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When to DX

by Bill Hardy

(Special thanks to Greg Monti, whose articles in past IRCA Almanacs formed the substance for portions of this article!)

Even the most casual radio listener is aware that AM radio signals travel much further at night than they do during the daytime. Many of us have met people who are fascinated by hearing a station at night from hundreds or even thousands of miles away.

The 50,000 watt "clear channel" stations have a range of quite a few states, even on inexpensive radios. Depending on interference, even a 5,000 watt station can get out quite well. With a good communications receiver, a listener can easily pick up stations from 20 or more states in the first few weeks of trying.

If you have just recently become interested in "DXing" -- tuning around for distant stations -- this article will give you an idea of some good times to listen.

• NIGHTTIME

Because AM radio signals travel further by night than by day, the hours after sunset are a good beginning for distant listening. Start at one end of the dial, and tune along, waiting for identification (ID) from each station you hear. Doing a "bandscan" like this will help you "log" (positively identify) a good number of new stations and states. It will also familiarize you with the "normal" stations for the evening hours, the stations you will come to know as your nighttime "regulars." If you hear two or more stations on the same channel, try to ID all of them.

After you have been DXing nighttime a while, you'll notice that certain stations -- either powerful or nearby, or both -- will block certain frequencies all evening, making it difficult or impossible to hear anything else on that channel with them on the air.

In order to log more stations, you may have to tune in when these strong stations are off the air or greatly weakened, or when other stations are stronger. Here are some other good times for DXing, and we hope you'll try as many of them as your available time allows.

• DAYTIME

If you do another "bandscan" between 10am and 2pm, you'll notice quite a few stations you don't hear at night, and vice versa. Obviously, the "daytime only" stations near your DX location will be heard only during daytime hours. And some fulltime stations use lower power or directional antennas at night, and may be audible at your location only during daytime hours. These are the stations you will hear by groundwave reception, as opposed to skywave, the "skip" that allows you to hear stations more than 100 miles away at night.

Incidentally, if you live on the ocean or near other large bodies of water, you may notice daytime groundwave reception from considerable distances. AM radio signals are carried via salt water some 150 to 5000 times better than via the same distance of land!

Also, cold temperatures tend to improve the ability of ground to conduct AM radio signals. Since cold weather usually coincides with shorter days, midday DXing in November thru January can sometimes turn up unusual midday receptions. Try it sometime if you're snowbound on a winter weekend.

• SUNRISE AND SUNSET

These times of day are a transition between daylight and darkness. In the morning, stations switch up to full daytime power while some of the nighttime skywave is still working. At sundown, the skywave skip starts working before daytimers sign off or many fulltimers switch to night power or directional antenna. So sunrise and sunset "skip" are your best opportunities to hear the daytime-only stations.

If you can't stay up late to DX at night, you'll discover that you can hear many new stations in the late afternoon or early evening, starting about an hour before sunset. And if you have a set of headphones (so that your hobby won't wake up others), you have a good case for getting up at 6am on weekends to DX sunrise skip.

We'll go into more detail about sunrise and sunset DXing at the end of this article, and in special articles on pages 13 thru 17.

• MONDAY MORNING

Some oldtimers consider "MM" the "only" time to DX, which may be an exaggeration. But it's true that many stations which operate 24 hours a day during the week, just happen to leave the air for a few hours between midnight Sunday and early Monday to test, repair, and maintain studio and transmitter equipment. Sometimes the station just gives the all-night deejay a night off. As a result, frequencies are opened up, and quite a few stations are audible on Monday morning that are impossible to hear during the rest of the week. Even some of the stations remaining 24 hours on Sunday night may carry special "talk" programming, giving you a chance to hear weaker stations through pauses in the talk which you couldn't hear through the regular music programming.

• OTHER MORNINGS (especially Sunday)

There are still stations in small towns that leave the air every night, perhaps at midnight, or perhaps 10pm, 11pm, 1am, or 2am. They usually return to the air at 5am, 6am, or some time in between. With these stations off the air, interference is reduced and the AM band is more "open."

The "local channels," or "graveyarders" as DXers call them, are especially more open late at night, because they have a heavier share of small-town stations than have the regional and clear channels. If these channels are not blocked for you by a nearby station, try 1230, 1240, 1340, 1400, 1450, and 1490 kHz.

Saturday night/Sunday morning is especially good for open channels. First, some stations have a later Sunday sign-on (perhaps 6:30, 7, 7:30, or 8am) to allow their audience (and their Sunday deejay) to sleep in. Second, some of the big stations which are 24 hours on Monday morning use Sunday morning instead for their weekly maintenance "silent period." This opens up a number of key frequencies.

• EQUIPMENT TESTS

AM stations are allowed to test their transmitters anytime between midnight and sunrise local time at the station. Tests may consist of music, test tones, or an "open carrier" (silence). Tests may contain many station ID's, or just a few.

