy, you can quickly turn them out. We were able to make 20 of these in about an hour and a half using a saw and a drill press. Don't try to use a hacksaw and a hand drill; as I mentioned last time, UHMW is some *tough* plastic. It's difficult to cut with a hacksaw, and when you try to drill it, unless it's firmly clamped, it'll fight the drill bit and try to go flying off into the shop. Fortunately, a few years ago, I had seen a radial arm saw at Harbor Freight that was on sale and picked it up. It made short work of cutting that tough, stiff rod into precise 30 and 40 lengths.

Another Harbor Freight bargain came to our rescue when we started drilling the center holes. I had also picked up a little bench-top drill press a while back and it made short work of the job. The rig that



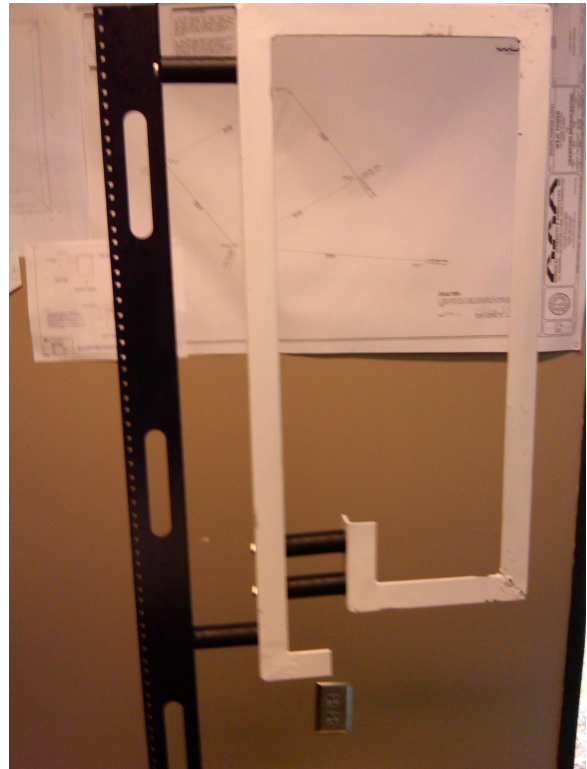
we came up with wasn't pretty, but it got the job done: the wood block kept the plastic rods perfectly aligned so that we could get good, consistently-centered holes. Once the holes were drilled, a standard 1/4-20 tap was used to thread the insulators for use.



The important thing with a set of sample loops is that they're all the same. We told Danny Dalton when he fabricated them that he needed to ensure that, if one was 1/8" too long in one dimension, all of the others had better be off by that amount. He managed to get them all so close that when we lay a ruler across the stacked loops, there's virtually no space between the ruler and the metal. That's what we wanted.

We're still building the loops as I type this, but the next photo shows one of the loops, painted and with insulators attached. We've temporarily mounted it to an old rack rail here just to get an idea of what it will look like on the tower. Appropriately enough, and for the curious: the drawing on the wall behind the loop is the surveyor's precise placement of the WXJC site, with exact distances and bearings for all the towers. Cris is using this for the computer

model.



Next time, Lord willing, I'll have some pictures of the finished loops headed up the towers at Tarrant. We still have to mount the N-type connectors and braze in the strap between the connector in the inner section of the loop.

### Tower Light Woes

Over the years and in the past, I've met different Christian groups who have wanted to buy or build a radio station. In every case, it was because they didn't like the local offerings, or were convinced that they could do a better job of ministry (my favorite: "you play too many commercials!" ó heh), or honestly thought the Lord had told them to. I've never been one to question someone else's calling; I have enough trouble keeping Stephen straight to worry about everyone else. But whenever they've asked for my opinion, the first thing I'd offer would be, "Do you have a lot of money? You're going to need it." This would always take them back a bit, but hey; they asked, right?

I'm amazed at the number of people who think that broadcasting in general, and Christian broadcasting in particular, means guaranteed income for very little effort. Those of us who've worked in this business for any length of time know that, while



it certainly can be rewarding, (a), it takes a great deal of drive and effort, and (b), it just plain costs a lot more than most people think. Most people have no inkling, when they first get into radio, that they'll be paying thousands every month just for licensing and electricity. They have no idea how much it costs to replace the tubes in that old second-hand transmitter that they "saved money" on. They will be astonished the first time they call for quotes for a simple job of relamping or tower painting. And if a catastrophe occurs, such as a severe storm that damages a lot of equipment, they will either find themselves borrowing a bunch of money or going out of business altogether. I've seen this more than once.

How expensive can it be? A case in point is the tower lighting system on WYDE-FM's 1,326-foot tower in Cullman, Alabama. When we bought the station in 2000, it came with an old EG&G system that was constantly failing. We finally replaced it in 2005 with a new TWR/Orga system. Aside from relamping and a couple of minor repairs, it has been working pretty reliably. But starting in October of last year, it decided that it would start playing games with us.

In October of last year, we needed to replace a couple of lamps that had failed; after discussing it with Cris, we decided to just move up the schedule for relamping by a month or two. We ordered the 12 lamps at \$750 each ... and I'dl pause to point out here that, had everything gone perfectly, it still would

have cost well over \$12,000 with labor to do the relamping. Of course, everything didn't go perfectly, which is why you're reading this!

