

## The future world of HAM radio: *Software Defined Radio's (SDR)*

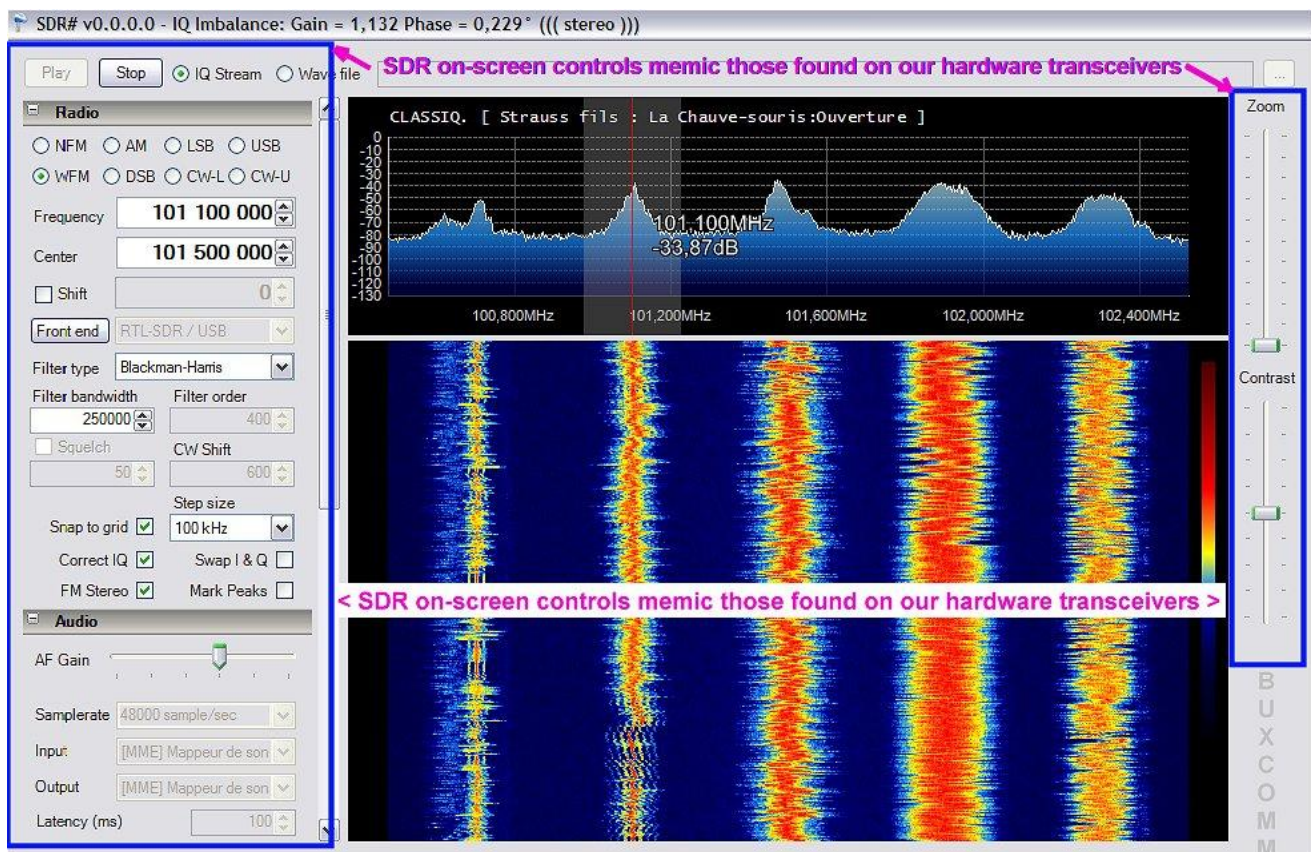
There's a lot of chatter on the internet about using cheap DVB-T devices with selected software as *software defined radio* (SDR) receivers. It all began when DVB kernel developer Antti Palosaari revealed that an economical USB EzTV 668 DVB-T/FM/DAB USB dongle that is based on the RealTech RTL2832U chip, can be used to stream raw I/Q samples to most PC's.

