

# Radio

# Contents

- Radio** **3**
- Small Broadcasters . . . . . 3
- Shortwave Radio . . . . . 3
- Receivers and Antennas** . . . . . 4
- Programming** . . . . . 4
- Time** . . . . . 5
  
- Related websites** **7**
  
- Tips** **8**
- Crystal Radio . . . . . 8
  
- Original Radio** **10**

# Radio

Whether at home, on the lam, or traveling the world it is useful and socially comforting to get news and programming in your native language and from several sources. Having a news station or shortwave broadcast in the background is usually enough to satisfy even the most addicted news hound even when cut off from the net.

If you want to use radio for secure, distant, or tactical two way communications see Communication

To avoid confusion if you come across older radio manuals, the terms "hertz" (Hz) and "cycles" (c) mean the same thing.

## Small Broadcasters

Check out the 88 to 91 MHz range of the dial. These stations are licensed by the FCC for non-profit broadcast. This includes not just NPR affiliates and national syndicated religious programming, but local and college broadcasters. If you live near a college or university, be sure to check out their radio facilities. Many are quite large, sporting FM and AM transmitters in the kilowatt range. These stations usually have their own FCC licenses, and are fiercely independent. There are a variety of opportunities, both as music DJ and other programming, and usually are willing to let community members get involved.

## Shortwave Radio

In an age of snooping and censorship, Shortwave Radio can be a godsend. International broadcasts can provide different perspectives on a major news event, as well as providing information that may not be available from corporate sources. Some stations, like Radio Habana Cuba and Voice of Korea (North Korea, that is) have a heavy political slant to their reporting, while the far-right conspiracy mongers who buy air time on US commercial stations often drift into the political Twilight Zone.

The BBC (British Broadcasting Company) World Service is a great source of news and info, but in a cost-cutting move, stopped almost all their entertainment programs on the World Service as well as discontinuing beaming signals to North America. They now focus on satellite radio (Sirius and XM) and licensing programs to NPR stations. However, you can pick up the BBC's Asian, African and Caribbean services in many parts of the USA. You can also listen in on the internet for free ( <http://www.bbcworldservice.com/>).

CRI (China Radio International), broadcasting from Beijing, picks up some of the BBC's slack especially in Asia and Africa with their Simple English service and Chinese language lessons. It often has a college radio feel with some shows being the hosts chatting on random topics like favorite holidays or stolen bicycles. They like to get emails and respond on air ( <http://english.cri.cn/>).

WBCQ "The Planet", a commercial USA shortwave station, was founded by former radio pirate Allen Weiner (Falling Star Radio Network, Radio Newyork International), and offers a number of diverse programs on the station's frequencies. Programs ranging from Christian preachers to old time radio to music programs to financial planners who want you to buy their gold coins. ( <http://www.wbcq.com/>)

Voice of Korea (formerly Radio Pyongyang) reflects the Stalinist government of North Korea (or as they prefer, the Democratic People's Republic of Korea or "DPRK"). While their station is a worthy catch for shortwave listeners, the programming can be quite detached from reality, since it mostly extols the "Supreme Leader of the Republic" Kim Jong-il and the glories of their country. A word of warning: If you send them a reception report (at: Voice of Korea, Pyongyang, Democratic People's Republic of Korea) you may be getting fliers and newsletters in the mail for several months afterwards. The station has no website, but recorded broadcasts can be heard here: <http://northkoreanradio.com/>

## Receivers and Antennas

When buying a shortwave receiver, get the best you can afford. Cheap portable radios simply aren't worth it. While the many "wind-up" radios, like the Baygen Freeplay models (<http://www.freeplayenergy.com/>), are good in an emergency, you'll need a serious radio for serious listening. This does not mean that a small travel radio is not necessarily a quality receiver, but be watchful since many well known quality brand names also have a junk discount product line for the lower end. Research the model that you want before buying.