To start with, one tube was damaged in shipment. This delayed the repair while we waited for a replacement from TWR. The tower crew replaced all of the lamps, but we began having repeated failures with station #47, which (of course) is near the top of the tower. To make a long story short (believe me, I have no desire to do a play by play on this one - it's too depressing), we have replaced the tube in that station twice, only to have it fail within 24-48 hours. We've replaced everything but the paint and the front glass bezel in that station; no difference. And back to what I was discussing above, the fact that TWR is willing to provide warranty replacements for the parts is appreciated, but it doesn't cover the repeated \$2,000-5,000 labor charges for *each* climb up that tower.

TWR, to their credit, finally sent us a known-good, rebuilt flash head to replace station #47. Of course, that won't help with the thousands upon thousands that we've already paid trying to troubleshoot and repair the thing on the tower, but hopefully, this will solve the issue for good. We'll lick our wounds, finish paying everyone and hope that it holds together until the next relamp, scheduled for late 2011.

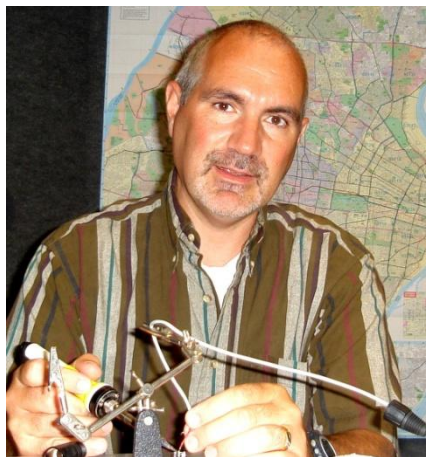
Until next time!

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

There I was just getting comfortable on my recliner. I had all my snacks and beverages (the non-alcoholic variety) at the ready. The Super Bowl was just about to start, and despite the fact that my Packers didn't get past the first round of the playoffs, I was looking forward to what I thought would be a great game.

You know what came next, my cell phone starting going with text message after text message from the AutoPilot computer. I knew that something was going wrong when I got so many. I quickly got on the home computer and



logged into the AutoPilot computer at the KJSL transmitter site.

It was showing that it could not reach the remote control at the KSTL transmitter site. I knew something was most likely up with either up with the T1 line to KSTL or the Canopy system that linked the KSTL transmitter site to the KJSL transmitter site.

I knew that the alarms I was getting concerning KSTL being off the air were false because of the remote control being disconnected. A quick scan of the radio dial showed both stations were still on the air. At this point KJSL was on the air

with its audio being delivered through the backup system over the Internet using the APT Worldcast Horizon Internet encoders. The digital input to the processor is automatically switched to this backup. It happens so quickly and smoothly the changeover is often not noticed on the air.

From the same computer I attempted to log into all of the Ethernet radios of the Canopy system that connected the two transmitter sites. There are four in total. Two that connect point-to-point from the KJSL transmitter building to the KSTL tower and two that connect from that point, 250 feet up on the KSTL tower to the KSTL transmitter building. There are Ethernet cables that connect the two sets of radios together into one chain on the KSTL tower.

I was able to log into the first two radios, meaning that I was good all the way to the KSTL tower. From that radio it showed that the Ethernet connection was down between it and the other radio on that tower. So either I had a bad cable or a bad radio. Nothing could be gathered any further from that computer so I drove to the KSTL transmitter site to learn more.

When I got there I found the radio on the building was working fine but I could not connect again to the one radio on the tower. Coming from the other side of the chain I again came up with the same diagnosis, it was either a bad radio or Ethernet cable. My bet was on the cable.

Unfortunately, there was really nothing I could do at that point because it would require a tower crew to go up there and make the necessary

repairs. Even more unfortunate was that the tower crew who I really wanted to do the work would not be available for several weeks, maybe even a month. You really need a tower crew that knows how to work with these radios and can make a decent CAT-5 cable while hanging from a tower. 250 feet in the air is not where you want someone to learn how to make a cable.

The station was on the air through the backup system that I am very thankful that we have in place. It was a fairly stable arrangement, but with it depending on two different Internet providers you don't want to be on the system for a long time. Sooner or later you are going to experience some down time on one side or the other or just have some bad audio due to Internet congestion.

That's why I was very happy to have the system come back on by itself just a day and a half after it went out. This pretty much confirmed my belief that it was the Ethernet cable not the radio that was bad. Since the radio gets its power through pair 7/8 on the cable, my guess is that was where the trouble was coming from. The wind may have taken the power off and then back on again. At any rate we still needed this cable replaced. It did however buy us time.

At the time of this writing we are still waiting for a break in the weather and the tower crew's schedule to get the work done. I am hoping that by the time this is published that the cable will be replaced.



### Valley Notes

By  
Steve Minshall  
Chief Engineer, KCBC

The night power increase project continues at KCBC. When we started this project I assumed that the night phasor would be fairly simple and not take up much room. I think that in days past they would be the case; however, modern phasor designs concentrate on a good looking Smith chart, and in this case it means a much more complicated design.

