

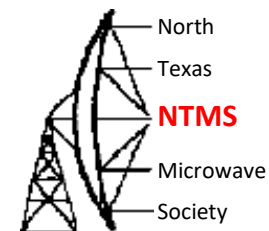
RTL-SDR

An Inexpensive and Portable SDR using a USB Sized Dongle

George Perkins – N5UI

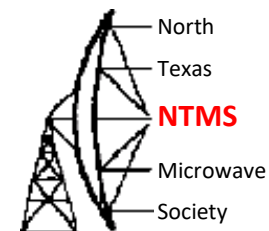


What is RTL-SDR?



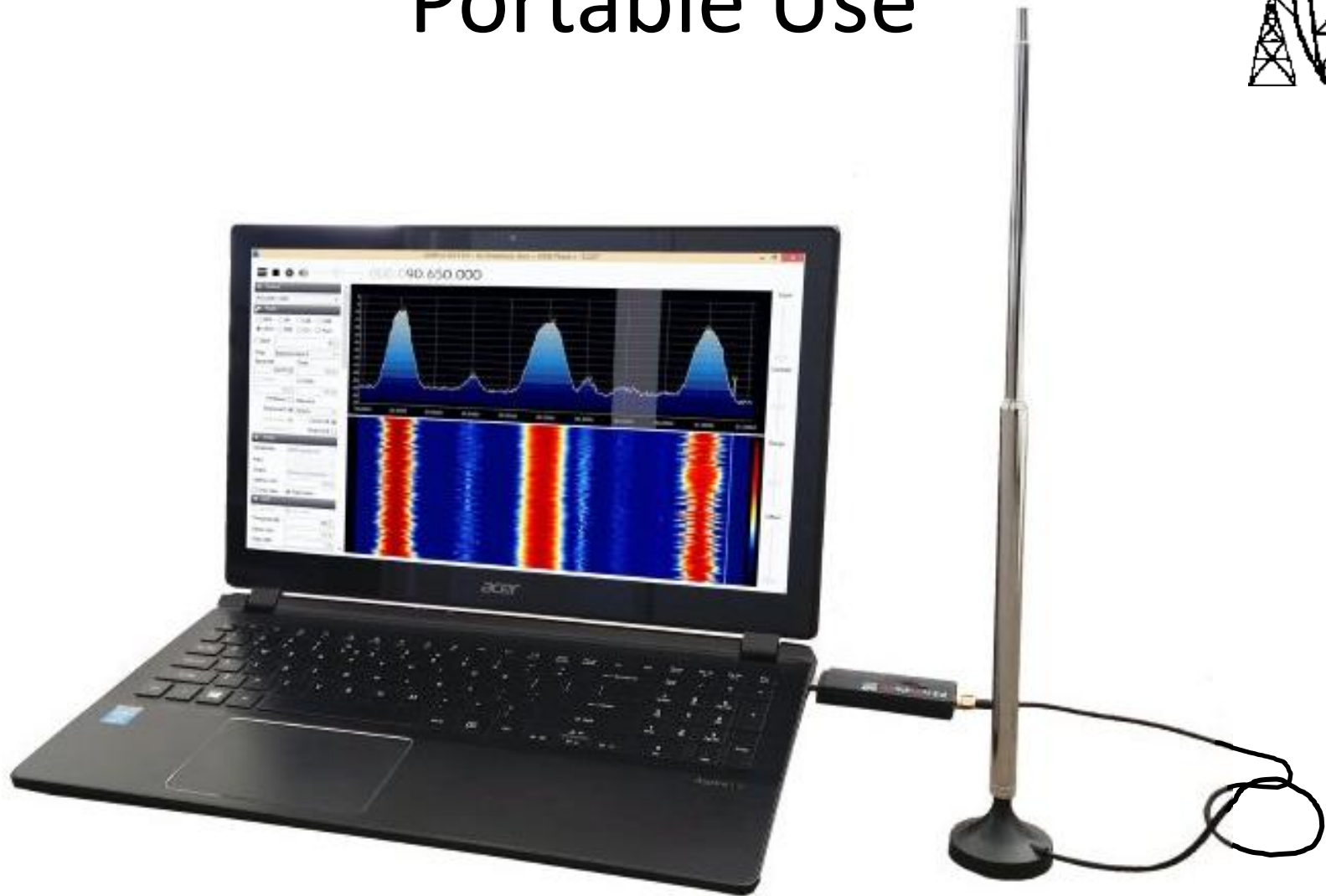
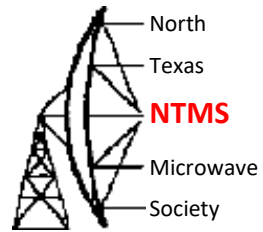
- What is RTL-SDR?
 - An inexpensive Software Defined Radio (SDR) receiver that uses a DVB-T TV tuner based on the RTL2832U chipset
 - DVB-T is a European based Terrestrial Digital Video Broadcasting standard
 - The RTL2832U chip supports USB 2.0 and usually is assembled on a USB dongle about the same size as a USB Flash Memory stick
 - RTL2832U is a RealTek product, details and specs can be found at <http://www.realtek.com>