These tests provide the only opportunity for a station to use its full daytime facilities during nighttime hours, other than emergency operation (see next section). A mere 1000 or 5000 watts can carry for hundreds of miles in the middle of the night, so it becomes evident why most stations are not permitted to use their daytime facilities at night normally. Hence, an equipment test after midnight provides an opportunity to hear a station that would be extremely difficult otherwise.

During tests, ID's are required at the beginning and ending of the test, plus hourly on the hour if the test lasts that long. The hourly ID may be postponed if it interrupts the actual work on the tested gear. The ID might not be as loud as the test tones or music, so a DXer is lucky to hear the ID's during many tests.

Stations may also test their daytime facilities between sunrise and sunset, and fulltime stations may test their authorized nighttime facilities between sunset and midnight. But such testing would disrupt regular programming on an established station, so testing between sunrise and midnight is rare except in the case of a new station getting ready to go on the air. As it turns out, you'd probably log these stations using their regular day or night facilities anyway, so they don't help you much.

Except for emergency repairs, most testing is done after midnight by daytime stations, and after sign-off by fulltime stations. Those 24-hour stations with a weekly "silent period" for maintenance usually confine testing to that period. Those with no silent period, called "NSP" by DXers, may have to avoid testing, or else choose an inconspicuous hour such as 4am.

Many equipment tests are routine, where the engineer does some work on the studio, sound processing equipment, or transmitter, and wishes to check afterwards to see how it sounds on the air. This may consist of nothing more than a record or two, or possibly some tones, with live or taped station ID's between records.

Besides routine maintenance, repairs, and such, there are three special categories of equipment tests that DXers should know about: frequency checks, proof of performance, and DX tests.

► Frequency checks (f/c). AM stations are required to be within 20 Hertz (0.02 kHz) of the assigned carrier frequency. Most are well

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within five Hertz. The great majority of stations have their frequency checked by their own equipment, or an outside monitoring company, during their regular broadcast hours. But some stations in remote locations, especially certain daytimers and some graveyarders, may not be audible at the monitoring lab unless the station tests with full daytime power after midnight. These frequency checks are commonly on a monthly schedule, usually a specific day of the week, at an appointed hour. The test is most often 15 minutes long, with ID's each few minutes and test tones, "dial tones," or music between the ID's. The frequency checks we know about are listed in the annual "Frequency Check List" right after this article.

▸ Proof of Performance (PoP). This is an annual equipment measurement required by FCC rules of all radio stations. The goal is to document the ability of the transmitter to broadcast audio from the main studio without distorting the signal. A variety of test tones from 50 to 7500 Hertz (the normal range of human hearing) are broadcast at 25%, 50%, 85%, and 100% modulation. The test sounds like a series of tones, ranging from low to high pitch and from weak to loud, and very few ID's. Sometimes there may be long pauses of silence while the engineers adjust equipment. Because the limiting amplifier or audio processor is disconnected for the test, any voice ID's may be less than full volume. And the station, in many cases, will hire a consulting engineer to perform the test and take the measurements; some are paid more than $100 per hour, so the station avoids wasting his time! Usually, the only ID's heard are at the very start of the test, and afterwards when all measurements are done and equipment is returned to normal limiting and processing. Listening to PoP tones for 45-60 minutes with no ID's is one of the most frustrating experiences in DXing! Note: Although all AM stations must conduct a yearly PoP, quite a few stations choose to run the test into a "dummy load" antenna that the public, and DXers, cannot hear. In fact, a 24-hour station with alternate transmitter is allowed to patch an alternate studio into its alternate transmitter with regular programming, while it runs the PoP from the main studio through the main transmitter into a dummy load, and the public will never notice the difference on the air!

▸ DX tests. This is any equipment testing which is planned in advance and publicized in DX club bulletins, such as IRCA's DX Monitor. A DX test usually coincides with planned maintenance and testing, possibly including a frequency check or proof of performance. However, DX tests normally include frequent ID's, and are often planned to take advantage of open frequencies; as a result, many are planned for Monday mornings, which also happens to be the time when the most DX club members are trying for tests.

• EMERGENCIES

Many communities have no nighttime radio service, or have low-powered AM or FM at night that cannot reach outlying areas. If a blizzard, flood, hurricane, or other natural disaster strikes, daytime stations in the affected area may decide to continue operation into the night. (Sometimes they may sign on before sunrise also.) Such operation is supposed to be commercial free. Fulltime stations which can reach affected areas by remaining on daytime facilities after sunset may also participate; in extreme cases they've been known to switch to nighttime mode for commercials, then back to daytime mode for emergency information!

If you hear a newscast reporting a storm, flooding, or similar emergency somewhere, try DXing for stations from that area.