Our day phasor is constructed with an open panel (plywood panels) design and there seemed to be plenty of room to add some components for a night system. For economic and practical considerations, continuing on with the open panel construction was an obvious choice. I had some physical configurations of the night phasor planned out in my head.



Our day phasor consists of three tee networks, that's all. Our night phasor design consists of seven tee networks. Seven tee networks take up a lot of room! When the parts arrived, my plans dissolved. There was no way these components could all fit in the space available. I figured out a solution.

The day phasor consists of panels on one side, the other three sides form a cage. The solution was to put an additional panel at one end to the cage. This gave us an opportunity to mockup the build on the panel while on saw horses, a much easier way to work. 60 to 70 percent of the phasor is on this panel.

Before the components could be mounted, they had to be configured electrically and physically.

Since we would be mounting these to plywood panels, I had adaptor panels laser cut locally. These panels and insulators make for a very robust mounting system which is easy to install.

Electrical configuration of each inductor and inductor/capacitor combination was done with an AIM 4170B vector

impedance antenna analyzer, an incredible tool for about \$500. Each component, or



combination of components, was adjusted for proper reactance.

The laser cut panels are just terrific. Accuracy is about .001 inches. A laser can cut slots just as easy as cutting holes. For many applications a slot is better, allowing for adjustments. I think a phasor should look good as well as function well. One of the things I did here was to paint the laser cut panels with anodize colors. It sure looks better than plain aluminum.

## Catalina Tales

By  
**Bill Agresta**  
Chief Engineer, KBRT

Greetings from Santa Catalina Island!

It's been a very wet month here on Catalina Island. After several very dry years, we are finally getting some desperately needed rainfall. The nice thing about these storms is that I got ample warning and was able to prepare for their arrival. Because of that, we have seen only very minor issues here at the KBRT transmitter plant. I had a window blow out from the high winds then another small leak so, not much to panic over, that is, besides no phone lines or power.

Thank God we set up a nice satellite STL soon after the fire a couple years ago, so losing the T1 was not so bad since I still had audio over the satellite link. That link did get choppy a few times but, we made it through without any major audio losses.

Our Onan propane powered generator got a good workout and I had our Whisper-Watt diesel generator waiting and ready on standby. At one point, the rain came down so hard that my entire tower field was under several feet of water. I heard the circuit breakers for my ATU buildings trip then I knew it was deep! A big river began to flow down the hill just west of tower 2 and the waterline rose to just below the ATU. I literally swam out to do all I could to redirect the river of water away from the ATU building. It took some time but I was finally successful and the waterline dropped and ended the threat of flooding my ATU. I left the circuit breakers to the ATU buildings off until the following morning since the only thing we use power for out there is lights. Things dried out the following morning and the breakers held after I flipped them back on.

The next day we got another downpour but my little river diversion did the trick and the tower 2 ATU building did not flood so the breakers held. Those breakers are a nice alert for me since the subpanels out in the ATU buildings are just a bit lower than the ATUs. If I hear the breakers trip, I know the ATUs are soon going to flood, so I have to get swimming.

The road you have heard so much about was

another nice bit of entertainment during and after the storms. Knowing that it was going to be a disaster, I stocked up on lots of food and beverages so just in



case I got stuck up here for a week or so, I could ride it out with no problems. Since our 4x4 truck is set-up pretty aggressively to handle the mud and rough terrain here, I was able to float over the muddy mess, but chose not to make my usual daily trip into town for safety's sake. After the road dried out a bit, it was like a giant washboard, making it very hard

to travel. It also became very dusty as the Indian clay type mud dried and became a very fine dirt. I shot some video while driving the road both during some of the heavy downpours and after it dried, and wow! Looking at the video you've just got to ask yourself who in their right mind would spend so much time and money on such a waste! It did not do much better than the untreated dirt roads around it, even after they spent weeks and weeks with large crews and heavy equipment going over it time and time again! But then, this is Catalina Island so, it is not supposed to make sense, right?

I have been dealing with a situation here the past few days that has me tearing the place apart. I got my desk reorganized and got a stack of paperwork ready to send out. Feeling great that I got this big pile done and was so organized, I went to send it all out FedEx the following Monday only to realize that the entire envelope has gone missing!

This is just not something I do very often. I am the type who has a place for everything, so there are only a couple places it could be. After checking those places twice, I began to dig. I am still digging, but there has been a nice side to this situation. While going through literally everything in this building, I began to run across some things that brought back some old forgotten memories. Things like pictures of the KBRT Ranch when I first got here and some old paperwork.

With the way things have been going lately, I have found it very tough to get excited about much.

The bad economy and lack of vision on the island are quite depressing at times. After finding some of these old treasures, however, it is nice to see how far we have come. I really began to appreciate things more, even though I cannot find that paperwork (and it contains some receipts that I was sending in for reimbursement), things are not as bad as the climate might make them seem. We've got to remember that God is in control here and He has a perfect plan. He will NEVER let us down and is our provider both in good times and bad.

