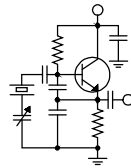


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

MARCH 2019 • VOLUME 29 • ISSUE 3 • W.C. ALEXANDER, CPBE, AMD, DRB EDITOR

Transmitters!

The first two months of 2019 have been filled with transmitter projects in our company. In last month's *Local Oscillator*, we detailed the KLDC transmitter project in Denver. We wrapped that up in early February and immediately launched into the KLZ project, and what a project that turned out to be! But before I get to that, let me tie a bow on the account of the KLDC J1000 transmitter project.

You may recall that the new Omnia.9 audio processor failed when we moved it in the rack to make room for the J1000. When we powered it back up, the display showed a Windows hardware error message that would linger for a few seconds before the unit powered itself down. We had to return the processor to Telos for repair, and they found some damaged hardware. As Amanda was talking to them about the issue, they told her they suspected some kind of power surge, but she explained that it occurred during a controlled power-down, a short vertical move in the rack, and power-up, and no other equipment had experienced any issues. They agreed that it was not a power surge and repaired the unit under warranty.

We put the Omnia.5EX back in while the Omnia.9 was in for repair, and the 5 was on the air for several weeks. During some programs that were simulcast on KLZ, I took the opportunity to punch back and forth between the two stations, and wow! I could really hear the difference. The older (2003) 5 was adjusted about as far as I could take it, but it was a couple of dB below KLZ's 9 in loudness, and it

didn't have the crispness and overall sound quality of the 9.

When we got the 9 back and reinstalled it, I again did an A/B comparison with KLZ during the simulcast. Both stations were running new Nautel transmitters by then, which further levelled the field. I was amazed to find that both stations were equally loud and were virtually identical in terms of overall sound quality. And both stations were noticeably

louder than the benchmark class A station in the market. In fact, I could be blindfolded, listen to a band scan and tell you which stations are Crawford's in the Denver market.

We had to do some RF bypassing of some of the metering samples at the KLDC Ruby Hill site. There isn't a lot of power at the site (1.6 kW total between the two diplexed stations), but the tower is not far from

the building, and it is a tall tower with a high-impedance (and high-voltage) base, so RFI inside the transmitter building has long been an issue. We found that the common point and forward power samples were all over the place after the transmitter replacement and remote control system rewiring, so Amanda added some bypasses and cured that problem.

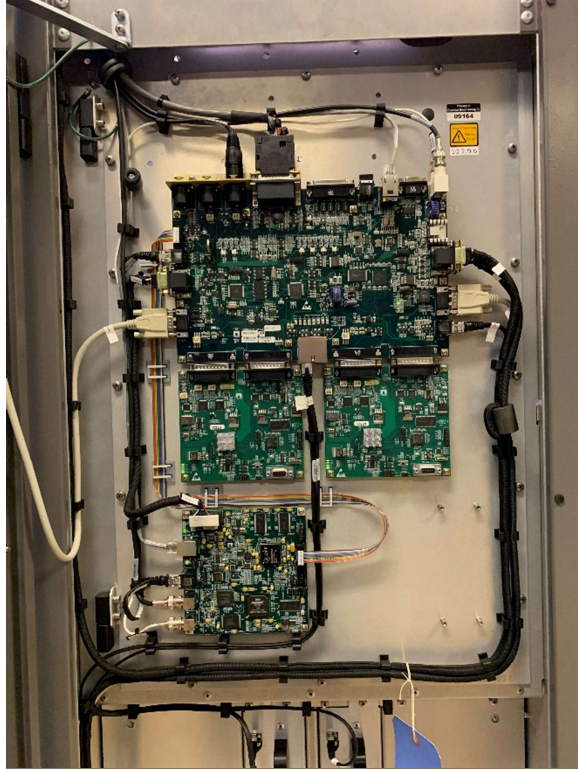
Now the project is complete, and that little station sounds like one of the big boys.

The KLZ project was a lot more physical than the KLDC project. For one thing, we had to move 600-pound transmitters around the building. We also had to do a lot of transmission line work.



The old man helps Amanda and Keith horse the old AMPFET 10 out of its slot and across the room, making room for the new NX5 at KLZ.

The project started by re-plumbing the ND5 transmitter to the auxiliary transmitter port on the phasor, moving the interlock wires for the ND5 to the auxiliary contacts. That opened up the main transmitter port on the phasor and allowed us to remove the old AMPFET 10 auxiliary transmitter, but it left us working without a safety net for a couple of days. Thankfully there were no issues.



Completed NX5 remote control, Ethernet, 10 MHz reference and RF monitor wiring. Remote inputs and outputs are on the D25 connectors at the top center.

Removing the old AMPFET was a real pain. It uses an external power supply that connects to the transmitter itself using five separate parallel AWG #4 wires for each phase, all of this wire contained in a big piece of 2-inch Seal-Tight conduit. Disconnecting all that and pulling it out was like wrestling an anaconda, but we got it done. We pulled all the modulators out of the transmitter, and that let us get a refrigerator dolly under it and move it out. Then we rocked it back and put a four-wheel dolly under it and easily rolled it across the room to a temporary storage location.

