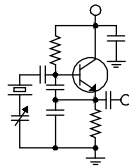


The Local Oscillator



The Newsletter of Crawford Broadcasting Company Corporate Engineering

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The Busy Season

Autumn tends to be the busiest season for the engineering teams in our company. The reasons? Some of it is a matter of weather. We get what is typically the best weather of the year in the autumn months, a time when we can get outdoor projects done without risk of heat stroke. In addition to that, with winter coming as surely as death and taxes, we know we have a limited amount of time to get those outside projects done, so we find ourselves hustling to wrap them up.

Another reason is that this time of year is our budget season. It is the time when we assess where we currently are and where we think we're headed, and we then make our plans for the coming year. Our chief engineers meet with their subordinates and other department heads and managers to see what their needs are, then vet the resulting requests, get quotes and prepare/submit the requests, complete with costs, to me for consideration.

At this level, I have to reconcile capital assets inventory updates. This is the first step in the budget process as it provides us with an accurate snapshot of what equipment we have and where it is on the maintenance/useful-life scale. It also provides us with a basis for establishing insurance values for the coming year, a defense against being over- or under-insured.

This year is a little different—okay, it's a lot different. In addition to all the busy work related to projects, inventory and budget, I have six new translators coming on line in the next month or six weeks. I am personally involved with several of those installations, as they require (or may require) moment-method AM directional proofs. In one market—Denver—we are racing the calendar to get two new translators on the air and a new Part 101 11 GHz microwave link up and working before colder

weather arrives, and that often happens in late October (we occasionally get significant snowstorms as early as late September).

Also this year, we have had to deal with the national EAS test on September 28. While the test itself only took 50 seconds and the reporting for all our stations just a few hours, preparing for the test took a good bit of time. I had to do all the ETRS registrations and Form One submissions, then make sure all our EAS units were up to snuff and receiving/decoding the all-US code (00000). More on this later.

And finally, we have a new format coming on the air in Denver later this month. One of our AM stations, KLVZ (810), has been on a silent STA since April as we figured out what to do with it. The STA runs out the 24th of this month, and we have been studying the market to determine what might work commercially. We settled on a format last month along with a game plan for hosting and voice-tracking, and since then we've been hustling to get other facilities and talent equipped and licensed to remotely host and voice track the new station. Add to that a new FM signal that will simulcast the station.

With all that going on plus the normal day-to-day stuff, a lot of folks around this company, myself included, have been busy as the proverbial one-armed paper hanger, and the end is not yet in sight. Still, even with all the time pressure, this is *fun!* This is the kind of engineering activity, at least at this level, that provides deep satisfaction, a sense of achievement and especially of good work done in furtherance of the Kingdom of God! I am blessed to have the privilege of leading the charge, I am blessed to have the best engineering team in the world to make it all happen, and I am especially blessed to work for a company that is all about God and country, where what we do makes a difference in people's lives.

National EAS Test

For the most part, the national EAS test on September 28 went just fine. All our stations received the test from IPAWS and local sources, and all stations forwarded the test.

What I found interesting was that in many cases, the test came in via LP-1 and LP-2 sources before it came in from IPAWS. No doubt this was due to differences in internet speed/bandwidth and local network congestion. In all cases it was a matter of just a few seconds difference, so it really didn't matter.

The ETRS reporting was a real pain (as expected). What surprised me about that was that I experienced no delays in logging in and reporting, and I did our reporting immediately after the test because I knew I would not be available to do it later.

The bottom line is that the system worked. Thanks to each of you for your good work in making sure all was ready.

A Sad Goodbye

It is with great sadness that I share with our readers that CBC-Detroit chief engineer Joe Huk passed away in the early morning hours of Thursday, September 29. At this point, I do not have many details. Apparently he sustained some sort of cardiac event while sleeping.

Joe worked for us twice, originally coming to us in June of 2009 and worked until early 2013. He then came back in March of this year after a three-year stint at General Motors.

A registered professional engineer, Joe was one of the smartest people I have ever worked with. He cared deeply about WMUZ, WEXL and WRDT and that showed in his work product. I will miss him. Rest in peace, Joe.