Looking at those pictures, I noticed that for the first few years I was here, if it rained we were literally forced to step from mud outdoors right onto our building carpet as we came inside. That was always so miserable and with the big rain storms we are now getting, I was really thinking God that this is no longer the case here. We've got a nice concrete pad, a place to sit down and take off your boots before stepping inside, and if you are really covered in mud, you can now come in through the shop and undress before heading to the shower. This saved me so much time and extra work cleaning up this year I

don't know how I could have done without it.

I think that has been our saving grace here as the island's infrastructure around us fails, our infrastructure has become more and more solid. Things like the satellite STL, for example. A few years ago, if both the T1 and POTS lines failed, I was forced to roll a pre-recorded standby tape from here at the transmitter plant. Back then it was not an unusual thing to lose audio and all communications with our studios in Costa Mesa. Now that situation is almost unheard of. Over time, we have learned this island's idiosyncrasies quite well and have built back-up upon back-up to overcome them. So, although I am still pretty upset about the missing paperwork and now having to recreate or find duplicates to it, I am also praising God because things could be and actually were only a few years ago, quite a bit tougher.

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

#### Project Sheherazade

“What is a Franklin Antenna?” was last month's question. Old time AM engineers will know this one. A Franklin is an antenna which was designed to provide the greatest possible groundwave coverage and the minimum of skywave which would cause self-interference to the station out in the sticks (around 80-100 miles out) or to any other station for that matter. This is really important to the 50 kW clear channel crowd.

The secret of the Franklin is best understood by how it was different from the usual AM antenna. In the case of a non-shunt-fed radiator, the tower is in one piece, and works against earth ground. The Franklin is neither. The tower structure is in two separate and distinct sections, one atop the other, with an insulator electrically separating them. A feed line going up alongside but insulated from the tower connects to a phasing box which parcels out the power to the two halves of the tower in the proper

phase relationship. The result is an antenna which (at least in theory) doesn't need a set of radials for a ground system network, or a base insulator, can be grounded at the bottom if desired, and is of very high efficiency.

Note that an ideal Franklin would have two half-wave towers, one on top of the other, but at the lower frequencies especially, this is not practical (we're talking about, say, 1,800 feet at 540 kHz here – get real!), so adjustments in

height, requiring adjustments in the design of the phasing box, and maybe even the addition of a capacity hat at the top of the tower, are used. Some famous stations which have used (and may still be using) the Franklin antenna design are KNBR San Francisco, WHO Des Moines, and KSTP St. Paul, Minnesota.

But the grand-daddy of them all, and the *only* such antenna actually designated by the FCC as a “real” Franklin antenna, is no less than a two-tower



DA-2 system (both towers -Franklin-ized) with real open wire feed, at station KFBK in Sacramento, California. Google this subject (KFBK Franklin Antenna), and read about it. I have to tell you, this is the most amazingly-engineered AM station in the country. The engineers there *hand-built* the *first* Ampliphase transmitter made in the states, back in the -40s, from a French design, and then sold the whole technology to RCA. (I guess that international patents didn't mean so much in those days). And you thought that RCA invented it. Hah! And no AM station in America has more signal strength at 1 km than does this one. Period! I've toured many an AM station in my career, including the WLW monster at Mason, Ohio, but KFBK is now at the very top of my list of radio places I want to visit. Wow.

Question for next month: Of all the microphone types ever made, which type is one of the most faithful in reproducing the human voice, but is also the most fragile, so much so that the mere act of blowing into it can destroy it?

Answer next month.

### More AES adventures

We're still on the case of why the AES audio has so much trouble getting through the Intraplex, and in the process of sleuthing that, we here in Chicago are learning a lot. For one thing, we're getting to know AES a lot better, and we're really falling in love with our little AES audio analyzer, the Digilyzer DL-1 by NTL.

It was actually Ed Dulaney, back when he worked for CBC out in Denver, who turned us on to this handy little hummer, and though we've had it for quite some time now, only recently have I gotten into really using it. Any shop using any amount of AES audio should get one of these, if only for the manual. I've even recommended it to the Intraplex folks at Harris! That Digilyzer manual is great, not just for the amusement value, though there certainly is a lot of that. To give you a clue: The Digilyzer is made in (and this would be a great -last question on "Who wants to be a Millionaire?") Lichtenstein. Yes, Lichtenstein, which has barely enough size to hold any electronics plant. But it's the way that the manual has been translated into English that gets you. They way the syntax comes out from whatever language they use in Lichtenstein is, well, quaint. Yeah, quaint covers it perfectly. You'd have to read it to fully understand, but you will not come away from experiencing it without a smile. Thing is, the fact that it is written in the way that it allows the info to stick with you. In other words, the manual really is a good teacher, not despite the translation but because

of it.

The DL-1 is easy to use, and it is chock full of menus which supply all sorts of information to help you get to the bottom of whatever issue you might have with just about any digital audio signal. It even has a digital scope for reading the output as analog audio.

