# Internet Accessible Software Defined Radio Receivers

Don't have an HF radio but would like to learn more or find what it is about? Many radio enthusiasts that have connected Software Defined Radio Receivers to the internet that you can operate from your web browser via an internet connected computer.

There are three major types available. WebSDR, OpenWebRX, and KiwiSDR. Each have the same basic features, allowing you to select a frequency, USB, LSB, AM, FM and often with various or adjustable pass-band widths and other controls. All allow the user to zoom in or out on the displayed frequency and waterfall display. You can change the displayed frequencies and/or adjust the center displayed frequency, just by dragging the appropriate section of the screen. Some may restrict you to specific bands. Others appear to cover LF through microwave bands. There are approximately 1250 of these stations located around the world. Therse can be located using a map of published stations that will link you to these stations. The home page of the site is: https://rx-txinfo, and the map is available by clicking on the Map Tab. Optionbuttons allow you to display all three types to choose from or just one variety. The picture on page 1 is of the KiwiSDR site located east of Highway 26 in Gresham, OR.

### WebSDR

From my playing around with them, WebSDR has the provide the most amount of controls but rely on the user to set them Enter frequency above, or nue by clicking dragging scrollwheel on the frequency scale. for best operations. I've mainly used of the many WebSDR Mode: LSB sites in Northern Utah.

- As the others you can key in a specific frequency and C200M C630M C640M CAM-160M-120M C60M-49M 060M-49M 040M adjust by clicking a button to change by specific amount. A single click will take to that band and to the Blue WebSDR (#3): 90-80M 41-40M 31M-30M 25M SW 19M SW 2M Lo 2M Hi SDR that supports it (color coded).
- The Utah WebSDR site also multiple receivers and antennas some are directional (non-rotatable) and others are omnidirectional.
- Most of the modes allow for a selectable bandwidth. as well as pass-band tuning.
- The current frequency indicator can be used to tune by clicking on the frequency scale.
- Left clicking on the waterfall display and dragging it allows for scrolling the display for which frequencies are shown.
- This site uses labeled buttons for zooming in/out of the CW wet a center/hequency of 750 Hz and L3B by default waterfall.
- Text labeled buttons also provide adjusting the speed <- low PBT >> low PBT high PBT -> low PBT -> low PBT high PBT -> low PBT -> of the waterfall.
- Like the others, the SDR waterfall displays will show significant locations on the band, such as the W1AW CW location of the displayed band.
- WebSDR has one of the shortest waterfalls of the three types

### Frequency: 7272.000 kHz VFO: A (B: 7272.00 kHz USB) -2.5k -500 -50 -10 -1 =kHz +1 +10 +50 +500 +2.5k VFO: A/B A=B B=A Use the = kHz button to snap to the nearest kHz. Clicking a band below will switch to the Green WebSDR (#2) with its Omnidirectional anter 30M 20CW 20PH 17M 15M 12M 10M Lo 10M Hi 6M Clicking a band below will switch to the Magenta WebSDR (#4) with its East-pointing beam: 400CW-E 400PH-E 30M-E 20CW-E 17M-E 15M-E 12M-E 10M-E Lo 10M-E Hi WebSDR #4 uses a Non-Rotatable directional antenna with a heading of 87° true (East - U.S., Africa, Southern Europe) Store <th WebSDR #5 uses a <u>Non-Rotatable</u> directional antenna with a heading of 278° true (Northwest - Alaska, Asia, Pacific). Clicking a band below will switch to the <u>Salt Lake metro WebSDR:</u> 2M Low 2m High 70cm RPT Lo 70cm RPT Hi SLC ATC 6M Lo Memories: recall erase store (new) Memories are stored as cookies on your computer, not on the server Bandwidth: LSB: 2.80 kHz @ -6dB; 3.26 kHz @ -60dB. Default BW in bold CW-wide LSB-wide USB-wide AM-wide FM-wide SAM-U CW-med LSB-med USB-med AM-med FM-med SAM-L CW-nrw LSB-nrw USB-nrw AM-nrw FM-nrw Info USB CW RX: Check box, or put ?usbcw in the URL for USB CW reception PassBand Tuning (PBT): << wider >> | >>narrower<< | << IF shift << | >> IF shift >> | Use buttons to select BW/mode or drag passband edges on frequency scale. PBT/IF Shift by Weert Websdr Figure 1: A Portion of the WebSDR Controls

## **OpenWebRX**

Of the three, OpenWebRX has the more minimalistic set of controls. It also appears to have the least amount of stations within the US.

- A dropdown list is used to select the desired band
- I didn't see ways to limit the passband or bandwidth
- Left clicking on the waterfall and dragging will set the frequencies visible.
- Zoom In and Zoom Out are buttons displaying the traditional magnifying glass icons.
- A nice feature is provided for digital modes. Clicking on the label of the digital mode in the frequency display will move the current frequency to the base location published for that mode and band and two windows pop-up displaying a more detailes water fall, and another window showing the decoded text. Figure 3 shows and example of this for FT4 digital mode.



Figure 3: OpenWebRx FT4 Focus Waterfall and Decoded Text

### **KiwiSDR**

KiwiSDR appear to be the most prolific of the group. The KiwiSDR software is utilized by a specific SDR receiver that comes in two forms, as an add on to the Beagle Bone Black single card computer (similar to a Raspberry Pi) or as fully contained SDR and Computer combo. The SDR receiver is of a very high quality design. There aren't as controls as the WebSDR software has, but what it does seem to adjust to the mode selected. The picture on Page 1 is of a KiwiSDR on my browser running on the FT8 Band and decoding the received text.



Figure 4: Map of KiwiSDR operating locations.



Figure 2: OpenWebRX Controls

- A dropdown list is used to select the desired band, and the frequency can be entered by value or by clicking on the water fall.
- Small incremental frequency changes can be made by clicking on the + or icons.
- Clicking on a flag of a mode on the frequency chart will align your frequency marker to that mode, but you must select that mode in the drop down to get the decoding feature.
- Zooming in and zooming out is made by clicking on buttons displaying the traditional magnifying glass icons.



Figure 5: KiwiSDR Controls

- A nice S meter is displayed with the controls.
- The drop down displaying FT8 in the picture, also includes a large variety of modes that it will decode.
- The frequency marker point to the received section of the waterfall can be resized to filter out nearby activity.
- Left clicking on the waterfall and dragging will set the frequencies visible.
- The decoded text window will let you select from a list of all frequencies supported by that mode.

Running these is quite simple, while writing this article, I had three tabs in my browser open each running a different flavor. It was interesting seeing the difference in the received FT8 signals on the same band, since the radios I had accessed were located in different parts of the country.

When selecting how I configure my radio for operation, I try to follow the recommend operator guidelines. One recommendation is looking at visual of your emitted signals. selected a UTAH WebSDR site and setting it to match my transmissions, gave me the ability to see the water fall of my signal at a remote location. I chose this site as I knew it was close to a RMS Gateway I regularly use. I set the WebSDR receiver to the frequency I would be using for VARA HF and sent the message on my Winlink Express Client. Doing this, I was able to see my signal that was being transmitted. I had chosen a VARA 500 mode, and could see I had a nice clean signal with no splatter all within the 500 Herz bandwidth as it should be. I did a little changing of the ALC away from optimum and could see the impact of the poor setting. A great tool to help optimize your transmission signals.