The power supply, which probably weighs 400 pounds, we moved with a refrigerator dolly and rolled it over to the dock door, putting it in the bucket

of the front-end loader. We used that to move it to a storage location in the garage. We have since sold the transmitter, but it will stay at the KLZ site until the buyer comes after it.

Getting the new NX5 into the building was another challenge, but it turned out to be less of an issue than I expected. The delivery truck had a lift gate and the driver was able to set the two crates in the garage. We were then able to get the bucket of the front-end loader under the transmitter crate, strap the crate to the bucket and then lift it into the transmitter building.



Amanda uses the front-end loader to set the NX5 into the KLZ transmitter building while Keith Peterson guides it in.

Moving it off the skid was actually the bigger challenge. It took a lot of “persuading” with crow bars and muscle to get that done. We moved it onto a four-wheel dolly, and that allowed us to roll it around the room, finally putting it into place where the old AMPFET had been.

The electrician came in and did his thing, drilling a hole through the concrete floor for the 3/4-inch power conduit. He also installed the surge suppressor and ran a conduit from the top of the NX5 over to the cable ladder for remote control, audio, Ethernet, 10 MHz reference and RF monitor wiring.

Next, we did the RF plumbing, and after that we took the opportunity to completely rework the remote control wiring at the site. That had started out as an orderly, probably well-documented scheme 20 years ago, but that documentation was lost long ago and there were layers upon layers of wiring, double-punches and question marks. Everything is now orderly and well documented, with laminated spreadsheets affixed to the inside of the rack door for ready reference.

The remote control wiring on the NX5 was a little different than other NX, NV and GV transmitters I have dealt with. Inputs (control, RF kill and interlock) are on a D25 male connector, and outputs (status and analog metering) are on a D25 female connector, which required some soldering. Rather than trying to work up in the transmitter, we kept the control cable long – really long – and did the soldering on a rolling workbench. With that done, we pulled the excess cable back in the conduit, plugged the connectors into the transmitter and secured all the wiring (see the photo on page 2).

By the way, kudos to Nautel for the built-in wire management system in the transmitter. Push-in wire capturing clips are provided, so it's not really necessary to even employ tie-wraps to secure external wiring. I think we just used a couple to anchor wiring where it came into the transmitter.

RF plumbing of the transmitter itself was a snap. I had to install the 1-5/8" EIA adaptor plate in the top of the transmitter and the bullet cup in the output filter. Then it was just a matter of installing a bullet and bolting down a flange. Of course I forgot to set the spark gap in the output filter while I had the cover open (which has like 18 screws), so I had to open it back up to set it.

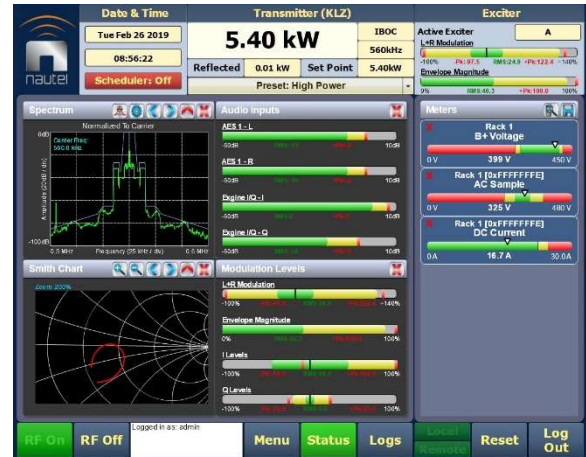
The transmitter came right up and ran with no issues. We programmed the remote I/O assignments and created presets for the desired operating modes and were off to the races.

The IBOC setup took a little time, mostly because of the narrow VSWR bandwidth of the diplexed antenna system at KLZ (see the AUI screen shot, above right). I had to adjust the external phase-shift network to get the optimum load orientation for



1-5/8" EIA RF plumbing on the top of the KLZ phasor. The dummy load is visible on the wall behind the phasor.

the NX5 power amplifiers. This was a little confusing because the Smith chart display on the transmitter shows the impedance at the amplifiers themselves, and it's rotated 45 or so degrees CCW from the orientation of the load at the transmitter output connector. I fought with that for a while until



Screen shot of the KLZ NX5 AUI. Note the tight VSWR bandwidth, load orientation (7-8 o'clock) and in-bounds spectrum.

Nautel's Steve Braley told me what was happening. After that, I was able to nail the orientation and get the spectrum adjusted for robust HD performance.

I mentioned that we re-did all the RF plumbing in the KLZ system. Some of that was the relatively short runs of 1-5/8" rigid line between main and aux transmitters and phasor inputs, but there was more.



A panorama of the completed KLZ transmitter room. Left to right, the AMPFET 10 (not connected), the KLDC night rack, the KLDC night J1000, the KLDC night four-tower phasor, the KLZ phasor, Amanda, the new KLZ NX5 main, the ND5 aux and the three KLZ equipment racks.

