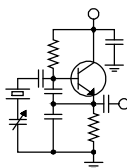


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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Old Man Winter

Winter is always a time of challenges for broadcasters in areas that experience real winter weather. But even in more temperate zones, sometimes Old Man Winter can cause problems, and because folks in those areas aren't prepared or equipped for it, they can have a harder time with a cold snap with precip than those who get a lot more snow with a lot colder temperatures as a matter of routine. Don't believe me? Just ask the people in Texas who experienced last winter's ice storms and rolling blackouts.

Here in Colorado, this has so far been a dry winter. Even at our house in the mountains, where we would normally have several feet of snow on the ground by the middle of December, we still had bare ground until right before Christmas. Thankfully the snows did at long last arrive in early January, and we got a big dump that took us days to dig out of. Our driveways were so deep with snow that even truck-mounted plows couldn't dig us out – my son-in-law Jordon and I had to do it by hand and with a snow blower. Oh, and I had to fix not one but two broken pipes at our church. Even radiant heat pipes don't do well in -14-degree weather!

At lower elevations, such as the Denver metro area, there has been very little snow, about 20% of what we would receive in a normal year. Looking outside as I write this, the ground is bare. Most readers have, I presume, heard or read about the Marshall Fire up in Boulder County, which is part of the Denver metro area, in which over 1,000 homes were lost. Hurricane-force winds and extremely dry conditions propagated the fire at incredible speed right through suburban neighborhoods. The cause is still under investigation, but the current thinking is that the fire started when a long-burning underground coal seam fire broke through the surface.

The dry and relatively warm conditions along Colorado's Front Range notwithstanding, it is still winter, and the traditionally snowiest months are still to come. The question I have to ask is, are you ready for the heavy, wet snows that so often come in March and April?

Power outages are the usual problems in such storms. Windy conditions combined with snow-laden tree limbs breaking and falling on power lines can knock commercial power out for extended periods as utility companies work through a long backlog of outage reports to restore service. Are our generator fuel supplies topped off and ready for an outage that may last several days? Have the oil and coolant levels been checked? Are batteries in good shape and within their expected life span?

It's been my experience that generators work great... until they don't. We exercise and test them weekly in most cases, and those tests almost always go off without a hitch, but then when they are called upon in a real emergency, sometimes they won't start.

We experienced this in Chicago and Buffalo recently. Some things we can do nothing about until they fail, but others we can head off, and batteries top the list of preventive maintenance items. I've had automotive and generator batteries last well beyond their expected life, but I think going beyond that expected life is asking for trouble. If it's a 36-month battery, it should be replaced close to that 36th month in service.

Another consideration for winter weather is how you will get into your transmitter site(s) after a heavy snow has fallen. At some sites, we have a contract or arrangement with someone who keeps the access road or driveway plowed whenever a predetermined threshold of snow depth is reached. We should be in good shape in those locations, but what about elsewhere, where we don't have such an

arrangement? How will you get in if you can't safely drive to the transmitter building? It's something to think about. Maybe you should carry a set of snowshoes with you during the winter months.

Thankfully, most of our company doesn't get a lot of ice in the winter, but once in a while, we do see ice buildup on towers, guy wires and antennas. Even in Denver in mid-January we had a bout of freezing drizzle that lasted a full day and loaded up some of our towers to the point that directional parameters were affected. We've experienced icing in Chicago and Birmingham this winter that resulted in power foldback or required a switch to a heated aux antenna.

Many years ago, I was CE of a TV station in the Texas Panhandle. That station had an 800-foot rectangular tower that was tough as they come. One icy winter day I drove up at the site and observed a guy wire "galloping." It was really scary seeing that wire oscillating up and down with each oscillation worse than the one before. I stood at a good distance watching and waiting for that wire to break and the whole tower to come down. Thankfully that didn't

happen – over the period of a few minutes, the oscillations lessened, and the wire was again motionless. I didn't see what started the oscillation, but I suspect it was a load of ice that fell off, suddenly releasing tension on the wire, effectively plucking it like a guitar string.

How do you prepare for something like that? You keep your tower maintained, paying particular attention to guy wires, guy tensions, anchors and anchor hardware, and tower attach points. You can't prevent an ice shed from starting an oscillation, but you can make sure your guy wires and anchors are in good shape. If tensions are right to begin with, a load of ice won't cause a big deflection that will be suddenly released with that load drops off.

