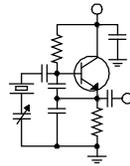


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Going Up!

At long last, after months of moving dirt, digging holes, pouring concrete and moving more dirt, the new KBRT transmitter site has steel in the air! The towers started going up the week of August 17, and by the middle of the week of August 24, all four had been topped out. What a beautiful sight that was, freshly-painted red and white tower sections against a blue Pacific sky! For the first time in almost 20 years, real radio towers are once again standing proudly at the site.

As the first tower topped out, we had to provide power to light it. But without utility power at the site, that was a bit of a challenge. The quick and dirty way to deal with it would be with a portable generator, but then we would have run-time issues. All the small, portable generators I could find had five- or six-hour endurance. We wouldn't make it through a night with one of those, meaning someone would have to top off the tank in the wee hours every night.

We opted instead for a solar option, purchasing a pallet of 180-watt 36-volt panels. We purchased 15-amp charge controllers, large deep-cycle batteries (over 100 A/H capacity) and inverters. Bill Agresta rounded up some materials and built stands for the solar panels, using Rubbermaid tubs for the batteries and Pelican cases for the charge controllers/inverters.

The solar panels produce 180 watts with full sun illumination, which is the norm for the site. With its elevation it is usually above the marine layer that tends to stay down lower, around 1,500 feet AMSL. That output will provide a full 15 amps of charging

current for much of the day, which should top the batteries off every day that the sun is shining. The tower lights consume 40 watts for the beacons (pulsed with a 16% duty cycle) and 21 watts for the marker array. So power consumption in a 12-hour night amounts to 28 A/H less inverter and tower light controller losses.

So what's next? We still have a long way to go. Next on the list are the concrete block walls around the tower bases. We are using these in

addition to chain-link fencing to provide additional security and a bullet stop should some yahoo try to shoot up our base insulators and ATUs. Judging by the history of vandalism the site has, that's a real concern, although we have had just about zero issues for most of this year. It seems that our daily presence at the site has sent would-be vandals elsewhere for lower hanging fruit.

We also have to install the foundation and UFER ground for the transmitter building. The building itself will be delivered, according to our current schedule, on September 26. The phasor cabinets will also be delivered that day. The plan is to set the first half

of the building on the foundation and tie it down, then set the phasor (and maybe the transmitter) inside that half, then set the second half and join the two into one. That will provide us with the 'ship in a bottle.' In reality, the door is wide enough to get the phasor inside, but it would have to go in on its back and then be rotated vertical. The issue with that is the cable ladder, which would have to be dismantled and removed to provide vertical clearance for the hypotenuse of the phasor cabinet height and depth. If



we can set the phasor inside while the entire end is open, so much the better.

Edison has told us they will have power to the site on October 8. That gives us over a week to get the electrical work for the building done and inspected. This includes setting of the main disconnect and meter base, installation of the 208V step-down transformer and connection of all the grounds (UFER and service entrance).



Bill Agresta built up these PV systems to run the tower lights until utility power can be connected.

Once we have power in the building we will be able to proceed with installing the phasor, transmitter, rack and all. I would start on it sooner, but we don't want to get in the electrician's way or get the county electrical inspector involved in the installation of our equipment.

We have rigid transmission line for all our inside RF plumbing, including from transmitter to phasor and phasor to antenna lines. In fact, we will run rigid lines right out of the building where they will be fitted with 90-degree elbows to attach to the Heliac lines coming up out of the conduits from the towers. This will eliminate the need to try and horse big semi-flexible lines around inside the building, and it will keep everything inside much neater. It will



Lots of conduits run beneath the sample line pit, marked and protected by yellow bollards.

also eliminate the big sweeps that would be necessary to transition from vertical runs coming up out of the conduit to horizontal to enter the building. By using hard 90s we can keep the vertical Heliac runs close to the building where we can support them using clamps and unistrut.

On about October 22, the tower company (Northstar Broadcast) will come back and pull in the transmission/sample lines, electrical feeds, control and fiber-optic lines to the towers and install the antenna tuning units. The conduits are already in place for this, and we have a pit excavated and delineated for the excess sample lines.

The ground system is the last element that will go in. By the time that is done we will have proofed the sample system and will be ready to measure the base impedance matrix, calibrate the antenna models and derive the operating parameters. Documenting everything and filing the FCC paperwork shouldn't take me more than a few days.

Hopefully we'll be wrapping all this up by late November. We'll all be ready for some quiet holidays by the time we're done!

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

Hello to all from Western New York! I am pleased to convey the news that CBC is in the process of purchasing an AM station here in Buffalo. We anticipate taking control of WNEB 970 within the next few months. For the past several years now, WDCX-FM has received interference from several stations that the Canadian government allowed to start up on 99.5, and since our signal is only protected to the US/Canadian border, there was nothing we could do about it. The areas we once covered were moderately populated, and we received literally hundreds of complaints from listeners that could no longer receive our signal interference-free. By purchasing WNEB, we will be able to once again serve many of those areas that we lost by simulcasting our programming on both frequencies.