What Do You Need?

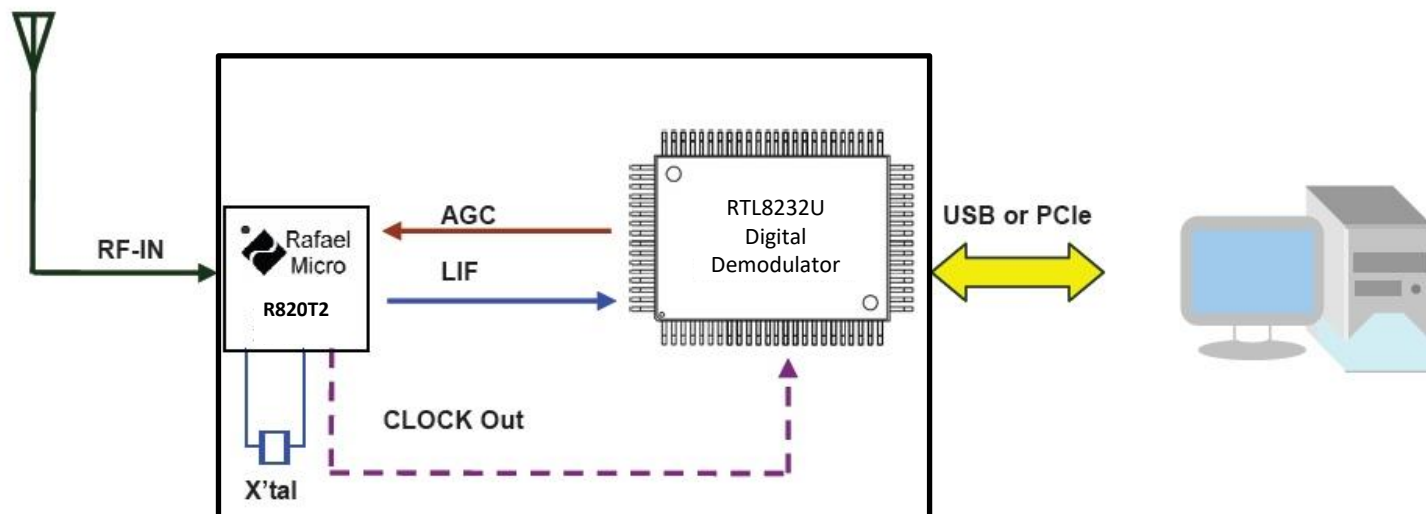
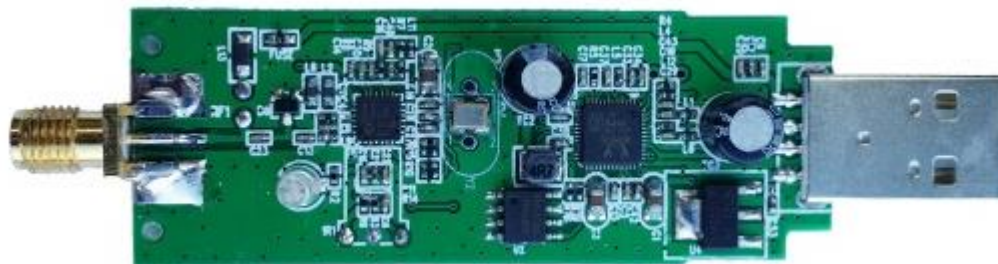
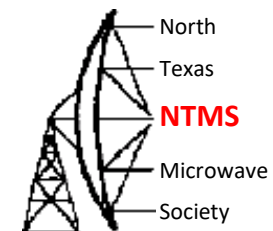