The New York Minutes

By

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

Hello to all from Western New York!

Each year, the first week after Labor Day, my wife and I take a week off and relax in Gettysburg, Pennsylvania. We have been traveling there for vacation for the past 24 years, and earlier this year, I decided that we would not go this year. I based my decision due mostly to problems my stations had in my absence the past couple of years. You just cannot relax and enjoy your time off while taking care of problems over the phone. Last year, I had 68 phone calls while on vacation, practically ruining three days of plans. The previous year, nearly 50 calls about various issues that required immediate attention, so you see why I decided to give up and just stay close to home.

Needless to say, my wife was disappointed, and could not understand the reasoning behind my decision. At first she accepted this decision

(reluctantly), but as time drew nearer, she began to needle me about it, so much in fact, that I had to give in. I figured that because we waited so late to make

hotel reservations no rooms would be available, but in a call to our favorite Travelodge where we have stayed for the past 10 years, I learned that miraculously, another couple had just canceled, and we were able to book in their place.

I called both my backup engineers for Buffalo and Rochester, and they agreed to cover for me while I was away. So far, everything was falling into

place, and I began to feel better about changing my mind and deciding to go. Then, along came Murphy. You all know him very well, when you least expect it, he shows up!

We had about two weeks to go until vacation time, and things began to fall apart, rapidly! Many of the issues I had could be explained, but



othersí there was no explanation as to why they were happening. I began to regret my decision to go, based on the events occurring almost on a daily basis.

To start off, the directional antenna in Rochester was not switching properly between patterns. The remote control would switch power levels in the transmitter at the appropriate times, but the RF switch in the phasor cabinet was not switching between day and night modes. This happened about ten days earlier, right after a thunderstorm had rolled through the area, so it was determined that perhaps a lightning hit that we took was the cause of the problem.

After I got the RF switch synced up with the remote, all was fine, for awhile. Further investigation found that the 24-volt supply that powers all outboard relays connected to the remote control had a high resistance connection on the positive terminal. Therefore, no voltage was getting to the switching relays. A thorough cleaning and re-tightening all connections fixed the issue.

Right after this occurred, we experienced a brownout at the Rochester studios, followed by a surge that damaged several pieces of equipment. The FM control room was spared any damage; the WDCX air studio and production room took the brunt of the surge.

The Eventide BD-500 delay unit was fried, and the Telos Zephyr/IP would not boot up past a certain point. I found out that the BD-500 delay units were no longer supported, and for any issues beyond the power supply there were no parts available. So a new delay unit had to be ordered to replace the failed unit.

With regard to the Telos Zephyr/IP, I have seen this issue happen before where when it abruptly loses power, it will not thereafter boot up. To correct this, you remove the top cover, and while powered up, remove the SIM card located on the mother board, remove power, and quickly re-insert the card into its socket and power the unit back up. As I was dealing with another issue in Buffalo, I talked Earl Schillinger through the process, and he was able to get the unit back up and running!

In Buffalo, while recently exercising the auxiliary transmitter, I hit the plate on button, and ó nothing! I had plate voltage but no current, indicating that the 4CX15000 tube had failed. I have not had good luck with Econco rebuilt tubes, so I ordered a

new National tube from Richardson Electronics.

Once installed, the tube tuned up nicely, and after running into the dummy load for about 20 minutes, I began to experience numerous PA plate and screen overloads. I pulled the tube and contacted Richardson for a replacement, which arrived several days later. The second tube, like the first one, tuned nicely, and it already has about 20 hours on it and is very stable.

There were a lot of other unexplained occurrences of equipment malfunctioning with no apparent cause. One such example is a digital distribution amp in the WDCX control room that would mysteriously turn itself off from time to time. There is a power switch on the front of the unit, and twice it has been found in the off position. Questioning of the board operators has not provided any answers ó no one has owned up to admitting turning it off. To top things off, I had to take inventory of our three facilities in Buffalo and Rochester, compile the data and submit it to corporate before leaving.

As you can see, I had an interesting two weeks before vacation, taking care of these issues and checking all of the equipment to insure that everything was in proper working order before leaving.