A Little History Lesson

WNEB 970 is rich in broadcast history in the Western New York area. Signing on the air on October 14, 1924 as WEBR "We Extend Buffalo's Regards" on 1340, it was owned by the Howell Electric Company of Buffalo. In 1936, the station was sold to The Buffalo Evening News and became affiliated with the Blue Network of the National Broadcasting Company (NBC). Enjoying moderate success with hosts such as Dinah Shore, Walter Winchell and Jack Armstrong & the Wiz Kids, the station was sold again in 1942, this time to competitor Buffalo Courier-Express. It was under the ownership of the Courier-Express that the station frequency was changed from 1340 to its present dial location of 970.

There were many format changes during the 40s and 50s era of AM broadcasting, with many local talents getting their start on WEBR. In 1959, Jack Sharpe went on the air with one of the nation's first traffic helicopters. Sharpe transformed traffic reporting into a broadcast news staple, so much that

WEBR's use of the helicopter triggered many other TV and radio stations here and elsewhere to utilize

this means to convey news and traffic information on a regular basis. For a brief period in the early 1960s, the station also experimented with a format which encouraged listeners to "Sing-A-Long" with distributed song books.

In the early 1970s, The Courier-Express sold the station to a group of local investors (Queen City Broadcasting), which operated the facility until its sale in 1975 to the Western New York Public Broadcasting Association. The acquisition by WNYPBA marked the first time in 50 years that a commercial station was purchased by a public broadcaster. Another first for the station was when it became the country's first public all-news station in 1976.

WEBR became an award-winning news powerhouse that gained great accolades with its in-depth coverage of the Blizzard of '77, which buried Western New York in over 10 feet of snow. In 1978, the station became the nation's top-rated public radio station, and its popularity held for the next 20 years, or until the federal government instituted funding cutbacks for PBS stations. In 1993, the station's call letters were changed to WNEB with a limited amount of locally originated programming and the majority of the broadcast day filled with NPR and other syndicated features.

WNEB is licensed to operate at a full-time power level of 5 kW directional, with no power or pattern change. The station utilizes five self-supporting 246-foot towers and a phasing and coupling system constructed by Kintronics Labs. The station is currently diplexed with WHLD, employs a Harris DAX-5 for its main transmitter and a Harris MW-5A as a backup.

WDCX-FM – Buffalo, WDCX(AM) – Rochester
Many weeks ago, we experienced a failure

of the WDCX-FM STL system after an extremely heavy fog over the transmitter site in the town of Boston, NY. After the fog lifted, we were unable to receive any signal at the transmitter site, so in order to get back on the air as quickly as possible, we simply utilized our 950 MHz ICR backhaul to work in reverse. Albeit not the best signal we would hope for, it was good enough to keep us on the air until Western Tower could climb our tower and investigate the cause of the failure of the main STL.

Tower contractor Don Boye found that the 1-5/8" coax had a hole in it, caused by wind moving the coax repetitively against a leg connection form. This movement was allowed because several of the hangers had broken due to age. A tower inspection in the early spring did not reveal any problems, so the hangers must have failed sometime in the early summer. Don patched up the hole with rubber tape and covered the patch with epoxy.

Next, we had to drain the water out of the line, which we found to be 42 feet from the transmitter end using an Anritzu Site Master analyzer borrowed from WIVB-TV. As this location was where an old braid-type ground strap was attached, Don and I felt it best not to remove the coax and hang it down to drain the water out as this area was weak due to no outer jacket in place. Don used an awl to pierce the outer conductor and drain the water out, which was estimated to be more than a cup. I ran an

entire tank of nitrogen through the line at low pressure to help push and dry out any remaining moisture in the corrugated ridges of the coax. By the next morning, I reattached the coax and turned the STL on. I was seeing signal levels matching those recorded before the failure, so we put the STL back into service. Don patched the small drain hole up where he had previously punctured the line.

The recent repairs to the WDCX(AM) antenna switching network have been working flawlessly since several of the solenoids were replaced. At some point before the snow flies, I will need to fully inspect and lubricate all of the network switches before the cold weather arrives. A dry, dirty switch does not switch well when the temperatures drop to 20 degrees or below, so a little preventative maintenance goes a long way! There were some maintenance items I did not get to this summer – I simply ran out of time – but hopefully the fall weather will be mild enough to allow me time to finish off my to-do list.

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

This month we are finishing up a studio installation for our afternoon talk show host, Bob Dutko. In addition, I have many Symmetrix headphone amplifiers in my plant. Many of them have failed or are on their last leg. Unfortunately, the Symmetrix headphone amplifiers are no longer available. Therefore, I have been looking for a suitable replacement. On a recommendation from our supplier, I kicked the tires on the ARTcessories Headphone amplifier. Bob's studio project is now complete. The ZipOne codec and computer equipment was transported to Bob's home studio. We provided wiring from his existing phone line and



internet point of entrance to his home studio in the basement. The cables were run, terminated, and tested. The ZipOne is equipped with a cough button and delay dump capability. The Zephyr contains telemetry control channels for this purpose. Back at the WMUZ facility, the corresponding telemetry output channel was interfaced with the control bus to both the network uplink and local terrestrial transmitter's delay units. When Bob pushes the dump button at his remote site, a closure will result on the dump port of each delay unit.