I could go on and on, but the reality is that while we think about these kinds of things in the dead of winter, the best time to prepare for them is in the heat of summer. Make your list now, while you're thinking about it, and use that list as a guide during warm-weather months. You'll then be as well prepared as you can be for the return of Old Man Winter.

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

Hello to all from Western New York! We are already through January, and it seems like the new year just started last week!

The WDCX(AM) studio move from Rochester to Buffalo was completed on January 11th, and I am happy to report that everything is working well. There were a number of people involved in getting this accomplished, and I would like to personally thank the following for their assistance in getting this project off the ground: Jennifer Thompson of RCSWorks; Richard

Maddox from Wheatstone; Bryan Harper, technical support, Tieline Inc.; Todd Dixon, CBC-Birmingham; and Solomon Leatherland, production manager, CBC-Buffalo. We ran into numerous issues along the way, but with each of the above sharing

their knowledge base and talents, we were able to get all of the issues resolved.

It seemed that we experienced problems and



delays, one after another, since the beginning of this project, but patience and persistence prevailed. I still have some tasks to complete, such as installing an FM receive antenna at the WLGZ transmitter site to back-haul EAS monitor audio for the Sage ENDEC unit, which is now located in Buffalo, and setting up RDS data for the FM translator and metadata for the streaming encoder, which

are located at the Rochester transmitter site.

In all, everything is operating relatively smoothly, and the audio sounds great! We had a couple instances of a dropped connection on the Tieline (which is to be expected with a connection

over the public internet), but the problem is that the unit did not auto re-connect after the drop. The Tieline is programmed to auto-reconnect, and we have not had any drops in almost a week now, so we will sit back and wait and see if it happens again. I can't say enough good about technical support from Tieline. If there is an issue, they will find it!

Weather in January in Western New York is hardly ever pleasant, but this year, we have experienced extremely harsh temperatures and snow. For weeks now we have been under a Canadian clipper, bringing zero-degree temperatures and sub-zero wind chills, bone-chilling cold! The second week of January, we were pelted with a snowstorm which brought snowfall totals over two feet seemingly overnight. Snowfall was measured at up to three inches per hour, 3 with winds near 40 mph.

While not unusual, the cold temperatures wreaked havoc on our standby generator's batteries. At WDCX-FM, we lost power mid-afternoon on January 19th and the generator did not respond to the power loss. Luckily, the outage was minimal, and the power was restored in approximately 20 minutes. After arriving at the transmitter site and insuring everything was operating properly, I turned my attention to the cause of the generator's failure to

start. I found that the battery charger that applies a full-time trickle charge to the battery had failed. With sub-zero temperatures, the battery simply did not have enough stored power to start the generator.

On the 21st, I purchased and installed a new 50-amp charger for the generator. I am in the process of building a thermal housing which will help protect the battery in extremely cold conditions and also have a thermostatically controlled heater pad. This should alleviate any future failures of the generator not starting due to low battery power.

At some point this month, I will be performing the annual occupied bandwidth measurements on both of our AM stations and making monitor point measurements to insure that our directional arrays are within parameters. I don't foresee any problems, as the antenna monitor equipment indicates that we are well within licensed parameters, but with so much new construction going on this past year, you never know what could be re-radiating or distorting our signal.

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

The Motown Update
by
Mike Kernen
Chief Engineer, CBC–Detroit

The DX Goes Bye-Bye

Many years ago, the then owner of WCHB purchased a new Harris DX25U transmitter for their site just south of Detroit's Wayne County Metropolitan Airport near Taylor, Michigan. That same site is now that of Crawford Media Group's Wmuz-AM 1200. Several years prior to Crawford's acquisition of this station, then owner Bell Broadcasting decided to improve its signal to 50 kW. The doubling of power meant a new array of 10 towers and the addition of several cabinets to the phasor, among other things. Of course, a 50 kW transmitter would have to be installed too. Or would it? In fact, no, because the Harris DX25U was field upgradable to 50 kW. All that would be needed is to



The old DX50 headed out the door to a waiting truck.

perform the upgrade: add or exchange some parts, a little tweak and a tune. In reality, it presented Harris's best factory engineer quite a struggle, but he eventually finished and decorated the cabinet with a fresh DX 50 badge.