In addition, the same device/dongle supports FM and DAB reception with the data sent to the host/PC where the PC and application software does the demodulation.

SDR reality should not come as a surprise to anyone since most of our recent transceivers are now computer based. In addition nano-technology has presented us with tiny radios that are smaller than a pack of those relics of our past, king-sized smokes.

These microprocessor based, nano-technology +transceivers have their own internal computer that reads, and disseminates digital pulses and data via internal "software." We more readily refer to this software as "firmware" because the software is embedded in an EEPROMs and/or a flash memory bios.

The tiny rubber buttons on the face of our large base station transceivers and the hand held transceivers of today are similar in design to the on-screen control buttons display of the *Software Defined Radio* software.



In addition to the display exhibiting the SDR controls and buttons, it also displays a panoramic view of the band on each side of the selected frequency. This panoramic view is several megahertz wide, providing indication of other signals each side of the frequency we are listening to.

As I read the various articles and advertisements for the Software Defined Radio (SDR), my interest grew, so much, and so fast, that I had to experience the fun of SDR for myself.

I contacted Tony Parks at: <http://fivedash.com/>

The SoftRock Kits came into being in 2005 based on Tony Parks KB9YIG's experience with an SDR 1000 *Software Defined Radio* and the series of articles in QEX by Gerald Youngblood K5SDR.

The softrock kits were introduced as a low cost technology sampler for Software Defined Radio and Tony continues to offer the kits as such. Many people have contributed to the design and testing of the various kits to lower the cost of the kits and to improve performance and functionality. It is estimated that, since the Softrock's inception, over 15,000 kits have been shipped to builders in about 60 different countries.

## What is a Softrock

Softrock is the title for a *software defined radio* (SDR) which consists of three major building blocks:

1. The SDR hardware (e.g., one of the Softrock kits)
2. A PC running special SDR software (which is free to download - see the "some SDR software" section of [Alan G4ZFQ's website](#))
3. and a stereo soundcard (with one stereo input for RX and, if TX is desired, a stereo output for TX and a second soundcard to deliver the demodulated RX sounds to the PC's speaker)

This document will focus on the highlights of both the SDR software and hardware. All of the softrock rigs currently available provide either RX and/or TX capability for signals either side of a "fixed" center frequency.

Some of the SoftRock hardwares allow the user to tune the local oscillator to multiple center frequencies; the earlier hardware limited us to a crystal-controlled center frequency that was, indeed "fixed". The bandwidth made available by SDR's is a product of the PC Soundcard make and model used.

Some of the software available for SDR receivers are:

- (1) ROCKY
  - (2) FAROS/CW Skimmer
  - (3) POWER SDR SEVERAL VERSIONS (1)SR40 (2)-IQ (3) SDR-Kits (4) IF Panadaptor (5) GENESIS
  - (4) SDR# SDR Sharp. I recommend this for a beginner. Receive only but easy.
  - (5) WINRAD Including HSDR, the best Winrad? Well featured. Now has TX capability.
  - (6) SDR-Radio and Server Simon, HB9DRV's progressing work.
  - (7) Pebble SDR A simple RX program with database.
- and there's much more....