For instance, our aforementioned Intraplex issues. To say that our audio chain for Soul 106-3 is complex would be a rather deep understatement. After the Wheatstone G-5 console system, and the Compellor with the Behringer A>D/D>A converter system around it, the audio is converted from the 44.1 kHz sample rate (which is native to the Wheatstone) into a 32 kHz sampling at the STL, a Moseley StarLink. At the transmitter, the STL first feeds an Arbitron box (of which there are three, one each for the three STL feeds, including ISDN), then a switcher to switch between the three, followed by a four-port AES Distribution Amp, both by VideoQuip. The AES DA feeds the Intraplex going to our Kirkland transmitter site, the Intraplex for the local transmitter, and the HD-1 audio processor for you-know-what. The Intraplex in turn feeds two audio processors for our analog signal. Both the AES and the baseband (coaxial cable) outputs of the audio processors go through switchers to get to the two exciters on our main and our backup transmitters. That's three switchers because the backup transmitter's exciter is independently switched (whew!) and handles both AES *and* analog baseband input. Whew! Somewhere in there, an anomaly of some sort is causing the frequency response to roll off at both ends, making the signal at times sound like an old transistor radio. What we're ending up having to do is perform an old-fashioned partial audio proof, actually several of them, to ascertain where the problem is. The DL-1 is a most important part of this proof, and frankly we couldn't do the job without it.

Here's the methodology which I've developed: The first job is to feed the transmitter with audio through the ISDN, with the ISDN feed point being as far back toward the console in the audio chain as we dare. This allows us to do the test with the StarLink while staying on the air with normal programming. Having the Wheatstone routing switcher in the system is frankly a God-send here. The Wheatstone allows us to work separately with the over-the-air STL. Starting with a point just past the ISDN pick-off point, we then would take our analog audio oscillator and put it through the Behringer DSC 2496 A-to-D converter at, in turn, a 44.1 kHz and 32 kHz sampling rate. Then we do a



frequency response sweep. At the transmitter, the Intraplex attaches directly to the output of the StarLink's Arbitron box, bypassing the switcher and DA (which we've ascertained as having no effect on the system). The output of the Intraplex attaches to the DL-1 as the measuring device. Once we have a sweep of that, the next run would be with the digitized sweep generator directly feeding the input of the studio-side StarLink box. For the following test, the Digitized Sweep Generator is connected directly to the input of the Arbitron box, then finally a sweep of the Intraplex box is done. From this, we should be able to learn where the real problem in the system is. Actually, as this is written, we've already done that last test (because it was the easiest to do) and the Intraplex passed with flying colors - perfect frequency response out to 15.1 kHz. By itself. That tells us something: The problem may be coming across as kind of a clash between how two pieces of equipment handle their AES audio. Now, which two? Or is it three?

Understand that the Intraplex, by its nature, is designed to operate at a sampling rate of 32 kHz, and auto-converts any material with any other sampling rate to that rate. This is not without an occasional issue. One thing that we've learned is that any audio tagged as pre-emphasised by the AES system in the housekeeping part of each packet is automatically de-emphasised by the Intraplex, without exception. And the user can't turn that feature on or off, either. But another issue we've run into is that, no matter what the actual sampling rate is on the AES audio packets coming down the pipe, does not mean that the *designated* sample rate, located in the housekeeping part of the packet, will change with it. We've seen that on the DL-1, and that actually is a StarLink issue, since the conversion from 44.1 to 32.0 kHz sampling is happening there, but the *designation* in the housekeeping part of the packet *isn't* changing. What does that do to the Intraplex's ability to handle the audio? We don't know, and that question stumped Jeff Merrow at Intraplex, but that may not be the real question, anyway. That question is for Moseley (which makes the StarLink) - why isn't the designation being changed with the actual sample rate? Kevin Winn out at Moseley doesn't know the answer to that one yet, but he's passed the question on to the software crew, and although I don't have an answer now, I may by the time the article goes together for next month.

I don't have enough time to both complete

the study and to write about it for this month. Stay tuned. I hope to have the answer for you next month.

### Electric Goldmine

Friend Len Watson got into an email thread with me, singing the blues about... well, let the thread tell the story:

"Just curious if any of you have the formula for the following: If you have a circuit breadboarded and ready to power up and test, and one wire is a little long, what are the odds of, when pulling on that wire, you will pull over a cup of coffee on the breadboard?"

My formula gets me to 100%. And I ran a proof of the formula and was right. Freaking Murphy.

My response: "And how much was the government grant which paid for that extensive research?"

Len: "I wish. You wanna know the clincher? Denatured alcohol dissolved the cement holding the breadboard together. Freaking MURPHY!"

Me: "Oh, I just LOVE it! So, can we safely say that the breadboard rotted?"

Len: "I treated myself to a new one courtesy of Electronic Goldmine."

Me: "Congratulations! I hope that your new one has a long, carefree life, and next time, make it decaf, OK? What is Electronic Goldmine?"

Len: "Elect goldmine is where us cheap guys find all sorts of stuff." <http://www.goldmine-elec.com/>

"I was looking for some IRC hexfets - out of production - \$20 each at Newark and a buck each here."

There you have it - an unedited email thread, during which I learned a couple of things, not the least of which is the name of another resource for finding stuff you really need to have at very cheap, uh, low cost. I looked them up on the web. Minimum order is ten bucks but hey, a cursory glance at the site tells you you're probably going to spend more than that snarfing up the things you didn't know you needed until you found them there, so do be careful when perusing. I am, and I can tell I am still going to be spending money on these folks.