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The external phase rotation network had been in series with the ND5 only – the 7/8-inch Heliac from the ND5 went to the external network input and the external network output fed the main transmitter phasor input with another piece of 7/8-inch Heliac. With the new system, I needed both main and aux transmitters, both of which are HD capable, to go through the external network, so I had to plumb it into the common point input of the phasor. That required punching a couple of holes in the phasor top and drilling out the EIA hole pattern. We used an empty plastic butter tub, Gorilla taped to the inside top of the phasor, to catch the filings. We did this mostly with the station on the air!

The existing phasor transmitter inputs and dummy load output were plumbed for 7/8-inch Heliac clamps, and we had to remove those, punch out a 1-5/8" EIA hole and drill an EIA hole pattern for each input/output. We also had to change the 7/8-inch EIA adaptor plate in the ND5 to a 1-5/8" EIA adaptor plate.

Then it was a matter of solving a set of three-dimensional simultaneous equations, which was a real challenge, but we got it done! The big loops of 7/8-inch Heliac are now gone and we have good,



short, low-loss transmission line runs inside the building.

So how does it sound? Delicious! With the Omnia.9 processor, the transmitter can walk right up to 99% negative modulation peaks and 124% positive, so it's good and loud, but very clean! The HD performance is robust with short lock times and few dropouts observed while driving around the Denver metro area and beyond. The HD audio sounds FM-like but lightly processed and open.

With these transmitter projects done, both KLZ and KLDC are set for the long haul with state-of-the-art, highly-efficient, reliable transmitters and cutting-edge processing. I had a ball getting out into the field and helping out!

The New York Minutes

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

Hello to all from Western New York! Typically, this time of year is relatively quiet in terms of engineering activities. The winter months are primarily when we take care of non-pressing issues, notably indoor projects that were shelved when the weather was good. (I know, it's Buffalo and the weather is never good!). This year has been the exception, as I have recently been busy preparing for several upcoming projects that are slated to begin soon.

The first project involves the replacement of the WDCX(AM) backup transmitter in Rochester. We currently have an old 80s vintage Continental 315-R transmitter that we



inherited when the station was purchased back in 1999. At that time, the Continental was the main transmitter, and a Harris MW-1 was the backup. Not long after CBC purchased the station, when I was working at S&B Communications, which was the contract engineering firm for the station, we installed the current Nautel ND5 as the main transmitter, with the Continental demoted to backup status.

Although it has seen limited service over the years, the Continental has had its share of difficulties with numerous failures. I recall several costly repairs I personally made on this rig, one being the fiber-optic cabling and the bias



The WDCD ND5 which will be put on 990 kHz for WDCX(AM) in Rochester.

supply had to be completely rebuilt due to a shorted transformer.

Another anomaly of this particular transmitter was the vibration caused by the blower motor assembly, which after running for a while, would loosen the mounting bolts and fall down to the bottom of the supply cabinet. I recall this happening several times over the years, despite numerous attempts at locking down the mounting hardware of the squirrel cage blower

assembly. But despite the above, it has served us well.

Recently, Cris was able to purchase a practically brand new Nautel ND5 from the now defunct WDCD(AM) in Albany, New York. On Monday, the 18th of last month, I rented a U-Haul truck and drove to Albany to disconnect this transmitter and bring it back to Buffalo so I can change the frequency from 1540 kHz to 990 kHz. I was pleasantly surprised at the “factory fresh” condition of this transmitter, and according to Cris, it has seen very little time on air in its backup role. It was nice to see the Albany facility again, as it had been years since I was there last. Many of you may not know the disastrous history of this station and the event that happened there nearly 66 years ago.

On September 16, 1953, American Airlines Flight 723 flew between the northeast and center towers of the station's three-tower array. The plane was cleared for a contact approach to Albany Airport's Runway 10. On final approach, while still miles west of the airport, the Convair descended too low, and, at an altitude of 308 feet, struck two of the set of three 365-foot-tall radio towers arrayed

northeast to southwest. The towers survived the collision and still stand today.

The right wing struck the center tower of the three, then the left wing struck the northeast tower. Seven feet of the outer panel of the right wing, including the right aileron and control mechanism from the center hinge outboard, together with 15 feet of the left outer wing panel and aileron, separated from the aircraft.

Ground impact occurred 1,590 feet beyond the northeast tower. At this point, the aircraft had rolled to a partially inverted attitude. The nose and left wing struck the ground first. The rest of the airplane fell to earth in short order and caught fire. The aircraft narrowly missed hitting a trailer park on the Albany-Schenectady Road. All 28 occupants on board (25 passengers, 2 pilots, and a flight attendant) were killed. The aircraft crashed just north of Central Avenue (NY Route 5). The evidence of this can still be seen in the northeast tower, as it has a noticeable bend in the top two tower sections.

Back on a more pleasant topic, once I have completed the ND5 frequency change, I will install the transmitter in Rochester to serve in the capacity of backup transmitter to our current ND5.