Bob will also have total control of answering and closing out each telephone

conversation utilizing the Telos call screening and control software (Assistant Producer). Bob's producer Jan will screen the callers, inserting all of the pertinent information within the fields of the software. Bob then can see what caller is banked on which line and their questions or comments. This gives Bob the flexibility to run his show as he sees fit in the moment. Bob and his producer Jan, can carry on a conversations utilizing the texting feature built into the software.

Last, I received the chance to try out the ARTcessories headphone amplifier. The unit required some re-wiring of the input audio connections so that

it was compatible with the new amplifier. The unit will accept either ¼-inch stereo plugs or miniature for headphone outputs or the audio inputs. The amplifier is really nice. It sounds great and has a lot of headroom. The only inconvenience is that all of the jacks are on the back of the unit. I was spoiled with the output jacks being on the front of the Symetrix. I still think it is an excellent amplifier and will continue to replace old headphone amplifiers with this model.

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

News from the South

by

Stephen Poole, CBRE, CBNT, AMD
Chief Engineer, CBC-Alabama

We had a chance to meet with Mr. Crawford during August while he was here in Birmingham. Todd, Jimmy and I appreciated him taking the time just to tell us that we were doing a good job. May God bless him and may God continue to bless our company.

As usual, I'll start with the weather, but it may be good news. As I write this, we're still not 100% sure where Isaac is headed, but it looks like it will miss us. Thank the Lord! It also looks like Isaac will not strengthen as much as originally projected, which is good news for the folks in New Orleans (the current projected target). Thank the Lord again.

If that thing would just weaken and move up into the Midwest where they badly need the rain, I'll consider it a win-win across the board and I'll thank the Lord a third time!

But the good news is tempered with some bad: we've had an unusually severe storm season so far this year. We installed and made operational our new 110 Mbps Dragonwave link between the studios and the WDJC-FM site at Red Mountain, only to have it die the *very next day*. The Trango link between Red Mountain and 1260 has been out for weeks now and is also as I write this is on its way

back from a factory repair. We plan to get that back into operation ASAP. For now, the studio-to-Red link is being ably handled by that little Nanobridge that I mentioned in a previous article. Those things are amazing (\$75 each!).

We've purchased a bunch of additional

Transtector units that we plan to mount right at the radios on the tower to help prevent this from happening again. Now if I could just find a way to keep the phone line fuses from blowing at the 92.5 and 850 sites, I'd be a happy man. I guess it's better to lose a couple of fuses instead of a remote control or other expensive equipment, but it is a pain in the neck.

The heavy rains and winds that we've had lately have been clogging the drains on the roof at 120 Summit as well. Jimmy Parker has been taking care of that, and while he was at it, even improved the drain system on the HVAC units. I don't know what it is about the heating and air folks here in Alabama: they'll install a good high-SEER unit just as neatly as you please, but then tack on a piece of pipe for the drain. Jimmy replaced it with glued PVC and secured it so that it won't wobble in the wind.





Figure 1 - A clean roof and a new drain!

Todd and I will make a Real Engineer out of that boy yet. All he needs now is a propeller beanie. (He's already got the glasses and the crazy hair.)

MOSFETS

I've been asked why I love discussing stuff like this. My background is to blame: I read and experiment incessantly. Back in the day when I was cutting my teeth on this stuff, I had a bookshelf filled with reference materials, from transistor and tube device manuals to Walt Jung's invaluable *Audio IC Opamp Applications*. I don't share stuff like this because I'm showing off, it's because I have the heart of a teacher. I love articles like this, so I write them and encourage all of you to do the same. Teach me! I enjoy reading them, I assure you. Stop learning, start dying!

You can find references online that describe the physics of Metal Oxide Semiconductor Field Effect Transistors, or MOSFETs, in great detail. I'm not going to get into that. In fact, I'll just concentrate on one type, the N-channel *enhancement* mode MOSFET, since it's the most common in our line of work, and I'll use the standard grounded-source configuration (Figure 2) to describe them.

You can get MOSFETs in a wide range of ratings and case styles, but they all have a few things in common. The gate is insulated from the channel

(historically by a thin layer of metal oxide, whence the name), so the static gate-to-source impedance is extremely high. The device shown in Figure 2 is operated with the drain more positive than the source. The channel is closed or *off*, and only a tiny leakage current will flow between source and drain, until the gate exceeds the turn-on threshold (about +4 volts in Figure 2).

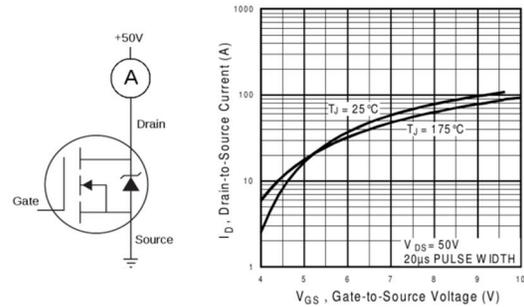


Figure 2 - An N-channel enhancement-mode MOSFET in grounded-source configuration.