Len is KB9MY, by the way, and we've been each other's radio tech resource for the last 30 years. He's an SBE member, too, and really worth getting to know. He's in the SBE directory. Look him up. And tell him I sent you.

## The Portland Report

By  
**John White, CBRE**  
Chief Engineer, CBC–Portland

Cue theme music. We are entering the domain of sight and sound, a place we call, *“The Twilight Zone.”* In this month’s episode, we follow our intrepid engineer in an endeavor we will call, *“How Not to Make a Repair.”*

As we join our hero, he is mounting his faithful steed, Truck. Rrrr, vroom, cough sputter, sputter. Truck is sick and cannot go. *“What shall I do?”* comments our hero. *“Hi! I am Triple-A man and I will take sick Truck to the truck doctor.”*

At the truck doctor, our hero paces the waiting room for news. Soon, Doctor Mechanic appears with good news. Truck only needs a fuel pump transplant and all will be well. So our hero, the engineer returns home to cancel the day’s plans and await the call from the truck recovery room with the news that all is well.

Ring, ring. *“Hello, Mr. Engineer. I have good news and bad news. Bad news first. While your truck was on the lift and receiving its new fuel pump, it fell off the lift. The good news? No need to worry about the fuel pump now.”*

Indeed Truck was in bad shape. Sporting a busted headlight, bent hood, smashed windshield, caved in front and rear door with smashed glass, bent rear quarter panel and taillight. Truck was in bad shape indeed. And the new saga begins, finding a new truck.

Revisiting an old project, I wanted to comment about the HD exciter upgrade. With all the move activity I haven’t had a chance to comment about the change, which wasn’t exactly flawless. One area of confusion centers on the documentation.

Some years ago I did engineering development for some products. Included as part of the task was working with technical writers to create the documentation and manuals. The engineering director at the time had an odd and simple way of evaluating the documentation. He would pick someone that knew nothing about the product, hand them the manual and ask them to hook up the unit.

The first time I experienced that it seemed crazy. But I soon understood that being familiar with the product, the writer made assumptions about what the people using the manual would know. Since then, I have noticed it’s the assumptions about what the

reader knows that often are the biggest limitations of most documentation. For example, a connector labeled *“analog digital.”* What is that? Well the answer is it’s the digitized (AES) version of the amplitude modulation component of the IBOC signal. Not precisely obvious.

My real complaint goes to iBiquity, exemplified by the following experience. When I installed the new exciter, the first thing I did was to set the DC offset to the same power. With the DC offset established, that only left the delay variable to deal with. That would be easy, or so I thought. I fired up the transmitter with the exciter default delay, but the HD did not lock. No problem, I thought as I began adjusting the delay up and down. Still no lock.

After several hours of this, I gave up and called Nautel at the next opportunity. After discussing the problem with Nautel, I gave them the delay setting from the old exciter. Based on Nautel’s reverse engineering, they then suggested a starting number to use. I had been very close to that number, still I gave that a try. This time the HD did lock. I then moved up and down to find the lock window setting the final number at mid-point.

I have two observations. The lock window with the new exciter is very narrow, making it hard to find. Which brings me to the second observation. iBiquity really needs to do a better job of providing information. At least a magic decoder ring between old and new exciter settings.

How were the results? Well that’s good news. I have one of the Radio Shack Acurian receivers. For those who have this receiver, in the upper right of the display there is a HD signal indicator of one to six bars. On the old exciter, KKPZ displayed 5 bars while two other local HD AM



stations would show 6. With the new exciter I now see 6 bars for KKPZ. That's nice news.

Well back to the salt mines. I have been experiencing serial failures. First I could not switch to ND mode to check the communications tower detuning. The contactor at tower 1 isn't switching. I decided to look at that on Monday.

On Monday when I came in, the UPS for the air chain was in alarm. I couldn't pull the UPS without taking us off the air, so that night I moved the air chain to direct AC. The Omnia did not fire up. The power supply died during the power cycle. The replacement power supply is only \$90.00. That at least is nice news.

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### Rocky Mountain Ramblings The Denver Report

by

Amanda Alexander, CBT  
Chief Engineer, CBC - Denver

What a month! February has definitely flown by. Then again, it is only 28 days long. I have kept busy every day with the various work that has needed and still needs to be done.

also no longer have a spare. I am still going to try to see if I can get the sound card to somehow work, but I'm not sure anything I can do will work.

#### NexGen Update

After working with RCS and coming up with no solutions to the intermittent data problem on their end, we decided to buy a new network switch to replace the Cisco. Upon pulling the Cisco out of the rack, I noticed the date stamp was September of 2000. It's no wonder we've had connectivity issues! After replacing the unit with a much newer D-Link switcher, I have had only one problem. It seems in the KLTT control room we still have the blank screen occurring. I think I have narrowed it down to a D-Link DSS-8+. It is an 8 port switch that has been in that studio for as long as I can remember. I am going to see about finding a switch of some type to test in place of the DSS-8+ in hopes of confirming the problem before spending more money on another switch.