The solid-state DX25U/DX50 had a new and clever way of

modulating

the carrier by switching on and off over 120 power amplifiers. Muting and driving them in proportion with the program audio's amplitude in this way modulated the transmitter's carrier wave.



Harris said, "The Harris DX transmitters have Direct Digital Synthesis of the RF envelope using true digital modulation." The DX50 was truly innovative and performed quite well, delivering up to 10 kHz audio bandwidth and remarkable efficiency.

I'm told the big DX50 worked for some time prior to my arrival, but it was off at the wall disconnect and some modules were removed, and others had presumably been rebuilt.

After a few consultations and some light reading, I reinstalled the DX's missing modules and restored its power supply. The unit was already patched to our test load, and I confirmed that all the interlocks

were closed before feeding it the onions.

Nothing happened. Module after module faulted. More troubleshooting revealed missing modules elsewhere – these in a different cabinet were responsible for driving the others.

I found those modules lying about the transmitter building and refurbished them with new fuses and whatever other parts they needed. Typically they had shorted FETs that I replaced. This should do it, I thought.

With the repaired modules in place, I pressed the RF ON button. WHAMMM!!!! and a searing white flash rose from behind the cabinet as long dormant rectifiers gave a final exclamation of their existence. The once great DX was now beyond its worth to repair.

Over this past month, the very same people that were the consultants for Bell's big power boost arrived in a rented truck and muscled the big DX off the property.

You see, a few years ago, after their purchase of the then dark 1200 WCHB, Crawford equipped the site with a Nautel NX50, obviating the need for the big silent DX50. Seemingly dejected, it opted to take its own life rather than live in the long shadow cast by the vastly superior Nautel.

Raspberry Pi

We now have a few little Raspberry Pi nano computers around the office. Most of you either have them or have heard of them. I'm a bit late to the party here.

While I was looking the other way, these amazing little doodads grew to be very capable and can be configured to do big or little things without committing to the expense and complexity of a Windows PC – no constant update routines, no expensive hardware, a tiny footprint, and low overhead, on an open platform. You can buy them in kit form, load a bit of software on them, stick them on your network and pretty much forget about them. Yeesh, who knew?

I've already got two in service, and am planning to deploy some more of these as time permits. The Pi seems like an ideal device for creating SNMP data points to feed back to your central SNMP monitor or a facility remote control system. With its onboard GPIO header, status and control duties seem easy. The Pi might just be the perfect solution for inexpensive integration of non-



The Raspberry Pi 4 is an amazing little SBC, complete with NIC, wi-fi, two USB 3.0 sockets, two USB 2.0 sockets, audio I/O, and two HDMI ports, all for under \$150 in many cases.

networkable gear, such as an emergency generator, where simple status and control are needed. I'll be sure to write about new projects with them.

News from the South
by
Stephen Poole, CBRE, AMD
Chief Engineer, CBC-Alabama

Let's begin by offering sincere condolences and prayers on behalf of Jack Bonds, one of our engineers here in Birmingham. His father passed away on Monday, the 24th of January. The elder Bonds was a retired minister and a believer, so I have no fears about where he'll spend eternity. But it's never easy to lose a loved one; keep Jack in your prayers, please.

In other news: we've had two (2) snow/ice events in January, which is extremely unusual for Alabama. I know that some of you folks elsewhere got it much worse than we did, but remember, we aren't wired for icy roads here. No snowplows, very limited salting supplies, and drivers who still believe that the best way to handle a slippery road is to floor the accelerator. They apparently think that, if they spin the wheels on ice fast enough and long enough, it will melt the ice and the tires will finally grab pavement.

In some cases, this does happen. The badly-abused tires will pavement and the car will suddenly rocket off in some random direction, piloted by a wild-eyed, thoroughly panicked driver. They'll be yanking the steering wheel one way and the other

with little effect on their trajectory. The car will usually end up with its tail sticking out of the shrubbery at an odd angle. Ah, good times, good times.