The schematic symbol in Figure 2 correctly shows a dashed line for the channel. However, you'll see them drawn with solid or dashed lines, regardless of whether they're enhancement (normally off) or depletion (normally on) types. Nautel's schematics for the NAP-16 module are a case in point. If you aren't sure, *always* refer to the data sheet for the device.

Two warnings about the gate: First, the insulator is extremely thin and won't survive a high voltage — typically 30-60 volts P-P, gate to source. This is why MOSFETs have historically been notorious for dying at the least touch of static electricity. Newer devices are better, thankfully; some even have protective clamp diodes built in. But you still follow static precautions when handling any MOSFET device.

Second, the gate is a not-insignificant capacitor. The specs for a power MOSFET will usually show the gate charge in coulombs and the capacitance between gate and source. Typical values range from a few hundred to several thousand picofarads. Because of that, when you drive the gate with AC, there can be considerable current flow in spite of the supposed *high impedance*. This gate capacitance obviously has to be accounted for in tuned RF circuits as well.

Figure 3 is a simplified RF amplifier inspired by the NAA03/01 modules used in Nautel's ND-series of transmitters.

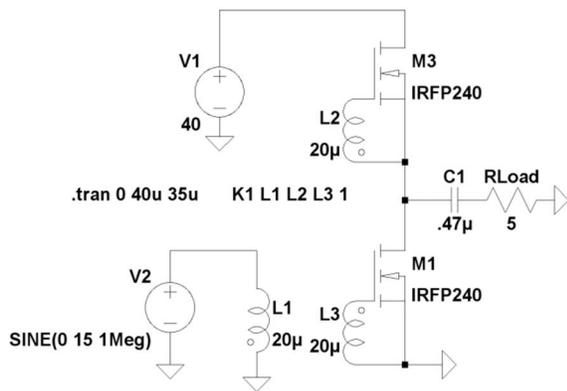


Figure 3 - A simplified MOSFET RF power amplifier

LTSpice doesn't have a model for the MOSFET that Nautel uses, the IRFP140. Rather than type in a model by hand, I just used the IRFP240 (M3 and M1 on the schematic). It has similar characteristics, but at twice the drain-to-source voltage (200V) and about half the current rating. V2 is the signal source and drives the gates through L1, L2 and L3, which form a transformer, thanks to the `K1 L1 L2 L3 1` SPICE directive. The drive is 1 MHz at 15 volts peak or 30V P-P. Note the phasing dots on the transformer: as expected, we're driving the gates of M3 and M1 out of phase.

V1 is the +40 volt DC supply. Since the MOSFETs are stacked in a totem configuration, the average DC voltage at the left side of C1 will be 20 volts. C1 blocks the DC component, resulting in a swing of $\pm 20V$ peak into RLoad, ignoring losses.

(Incidentally, the 5 ohm load is quite typical. I've calculated the effective load at each output in Nautel's NAA03/01 modules and they actually run

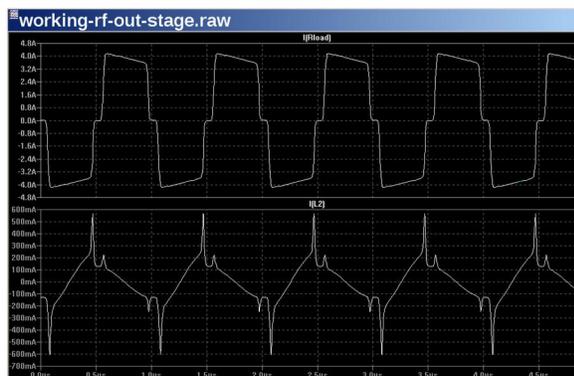


Figure 4 - Simulation results from the circuit of Figure 3

lower than that.)

Figure 4 is the simulation run in LTSpice. The top trace is the output current waveform through RLoad, which is what we'd expect. There's some obvious crossover distortion due to the gate threshold. The bottom trace shows that we do, in fact, have considerable gate current, too, as the gate capacitance charges and discharges.

What can we take away from this?

I usually replace all of the MOSFETs in a defective RF output stage, even if only one actually checks bad (the so-called, much-loved 'shotgun' approach). To be fair, some would argue that this isn't necessary with modern MOSFETs, as long as you use reasonably well-matched replacements. MOSFETs behave quite well in parallel.

My view is that, if M3 in Figure 2 shorts, M1 will (at least briefly, until a fuse or protection circuit takes action) be hit with a very large current overload. Most MOSFETs are quite forgiving: the IRFP240 has a nominal rating at room temperature of 20 amps, drain to source, but can handle brief peaks of 80 amps. I'm still too chicken to try it. Considering that MOSFETs are dirt cheap (the IRFP240 is less than \$3 from Digikey), I'd probably just keep shotgunning!