The great news is that during my vacation, for the first time in years, I had no communication with the staff about any issues with our four stations, and I was able to fully enjoy my time off. I don't think I have felt this rested and relaxed in years! I wish that each and every vacation could go as smoothly as this one did, but we are in broadcast engineering, where breakdowns can occur anywhere and at any time.

This month, I will celebrate 14 years on staff with CBC. How the time flies! Deciding to join the CBC engineering staff was the best decision I have ever made, and I thank Cris and Mr. Crawford for allowing me to live my dream on a daily basis. Counting my 11 years with S&B Communications, I have 25 years of engineering service to WDCX, and Lord willing, would like to be around for another 25 years.

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

News from the South

by

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

Let me start with my heartfelt condolences to and prayers for the family of Joe Huk, who passed away unexpectedly just as I was about to write this article.

Here in Birmingham, the year is coming to a close with a vengeance. Inventory is done, budget requests for 2017 are being worked up, we have Wireless Infrastructure Services here as I write this, and we're BUSY.

New WXJC Translator

The new translator for WXJC (850 AM) is about ready to go live. We're excited about this one. WXJC runs at 50 kW during the day with a huge coverage area, but at night, has to reduce power to 1 kW. The nighttime

pattern is essentially a laser beam toward the south-southwest, and covers Birmingham quite well. We have WXJC-FM (92.5) to take care of the northwest, but this new translator will very nicely fill in the holes to the northeast, especially at night.

We're using a Kathrein-Scala 5-element Yagi that's similar to the one that we did a few months ago for WYDE's translator. There was a bit of confusion while we were assembling it; Kathrein's idea of assembly instructions basically consists of a few small drawings. On paper, they're hard to see, and if you pull up the PDF version, a zoom doesn't help

much, either. But a quick call to Mike Bach at Kathrein gave us the answer that we needed. We finished assembling the Yagi, then sent it up.

While 1260's tower has stood for many years and has survived many storms, the top sections only have 1/2" legs. I wanted to keep the loading as low as possible. The antenna is 38 pounds assembled and mounted. I didn't want to add another hundred pounds of galvanized hardware for a mounting post. The problem was exacerbated by the existence of the unipole skirt wires on the tower; I especially didn't want a lot of weight hanging in the wind several feet from the tower.

My original design would have used mounting arms that would stand out the Yagi at least 4 feet from the tower, but the more we ran the numbers, the less we liked it. After consultation with Cris, we decided to actually cut and lower one of the unipole lines, allowing us to mount the Yagi much closer to the tower.

For the actual antenna mount, instead of galvanized steel we used tempered 6061-T6 aircraft aluminum, including the 2" pipe. That cost a good bit more than steel, but I couldn't believe how light it was. The mount (Figure 1) was less than 15 pounds; you could balance it on one hand easily. Of course, aluminum is easier to work with, too. Using a radial saw with a metal blade, we very quickly came up with the pieces we needed.



Figure 1 - Left, the bracket for the lowered unipole "skirt" wire; right, the bracket, ready for drilling and final cuts.

With aluminum, the biggest concern was to avoid breakage or crushing the pipe ... easy to do if you really crank down on the clamps. But in the end, we had something that weighed less than 50 pounds total, with antenna, mounted within one foot of the tower leg (Figure 2). Beautiful!



Figure 2 - Left: the antenna and mount headed up; right: the antenna in place.

Wireless Infrastructure Services did their usual excellent job mounting the antenna, moving the unipole δ skirt δ wire and running the $\frac{1}{2}$ -inch coax down the tower neatly. Grounding kits at top and bottom, as well as a ground in the building (of course!) will hopefully keep out the lightning. All that's left is to build a shorting coax section to protect the transmitter output and to get the δ go δ signal from the FCC.

Another Translator at Red Mountain

WDJC's tower has become much busier over the years. When I took the job here in late 1998, this market had two stations: 93.7 FM and 1260 AM. We've since added two FMs and another AM, and most of these receive STL signals from WDJC's tower on Red Mountain. The transmitter building is filled with STL stuff and the tower is covered with dishes!