- An RTL-SDR Dongle
 - Preferably with an **R820T2** tuner chip, typically < \$20
- A computer or laptop
 - At least dual core, 1GB RAM, Windows XP or newer
- Antenna and coax with an MCX connector or MCX to coax adapter
- RTL-SDR Software
 - Many to choose from
 - SDRSharp is free and the most popular

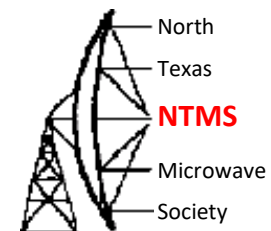
Portable Use



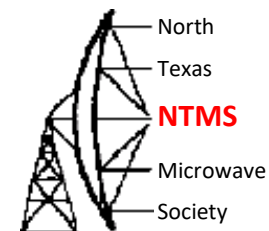
RTL-SDR & RTL2832U



R820T2 Closeup



RTL-SDR Variations



Tuner Chip	Frequency Range
Rafael Micro R820T2	24 – 1766 Mhz
Rafael Micro R820T	24 – 1766 Mhz
Elonics E4000	54 – 2200 Mhz
Fitipower FC0013	22 – 1100 Mhz
Fitipower FC0012	22 – 948.6 Mhz
FCI FC2580	146 – 308 & 438 – 924 Mhz

High Fun to Dollar Ratio



NEW USB DVB-T & RTL-SDR Realtek RTL2832U & R820T DAB FM
Tuner Receiver MCX Input

\$6.50

10 bids

2h left (Today 12:00PM)

From China



Tenflyer TV28T V2 USB DVB-T & RTL-SDR Receiver RTL2832U & R820T Tuner MCX Input USB Receiver
by Tenflyer

\$11.73

amazon

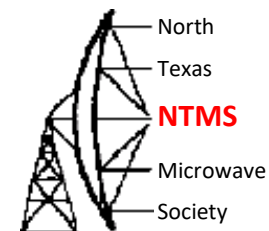
FREE Shipping

Product Features

Applications: SDR, DVB-T Tuning.