In my discussion of switched-mode power supplies (SMPS) a few months ago, I mentioned that these types of circuits feature brief, high-current pulses. The same is true here. Remember that solid-state RF amplifiers typically operate at low impedances, too. Given that, if you have a burned trace on a circuit board, assuming you can't get a replacement card, *don't* use round wire to make the repair. Use flat strips of copper and keep the repairs as neat and short as possible.

(Here's a tip: you can get copper tape with adhesive backing at most hobby shops. Hobby Lobby here in Birmingham carries it in their stained glass section for \$10-20 a roll. You can trim it to fit with scissors or a razor blade and it will take solder just fine.)

Second, watch the phasing and timing. Imagine what would happen in Figure 2 if you accidentally reversed the leads on one of the gate drive transformers: you'd instantly destroy both devices as soon as you powered up. That's obvious, but there are other considerations (also mentioned for SMPS): if the devices aren't reasonably matched, or if the drive waveforms are sloppy or out of sync with one another, the MOSFETs will run hot and you will eventually have a failure.

Until next time, keep praying for America!!!

The Chicago Chronicles

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

More Nautel tips

Last month I wrote a note about dealing with the issue of the Nautel VS-series rig losing its memory and forgetting its proper power output level. I didn't have enough space to tell you about all the other neat stuff I've learned about the latest generation Nautel rigs, so I'm including them here.

RDS on SCA: I'm confident that all the transmitter manufacturers are doing something like this, but one of the things I find interesting in both the NV and VS series rigs is that there is more than one way in which RDS data may be put on the air. One is to send it in by Ethernet (with either the ASCII or UECP protocol) and let the transmitter generate and insert its own 57 kHz carrier. The AUI menu allows the user to do that. Then, back at the studio, configure your RDS data generator for the main transmitter's IP address, and port 7005. Simple as that.

Or, you can enter RDS data via the good old fashioned com port method. Yes, the VS series rigs has one of those, which is designed for insertion via ASCII or UECP, for all you folks who still like to do it old school. Just replace your present RDS generator with this setup, and go. The AUI menus are rather intuitive in this area, so it isn't difficult to do..

For my part, I prefer to do it the *other* old-fashioned way, using the station's new Inovonics 730 RDS generator, letting it generate the 57 kHz subcarrier. I prefer that method because the 730 can be configured to generate its own fall-back messages in case the data feed from the studio is lost. But there's a trick to making it work with the Nautel system. It may look like there is a plethora of ways to configure the feed, but with a little help of our friends Trial and Error (last name Murphy) and a lot of help from Inovonics, we've determined that there is only one way which works well. Here's how to do it:

You should have an RDS-capable receiver to actually view the RDS data. The Inovonics 632 or the Denon TU1500RD are two such examples.

Connect the output of your RDS generator to the SCA2/RDS input of the exciter. Do *not*

connect to the main transmitter.

Now, do the following, in order:

- Click Menu.
 - Click Presets.
Choose your preferred preset from the menu which drops down.
 - Click the RDS tab. Make sure that the RDS is disabled.
 - Click the SCA tab.
 - Click on the MPX SCA drop-down menu, and Click Enable.
- Set the Input level to 2.00 volts pk-pk
- Leave SCA reduction at 0.0
- Leave Internal SCA 1 & 2 disabled, or disable them if either one is enabled.
- Click Apply, and then Save from the menu tabs on the left side of the window. Exit the configuration menu with the exit X in the upper right hand corner of the menu window.
- In the RDS generator, set the output level for an SCA injection level of about 4.5%, or whatever you prefer. That completes the adjustments.

A totally different issue revolves around the metering panel in the AUI main screen. Those users who have tried to load a list of favorite meter readings from the Meters menu to the list on the right side of the screen have likely noticed that the list has this nasty habit of disappearing, as if the readings were not being stored in non-volatile RAM. That's because they aren't. Nautel has a fix for that one as part of their next software update, coming out sometime this fall. However, if you want to prevent this problem from re-occurring in the interim, simply put a UPS on the AC feed which supplies the transmitter control system, and that will end the problem until the software upgrade rides to the



rescue.

Here's another one, involving the Exporter Plus chassis, although I would suggest that the other manufacturers who are engineering and producing their version of the next generation of HD broadcast transmitting equipment are probably into the same situation: We recently suffered the failure of the GPS receiver on the Exporter Plus in our Beecher installation. What caused the failure isn't known and not even worth the energy of speculation, but quit it did. Now, in the first design generation of HD equipment, the GPS receiver was not an integral part of the Ibiquty design board, but rather an in-chassis, separate piece of equipment which could be removed, replaced, and repaired by the manufacturer, which in all cases was FEI-Zyfer out of California. We prefer that system to the current state of the art, and here's why: The new way to GPS is now with a single-chip receiver, surface-mounted directly onto the main circuit board of the Exporter. There isn't even a daughter board there to hold just the receiver chip.

The GPS receiver in our Exporter Plus failed recently, and because of the fact that replacing the board in the field without the box around it turns out not to be a viable option, we now have the issue of replacing the entire Exporter Plus box in toto, just to replace the GPS receiver. I'd bet that this issue is going to be addressed up at Hackett's Cove, at least, if not elsewhere as well, but it still begs the question: If GPS receivers fail, and they do, why didn't anyone give any thought to the consequences of that, and design the system accordingly? Or, am I just being my cranky, out-of-line self again?