#### Wires Wires Wires!

It seems I have been doing a lot of tracing down of wires. I have barely made a dent this month in all the wires that are left to be traced out. It seems every time I plan on spending a day doing this, something goes wrong elsewhere. I was able to get the wires from the blocks in the racks in engineering traced down. That took a good week. I have them documented. All that waits is for me to go into the

Wheatstone computer and write down where they go in the bridge router. I do hope and pray that I am able to really buckle down the first week or two in March and get this finished up. I am looking forward to having everything documented for the move. It will be the first time in many years we have had updated spreadsheets of how everything is routed in our studio.

#### Update on the NexGen Spare Computer

Well, it was a bust, as of now at least. It turns out there is a known issue with the ASI4215 sound cards and the new chipsets in PC motherboards. As long as I use the new HP computer that was purchased, I cannot use our old sound card. According to Audio Science, the sound card should not even be working on the motherboard in the computer I rebuilt. This has me a bit worried because the computer could quit working at any moment. We

#### KLDC Snow Causing Problems

We had a decent snowstorm right around the middle of the month. The snow ended up causing problems at the KLDC transmitter site. For whatever reason, it caused the RFI in the building to get higher, so much so that when I had my laptop in the room where our transmitter is, the touchpad mouse went crazy on my and messed up a lot of things. I ended up using Entercom's ISDN unit and line in another room, running a long audio cable to our side and borrowing their otherwise unused ISDN to stay on

the air through a weekend. I wanted to give the snow enough time to melt off so it was not causing problems. After two days of no problems, I decided it was safe to disconnect and run as we normally would. This is not the first time I've had to do something like this. Last year, Entercom had to turn on their two FM backup transmitters which are located at the same site. This also took us off the air due to RFI. That one took all day to figure out because I had never seen anything like it, nor did I know the backups were on. I would like to find a way to have a working backup at the site that can be accessed remotely so I will have to start pondering what we can do.

### Reformatting of the Stream Computers

Liquid Compass has been pressing on me to reformat our stream computers. They are not working as well as they should be. I have begun the reformat process of the KLZ stream computer. After having it not stay up for more than a couple days at a stretch, I was fed up and decided to just reformat. We have software on it that was never removed by a company whose overlay software we were in the

process of testing. I still get the email messages from time to time that our stream has not checked in to their server. I look forward to having a computer with 1 GB of RAM that actually works as well as it is supposed to. I will have to figure out how to reformat the KLTT stream as there is no CD-ROM drive in that unit. I may steal a CD-ROM from the KLZ stream when I am done so as to allow the KLTT stream the ability to boot from CD.

### Build-out Just Around the Corner

The build-out will begin soon and I have no doubt my work load will become even greater. So in between the reformatting of the streaming computers, tracing down of the wires, and all the normal activities I undertake on a weekly basis, I have no doubt life is about to get more hectic. I am excited the move is getting closer. I look forward to seeing how everything is going to turn out.

So, until next time, that's all folks!

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## Digital Diary

by

Larry Foltran

Corporate Website & Information Technology Coordinator

### Should Big Brother Be Watching?

We live in a world where communication occurs in a split second whether via the Internet or a mobile cell signal. Every interaction consists of software commands between one terminal and another, whether it's email, an instant message or a tweet. Try to remember the last time you actually sat down and wrote a formal letter to someone using a pen and paper. Ironically, along with this ease in the ability to communicate comes the relative ease in which someone can tap into your messages or whatever else you're doing on an electronic device. A recent phone chat with a colleague regarding the pros and cons of cyber monitoring in the workplace sent my mental wheels spinning on that specific topic.

Aside from my employment at the local grocery store during my mid-teen years, every other

position that I've held has involved computers in one way or another. In some cases I was simply one of many computer users, such as during my time as a designer on CAD or a Simulations Engineer. In other



cases, I was administering a network of machines and related hardware. Some of my employers had no interest in monitoring what their personnel were doing on company time and computer equipment. Others closely watched and controlled user access from top to bottom. Even on a personal level, I've installed PC monitoring software and several computers for acquaintances who were concerned about what their teens were doing on the computer when they weren't around. I have my own opinion regarding that specific application of monitoring, but that's a topic for a different day.

Before I really open this explosive can of



worms and explore the pros and cons, let's step back a bit and take a closer look at cyber monitoring and access control. According to a survey conducted by the American Management Association (AMA) and the ePolicy Institute, employee e-surveillance has been increasing annually. That's evidence that more and more employers are concerned about how their equipment is being used. Monitoring employee activities on company equipment can come in a variety of different flavors and I've seen these on many different levels. In some cases, employers are concerned with the amount of time their staff spends on non-work related web surfing. Others are trying to prevent inappropriate use of their equipment or theft of sensitive data. I've had the opportunity to work in the competitive operations department of a major corporation which obviously took cyber security extremely seriously. Even after implementing restricted access to the building floor our department occupied and installing a wide range of computer security devices, there were still instances of stolen hard drives and theft of confidential data using removable media. Although my responsibilities there were not related at all with IT security, e-surveillance was on every employee's mind and essentially necessary for the type of work we were involved with.