Some newer radios have digital technology like "DRM" (Digital Radio Mondiale, French for "Digital Radio Worldwide"). This promises much of what digital TV offers; more channels and cleaner signals with smaller bandwidth using less power. However, this is still in the experimental stages and only a few stations are using it.

If you can, get a radio with continuous tuning (150 to 30000 kHz) and a Sideband filter so you can listen to the Hams and Pirates. Check the net and look for mods to your shortwave radio to tap the IF stage and add the sideband or digital decoding stages. If there's an Amateur radio swap meet where you are, go there and ask a lot of questions. See if you can get a good deal on a used receiver. If someone mentions a "boat anchor", that's slang for an older style desk top radio. The name comes from the fact that since they use vacuum tubes, they're quite heavy and parts may be hard to come by.

If you already have a regular non SSB shortwave set and want to pick up sideband or SSB broadcasts and communications you will need to add a BFO or beat frequency oscillator since sideband unlike broadcast AM is a signal without the wasteful carrier. There are easy plans and ready to solder kits on the net under \$10 to inject a 455Khz IF (intermediate frequency) carrier to the internals of the radio instead of receiving the carrier from a far away radio station. The IF stage is where the received signal goes after the tuner but before mixer and sound amplification, look on the net for info on where this is on you radio or find a good radio geek to help you. The best system is to solder the injector directly to the IF stage of your radio but often just making a loop and placing the injector closer to the radio will be enough to allow good reception of sideband transmissions.

A radio is only as good as the antenna, so if you don't have the space or budget for an outdoor antenna, you can use an indoor longwire antenna. Get 48 feet (about 14.6 meters) of insulated, triple-braid copper wire and an alligator clip. Trim off just enough insulation to attach the clip to the wire, and then attach the clip to the telescoping rod antenna on the radio. Either lay the wire flat on the floor or tack it onto the wall. Don't worry if you have to bend it along another wall, but keep it from turning back onto itself. You want it to stretch it out as far as you can to pick up all the signals. Just remember not to attach the wire to any electrical outlet or any electrical appliance other than the radio, and don't drive any staples or thumbtacks through the wire. You don't need to ground the antenna, since you're using the existing ground in the radio.

## Programming

The closest there is to a "TV Guide" to shortwave is the annually published *World Radio-Television Handbook* ([://www.wrth.com](http://www.wrth.com)), which covers the whole broadcasting industry (AM, FM, TV, Longwave,

Shortwave) and is very tech-heavy. (There used to be *Passport to World Band Radio* which only covered shortwave, but it stopped publication in 2009.) The magazine *Popular Communications* (<http://www.popular-communications.com/>), known by techies as "PopCom", is a monthly magazine that covers almost all facets of radio and TV broadcasting from many technical angles. The centerfold always has a listing of shortwave broadcasts and times. Another good monthly publication is *Monitoring Times* (<http://www.monitoringtimes.com>), which mostly covers Ham Radio and scanners but has a multi-page "Shortwave Guide" listing.

The following websites provide frequently updated shortwave schedules:

- The DX Zone - [http://www.dxzone.com/catalog/Shortwave\\_Radio/Schedules/](http://www.dxzone.com/catalog/Shortwave_Radio/Schedules/)
- Frequent Frequencies - <http://shortwave.frequentfrequencies.com/>
- North American Shortwave Association - <http://www.naswa.net/swlguide/>
- Prime Time Shortwave - <http://www.primetimeshortwave.com/>
- Shortwave Central - <http://mt-shortwave.blogspot.com/>

Pirate radio broadcasts are necessarily unpredictable but tend to hang around the edges of broadcast and ham bands, particularly at 6925-6975 kHz ("42-meter" band) and 10-10.1 MHz ("29" meters), as these are accessible with minor modifications to ham radio equipment.