Can you believe this?

At a recent hamfest in the deep south Chicago suburbs, the local broadcast engineer brain trust got together to swap shop. One member of the group told a truly unbelievable story: A local FM station, which shall remain nameless and group-anonymous, had a problem a few months back. The tower on which they leased antenna space was becoming somewhat, shall we say, iffy. It no longer met the latest ANSI tower spec for wind-loading with their radome-mounted antenna, and the tower was, in any event, apparently beginning to deteriorate structurally. The problem was, they couldn't just take the tower down and *then* build a new one, because that would put the station off the air for an extended period of time. For whatever reason, building a new tower on-site and moving the antenna over to it was not an option either. So, what did the tower owners do?

They literally built a bolt-on tower around

the old one and, in effect, cocooned the old tower inside of it. Really!

The picture tells the story. The new tower



A tower within a tower?

was cross-section-sized to just fit around the old one, with the old one clamped to the new one every few feet. Neither tower utilizes a single point contact to earth, which could be an advantage in this case. Double guying is utilized, and the antenna is now mounted to the outside tower.

Despite all this, the whole setup begs the question of, "Who would do this?" I have no idea as to which structural engineer, if any, actually passed on this sort of design idea. The same applies to the manufacturer. I just don't know. I visited this place just out of curiosity, not believing that such a thing could even be tried, brought my camera, and left not quite believing what I'd seen. Cris thinks the whole idea is nuts, and he may be right. But I'd sure be interested in knowing who's doing this sort of thing, and why. More later if I come up with an answer. If any of you folks out there know, kindly pass the knowledge on.

Until next month, Blessings to you all!

The Portland Report

By
John White, CBRE
Chief Engineer, CBC-Portland

Having grown up on a farm, my view of the bounty of the fields has been corn, wheat, and potatoes, ready for harvest in the fall, golden and bountiful of America's farms producing golden wheat and corn. Somewhere when I wasn't looking, that changed. Sunflowers were replaced with tall metal poles adorned by flat panels. As far as the eye can see, cell towers proliferate with abandon. The expansion and upgrades continue as no less than four towers close to the KKPZ antenna site are being changed in some way. In some ways I feel like Flash Gordon keeping track of the latest cell / PCS changes in the neighborhood. My tool kit complete with a magic decoder ring, tracking each tower in turn.

Last month I talked a bit about the heat of the summer which had bypassed much of Oregon for this year. The last two weeks of August, summer came on strong with two triple-digit days. I had a chance to review some of the symptoms of heat-

related problems.

I had been working in an uncooled area of the building, then drove home in the heat of the afternoon of a textbook case for heat cramps or heat exhaustion. What makes heat stress potentially life-threatening is the body's normal mechanisms for dealing with heat stress, such as sweating and temperature control, become inadequate. The main sign of heatstroke is an elevated body temperature. Other symptoms are rapid heartbeat, cessation of sweating, feeling dizzy or lightheaded, headache, nausea, or fainting. It's even possible to feel cold and shiver as a reaction to heat stress.

If you suspect a heat stress situation, move out of the sun and into a shady or air-conditioned space. Cool down using damp sheets or towels and drink fluids to stay hydrated. Being on the watch for heat relates stress is the best way to minimize overheating in hot weather.



Rocky Mountain Ramblings The Denver Report

by
Amanda Hopp, CBRE
Chief Engineer, CBC - Denver

KLTT Update

The STL issue at KLTT seems to be a never-ending problem for us. You might recall that from time to time (and usually after a thunderstorm has passed the area), we would lose connectivity between the equipment at top of the tower and the transmitter building.

Since we don't know what the cause is and have to troubleshoot on a trial-and-error



basis, we have been trying to do the inexpensive things first. This includes replacing network switches on the tower and in the building and replacing the power cable going up the tower (which was in bad shape from UV exposure). But even after both those things we still had two failures! but those failures were different than what we had seen in the past. Instead of losing connectivity from the tower to

the building, the Trango link failed in the outbound direction (but it continued to work on the return path). A power cycle fixed the problem both times it occurred, both within a day of replacing the power cable.

The plan for while I was on vacation at the beginning of August was to have someone climb the tower to check that power cable to make sure it was okay. Perhaps we have several different issues and they mask each other. As we fix one problem it unmasks the next.

I kept an eye on the weather and we did indeed have some storms while I was on vacation, but we had no more issues with the STL. However, it seems the problem cleared up while I was gone. We decided to wait before sending anyone up the tower to see if the problem would present itself again. I am not sure yet if I am happy to say it hasn't. It's like the problem just corrected itself. It has been nearly a full month and so far, everything has held solid. I am cautiously optimistic about this. Only time will tell if the problem has been resolved or is just lying dormant.

KLDC Transmitter Power

Last month I had mentioned writing a script that will check the power of the main transmitter every so often and if it appears to be off, it would switch to the aux transmitter so as to remain on air. I believe the script only had to be used once in the last month. August, thankfully, has been a good month storm-wise here in Denver. So we have not needed to use the aux transmitter.