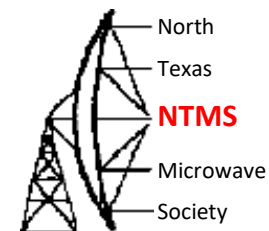
Electronics: See all 30 items

Where to Buy



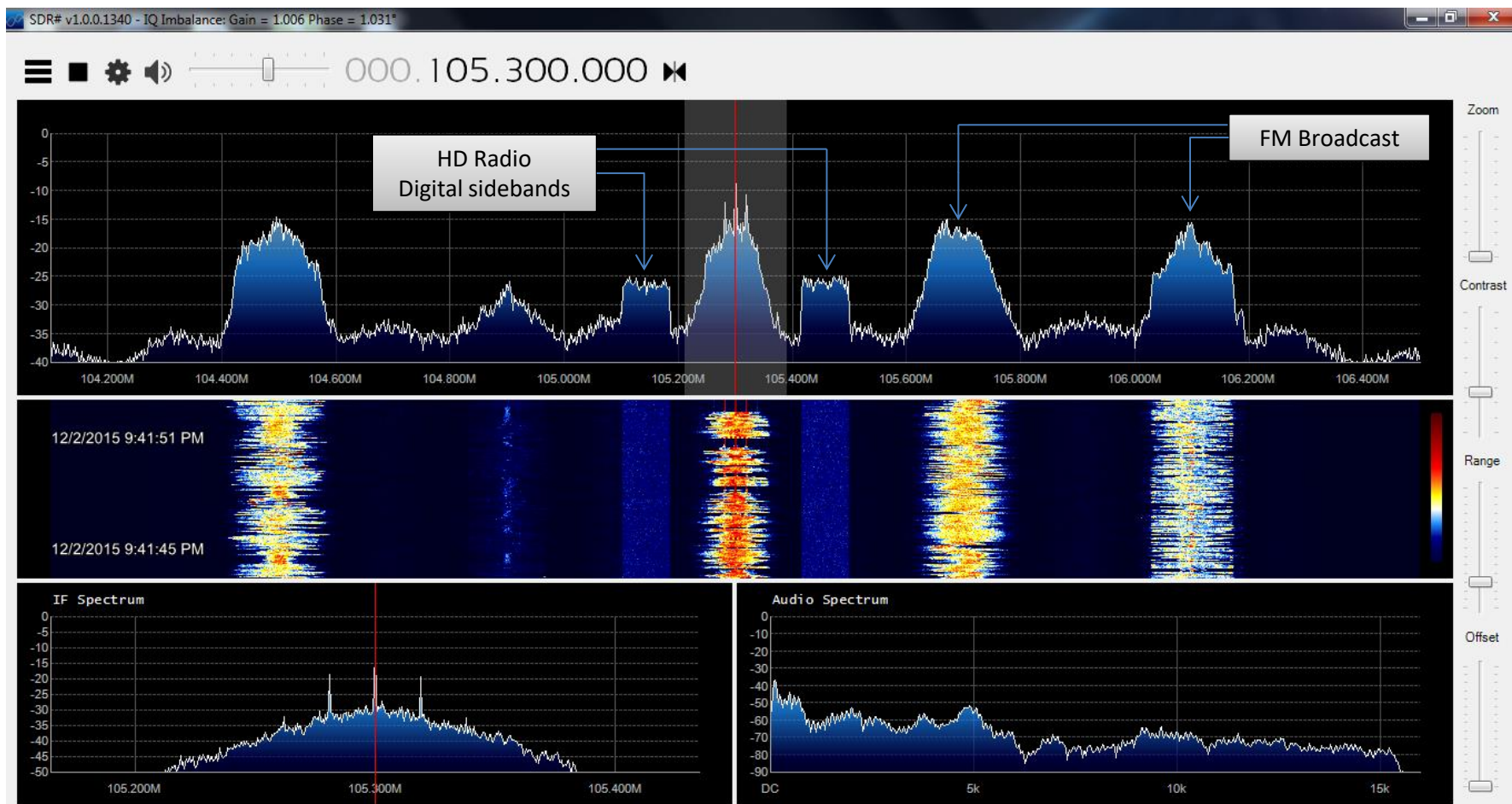
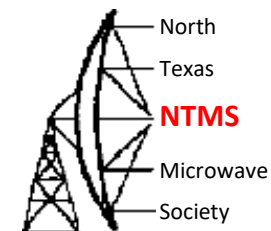
- www.Amazon.com
- www.eBay.com
- www.RTL-SDR.com
- www.NooElec.com
- Many other places, just Google “RTL-SDR”