## Time

Broadcast times are set by Coordinated Universal Time (UTC), which is also called Greenwich Mean Time (GMT) or "Zulu" (Z), and is the local time at 0 degrees longitude. UTC is posted in a 24 hour standard. That is, 2 AM is 0200 or "Two Hundred Hours", 2 PM is 1400 or "Fourteen Hundred Hours" and 5:32 PM is 1732 or "Seventeen hours, Thirty-Two minutes". You can find what UTC is where you are by tuning in time signal stations WWV or WWVH at 2500, 5000, 10000, 15000 and (WWV only) 20000 kHz. If you hear a "tick" once a second, wait for a voice announcement saying "At the tone, - hours, - minutes, Coordinated Universal Time", then a loud "beep" marking the minute. You can tell the difference between the two stations by the voice announcements. WWV in Fort Collins, Colorado uses a male voice, while WWVH in Kekaha, Hawaii uses a female voice. If both stations are being received on the same frequency, you'll hear the female voice first.

In Canada, there is CHU, broadcasting at 3330, 7335 and 14670 kHz from Ottawa, Ontario. They broadcast their timechecks in English and French, beginning with "CHU Canada". Due to propagation problems, their signals can't be heard in most of Western Canada, as well as Nunavut and the Northwest Territories.

Other time signal stations broadcasting on or near 2500, 5000, 10000, 15000 and 20000 are:

- BPM, Xian, People's Republic of China
- BSF, Taipei, Taiwan
- EBC, Cadiz-San Fernando, Spain (4998, 15006 kHz)
- HD2IOA, Guayaquil, Ecuador (3810 kHz)
- HLA, Taejon, South Korea
- LOL1, Buenos Ares, Argentina

- RWM, Moscow, Russia (4996, 9996, 14996 kHz)
- YVTO, Caracas, Venezuela

Not all stations broadcast 24 hours a day, and some ID only by CW (Morse Code). You can get more info on these stations here: <http://www.dxinfocentre.com/time.htm>

While not a time signal station, BBC World Service gives a timecheck tone every hour on the hour. (The signal heard on Internet streaming and satellite radio services is off by a few seconds.)

Knowing these frequencies is very important if you are navigating at sea using a sextant, need to reprogram a computer that you are using to track communications satellites, or any other application where the exact time is needed.

The best thing to do is start a stopwatch at the time check and then take a reading or begin programming your device and just add the time on the stopwatch. When taking celestial readings with a sextant just hit the stop button when you take the reading and you can read the stopwatch and sextant below decks in full light when charting your position.

## Related websites

The following sites offer tips for beginners, reviews of radio receivers, and other shortwave related information including links to other sites.

- DXing.com <http://www.dxing.com/swlintro.htm>
- Eton Radio Shortwave Tutorial <http://www.etoncorp.com/shortwavetutorial>
- Shortwave.be <http://www.shortwave.be/>
- ShortWaveRadio.com <http://www.shortwaveradio.com/>
- SWLing.com <http://swling.com/>

Glenn Hauser has been called "The Yoda of Shortwave Radio" and has a syndicated program, "Glenn Hauser's World of Radio" on many shortwave and Part 15 stations. Podcasts of his shows can be heard here: <http://www.worldofradio.com/>

# Tips

Just to avoid confusion, 1 MHz (Megahertz) equals 1000 kHz (Kilohertz), so 5.75 MHz is 5750 kHz. Also, the older term "cycles" is often substituted for "hertz".

A good thing to remember is that frequencies above 13000 kHz are better for long distance during daytime, and below 13000 kHz is better at night. There is overlap especially within a few hours of dawn or dusk.

Very important: If you are listening at home and using an AC plug for the radio, get a surge protector and use it!