Inventory

Raise your hand if you hate doing inventory every year. My hand is definitely raised. I have always been tasked with inventory. When Ed was around, he'd give me the list and I'd be the one responsible for finding everything. When I got down to what I couldn't find, then it became a team effort. I am still responsible for it here in Denver, and when I got the list this time around I was dreading it. I had only two weeks to get it done. I was already busy with some projects here at the office as well as the personal project of planning my wedding. I decided to just hit it hard and devote several days to nothing but inventory.

I am proud to say that everything was found. There were just a few items that needed to be deleted because for one reason or another, those items weren't updated from the previous year's list or the equipment died in the last year (like several LCD monitors). Once I got down to the last few things

that needed to be found Keith Peterson provided me a fresh set of eyes and found several things I had missed. When doing inventory, after a while, everything starts looking the same.

I am very grateful inventory time is over for me. I am still trying to find a better way of keeping track of equipment. We move things around constantly between our four transmitter sites and the studio. I guess I should just make it a habit of marking it on the updated inventory list I will be getting back at some point.

Adobe Audition

Ahhh, Adobe Audition. It seems since we have upgraded to versions 2.0 and 3.0, we have had nothing but issues. We run NexGen and use the recommended sound card. Most of our rooms use an Audio Science (ASI) 4215 card. One room uses the ASI 6540 card.

Now, why do we have two different versions of Adobe Audition? Well we don't. We use three. We have 1.5, 2.0 and 3.0. The reason behind this is just upgrading over the years for the other rooms. We have two copies of 1.5. This version is the one that works great with both sound cards. Then I guess we decided to add 2.0 to three other rooms (1.5 was no longer available by that time). This made all five of the production rooms we had at our old studio leasehold Adobe Audition equipped. We began migrating to using that instead of NexGen's Wizard Editor. Then, once we moved to the new location we only had three production rooms. We decided the control rooms would double as production rooms when there were no live programs. I moved two copies of version 2.0 to the control rooms. This left us needing two more copies of Adobe Audition. By this time only version 3.0 was available, so we purchased two copies of this. It didn't seem cost effective to upgrade every room to the same version, and why would we want to since the two later versions had issues? Let's face it, Adobe Audition, is expensive, and why spend money on upgrading older copies when those copies work better anyway?

The issue we have noticed for years with Adobe Audition 2.0 (and now 3.0) is latency. When recording, instead of seeing your audio instantaneously on the screen as you would with NexGen Wizard Editor or programs like Audacity, it would appear just less than a second later. And then upon playback, the audio didn't line up with the displayed waveform. This made editing extremely time consuming and difficult.

I am no Audition person. When I was a board op, I used Wizard Editor only. Adobe

Audition did not start becoming a program we all used until after I moved into engineering. But I went ahead and played around with the settings, sometimes crashing the program, with no luck of fixing the original issue at hand. Once we moved to the new studio location, the need for getting Adobe Audition to work became even greater. I must say that I took my time getting to it well over a year. Everyone was able to deal with it and just use the working 1.5 version in a couple of the rooms.

One day after talking to Randy Frongillo, one of our writer/producers, about Adobe Audition, he handed me a bunch of paperwork. He took it upon himself to start digging around, knowing I had really no idea where to even start with all this. We always seemed to get conflicting reports from RCS. One day someone would say the sound card isn't compatible, other times the driver was wrong and things would get changed (by RCS) without my knowledge.

I decided to put the sound card back the way it was supposed to be, using the WDM/Combo driver. Then I began first off messing with the version number of the combo driver. This didn't help. I after working for several days trying to figure

out the issue, I decided to switch our room with the newer ASI 6540 sound card from version 1.5 to 3.0 of Adobe Audition. BINGO! Things started working. There were still a few quirks here and there I had to work out, but once I figured it out, I decided that although Adobe says the ASI 4215 card is compatible with Adobe Audition, it obviously is not.

The next step in this project is to begin replacing our sound cards after the first of the year. Hopefully this task won't be too difficult and we can get all of our rooms working to their potential.

Looking Ahead

I am looking forward to a slightly slower September. It seems this year is just flying by. It'd be nice to get a month to catch my breath. I only have two more Colorado Rockies games to attend thankfully. This has been the worst year ever for the team. Definitely a forgettable season.

The craziness of planning a wedding will be a distant memory as I start my married life. It just seems things are ending, which is good. I look forward to the next update from Denver, so until next time! That's all folks!!!

Digital Diary by Larry Foltran Corporate Website & Information Technology Coordinator

My Afternoon with MS Surface

I can honestly say that I've worked with some extremely talented and intelligent people during my career and I certainly try to stay in touch with them as best I can. Sometimes, these connections lead to some very exciting experiences.

A short time ago, I received a call from one such person whose search for greener pastures lead him to where Windows is king and Starbucks is the local coffee house. He said that he'd be in town for a couple of days and wanted to get together. After nailing down a time and place, he added that he was bringing something special to show me. Considering that this person held a fairly exciting position with his company, I was eager for his little show-and-tell session.

