Newcomers and Elmers Net: Software-Defined Radio Options
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SDR
Software-defined radio simply put is where a computer processor/integrated circuits take analog signals from an antenna, turn them into digital signals which computers understand, and then apply various filters and sampling to the signal before returning it to analog and out the speaker
-- most analog radios over the last 10 years or so have some elements of SDR in them, even though it is not readily apparent
-- for example, the tuning dial of modern radios is an optio-electric sensor – not a manual tuning dial like in the 60s or 70s.
Computer code is applied to the digital signals withing the circuitry of all modern radios with DSP chips – they will boast of 16 and 32-bit processing chips and other computer-related features
-- not a huge jump to an all-computer designed radio
-- much of what we see on modern "analog" radios is just to keep us old-timers happy with buttons to press, knobs to turn, and switches to flip

SDR Basics
Some SDRs rely on the laptop or desktop PC for most of their processing power; USB SDR Dongle chips are like that
-- Since almost all radio enthusiasts have at least one computer, using that computer drastically reduces the price of an SDR.
-- Another advantage to using a standard PC is software integration. The SDR can easily be used with many different digital-mode packages, logging programs, and even computer control interfaces.
-- Updates are easy using standard Internet connections, and memory/storage capabilities are easily expandable.
-- Other models rely on specialized digital signal processors which can allow stand-alone units some incredibly fast processing times, and dramtically increase the efficiency of signal manipulation

Software does the Real Work
-- Software manipulation of a signal is possible because of the technology which converts an analog signal to a digital one: a processing chip called an ADC, or analog-to-digital converter, puts the received electrical signal into a discrete-time and discrete-amplitude digital signal.
-- Once a signal has been converted to a digital format, all kinds of manipulation or *processing* of the signal is possible.
-- This conversion is done through *sampling*, where the ADC takes a predetermined number of readings or samples, rather than one single conversion.

-- *Oversampling* is a process by which signals are sampled at a high frequency and then digitally filtered to reduce the bandwidth.
-- The signal is then usually dropped to a very low intermediate frequency, and thus enhancing the ability of the software to manipulate the signal.
-- With the right combination of filters, for example, a digitally-filter signal can have a sharper filter-form without as much damage to the signal as a similar analog filter.

-- In addition to functions such as AGC (automatic gain control), noise reduction, and notch filtering, SDRs allow for rather advanced digital signal manipulation.
-- For those familiar with operating CW, for example, traditional analog filters are often either too steep or too wide.
-- An SDR can accomplish extremely tight narrow filtering without unnecessary clipping of the audio with the click of a mouse.
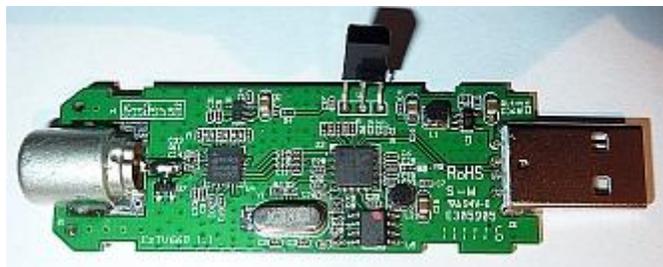
-- Similarly an SDR can lock on to portion of a signal and track it, much like the synchronous detect feature of some higher-end radios, but often with better results than its analog cousins.
-- The result is a stronger continuous signal less prone to fading.
-- Broad spectrum coverage is another advantage to an SDR receiver as signals from across the chosen spectrum are visible on a typical waterfall display (so called because of the movement of the graphical representation of the band which resembles a waterfall).
-- For those who have used some of the digital modes such as PSK31 or MT63, the waterfall display is a familiar one, and it can become addictive!

DAB Dongle
An inexpensive entry into SDR is the DAB Dongle.
-- For a bit of technical background, the USB SDR dongle I have been using is based on an RTL2832U integrated chip and the R820T tuner chip.

-- The dongle has a tuning range of about 25MHz-1700MHz with the R820T chip, while some based on the E4000 chip or the FC0013 chip are slightly different.
-- These dongles were designed for Digital Video broadcast reception in Europe, but their design architecture allowed for SDR use

-- Depending on your unit, you may see as much as 2MHz width of signal at one time displayed in a waterfall on the computer screen

-- The noise level is obvious, and the signals rising significantly above the noise level is likely a broadcast station.
-- When you click on the signal (using a software program like SDR# see below), the receiver is tuned to that frequency, and you hear it through your computer audio.
-- The bandwidth can be recorded depending on your setup, allowing you to go back and listen to the various channels.
-- more expensive units like the Elad FDM-SW2 offer up to 6 MHz, while the newest Flex radios go up to 10 MHz or more.
-- Of course, all of the typical VHF/UHF bands may be covered, such as marine, military and civilian aircraft, local businesses, etc..
-- Pretty much anything you can pick up with a regular scanner can be received with one of these units

From an email to the NewcomersElmers Yahoo Group from Ron, KD8AFH:

Check this link often, as
new articles appear all the time.
http://www.rtl-sdr.com/

Here is a site for the basics; sort of FAQ too:
http://tylerwatt12.com/tips-for-using-sdr/

Here is a site talking about some software to use:
http://rtlsdr.org/softwarewindows

Here is where I purchased mine. As Robert stated, you will need an adapter for use with your amateur antenna. In my opinion, don't even bother with the antenna that they ship with the dongle.
http://www.adafruit.com/product/1497

Additionally, here is a link to some SDR receivers on the internet that you may wish to try out.
http://www.websdr.org/

Hope this helps. Have fun!

Ron
KD8AFH

An additional Resource for purchase:
http://www.amazon.com/NooElec-Previously-Compatible-Packages-Guaranteed/dp/B009U7WZCA/ref=sr_1_2?s=electronics&ie=UTF8&qid=1416252751&sr=1-2&keywords=rtl2832u