See also Guerrilla Broadcasting

## Crystal Radio

If you get cut off from news outside, say when you are hiding in your unabomber wilderness hut, make a simple crystal radio set, just remember that a crystal set only pulls in strong local stations. All you need is some wire, aluminum foil, a non-cordless telephone handset, antenna and coil wire and a diode (or pencil and razor blade). No battery ever needed! If you find a wall wart transformer or almost any electronic gadget you are almost set except for the telephone handset speaker. A piezo speaker disk might work but sound will be crap. Take a diode and put it in parallel to your earphone, run one wire to a ground like a water pipe or ground and the other should be strung out as long as you can make the antenna. If a ground is impossible, string both ends as long as possible, making a dipole antenna. At the center between the antennas or antenna/ground wire you will place your stacked foil capacitor and a coil of wire around a straw or bottle (anything non-conductive, even air). Play with number wraps and alignment layers of foil (with plastic or paper between). This is your tuner/variable capacitor.

If you need a long antenna wire unwind a motor armature or transformer found in most plug in electronic devices, if you have only some stranded wire untwist and join the strands end to end for a longer more effective antenna and if you are unable to solder them knot and crush together using a steel tool as a hammer. (schematic Wikipedia)

^100p\

see [http://en.wikipedia.org/wiki/Crystal\\_radio\\_receiver](http://en.wikipedia.org/wiki/Crystal_radio_receiver) and <http://sci-toys.com/scitoys/scitoys/radio/radio.html>

Even better, there are crystal radio circuits out there that ROCK; even some of the simple ones such as "The Mystery Crystal Set" are surprisingly effective.

- <http://www.clarion.org.au/crystalset/mystery.html>

Shortwaves crystal sets are QUITE practical; they work on Short Wave broadcasts which are also AM, just a higher carrier frequency; 49 Meters is probably your best bet for a first time effort (that's 5.8 Mhz to 6.2 Mhz kiddies).

Visit the following sites for some cool instructions and snaps of very effective and fairly simple sets.

- <http://www.crystalradio.net/>
- <http://bizarrelabs.com/crystal.htm>



It is possible to make an FM crystal receiver, but you need some specialized capacitors.

- [http://solomonsmusic.net/FM\\_CrystalRadio.html](http://solomonsmusic.net/FM_CrystalRadio.html)
- [http://www.somerset.net/arm/fm\\_only\\_lowtech.html](http://www.somerset.net/arm/fm_only_lowtech.html)
- <http://www.gizmowatch.com/entry/how-to-make-an-fm-crystal-radio/>

Another type of crystal receiver is the "Foxhole Radio" that was developed by US soldiers during World War Two, and was also used in Prisoner of War camps by captured soldiers. It uses a razor blade for a crystal and a pencil lead for a tuner. However, you need a "blue" razor blade, which is not very easy to find these days. Back in the day when stainless steel was expensive, the blades were coated with blue silicone so they stayed sharper longer. You can also try a dark blue colored box cutter blade or hacksaw blade. If you can't track one down, find a blade that is rusty (or soak it in vinegar, salt water, gun bluing or cola for a few days to promote rust). Note that this sort of expedient detector is quite difficult to adjust and not as sensitive as a 99 cent 1N34A diode from Radio Shack or ripped out of of a broken radio or "wall wart" transformer, but if it's all you've got, try it.

- <http://bizarrelabs.com/foxhole.htm>
- <http://www.youtube.com/watch?v=skKmwT0EccE>
- <http://www.adonald.btintemet.co.uk/Crystal/Crystal.html>
- <http://www.peeblesoriginals.com/Fox-Hole-Radio.html>
- <http://www.scribd.com/doc/7846118/Foxhole-Radio>

More important than relieving boredom, a crystal set works without batteries or plug in power and, if kept in good condition, will probably outlast your great-grand kids. Think about that.

However, more importantly to us is not RECEIVING radio signals but TRANSMITTING them- see Guerrilla Broadcasting

# Original Radio

Want to construct your own neighborhood radio station? You can get a carrier-current transmitter designed by a group of brothers and sisters called Radio Free People. No FCC license is required for the range is less than 1/2 mile. The small transistorized units plug into any wall outlet. Write Radio Free People, 133 Mercer St., New York, New York 10012 for more details. For further information see the chapter on Guerrilla Broadcasting later in the book.



Radio

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[stealthiswiki.com](http://stealthiswiki.com)