A Few RTL-SDR Use Cases

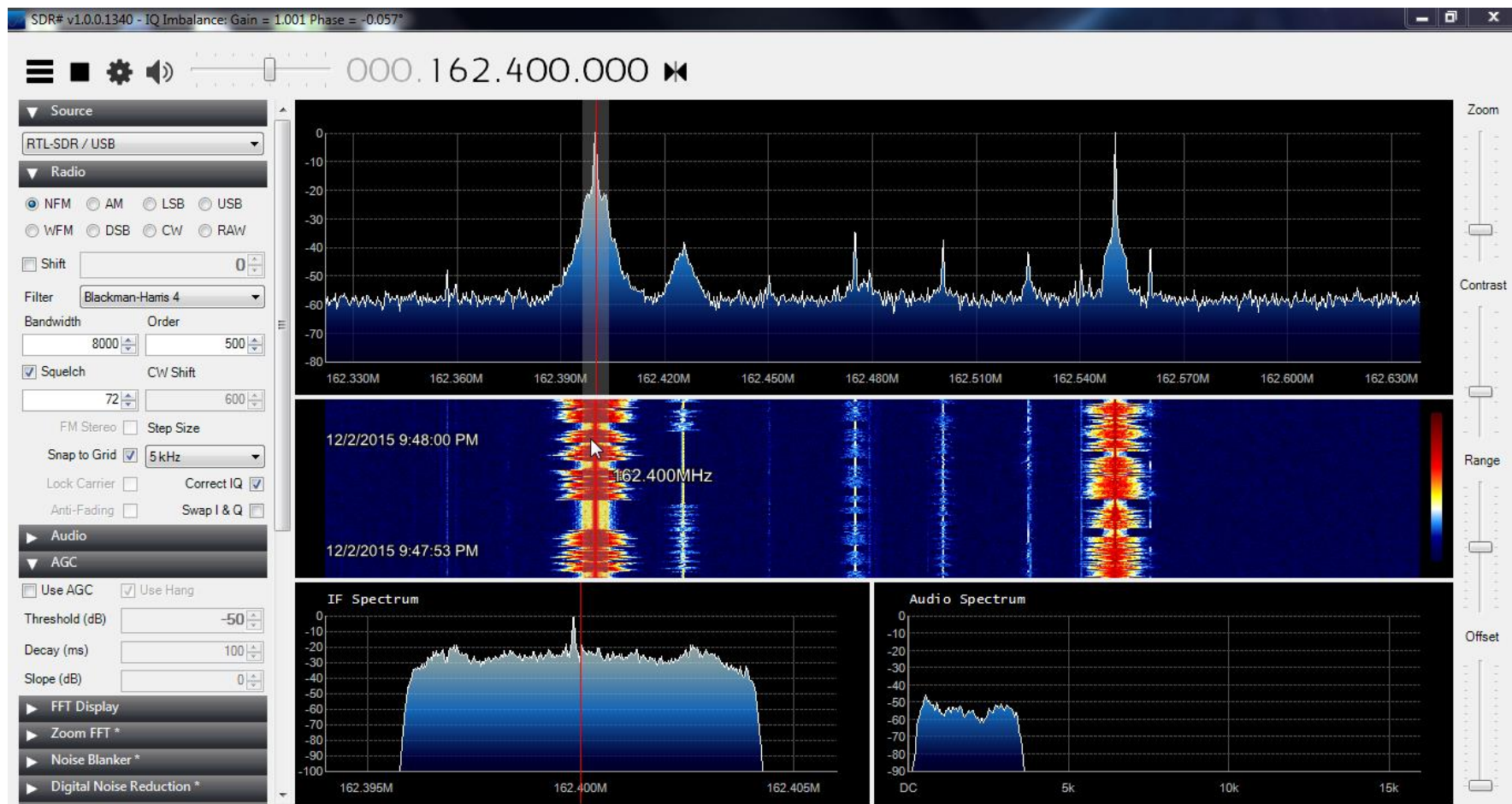
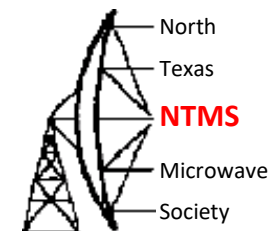


- Amateur Radio Reception, 6 Meters, VHF, UHF
- Amateur Packet Radio, APRS
- Amateur Satellite or ISS
- Unencrypted Police, Ambulance, Fire, EMS
- Digital Voice decoding with P25 and D-Star possible with external app
- NOAA Weather Radio, 162.40 – 162.55
- NOAA Weather Satellites
- GMRS / FRS
- Air Traffic from DFW & Love Field
- ADSB Aircraft Telemetry & Position Data @ 1090 Mhz
- FM Broadcast
- Spectrum Analyzer
- Low Cost Pan-Adapter for HF reception