It's like I've told my wife Sandy many times: I know how to drive on icy roads, but most people in Alabama do not. So even if you're taking it slow and easy, you may not get where you need to be. You'll run across blocked lanes, cars sideways and the aforementioned tail-end of an auto sticking out of the shrubbery. All of these things must be dodged. Back in January of 2014, when we had several inches of snow that shut down

central Alabama for a couple of days, I managed to get Sandy home from work in only 2-3 hours. I was taking back roads, driving around wrecks and praying the whole time.

The Sad State of AT&T

Several years ago, I was chatting with Mike Cary about AT&T's ridiculous charges for phone lines that were rarely used. I can still remember his response: "That's what happens with a monopoly."



Figure 1 - A little snow and ice in January.

WDJC-FM on Red Mountain. We haven't been able to get reliable Internet service up there, but the Cambium link between the studios and that transmitter site has been rock solid. We elected to tell AT&T, "Ta-ta for good!"



Figure 2 - The last VOIP device installed at WDJC-FM!

infrastructure anymore. Lines on the ground, junction boxes with the doors missing, fiber runs that sag into the trees – one wonders how they expect to provide reliable service. From my experience in the past few years, the only thing that's reliable about AT&T is that they will, in fact pester you to do a survey after each service event. I got so tired of entering 1s and 0s (I was beginning to feel rather binary), I began ignoring them a couple of years ago.

I still say the best event involved 101.1 FM in Cullman, which was using a DS1 ("T1") line as an STL at the time. The link seemed to be up, but we couldn't pass data. After a bunch of poking, loop-backing and prodding, it dawned on me that we had a link, but were getting the wrong data. In other words, Cullman was receiving someone else's DS1 data. To

I mentioned in previous issues that their monthly bills recently have increased to the point of insanity; we have been moving to VOIP services to get away from them. The last one was finished up this past month, at

This is just my opinion and worth precisely what you paid for it, but driving around Alabama, especially in the rural areas, I've been forced to conclude that AT&T just doesn't care about their

increase the hilarity, Cullman and Birmingham are in two different service areas; the 101.1 site was covered by Huntsville.

Getting that one straightened out took a day or two of phone calls and much gnawing of fingernails. Their techs would "check" the link, see that it was up, and declare it Good. We'd have to call back: "um, no, we're still not getting data."

One honestly wonders how they expect to stay in business. They don't actually have a monopoly anymore. Sandy and I use Spectrum at our house; it's cheaper than AT&T and much more reliable. We have Spectrum at our transmitter sites, and a Spectrum link at the office. There are other choices as well nowadays.

It's baffling. The days of Ma Bell being able to dictate that you would learn to love your plain black dial phone, and that was that, are over. Not sure if they're going to realize that before they're forced into bankruptcy. We'll see.

Brookside Police (And Other News)

I've been spending a lot of time working at transmitter sites during this whole COVID thing. The longest drive is to 92.5, WYDE-FM. A few years ago, I-22 was opened up between Birmingham and Memphis, and that made things a bit easier. We head up '22 until we hit the West Jefferson exit, then drive straight over to the site in Pumpkin Center, AL.

I had noticed in the past few months that there were a lot of law enforcement vehicles on the side of the road. When I'd glance at them, I'd see "Brookside Police" on the side. They were pulling people left and right, too.

Well, heh. They've made the national news. It seems that they've been writing tickets for anything and everything – license plate lights being too bright or too dim is one of my favorites – and raking in the fines.

Brookside is a little community of about 1,200 people, and in the past year, roughly half of their entire budget has come from these forfeitures. They've hired nine police personnel (nine, for a town of 1,200!) to make sure that they can keep rakin' at all hours.

Well, now the media is all over it, lawsuits have started flying, and the police chief has submitted his resignation.

They've never stopped me, but then, I don't actually drive like a maniac. It's my understanding that there's a law on the books that prevents local cops from issuing speeding tickets outside of their jurisdiction, but Brookside has been going after everything else. But a light came on when I started



Figure 3 - Inset: the damaged door, now replaced.

seeing the news reports. AL.com gets a thumbs up for breaking this story.

In other news, Jay Barker, former Alabama quarterback and former pro football player, was arrested for allegedly trying to iron

out his wife (country singer Sara Evans) with a vehicle up in Nashville. The court date is in March.

Jay had been doing a sports-oriented talk show on WYDE-FM/AM; he's turned the mics over to some other folks while he works this one out.