The other project I recently began was to install the equipment at the WLGZ-FM transmitter site which will enable us to broadcast WDCX (AM) on 107.1 to the greater Rochester area. As this transmitter site is rather remote, I thought it best to house the equipment inside the building, rather than using one of the weather-proof outdoor enclosures that CBC has in use at other facilities around the country. We had the wall space available, and aside from the security issue, by mounting the transmitter and ancillary equipment inside, we will benefit from a cleaner, temperature-controlled environment. Once we have received the antenna from PSI, we will employ Patriot Towers to complete the antenna/feed-line portion of the project. We are hoping that the addition of this translator will enable us to gain additional listeners that do not tune into the AM band.

That about wraps up another month here in the Northeast. Until we meet again here in the pages of The Local Oscillator, be well, and happy engineering!

The Motown Update
by
Brian Kerkan, CBTE, CBNT
Chief Engineer, CBC – Detroit

Greetings from Motown! February was a great month where we accomplished a lot and stayed on the air through some pretty nasty weather. I also had an opportunity to take the trip to Florida in my \$650 Winnebago Lesharo with my assistant Steve Cuchetti as co-pilot.

After several months of preparation, it was finally time to head south. Our destination was Hamcation in Orlando, but there were several great stops along the way. We were traveling on I-75 south through Dayton, and we just had to stop at Mendelson's Surplus Warehouse since it was on the way.

If you haven't ever visited there, you should go at least once. This place is full of electronics surplus. Rows and rows of subassemblies, components, tubes, and occasionally things you wouldn't think you would see at a surplus store. As we were walking through, Steve noticed something down one of the aisles. He said, "Is that what I think it is?" I looked over, and to my surprise, there was a Harris AM broadcast transmitter!



transmitter for \$200! There is so much to look at, that you could spend several days seeing it all. So far, the trip was going well.



I looked it over. Other than the LCD display and the rear cover, everything looked pretty clean and intact. Guess how much they wanted for it. We hadn't even reached the hamfest and we found an AM broadcast

Steve is interested in studio recording, so I set up a tour of Nashville's Blackbird Studios. This studio is one of the finest in Nashville and has one of the largest microphone collections in the world. After a few hours of driving, we ended up in Nashville at one of the rainiest times I can remember. Downtown

Nashville streets were streams, but it didn't keep us from trying out some great BBQ and checking out the places on Broadway. We stayed in Nashville overnight and went on our tour of Blackbird in the morning.

There is so much music recorded and mixed at this studio. They also have a rental business with just about any type of audio limiter and compressor that was ever made. They even

had a reverb delay unit the uses a garden hose. Their microphone collection was huge, drawers and drawers of classic and rare microphones, some of which were serial number 1. In one drawer were the mics used to record Disney's Fantasia, and in another was RCA ribbon mics. They have a quad Neumann microphone, and one of the first stereo mics that Neumann ever made.

It was a great time seeing some fantastic gear, including the Neve console once owned by Donald Fagen (Steely Dan), and equipment that was once used at the Abbey Road studios in London.



What a morning it was, but it was time to head further south.

I mapped out the trip, which took us over Montecagle Mountain. I didn't want to get too

concerned about this mountain, even though Johnny Cash had written about people dying driving over it. What could go wrong driving a \$650 4-cylinder Lesharo motor home through the mountains? We had the power of prayer on our side. We were able to make it through without any issue. The mountain was pretty, and we were able to take it all in through the RV's giant windshield. We rejoined I-75 for the remainder of the trip to Orlando and arrived at the Orlando Fairgrounds without an issue. While there, we took a small trip to Cocoa Beach to have dinner by the ocean.

We were able to get back to Michigan safely, and it is a trip that I will long remember.

One of the projects I have been working on is a cost-effective solution for some of our clients that do live broadcasting on the station from their homes or offices. In the past, we have used Telos or Tieline equipment. I was able to find a software-based virtual mixer from VB-Audio. They have several versions of their mixer, but I choose Potato. This software mixer provides five hardware inputs and three internal sources that can be used for programs like Skype. It provides gating, compression, and an FX bus and sub groups for building mix-minuses.



VB Audio Potato Mixer

To my surprise, this mixer works really well. I wanted to see if I could mix multiple USB attached mics. Not only was it very low latency, but the quality is excellent. I paired this up with the Cleanfeed audio solution for connecting with the studio. To the end user, this solution is extremely easy to use. The studio sends an email with the link to connect. They don't need to worry about IP address settings, proxies or SIP configurations. It is as simple as click and go. We will have our first broadcast with it soon. So much capability is available due to today's faster CPUs.

I am looking forward to spring just around the corner. Until next month, 73 from Brian, W8FP!

News from the South

by

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

We've had a ton of rain lately. I know that elsewhere there has been a lot of snow. Bottom line is, we've all had a bunch of precipitation. The ground here is saturated and as I write this, more is on the way.

We've been blessed as far as power outages. 101.1 in Cullman was on generator for a few hours in the most recent storm, and the studios were on generator for a while. We were working on the new NX5 for 1260 AM when that particular storm brewed up. Lightning began striking all around us – including two strikes on the tower – so I told everyone to clear out. We headed back to the studios.