In the most basic terms, a computer typically collects a wide range of information on a daily basis. These can consist of Internet browsing history, cache data, web site cookies, and other temporary files. Further up the chain, overall Internet activity can be reviewed using the logs collected by a router or similar device. These can be considered passive methods of monitoring and are simply stored until they are deleted. Most users never even realize that this information is being collected and typically don't give it a second thought.

The next level of monitoring is more active and can consist of keystroke loggers, timed screen captures, email filters, and web filters. These are methods that can take very specific snapshots of employee activity for review at a later time. In some cases, I've seen monitoring filters used as a warning flag of a potential problem, which then leads to a review of logged keystrokes or stored screen captures. Software used to actively monitor computers has become more and more sophisticated in recent years, even allowing for remote administration when necessary. They are also typically completely invisible to anti-spyware software or can be configured to be undetectable.

The availability of such tools is all well and good, but the real question is whether or not there is a

benefit to utilizing them. Some may argue that giving employees the impression that Big Brother is watching tends to improve productivity and eliminate time wasted on non-work related tasks. In certain regards, as I mentioned earlier, monitoring is a necessity due to the confidential or sensitive data being accessed by each user. I believe there are valid arguments for both proponents of e-surveillance and those completely against it, so let's take a quick look at both sides of the coin.

Prior to even installing any sort of monitoring software, it's necessary for the employer to clearly convey the guidelines for what is deemed as acceptable use of the company's computer equipment. Again using a previous employer as an example, we were required to sign a document outlining the company's acceptable use policy. This document included specific examples regarding unacceptable behavior, such as accessing or downloading pornographic material, as well as vague references to excessive "personal" web surfing. The main point that the document conveyed was that any and all computer activity had the potential of being monitored at any time, and violations could lead to action by HR up to and including termination. Just in case an employee had a lapse of memory, a message briefly reiterating the company's monitoring policy and related consequences was displayed each time you logged in to any of the computers. Yes, Big Brother would be watching.

During my time there, I was only aware of two instances where someone was reprimanded for conduct going against the acceptable use policy. One such incident involved a joke email which included a drawing of a nude elderly woman and the second was a result of a Google search for breast pumps. Although I can't honestly say I know all of the details in both situations, I do know that the joke email resulted in the termination of that employee and the second person received a basic reprimand.

One could argue that active monitoring can lead to contempt towards an employer and a sense of mistrust between the employer and the employee. Some could even say that this type of activity could create a hostile work environment. I can personally admit that while working in an environment as I described earlier, an errant clicked link while surfing the web at lunch time resulted in the fear that swift retribution by HR would quickly follow.

There is also the question of time and resources spent to extensively monitor computer activities. Aside from the time involved to review keystroke logs, screen captures, flagged emails, and other items, there is extra burden put on the

company's LAN infrastructure due to the added data being sent for review and storage. In cases where screen captures are being saved, a company with a sizable staff will need to consider options for considerable data storage to collect these images. Also keep in mind that if active e-surveillance software is being used on each machine, it will always be running in the background, thus slowing PC performance.

In my honest opinion, I believe e-surveillance is necessary in only very specific situations. Here in Detroit, we use very basic access control when it comes to Internet access. Some machines have no access at all to the Internet simply because it isn't necessary for the work-related tasks being performed on them. Internet access for computers requiring it is controlled by both our firewall appliance and our router. At that level, we have specific keywords and sites programmed into our router that are blocked if access is attempted. We've thankfully had only one instance of Internet abuse where a weekly, evening station guest was connecting a LAN cable to their personal laptop and accessing a considerable amount of questionable material. The router blocked most of these attempts, sending me a notice with the specific time of the

incident, URL visited, and the IP address of the connection used. I should add that this person's persistence to access these sites provided us with a large amount of access log data. After three weeks of logged activity, the pattern made it easy to pinpoint who was at fault and measures were taken to ensure it wouldn't happen again.

I believe that everyone on a network should be trusted until that trust is broken. If a user breaks that trust, then specific measures should be set in place to insure that person adheres to the company's established policy. Of course that depends on the severity of the first offense, but that's an issue for HR rather than the IT department. A clear acceptable use policy, basic network safeguards, and good old fashioned trust can go a long way. When those are breached, the question becomes whether to deploy more stringent control and to what extent. I hope I've provided some valid pros and cons to help in that decision process if that ever becomes necessary. Of course, then there is a new question to contend with. In the words of the poet Juvenal, "Quis custodiet ipsos custodes?" Or in a more modern version, "Who watches the Watchmen?"

Until next month!

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The Local Oscillator  
March 2010

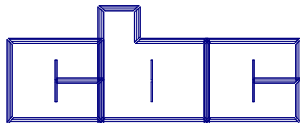
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**KBRT** ■ Avalon - Los Angeles, CA  
*740 kHz, 10 kW-D, DA*  
**KCBC** ■ Riverbank - San Francisco, CA  
*770 kHz, 50 kW-D/1 kW-N, DA-1*  
**KJSL** ■ St. Louis, MO  
*630 kHz, 5 kW-U, DA-2*  
**KKPZ** ■ Portland, OR  
*1330 kHz, 5 kW-U, DA-1*  
**KLZ** ■ 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*  
**KLWZ** ■ 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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BROADCASTING  
COMPANY



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