Shaking my head on that one.

I know Jay and spent a good bit of time around him back when he had a talk show on 101.1 FM. It's hard to believe, but something happened. We'll wait and see.

New Doors!

When I left you last time, Sunbelt Builders was on the way to replace the badly-damaged doors on the WXJC transmitter building in Tarrant. The doors have been installed, but haven't been painted yet; it has just been too cold. But it's nice to have solid doors again.

Next on the agenda is a replacement door for WDJC-FM up on Red Mountain. That's in the budget, so we're working on that now. Sunbelt has a bit of work to do on that one as well, because the door is countersunk into the concrete composite of the building. We'll see.

Until next time, keep praying for this nation!

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

Our company has put an emphasis on cybersecurity as we began the new year, and rightfully so. The enormity of a ransomware event can be devastating. All data has the potential for exploitation. But we in the broadcasting industry have a lot at stake with our dependence on automation and the way we use computers to schedule and bill all our advertising. If our playout systems become nuked by ransomware, we're dead in the water.

In my article a few months back, I talked about VNC software being an issue when being used by remote workers since the freeware version doesn't have encryption. One of the steps I took was to begin shifting my engineering staff to Mesh Central, which is a remote desktop software that is encrypted and managed through a server, in our instance, a Linux server running on a Raspberry Pi. I had planned on the possibility of shifting the rest of the staff to this, or at the very least force them to use a VPN in order to use VNC.

It wasn't much after this that we received

the mandate from Corporate Engineering to have all remote desktop connections come through an encrypted VPN. For our Traffic/Sales department

and the separate network for them, we had already installed a VPN for them to use early last year. I had also been working on getting a VPN for our studio and programming staff, so the mandate certainly pushed this to the forefront of our agenda.

Once again, we chose to use a Raspberry Pi to host the VPN software. Both Raspberry Pi installations took place with great assistance from Todd Dixon, who works in our Birmingham market. Todd is quite the Raspberry Pi guru. So, if you get stuck, he usually has the answer. He was also the one who

suggested both Mesh Central and the VPN software.

My engineering staff loves Mesh Central and has become quite proficient with it. We now have the studio VPN up and running, and the engineering staff has been the first to adopt it. We are just at the beginning of getting the rest of the programming staff on the VPN, with the goal that all



our operations externally are through the encrypted VPNs.

Having used a VPN before with another company that I worked for in the past, and then after this transition, I am very glad we are taking this step. Not just from a security standpoint, but with actual ease of connecting to the devices and computers. I no longer need a bunch of bookmarks for inside the network and then another complete set of bookmarks for outside the facility. With the VPN, you have a

virtual local IP address on your device and connect to other devices just like you would if you are on the local network.

I am sure there will be some challenges as we move toward this new secure model for working remotely, which itself is a challenge. However, I can rest a little more easily knowing that the vulnerabilities that had been a big concern are being eliminated.

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

Endpoint Protection

All I can say is wow. The first month of 2022 has come and gone in the blink of an eye. My month was rather busy, too, which made things go by fast. I have been put in charge of our new endpoint protection software company wide. It hasn't come without its bumps and bruises, but we are all learning and slowly getting it set up to work with each market.

The program comes with a cloud management tool to allow me to monitor the endpoint protection activity on all the computers. I can create installers for each market, create and change policies, deploy software, deactivate licenses and so much more. I am still learning all the ins and outs and am very grateful to ESET support for helping me when I've called on them.

Anritsu Analyzer

Note to self: Use labels! We had sent our Anritsu MS2721A spectrum analyzer to one of our markets last year so their occupied bandwidth measurements could get done. No big deal, we've done it plenty of times.

A few years ago, the internal battery charger stopped working, so we bought a drop-in charger, and we kept it and its "brick" power supply in the Pelican case with the analyzer. That power supply for the charger looks a lot like the Anritsu power supply, and a mistake was made. Unfortunately, the 24V plug for the battery charger fit into the Anritsu,

and before it was realized to be the wrong power supply, the damage had already been done.

I'm not going to name names here as I do

not blame this person at all and don't want to cause any more embarrassment. What I have learned is that I need to label things like that.

Of course, I know what the charger supply is. I purchased it and I use it the most, I'm sure. And the Anritsu supply is clearly marked (on the brick itself). But others who use it once or twice a year may not pick up on this.