A second effect of natural disasters is that some interfering stations may be forced to go off the air. Wind, snow, and flooding may topple towers, cut off electricity to transmitters, or force evacuation of the station. This can open up frequencies in your area, especially if the outage lasts for several hours or even days.

And there is often an effect on reception of distant stations during the passage of storm fronts. Distant stations from certain directions may be louder than the regulars, while stations in other directions may disappear. A hint: If you are hearing a station much louder than usual, look for other stations you need in the same area.

• AURORA

Sometimes DXers in northern states or Canada find that "nothing is coming in" or "even the regulars are gone." This is usually the sign of auroral conditions. If your favorite newsman says to expect the Northern Lights, then you can bet that radio propagation will be affected by the aurora. Most reception of stations to the north will be greatly weakened or eliminated, and it provides an opportunity to hear stations from the southern states, as well as from Latin American countries.

• MORE ABOUT DX'ING SUNRISE AND SUNSET

If you haven't tried DXing "sunrise skip" and "sunset skip" yet, you are in for a treat. You'll hear dozens of daytime stations signing on or signing off, and you'll also hear fulltime stations that you can't get at night, just after they switch to their daytime facilities or just before they switch to nighttime.

The transition from day to night, and vice versa, is not fast and solid. It is gradual. The first hints of distant AM reception begin one or two hours before local sunset, and linger as much as one or two hours past local sunrise. In the winter months, you should start getting some sort of skip conditions as early as 4pm. In the summer, skip may start later than 7pm, depending on sunset time at your location.

In order to provide some specific cut-off point between daytime and nighttime, the U.S. and Canada many years ago defined "sunrise" and "sunset" for each month of the year. They could have computed a different sunrise and sunset time for each station, at odd times like 5:07pm, 6:22am, etc. for each of 365 days. Instead, the FCC and Canada's DoC have computed the sunrise and sunset time for each station on the 15th day of each month, rounded it off to the nearest 15 minutes, and used that time for the entire month.

Because of this process, daytime stations are sometimes on the air with daytime facilities a few minutes past actual sunset. But it balances out, because at the other end of the month the station signs off while the sun is still up.

This chart gives you an idea of which part of the month has maximum darkness in relation to licensed sunrise/sunset times, and thus provides maximum skip.

Earliest sunrises:	June 11-21	Earliest sunsets:	Dec. 11-21
Latest sunrises:	Dec. 21-Jan. 1	Latest sunsets:	June 21-July 1
Best sunrise skip:	Early in the month, January thru May Late in the month, July thru December		
Best sunset skip:	Early in the month, January thru May Late in the month, July thru November In December, best around Dec. 10-25		

DX conditions tend to improve in the fall and winter months, so you might try mid-December for sunset DXing (all of December is fairly good), late December for sunrise DXing, and Oct. 20-31, Nov. 20-30, Jan. 1-10, and Feb. 1-10 for both.

Another factor is the rounding off of the time on the 15th of the month to the nearest 15 minutes. Note that sunset at 4:37pm rounds off to 4:30, whereas sunset at 4:38pm rounds off to 4:45! The latter station will get out better on skip by staying on later, while the former will cause less interference. In specific months, an interfering station may drop out 15 minutes earlier than the desired station cuts power.

Also, after sunset at your location, you'll continue to hear sign-offs of daytimers to the west, as nighttime conditions move westward. Again this works best early in January thru May and late in July thru November. At sunrise, you can hear sign-ons of stations to the east much earlier than your local sunrise. Frequencies above 1500 kHz, heavily populated with daytimers, produce best results. Thus, sunset skip can continue for hours for eastern DXers; sunrise skip benefits western DXers; and central DXers are lucky enough to have both available.

This progression of sunrise and sunset times across the continent is readily seen in a set of maps, prepared by Ernie Wesolowski, showing United States sunrise and sunset times for each month of the year. They are accompanied by worldwide maps prepared by Father Jack Pejza for foreign DXers. These maps appeared in Volumes 1 and 2 of the IRCA Almanac, and are available for $2.00 postpaid from the IRCA Goodie Factory, P.O. Box 17088, Seattle, Wash., 98107. You may also send them a self-addressed stamped envelope for a reprint list, including articles on sunrise/sunset DXing.

One other factor in sunrise DXing is the "Presunrise Service Authority" (PSA) issued by the FCC to many daytime stations and some fulltime stations. Most PSA's permit operation at 6am with a power of 500 watts or less. Since 6am is much earlier than real sunrise in October thru February, some stations are DXable quite a ways on PSA power.

The FCC is currently negotiating to allow PSA's on Canada's clear channels, and hopes to liberalize its rules so that more daytimers can use PSA's. The FCC is also contemplating a "post-sunset authority" to permit daytimers to operate until 6pm. If this happens, it will open up even more opportunities for sunset skip DXing!