Not long after we arrived at the studios, there was a huge “boom” and the lights went dim. You could hear a loud, basso “brtt” sound, then we

went on generator. Fortunately, no damage was done, and (Stephen knocks on wood – that means Stephen taps his head) I think we've gotten the bugs worked out of our UPS systems. Nary a glitch, never missed a beat. Thank you, Lord!



New Cambium Links

In February, we installed the new Cambium data link radios between the WDJC site on Red Mountain and WYDE, 1260 AM, near downtown (Figure 1). The first day, we managed to get everything mounted, but had to quit due to storms. The link was up, but we weren't happy with the signal. The crew came back and tweaked the dish. We're back at the expected RSSI numbers and the link seems solid ... now.

The first issue that we faced was



Figure 1 - 1260's new Cambium headed up, the old Trango coming down.

that the RF was causing random errors. The Cambiums shipped with a little plastic "brick" power supply; they reminded me of what you might use with a laptop. Cris ordered a nice shielded unit for us (Figure 2). I installed and grounded it carefully and the link seemed more reliable.

Then we started having other odd issues, and it may help explain some of the "ghosts" and "gremlins" that we've had with our network recently. Once the Cambium was up, as soon as we'd plug certain equipment in, everything would go haywire: the STL links would go down and alarms would start



Figure 2 -- Cris ordered this shielded, grounded power injector for 1260.

with all of our NexGen/Transmitter network IP addresses, but something must have slipped through the cracks. We found the offender (as a matter of

blinking. Ah. I knew this was a fundamental network problem, probably a duplicate IP address somewhere. We took a break and ran it down.

We have a spreadsheet, carefully maintained,

fact, it was at 1260!), changed its IP and everything was happy again.

That Cambium link has much lower latency than the old Trango that we were using before. I think that the duplicate IP was being masked by that. If you have a duplicate IP address on the same network switch in the same building, you'll have problems right away. It's obvious. But with the latency in the Trango, it seemed to work ... except for when it didn't. So, we've learned another lesson. Not only do you have to be very careful not to duplicate IPs (that's just common sense), beware: when you upgrade your links, problems may start showing up that were being masked by older equipment.

That's still not the best one I've seen. We once actually had two devices with the same MAC address. That's supposed to be impossible, but hey; I guess it isn't. The symptom in this case was that the links would seem to work, but we were unable to get into one of the NanoBridges at Tarrant for configuration and status. We finally just replaced them last year with NanoBeam units. No more duplicate MACs.

A New NX5 for 1260!

As I write this, we're in the process of installing a new Nautel transmitter at 1260. We had already moved the old Continental out of the building (Figure 3) and made room for it. Todd and Jack moved it into the building before I even got there on delivery day. We rolled it into place on pipes and got to work.

We've had it on air and it sounds great, but there's more to do. One issue is that 1260 dramatically lowers power at night (41 watts, as opposed to 5 kW during the day), which is a huge change. On the old ND5, we used

a 9 dB attenuator so that the transmitter could run at a more comfortable level after sundown. We're still thinking about how to do it with the new NX5. Nautel advertises that it can make any power level from "0 to 5.5 KW," but it sounds really bad below a



Figure 3 - The inimitable Danny Dalton helping us move 1260's old Continental into storage.

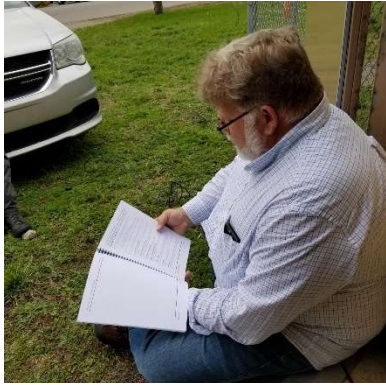


Figure 4 - Todd ponders the Exporter manual for our new Nautel.

couple of hundred watts.

Cris, Amanda and Keith had just finished their NX5 installation out in Denver, and Cris provided a nice “cheat sheet” of things to watch for. One is that the Nautel-provided lugs for the power

transformer don’t fit the existing M8 hardware. Nautel provides smaller M6 replacement bolts, but neither Cris nor I were comfortable with using that smaller hardware. They’d be rattling around in the larger holes on the transformer. In both cases, the concern was addressed by drilling out the lugs and using the original M8 hardware. Cris re-used the Nautel-supplied lugs; I ran to Home Depot and bought some larger ones. Either way, it works for us.

By the way, I can always tell when I’m working on a project: if I don’t cut my hand at least once, it’s not officially a job. Sandy is selling

Pampered Chef at home and bought some of their insanely-sharp knives for our kitchen. All you have to do is bump the cutting edge, and you start bleeding. The same is true of the PVC conduit cutter that I was using at 1260. Seriously, I absently tapped the blade with the back of a finger and it shaved off a couple of millimeters of skin. A field-expedient bandage was applied (Figure 5) and we continued the mission.