Since the problem occurred, I did label the charger itself and its coaxial plug, so it is known. I also labeled the Anritsu plug, so you see what it's for easily.

We have not been able to repair this unit. It is old (2006 vintage) and has been discontinued. And in these pandemic times, trying to get a call back from anyone is like pulling teeth, although now that I think about it, pulling teeth may be easier.

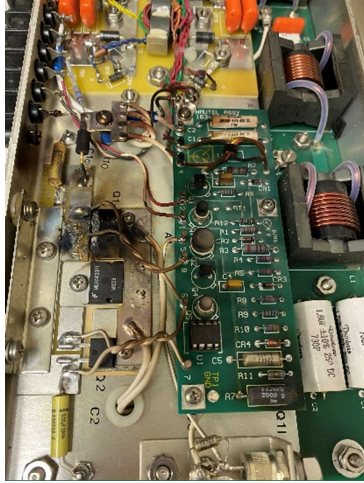
We have not given up hope on this and will continue to exhaust all resources to repair it. Cris did buy a used Anritsu analyzer on eBay. It should be here early this month.

KLTT ND-50 Power Module Go Boom!

I made a routine trip to KLTT to check on some things. The actual reason we went to the site escapes me, but I did check things over. I wanted to get my maintenance logs done, make sure all looked



good and prepare for bad weather.



**This ND-50 module was
BLASTED!**

the B exciter in low power.

The low power part is normal, it's how we have it wired up, so I was able to select the 50 kW power level with no problem. The B exciter part was a bit weird, but the NX-50 will sometimes switch itself over and it switches back to A with no issues. I figured it was a similar case here. I hit that A exciter button and BANG!

I don't know the last time I repaired an ND-50 module. I want to say it was back when Ed Dulaney was still around here, in the mid-2000s. We took the power cube out and made the decision to remove all five modules. The breaker supplying the entire cube had tripped, so I didn't know whether I had one failed module or more than one.

The issue was very easily found. One module was black on the back, which happened when the module next to it blew up.

The amount of damage was ridiculous, with molten metal on the heat sink and blasted parts all

One thing I hadn't done in a while was put the ND-50 auxiliary transmitter on the air. Sure, I can run it into the dummy load, but what's the fun in that? (And it runs the demand charges up if we run it into the dummy with the main on for too long.) So I switched it over and it came up on

over the place. I still don't know the last time I repaired one of these modules, as my dad was with me and he just took over and did the work (couldn't help himself). I watched, grabbed schematics, found parts and wandered around while he did the work. He was having some fun with it, so who am I to say stop?

We had to order some parts from Nautel and once they came in, we first used a Dremel to grind down the molten metal on the heat sink and then polish it smooth again. New parts, including some metal pieces, were installed, the unit was repaired and I put Humpty Dumpty back together again and tested the transmitter...into the dummy load. All was once again well.

Coming Up

I am looking forward to February. We are getting new garage door openers at the KLZ transmitter site, which will be great! We have some old units, dating back to before my time at Crawford. Both have started giving us grief, sometimes even requiring a breaker reset because the unit just quits responding.

The new units will have Wi-Fi access for use with a smart phone app. This will help me better monitor when the door is open/closed as well as giving me the ability to open and close it from my phone. While I don't typically just let everyone go to the site unsupervised, if I need to, I can get service personnel in much easier, or even if I'm in a different vehicle and forgot my remote transmitter. No big deal because I can just use an app now.

We are also keeping our fingers crossed we get our new codecs in. The order with Tieline has been placed, but for the Gateway-8, it sounds like they are having trouble getting the display in stock... supply chain issues, we're told. So, we wait.

That about covers it for this edition. I pray you all stay safe and well.

The Local Oscillator
February 2022

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

KLZ • Denver, CO
560 kHz/100.3 MHz, 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/95.1 MHz, 50 kW-D/1.4 kW-N, DA-2

KLVZ • Denver, CO
810 kHz/94.3 MHz/95.3 MHz, 2.2 kW-D/430 W-N, DA-2

WDCX • Rochester, NY
990 kHz/107.1 MHz, 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/94.1 MHz, 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/107.1 MHz, 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

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

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

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



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