Communications Committee

Shortwave Listening to the CORAC Net

Overview

- We've been getting requests for some basic explanations on how to listen to the Sunday night CORAC radio net

- We'll start with some explanations of the terminology

- Next are some antenna tips

- How to use the radio (Tecsun PL-330)

- BONUS! How to pick up the JS8Call digital transmissions

Why not "broadcast"?

- Under FCC rules, amateur radio stations are not allowed to conduct one-way broadcasts
- Can't play music, either
- So, we call the Sunday night sessions a "net", which allows for two-way communications
- We start with a Scripture reading, and then invite members (all hams, actually) to "check in", by identifying themselves
- After receiving check ins, the "net control" then asks for comments for all those who have checked in
- Not limited to only CORAC members

Terminology

CORAC

- Radio functions by generating waves
- One radio wave is a cycle, and is measured in Hertz (abbreviated Hz), which is actually one cycle per second
- 1,000 Hz is also 1 kiloHertz (or 1 kHz)
- 1,000,000 Hz is also 1 megaHertz (or 1 mHz)
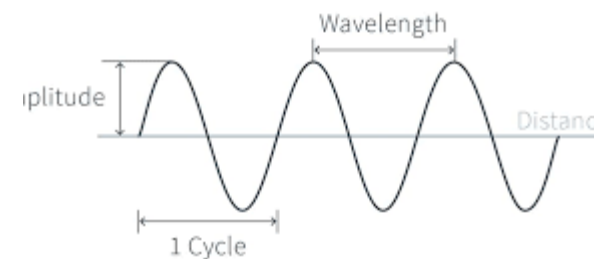
Traditional AM/FM Frequencies

- The AM band extends from 535 kHz to 1705 kHz

- The FM band covers 87.8 to 108.0 mHz

- The CORAC net amateur radio frequencies are in between these two

Radio Spectrum

- Three main divisions in the radio spectrum used by amateur radio
  - HF (high frequency) – between 3 and 30 MHz
  - VHF (very high frequency) – between 30 and 300 MHz
  - UHF (ultra high frequency) – between 300 and 3000 MHz (or 3 gigaHertz)
- Traditional AM broadcast radio is considered medium frequcy, the CORAC net occurs in the high frequency spectrum, while traditional FM broadcast radio occurs in the very high frequency spectrum
- That's why the abbreviation "HF" is also used in connection with the CORAC net

What is "short wave"?

- In the early days of radio, the radio spectrum was divided into long wave, medium wave and short wave

- Long wave was 3 to 300 KHz, medium wave was 300 KHz to 3 MHz and short wave was 3 MHz to 30 MHz, which was as high as it went back then

- Thus, short wave is equivalent to high frequency, so the HF bands are considered short wave
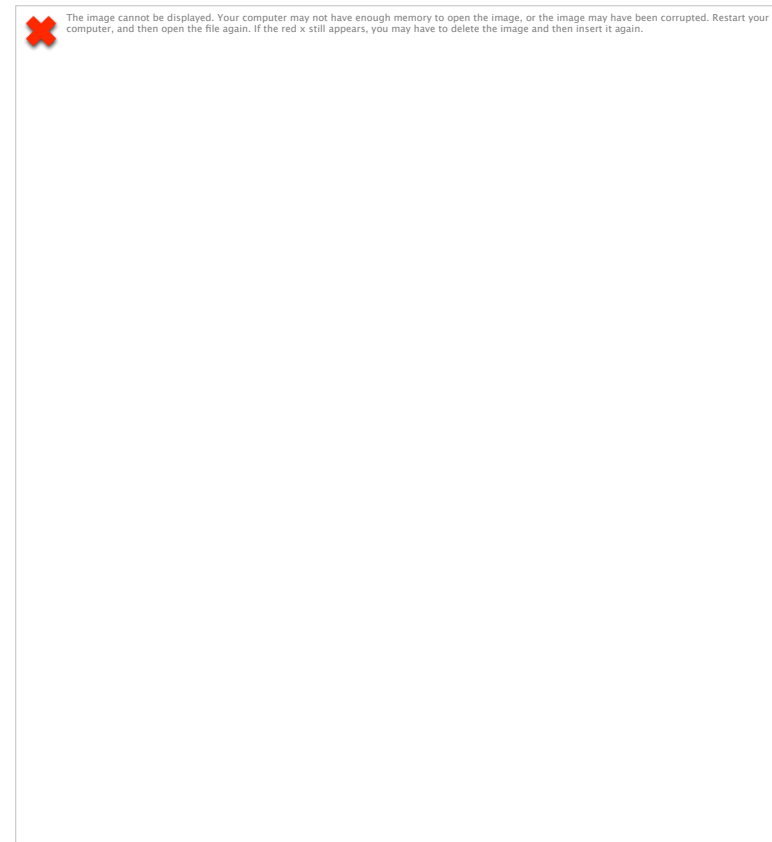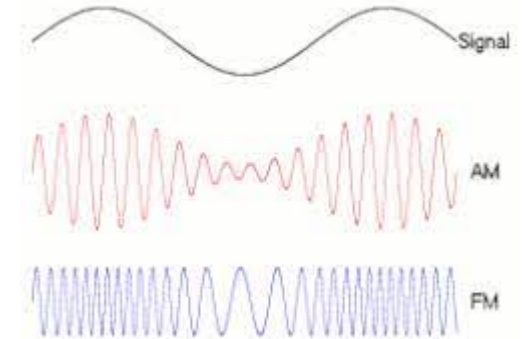
AM v. FM