We’re pretty excited about the new NX5. We already know it sounds good; like I said, we’ve had it on air. We’re anxious to get it on air for good, making HD and pumping out the watts. I’ll have more on that next time; until then, keep praying for this nation (but NOT for rain; we’ve had enough!).



Figure 5 - When you cut your hand, a field expedient may be required. (I didn’t have any duct tape.)

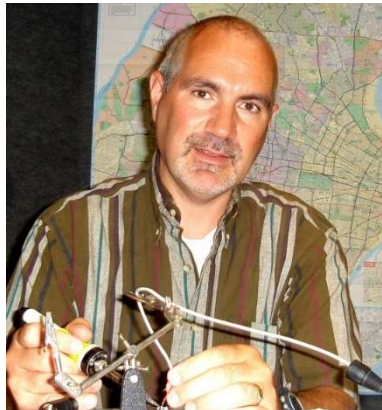
The Chicago Chronicles
by
Rick Sewell, CSRE, CBNT, AMD
Engineering Manager, CBC–Chicago

Security

It hardly seems a week goes by where we don’t hear about some multiple shooting event. It’s stating the obvious, but no place is safe. Now factor in the field in which we work, broadcasting, and we can add a bit more to our risk factor. Every media outlet not only attracts attention but is often a lightning rod in today’s polarized culture. If you have never considered your radio station a target, then you either haven’t given it much thought or your transmitter has been off for a while.

Certainly there are formats that lend themselves to more

controversy. Talk, especially political, immediately comes to mind. In another lifetime, I was program director for one of this company’s talkers. We took strong stands on many hot-button issues. I can vividly remember taking numerous complaint calls and can never forget getting a visit from the Secret Service.



This company has many Christian-formatted stations. On the surface, this wouldn’t seem like a format that would have to worry about an unstable person coming in to the station and causing problems. For those of us who worked in this format for a while, we know that’s not the case. Any format that can generate

passion will incite some individuals on the edge to do more than write a strongly-worded letter. I have never worked a sports format, but I can't imagine a sports fan getting passionate. (Remove tongue from cheek.)

We live in an era where there are enough individuals who are on the edge that we must take these things seriously. If you haven't thought through active shooter scenarios and how you would prepare and respond to one at your station, I would humbly submit that the time has come. Just Google "Radio Station Shooting" and you'll see numerous stories on the Madison, Wisconsin station that was the subject of an active shooter last August. Nothing like seeing a picture of a bullet hole in studio glass to make you think.

You just never know who is coming through that front door sometimes. Where I am currently writing this article, it crosses our minds a lot. We're in a neighborhood that has many homeless that wander the streets. Beyond the expected panhandling, many of these individuals often seem on the edge of rage. That doesn't mean these people are likely to come in and shoot up the station, but we have had one of them manage to get into the building with a sickle. Fortunately, this individual was looking for temp work to cut our weeds (we don't have a lawn). He put off vibes that made all of us uncomfortable.

Most recently, I was working with one of my engineers at our front gate control pedestal because of a problem with the access card reader for the gate. I went back into the building for one minute to check something inside. By the time I got back out to front gate, my engineer had been confronted by a passerby who had asked him for tickets. He told him he wasn't in charge of tickets, at which point the passerby let out a lot of expletives and then threatened to come back and "shoot up the station and burn it down." This wasn't an individual who won tickets and showed up to the station to collect his prize. Our surveillance video showed that he was walking from one of the local neighborhoods and then back again to the same neighborhood later.

Now once I found out, we called the police. I was 99.9999% sure that this was somebody shooting their mouth off, but with today's environment, you have to take every threat seriously. We collected all the appropriate videos from our security system so that we could forward them to the police. This is important so that you get a record of the event, because sometimes these events escalate over time.

I'm reminded of another event in Wisconsin, this time at a television station. An unstable

individual had stolen a crucifix from a church and then took it to the TV station and was using it to bash the digital sign board along the sidewalk outside. Just a few days before, the TV station had found blue crosses painted on one of their exterior doors. In all likelihood, this was the same individual escalating his actions.

So, we need to take any event like this seriously and get it on record with the local authorities. It could be related to events they have seen elsewhere and, that might help them stop an unstable person before they do greater harm.

We have had many of these incidents. Enough to cause us to take steps to better our security. When I first got here, we had an intercom system that was an aging off-the-shelf system from Radio Shack. It didn't work too well. With the amount of road noise at our front gate, it was not practical for the receptionist to properly screen the public before letting them into our front gate or front door. Certainly, a very important aspect of security is to not let the potential problem makers in the building in the first place. We ended up installing a newer system that featured noise cancellation. This works well, but in reality, it is only as good as the person doing the actual screening.

I also designed a panic button system for the reception position using our Avaya phone system. We simply designated one of the unused extensions on our phone system as our panic alarm. We use an analog output on the phone system to an Enberg FN-2 Phone Relay module that will set off buzzer alarms throughout the offices.