Unlike 1260's poor little self-supporting tower, though, WDJC's is a very rugged Pirod. We've had engineering studies done and we actually have quite a bit of capacity left at most elevations. With that in mind, Cris leased space to Guadalupe Radio for a translator on WDJC's tower. Guadalupe contracted for one day with Wireless Infrastructure for this antenna.

This was a bigger Yagi than the ones we used for WYDE and WXJC. I was busy and in a hurry, so I never did find out how the driven element was driven. I never even figured out which was the

driven element ... but I guess Kathrein wouldn't have sold it if it wouldn't work!

Figure 3 shows the Wireless Infrastructure crew headed up the tower (the guy on the right is bringing up the rope) to rig for the job. Above them, you can see WYDE's translator antenna. Those with really good eyes might be able to make out the little NanoBridge (δ Nanner δ) that we use as a backup link between the studios and WDJC's tower. It's at the very top of the picture, on the right side of the tower.



Figure 3 - Rigging to install a translator antenna for Guadalupe Radio.

WXJC's Data Link

After a round of severe storms earlier this



Figure 4 - She took a bite of lightning!

year, the Dragonwave link between Red Mountain and the WXJC site in Tarrant developed a strange problem. At night, it would work fairly well, but in the daytime, after switching to high power, it would

stay up for less than an hour, then fail. The problem was in the tower-mounted Nanobridge that we use to bring the signal from tower #2 at Tarrant into the building.

WIS pulled the box and found what you see in Figure 4. The little black disk, which I've circled, is the remains of a MOV suppressor that we had across the AC line. This also acted as a .01uF RF filter capacitor, so when it gave its life earlier this year, we undoubtedly started getting RF in on the AC line. We're addressing that as you read this.

WheatNet IP Network Issues

We solved the problem with the random popping in the audio. The Cisco 2960 that we were using to do the IGMP queries had somehow lost its configuration, and to be frank, Todd, Jack and I weren't familiar enough with it (at the time!) to recognize this in a Wireshark packet sniff. Also, this particular 2960 didn't want to let us get into it to reconfigure.

We had ordered two additional 2960s to permit isolating the busy production rooms on their own islands within the overall network. When we installed the second one, Todd re-enabled the IGMP query and all of a sudden, we had regular IGMP packets all over the place in Wireshark. The popping went away.

Our celebration was short lived, though. We had a major power glitch at the studios that wiped out the config in the 2960s (again). Since the tower crew was on the way and we had to pivot toward that job, for now, we've just isolated the productions onto two little separate gigabit switches. Everything seems to be fine, so we know that our problems have indeed been network issues.

I hope to have a complete report on that in the next Oscillator. Until then, take care, God bless and keep praying for this nation!

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

Just when you think it's over. The lightning strike on our studio tower was just a little over two months ago. I thought we had resolved most of the problems and issues from the strike. However, we seem to have some nagging problems popping up.

It's hard to know if it is something coincidental or is it something that has just taken this long to show up. We continue to have bad NICs showing up on computers. Again, these could just be run-of-the-mill normal failures, but they're happening at a rate that appears to be above normal. They are also occurring on machines that are barely a year into service.

Some of it could be that we haven't shut them down or rebooted them since the day of the strike and when they do start up, that's when the problem shows up. This is probably the case with a NexGen workstation in a production room. We had to take the room down as we were having carpeting installed. When we re-fired the computer, it logged in to the NexGen fileserver and the drives were mapped. The NexGen software came up. I was going to test the audio connections and then the NexGen software started "hour-clocking." We had to replace the onboard NIC to get it going again.