- AM – amplitude modulation
  - The HF/Shortwave signals used in the CORAC net are AM (actually a form of AM, explained below), which stands for amplitude modulation
   - Simply put, the amplitude, or the signal strength, carries the information of the signal
    - AM signals can be sent for much longer distances than FM, but both the distance and signal quality can vary significantly depending upon atmospheric conditions
    - AM is generally used for HF/shortwave and lower frequencies
    - Signal quality is generally lower than FM, which is why AM stations tend to focus on talk rather than music

AM v. FM

- FM – Frequency Modulation
  - FM stands for frequency modulation, where the information in the signal varies by frequency
  - FM is generally used for VHF and UHF frequencies
  - GMRS, or General Mobile Radio Service, uses UHF FM (there are some excellent articles on the CORAC website on GMRS)
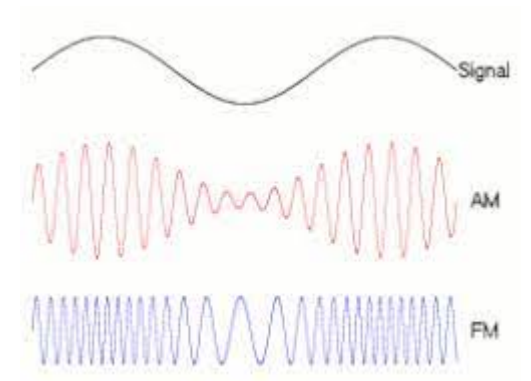
Single Sideband

- Single sideband, or SSB, is another important concept in ham radio

- A standard AM signal consists of a carrier wave and an upper (USB) and lower (LSB) sideband

- The upper and lower sideband contain the same information

- SSB essentially eliminates the carrier and one of the sidebands, resulting in both longer transmission ranges for the same power, as well as less use of the radio spectrum
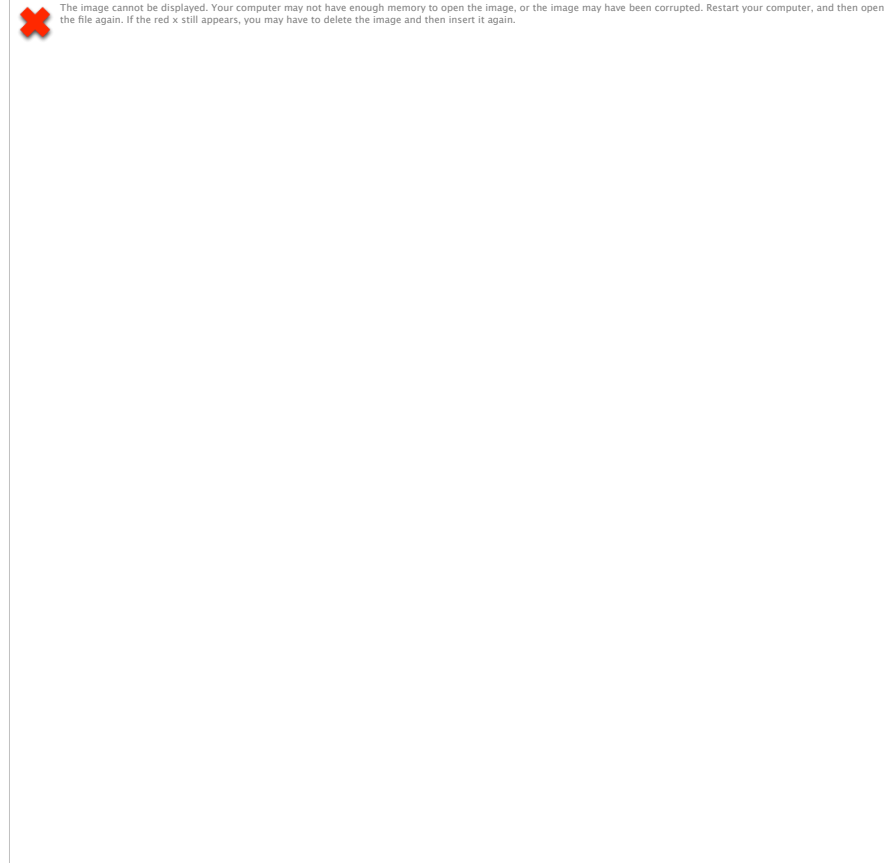
Single Sideband