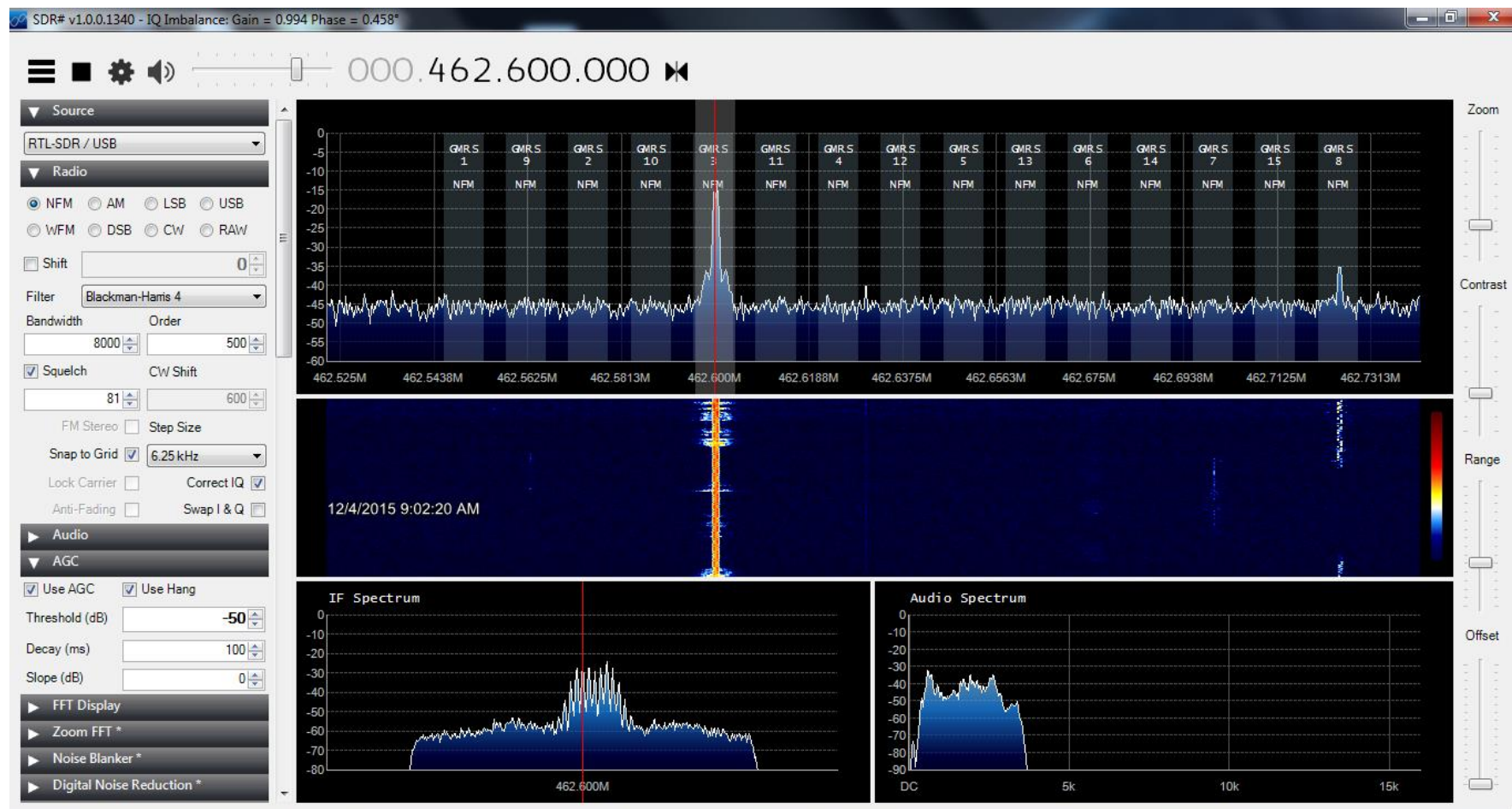
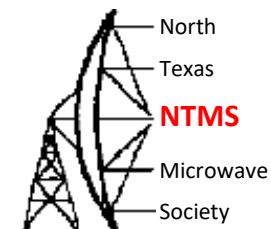
FM Broadcast w/HD Radio