Several days after our conversation, we met at a quiet local restaurant to chat. With a smirk on his

face, he reached into his computer bag and retrieved a tablet device. He handed me the tablet and the first thing I spotted was the iconic Windows logo at the bottom of the frame. Meet Microsoft's Surface.

What I was holding in my hands was Microsoft's attempt at pushing the iPad aside and I couldn't wait to try it out. First off, Surface looks great and doesn't feel delicate at all, although I was being extremely gentle with it for fear of putting even the slightest scratch on it. The device looked to be between half to three-quarters inch thick, definitely thicker and possibly slightly heavier than the iPads I have previously held.

As I inspected the tablet, the first thing that caught my eye was a USB port. In my opinion, the lack of such a critical item in today's technology world has been a significant shortcoming of the iPad. I can certainly understand saving space by not including an optical drive, but



not offering a USB port is - in my opinion - unforgivable. Aside from the USB port, other input ports include a MicroSD slot, and a MiniDisplayPort which I assume would allow you to output the display image to an external display or projector.

The second physical feature that I was impressed with was the integrated kickstand. This feature pops out from the lower-back portion of the device and allows the user to easily prop up for use. Another nice touch by the developers at Microsoft. In the closed position, it's nestled in as if part of the actual shell.

Next was something my friend referred to as the Touch Cover. It's a very thin cover that snaps onto the front portion of Surface to protect the display. When removed, the inside of the cover features a full keyboard along with a touch pad. Despite being thin, the mechanical keys function quite nicely. When you put the cover back in place, the keyboard is automatically deactivated. Used along with the kickstand, you have something very similar to a laptop or netbook.

We powered up Surface and I was instantly impressed with the display clarity and overall size, roughly 11 inches. The desktop area looked similar to the Windows smartphones I had seen, utilizing the same general start-up scheme which we can expect from Windows 8. Surface also appeared to have a camera on the top rear portion of the case along with one along the long edge of the display, although I didn't use either.

The apps on this specific device were limited in number, although I was able to bring up traditional applications such as MS Word and the web browser quite easily and nearly instantly. What surprised me most was the ability to view two separate applications on the display at the same time. Pull up research materials on the left while you type a report on the right. If this device isn't an iPad killer, it definitely has the potential to be a laptop killer.

After playing around a bit, he shared some of the technical specifics of this device. What I was holding was the Surface Pro which runs on an Intel Core i5 processor. Microsoft will also offer an RT version which will be slightly different than its more robust sibling in terms of processor and storage capacity. Based on what I was told, Surface Pro will have the capability of running Windows 8 apps along with Windows compatible software. Surface RT will only be able to run apps, which may be fine for most casual users.

In terms of storage, Surface Pro features 128GB of space and other smaller options will be

available for both Pro and RT models. Another feather in the cap for Surface is the SD card port mentioned earlier, which provides the user with expanded storage capabilities. Although my friend played ignorant when the question of unit price came up, I think it's a safe bet that it will be competitive with other tablets on the market.

Overall I was extremely impressed with Surface Pro. So much in fact that I was really hoping he would leave it as an early Christmas gift to me, but no such luck. What I'm most excited about is the device's ability to run traditional software along side with the type of software that has been coined as "apps." If I can run high power applications such as Photoshop, use the MS Office productivity tools I'm accustomed to, and have the light-weight frame of a tablet - just take my money right now.

In terms of quality, it certainly appears that Microsoft has taken the time to get it right. Surface Pro appears sturdy and solid. Although obviously not known for their hardware, Microsoft has put out some outstanding peripheral products in the past including a variety of gaming controllers, keyboards and mice.

I also wonder how Microsoft's decision to offer two models will play out with consumers. Based on what I've been told about the RT model and what I've seen in the Pro model, I won't bother giving Surface RT another look. Although Apple offers different variants in terms of storage capacity, it's the same iPad across the board.

In my opinion, the significant hurdle that Microsoft needs to overcome with the release of Surface will be the limited availability of Windows 8 compatible apps right out of the gate. Similar to what we saw with Apple and Android based apps, I do see the number of offerings increasing as time goes on and developers jump on board. The big question is will consumers jump on the bandwagon immediately or will they sit back and wait until there's more available? By that time, the excitement over Surface may have passed and folks will simply stick with what they have.

On the other hand, Surface Pro's ability to run Windows 8 apps along with other compatible software could be the important factor that causes consumers to jump on immediately. I for one would be happy with running the applications I already use and simply watching the Windows 8 based app inventory grow over time. Besides, does it really matter if I can't start my coffee maker remotely via my tablet?

í until next month!

The Local Oscillator
September 2012

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

WYRB • Genoa - Rockford, IL
106.3 MHz, 3.8 kW/126m AAT

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

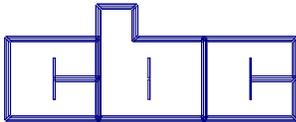
WYDE • Birmingham, AL
1260 kHz, 5 kW-D/41W-N, ND

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

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

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

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