One of the other things that came up involved our phone hybrids in the studios. Initially we lost three of the hybrids in the strike and they had to be sent to Telos for repair. One couldn't be repaired. Just in the last week, two more units have

developed problems. Essentially, we had to have every hybrid in the studio sent in for repair. Again, these last two could have been run of the mill normal

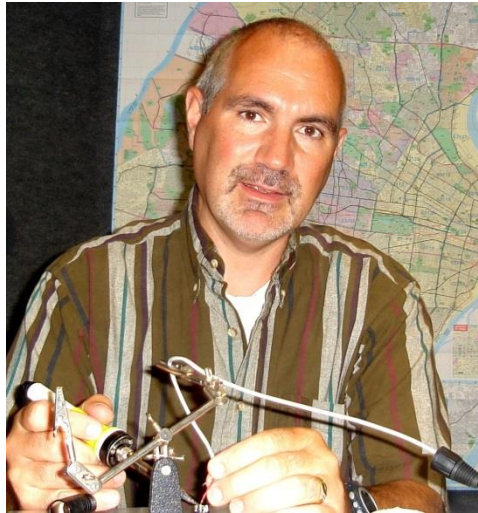
malfunctioning, but when you have every unit go bad, my assumption is that it is still lingering problems from the strike.

We also continue to try and improve our protection from future strikes. We added a copper ground bar to the studio tower. The lines coming from the 950 MHz STL antennas were all tied together on one bolt with a clamp to the tower. They had actually come loose a bit. We replaced this with the ground bar where each line has its own hole.

They're all getting better contact to the ground and they can be tightened down to the block individually, which is better than all of them on one bolt.

While working on this, we did notice that one of the lines was missing a ground kit, and so we need to get a kit and put it on the block as well.

The other big project going on here is the remodeling of the rest of the studios. Last year we took care of the control rooms and the one talk studio with carpeting on the floors and wall. We also replaced the doors on these rooms. This year we are finishing the project with the seven production rooms. At the time of this writing, we only have one room left to carpet, and should most likely have doors installed by the end of October.



The Portland Report
by
John White, CBRE
Chief Engineer, CBC–Portland

As I write this, the National Periodic Test (NPT) is happening. The test worked, sounded good and it was a wonder to behold every radio station with the same content. KKPZ sent the CAP version of the test, which had excellent audio quality. The only anomaly I saw is that our decoder only listed one of the Local Primary sources as a duplicate. Apparently the decoder can detect only one duplicate at any given time.

It's Official!!!

Oregon's new credentialing program to assist broadcast engineers with access to broadcast facilities during disasters has been officially approved. A ceremony is planned to commemorate the accomplishment and acknowledge the contributions of the partners that made this program possible.

The program is a partnership between the Oregon Association of Broadcasters, local chapters of the Society of Broadcast Engineers and the Oregon Office of Emergency Management, which is a part of the Oregon Military Department.

Now the hard work starts as volunteer engineers begin the detail work that will make the credential program a reality. The end product will be the card shown in Figure 1, which will identify the engineer has training working safely during emergency conditions.

The program will be administered by a committee made up of volunteers from the broadcast community. Branding and accountability are major objectives of the program. If engineers want the credential program to succeed, we will need engineers across the state to step up and support the program as volunteers.

We also wanted to clearly indicate how the committee was created, who was responsible, and what tasks were expected of the committee. The Memorandum of Understanding (MOU)s between the OAB and local SBE chapters provide that needed structure.

The program is not limited to the state level, and the success of the program depends upon local emergency managers playing a role in the program.

Early on, we spoke to the Local Emergency Managers Update meeting, and local managers are now aware of our efforts. Local managers have also attended our discussion meetings with OEM.

It should be mentioned that legislation supporting Oregon broadcasters is part of the state law governing the state's responsibility to prepare for and respond to disasters. While the program is founded upon the Governor's disaster authority, OEM has been careful to involve local emergency managers in the process.



Figure 1 - Oregon State Broadcast Engineer ID Card

It needs to be clear up front that neither the OAB nor the local SBE chapters have the resources to fund paid staff to operate the program. Oregon volunteer engineers will break into several working groups.

- The Card working group will select the vendor to manufacture the identification card to be used by credentialed engineers. The card will be driver's license size and will be molded and tamper resistant.
- The Data working group will develop the data processing tools and database storage for the program. We hope to use existing

standard software packages for this task. The ultimate objective is a web page signup process.

- Budget and audit working groups will round out the development process.

KKPZ Translator

At Mt Scott, the KKPZ translator project is in full swing. The antenna work will be a major effort with the antenna mounted at the 170-foot level of the communications tower to the south of the building. Early on, I sent a crew up to make

measurements at the top of the tower, including the dimension of the pylon at the top. Adapting mounting to the tower is a real challenge as the pylon is quite large and convenient horizontal members are not present to assist mounting a vertical mast.