The extension is assigned on a button on the reception and labeled panic. Furthermore, any calls to the extension are automatically forwarded to 911. So, when the person at the reception desk hits the panic button the alarms are set off and then the call is forwarded to 911, all at the touch of one button.

This was a step in the right direction. But as we analyze our situation further, we know we need to take more steps to keep our staff secure. While we did enclose our receptionist in a booth, it is not really substantial enough to offer much protection against a violent offender. Our hallways from the reception area are open so that anyone wanting to gain access to other parts of the building can easily do so.

The days of radio stations having open reception desks with open hallways to the rest of the office and studios are probably over. Certainly if we are designing a new office layout, we would probably design it with greater care to set up barriers to keep a dangerous individual as confined as possible.

It is well worth the time to examine current

setups to understand where we are vulnerable. You may find, as we have that it is difficult to weigh being more secure against the ability of evacuation in case of fire or other events. Setting up barriers could possibly compromise potential fire escapes. Consulting with the fire marshal is probably not a bad idea, and we are planning a meeting with our fire marshal to be sure what we do will pass his inspection.

Besides the technical and structural changes that you might want to make, training staff for these scenarios is just as important. For instance, when the reception panic alarm was set off the first few times, we found that staff members were rushing into the reception area. Not really a good idea, as you are adding stress to an already unstable individual. We

had to praise our staff for responding so well, but caution them to enter the room more casually. You don't want to add gasoline to a fire.

You also want to make sure they understand their role. We don't want staff members taking matters into their own hands. Usually, that type of person who wants to be the hero is more likely to again be gasoline. The staff needs to train to understand they are to be witnesses and not heroes. If you are not capable of adding calm to the situation, stay out and let the police arrive and do their job.

It's not fun to think about these things, but the reality of the news each day should probably drive us to realize we shouldn't wait for a tragic event to occur at our facilities to start taking steps to increase the security for protection of our staff.

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

New Transmitter

We did get the new NX5 transmitter installed at KLZ. It was quite the project. We had some issues trying to get delivery info, as the freight company had told me it was on a truck with no lift gate. We were planning on having to use our tractor to unload it and then get it into the building. We also had no clue when it would arrive. The company was supposed to call the Friday before to confirm a Monday delivery, but never did.

I called that Monday morning and they said it had been delayed and would get back to me. I never heard back. Thankfully, the driver actually showed up a couple hours later, in a truck with a lift gate! This made the unloading process so much easier.

We had already moved the old AMPFET 10 out of the way, so it was ready to go. Once the crates were on the ground, we brought the tractor in. I was the one at the controls watching for commands as to what Keith and my dad needed me to do to get the transmitter loaded and safely up into the building.

Once in the building, the unpacking began. We didn't have a whole lot of room to move the crate around, but we did get it after a bit. We loaded the

transmitter onto a dolly so that we could roll it into place and allow the electrician the room he needed to get his work done. You can see the whole process in a couple of short video clips in which we look a little like the Keystone Kops trying to get the NX5 off that rubberized mat on the skid at:



https://crawfordbroadcasting.com/Eng_Videos/.

The electrician was scheduled to come out the next day to do his thing and get power run to the new transmitter. This involved him working in the garage and in the crawl space beneath the transmitter room. He did a great job!

It took us several days to get everything done to complete the project. Some things were related to having to keep the station on the air while we worked, which presented some challenges. We completely revamped all the KLZ indoor RF plumbing. I've decided I really like rigid line. It just



Careful... careful!!

looks amazing. Straight lines, no need to brace it on the ceiling, it just works. We also redid the remote wiring. We labeled everything we did and even traced out the old wiring so that when it was redone, we had a record of where it went on the punch blocks. Posted on the rack door where the blocks are, are four documents detailing this, so we can easily find something rather than wasting time having to trace things out.

Diffuser

The diffuser in the ceiling in the KLZ transmitter room that blow all the nice cold air from the roof-mounted Breeze-Air cooler has been rusting for years. It dates back to the 1960s and was one of those big round jobs, about five feet in diameter. At one point, Ed Dulaney and I worked on it. We scraped it really good and used some Rust-oleum to stop the rust and make it look good again. Keith has even done this on at least one occasion, but the years of having the humid air blow through it has taken its toll. As we were wrapping up the KLZ transmitter site project, we saw the severe rust and knew it was time to have a new, stainless steel diffuser installed, one that will last, and one that won't rust and look bad. As I write this, we are waiting on the installer to get to the site to get the job done.

Audio Processor

You wouldn't think a new audio processor, especially by the same company as the last one, would make such a difference, but we have learned that it does. When we originally moved the

equipment down in the rack at KLDC to make room for the new J1000 transmitter, the Omnia.9 would not boot back up. Instead, it kept giving an error and would shut itself down.

We aren't sure what happened. Telos says it looks like a power surge fried several cards in the unit. All we did was power it down, unplug it and move it vertically a couple of feet in the rack. It is on a UPS, which should protect it, and all the other equipment was fine.



My new best friend, the KLZ Nautel NX5 transmitter.