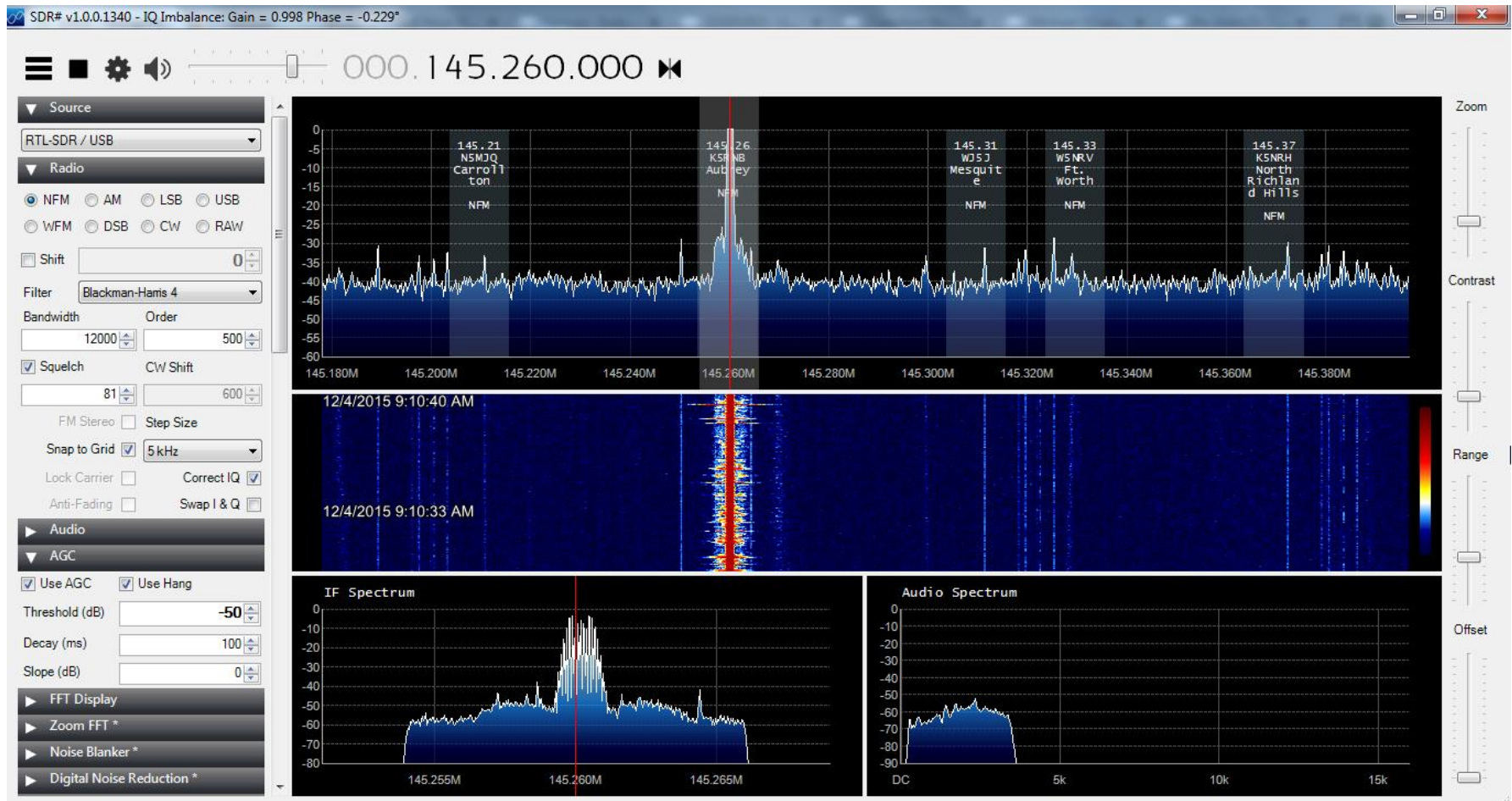
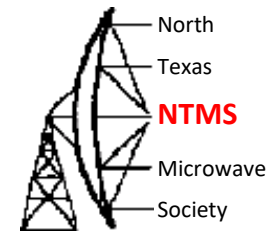
NOAA Weather Radio