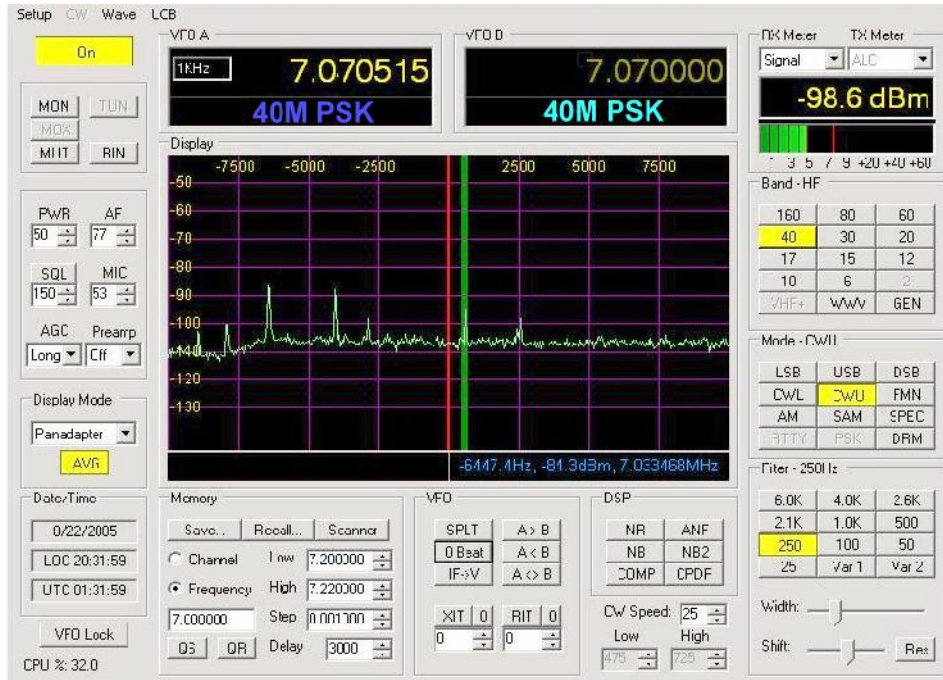
The photo above reveals the "wheels and whistles" within an SDR dongle, and the antenna input and USB output ports.

There's loads of SDR software on the internet, and most of it is free for the downloading.

Simply use your favorite search engine to locate the SDR software of your choice, or that fits your need and application.

I enter the keywords; "SDR radio software" I had more than 2000 links returned to me from these keywords.

Shown below is a screen shot from one of the SDR software packages. Note that the display can be configured in several ways, defining colors, waterfall, and graphic displays.



One of the nice features that we immediately notice is; All the commands, options, configuration settings, modes, frequency's, etc... are displayed on your computer screen. All this without having to sort through a manual, and menus that must first be found so they can be set or changed.

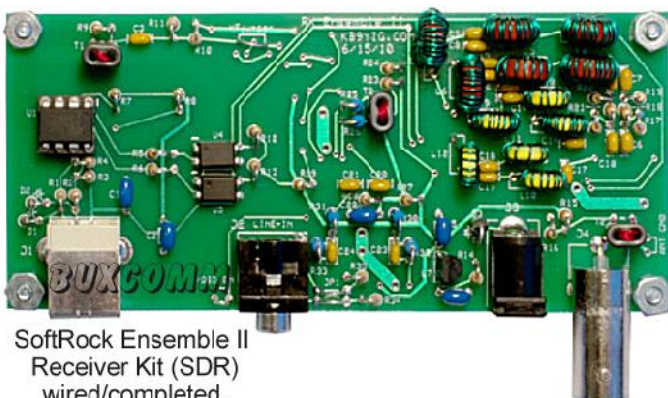
Tony KB9YIG announced the implementation of his new ordering system. I have ordered several of the DVT-T dongles which operate 60 MHz through 1.7 GHz. They perform well at VHF, UHF and into the microwave region. Tony is up to his "SDR's" building the Softrocks. You can visit his web site, go to:

<http://fivedash.com/>



The SDR dongles (*shown at left*) I have are set to operate in the VHF, UHF, and higher spectrum frequencies.