We finally received it back from Telos after they so kindly repaired it, and we immediately put it in service. I cannot believe how much of a difference there is! Perhaps it is the fact that there seem to be even more settings, more things to adjust to get just the sound you want. We got the station where it sounded great and was (just barely) within FCC-prescribed modulation limits. We also did an A/B comparison it to some of the bigger stations around town that are not Crawford Broadcasting, and based on the loudness and clarity, you cannot tell it's a little 1 kW transmitter making that big sound! Listening on the radio, I'd think it's a big powerhouse. We have had several people notice and comment on how great it sounds.

When we received the Omnia.9 back, I had a thought: Since it's a computer at heart, perhaps there is a shutdown in the menu. Many pieces of equipment have nothing, you just plug it in to turn it on and unplug it to turn it off, so it was 50/50 if this one had anything. We did find the "Safe Shutdown" menu option and plan on always using that (assuming

the screen works) anytime we need to shut down or restart the unit. I can't imagine not using that would have had any effect on the hardware, but it's certainly a better way to shut it down, protecting the operating system if nothing else.

UPS Batteries

It seems when we have one UPS battery die, I will order a replacement and before the new battery arrives, another one goes out. On a recent trip to the KLTT transmitter site to get a bid for the HVAC replacement, I noticed our APC SmartUPS1000 had the lovely red light on. First thing I did was pull the battery pack out to make sure I could. I've had, on a couple occasions, the batteries swell enough that removing them wasn't going to happen. Thankfully this pack came out easily, so I went ahead and ordered the new battery.

The next day at the office, I'm in our engineering room and notice one of our SmartUPS1000s had the same red light. This one is on our Wheatnet system, the heart of all things Denver. If it goes down, it would take down all four stations for a significant period of time. Not to mention if we get a power outage, the sudden power cycle as the power drops out and the generator comes on risks killing off a card or two or three.

I did the same thing I did at KLTT, and once I verified the pack was still able to be removed, I ordered a new one. I decided to go ahead and use the first pack I ordered here due to the severity of what could happen. At the KLTT site, yes, we would be off for a significant amount of time, but here's the thing – we have no generator at that site, so we rely on the UPS unit mainly to protect the equipment from those quick surges and brownouts. Either way, when

the power goes out, it typically is out for an extended period of time, and one station (or two if you consider the FM) is off air vs. the four (or eight counting FMs) if the one at the studio died. I am eagerly awaiting the second battery pack to arrive so I can drive it to the site and get it installed.

Upcoming

I am glad we have both new transmitters installed and done. Next up for us is getting the HVAC replaced at the KLTT transmitter site. Years ago, when Ed Dulaney was around, we had it done. We left the old unit on the roof and put in a second unit. I think for a while, that older unit was a backup, but hail damage left it dead and unable to run. Our current unit is old and beginning to show its age, so we have decided to get a new unit. This time they will take the dead unit down and put a new one in its place. The current unit will then serve as a backup, hopefully for years to come, since it has the protections against hail, which the other unit didn't have and led to its demise.

This is going to be a big project, but it is one I look forward to. I will do my best to see if I can mount a GoPro or something else somewhere so we can get some good video of the old unit being removed and new one being installed. I am not sure what I will be able to do, but I will plan on at least taking pictures.

Thankfully things are going to slow down a bit. We have some big projects coming up this spring/summer, but nothing like two transmitter installations. I will enjoy this slowdown a bit and wait for spring, albeit impatiently, to arrive.

That about covers it for this edition, so until next time... that's all folks!!!

The Local Oscillator
March 2019

KBRT • Costa Mesa - Los Angeles, CA
740 kHz/100.7 MHz, 50 kW-D/0.2 kW-N, DA-1

KNSN • San Diego, CA
1240 kHz/103.3 MHz, 550W-U

KCBC • Manteca - San Francisco, CA
770 kHz/94.7 MHz, 50 kW-D/4.3 kW-N, DA-2

KKPZ • Portland, OR
1330 kHz/97.5 MHz, 5 kW-U, DA-1

KLZ • Denver, CO
560 kHz/100.3 MHz, 5 kW-U, DA-1

KLDC • Brighton - Denver, CO
1220 kHz/95.3 MHz, 660 W-D/11 W-N, ND

KLTT • Commerce City - Denver, CO
670 kHz/95.1 MHz, 50 kW-D/1.4 kW-N, DA-2

KLVZ • Denver, CO
810 kHz/94.3 MHz, 2.2 kW-D/430 W-N, DA-2

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

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

WDCZ • Buffalo, NY
950 kHz, 5 kW-U, DA-1

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

WCHB • Royal Oak - Detroit, MI
1340 kHz/96.7 MHz, 1 kW-U, DA-D

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

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

WMUZ • Taylor - Detroit, MI
1200 kHz, 50 kW-D/15 kW-N, DA-2

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/95.3 MHz, 5 kW-D/41W-N, ND

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

WXJC • Birmingham, AL
850 kHz/96.9 MHz, 50 kW-D/1 kW-N, DA-2

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



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