- The circuits required to receive SSB signals are more complex than standard AM, which is why AM broadcasters never adopted SSB

- Almost all amateur radio transmissions, including the CORAC net, use SSB

- The 7 MHz and lower voice frequencies use LSB, while the frequencies above 7 MHz use USB (all digital modes use USB)

- Therefore, in order to receive the CORAC net signals, you must have a shortwave receiver able to receive SSB signals

- The Tecsun radios we have recommended can all receive SSB signals

The Radio

- CORAC recommends the Tecsun series of radios, of which the PL-330 is the least expensive which incorporates SSB - the cost is $80 from either Walmart or Amazon

- Other Tecsun radios are the PL-660 at $130 or the PL-990 at $280

- The PL-330 has gotten very good reviews, and I find it to be a solid radio

The Long Wire Antenna

- My antenna is based on an excellent article by the late Bill Hammer on the communications section of the CORAC website called "Shortwave Radio Listening"

- Bill's antenna was based on a single 14 gauge wire connected to the radio

- I bought a 100 foot roll of wire for about $40 from Home Depot (black is harder to see)

- I also bought an alligator clamp (available as a 2 pack from Home Depot – Gardner Bender Model 14-610 for $6.58) which I use to connect the wire to the radio

- The wire end going to the radio needs to be stripped so that the alligator clamp makes contact

The Long Wire Antenna

More Options Available

$37.80 (38¢ /ft.)

★★★★☆ (243)

Model# 112-1471CR

100 ft. 14 Gauge Black Solid Copper THHN Wire

Shop this Collection

$6.58

★★★☆☆ (32)

Model# 14-610

Gardner Bender
10 Amp Battery Clamps (2-Pack)

Listening to the CORAC Net

- Look on the Communications section of the CORAC website for the frequencies and times used by the CORAC net

- Because of the propagation characteristics of HF, the bands used for the net will depend on the time of the year

- In addition, we do not have the ability to reserve a frequency for the net, so you may need to try several frequencies before you find it

Tuning the Radio

- The radio is tuned using the keypad or the tuning knob on the right of the radio

- Note the little arrow (1) – if over the last large number it will tune in 10 kHz steps (7078.00, 7079.00, etc.)

- Press the Step button (2) (it may take a few presses) until the arrow moves to the smaller numbers (100 Hz steps) – (7078.01, 7078.02) – that's how you can tune the 7.284.10 frequency

Programming the Radio

- By pressing the VF/VM key (1), make sure you are in frequency mode (rotating the tuning knob changes the frequency instead of the memory channels)

- Select the frequency you want to program, by entering it into the keypad or manually tuning it with the knob

- Choose the correct sideband by pressing either the USB or LSB keys (2)

- Once the frequency is correct, press the Memory key (3)

- The memory channel and "PRESET" will begin to flash

- You can accept this number either by pressing the Memory key again or doing nothing and that frequency will be entered into that channel

- If you want to overwrite a previous entry, you can rotate the tuning knob (upper knob) to select the memory channel to which you want to store the frequency

Digital Amateur Radio

- The digital part of the broadcast uses a software application called JS8Call – which can be downloaded at JS8Call.com

- It works like the old dial-up modems, except that the tones are sent over the air, and it is much slower

- The flip side is that as the signal is much less complex than a voice signal, it can be received from across the country under poorer signal conditions

Digital Amateur Radio

- Since it works with audio tones, you can actually place the radio near your computer's microphone, and it will decode the signals

- You can also get a USB to 3.5mm male connector, which plugs into the computer's USB port and the radio's headphone output

ZIMRIT 3.5mm Male AUX Audio Jack to USB 2.0 Male Charge Cable Adapter Cord 3 Feet (3.5mm Aux 3 feet)
Visit the ZIMRIT Store
4.0 ★★★★☆ ⌄   4,398 ratings | 363 answered questions
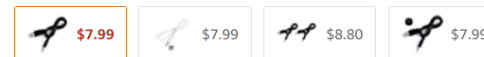
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Compatible Devices	PC
Specific Uses For Product	Mp3 Player,Speaker
Connector Type	USB 2.0
Connector Gender	Male-to-Male
Color	Black

Roll over image to zoom in

Software Configuration

- The software contemplates both transmitting and receiving, so it requires a ham radio call sign, issued when one acquires a ham radio license

- Thus a box comes up with two pink stripes, where it wants your license number and a location code

- If you are using a microphone, just close the box and the defaults should work

- With a cable, plug the radio in and turn it on, and then start the software – the software will detect the cable (and then close the box)

- One point not covered in the video is that is Settings | Station in the configuration file, if @CORAC is added to Callsign Groups, messages with an @CORAC prefix will show up in the middle box