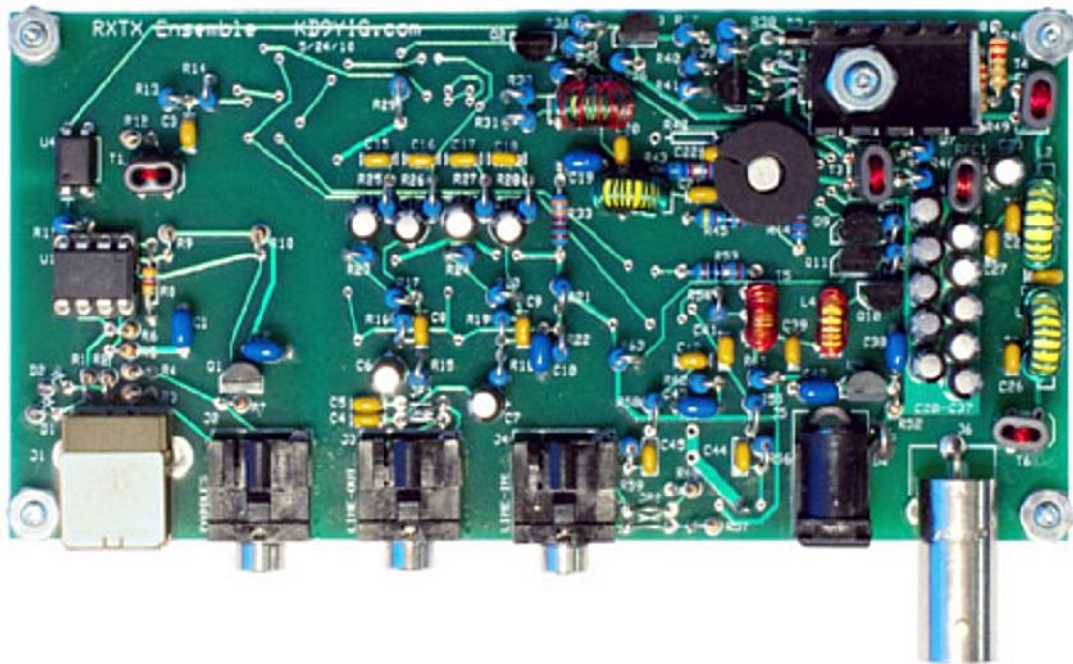
After talking with Tony KB9YIG, I had to have one of the HF SDR's, so I ordered the [SoftRock RX Ensemble II Receiver Kit](#), except this one is wired and tested by Tony.



SoftRock Ensemble II Receiver Kit (SDR) wired/completed.

The SoftRock RX Ensemble II Receiver *Kit* (at left) include the components to build the kit for LF, 180kHz through 3.0 MHz, operation *or* for HF, 1.8 MHz through 30 MHz operation. I chose the 1.8 MHz through 30 MHz. All the modes I like to monitor and work. The circuit board measures 4.5 inches by 2.0 inches.

My next SDR order is going to be the SoftRock RxTx transceiver. The ready to operate, wired and tested by Tony Parks, KB9YIG is shown below.



The RxTx SDR transceiver (shown above) comes in five models... The TxRx SDR transceiver kits are in five packaged for various segments of the HF Bands, The list of band segments are:

- 160m
- 80m/40m
- 40m/30m/20m
- 30m/20m/17m
- 15m/12m/10m

My choice is the 40m/30m/20m transceiver. In kit form, it is less than a hundred dollars.

As I progress in this new-found fun venture, I'll be updating this article with more links and maybe some products to help you get started in the future world of HAM radio *Software Defined Radio's (SDR)*.

**Meantime, please visit:** [www.PacketRadio.com](http://www.PacketRadio.com) and [www.HamRadioExpress.com](http://www.HamRadioExpress.com)

For loads of HAM radio related (free) handbooks and articles, **Visit:** [www.JaComm.com](http://www.JaComm.com)

### 73 de Buck Rogers K4ABT

#### Acknowledgements:

*To:* Antti Palosaari, Project Manager at Nokia Siemens Networks, Finland Telecommunications. Antti described a design that permits an economical USB EzTV 668 DVB-T/FM/DAB USB device could be made into a cost-effective SDR.

*To:* Gerald Youngblood (K5SDR) of Flex-Radio Systems has made the *PowerSDR* project possible.

*To:* Bob McGwier (N4HY) and Frank Brickle (AB2KT) who has licensed their DSP code (the DSP engine in PowerSDR) under the GPL.

*To:* Tony Parks (KB9YIG) for his contribution to *Software Defined Radio's (SDR)* based on the series of articles by Gerald Youngblood K5SDR.

Our thanks for their contribution advancing the Software Defined Radio (SDR) aptitude, talent, and for making their system available under the GPL license that make it possible for us to enjoy their accomplishments in this futuristic facet of amateur radio. There are others who have and will contribute to this project, our gratitude is extended to them also.