Now the real work begins as adaptors are required to provide mounting brackets. When the antenna was received, it was awesome. When I got a look at the log-periodic from Kathrein-Scala, it became clear that this installation would not be an ordinary effort. New brackets and masts are being fabricated to mount the antennas.

Stay tuned as this project develops.

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

Inventory

Every year, I tell myself I am going to get better at keeping track of equipment. I will mark when and to where I move it. Every year I fail miserably. I know I am not the only one either. The KLZ transmitter site, which is the storage facility for things old and new for the whole company, is a special challenge. Trying to track down equipment that may be stored out there is a bit of an issue.

I have decided that once we get done with the FM translators and other projects, Keith and I will go through each site and make sure of everything. If it doesn't need to be at a specific site, it will go to KLZ. If it is not on inventory anymore, we will move it to a specific place. Things that are smaller and harder to find will be put in something to help us keep track of it. This will be a good winter project. At some point, things will slow down enough due to weather and I will be able to finally get things the way I like.

FM Translators

We continue to work on getting Denver's two newest translators finished up. We were able to get a contractor out to expand the tower base fence at

KLTT tower #4 so we will have room for the translator cabinet. We got the concrete pads done at both KLTT and KLVZ. We also pulled in some CAT5 and audio cable to the tower at KLVZ. The

equipment is configured, tested and ready to go. One cabinet was delivered and will be installed shortly. Things are progressing rather quickly.

Lookout Microwave

The radios for the 11 GHz microwave link between the Denver studio and the Lookout Mountain FM site have been

delivered and set up. We now wait for the antennas to arrive so we can schedule a tower crew to go to the studio and to Lookout Mountain to install them. We look forward to getting this done as it will give us solid connectivity to the site, something we don't have with an Internet-based link.

Comcast

Speaking of stable connectivity, I think Comcast finally did it. After months of complaining to them about the studio and Lookout Mountain internet services, we think they figured out the issues at both ends. I had called about the studio end dropping packets, and they sent someone out who found



nothing. The following Monday, I called again when I noticed all the packet loss on the Horizons for the two FMs. That time, they saw something! I got a call from someone who said there definitely is a problem and they were working on it. We lost the internet a few times as they worked on the problem, and then things got better.

The next week, Comcast went up to Lookout Mountain and installed a shielded box to help block the RF from several of the TV stations located at the mountain. It seems their modems use many of the same frequencies as the 1 MW TV stations at adjoining sites, so RF interference was our problem. We got the box installed, and five days later and 200 million packets later, we had only dropped 2000!!!! That all happened on the weekend too. So the three days before the weekend we dropped ZERO packets. Yes, you read that correctly, ZERO. We had never seen that on those two links.

We are forever grateful for Comcast tech Lynn Miller, who was the one helping us out. If it weren't for him, we probably never would have gotten internet up there in the first place. He believed us when we said we had issues still and he kept working with us to figure out the issues.

We plan to keep the Comcast internet service at the site to serve as backup to the microwave link. We'll put the SureStream secondary audio streams on Comcast with the primaries on the new microwave link.

Upcoming

It seems all of our projects are happening at once. We have the two new FM translators we hope to have on the air in October. Both of these will include quite a bit of work. We are also going to be bringing KLVZ back on air with a new format (and an FM signal!). With this, I am having to learn some new things about how Nexgen will work. We'll be using remote voice-tracking and WANcasting. I have to have this all done and set up in a matter of weeks. We also have a method of moments recertification due for KLZ in early October. I look forward to the challenge each of these projects will bring. I have no doubt that once we are done I will be bored and sad that I am not so busy.

That about covers this edition so until next time! That's all folks!!!

The Local Oscillator
October 2016

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, 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/91.1 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

WEXL • 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 • 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/95.3 MHz, 5 kW-D/41W-N, ND
WYDE-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
WXJC-FM • Cordova-Birmingham, AL
92.5 MHz, 2.2 kW/167m AAT



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