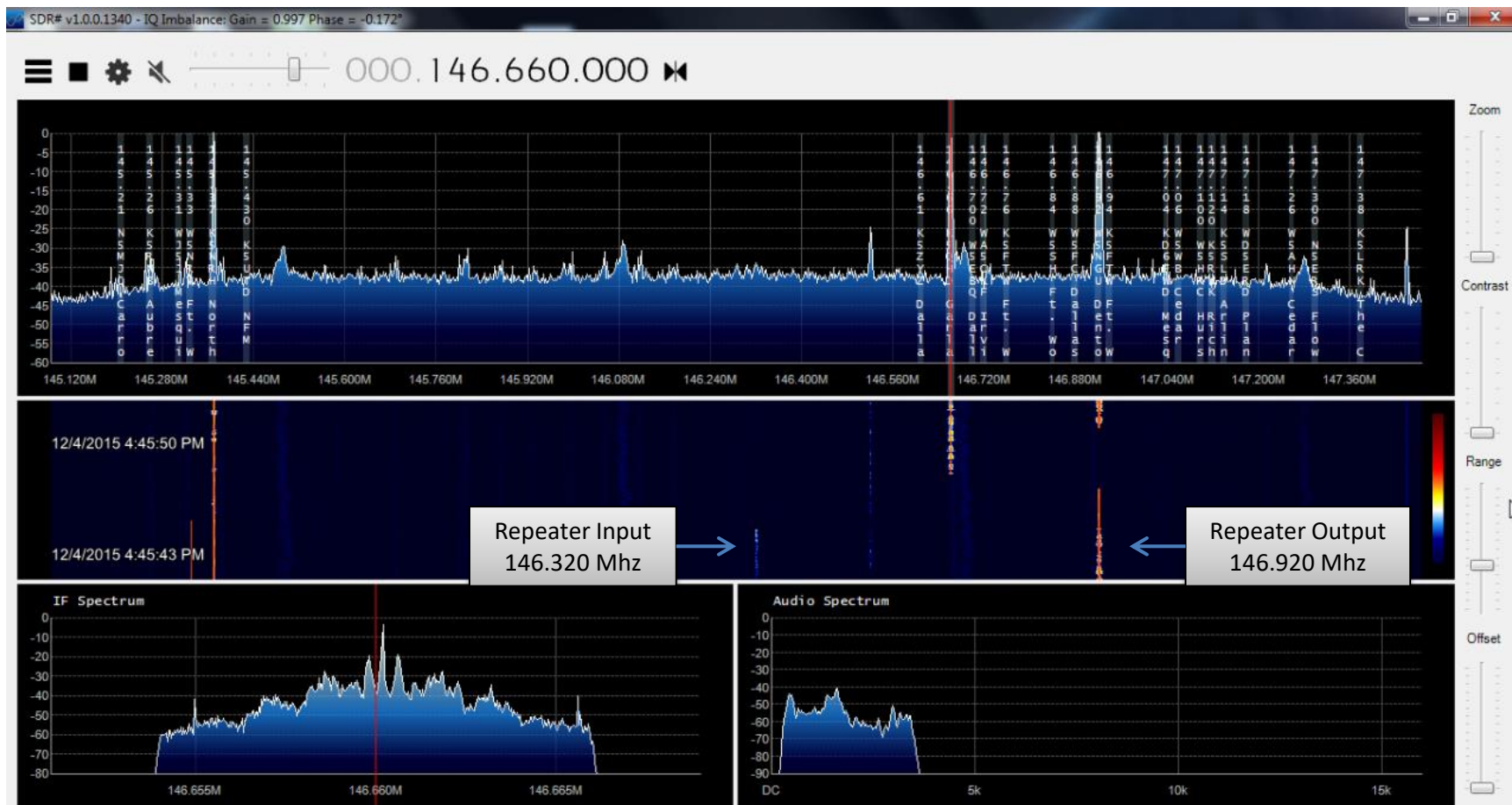
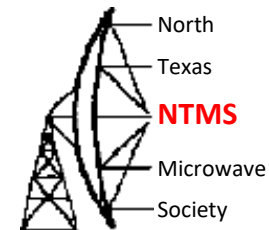
GMRS / FRS



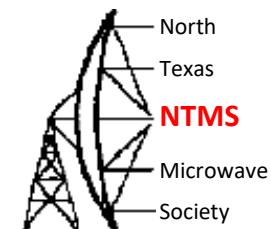
2 Meter



2 Meter Wide Spectrum



Spectrum Analyzer



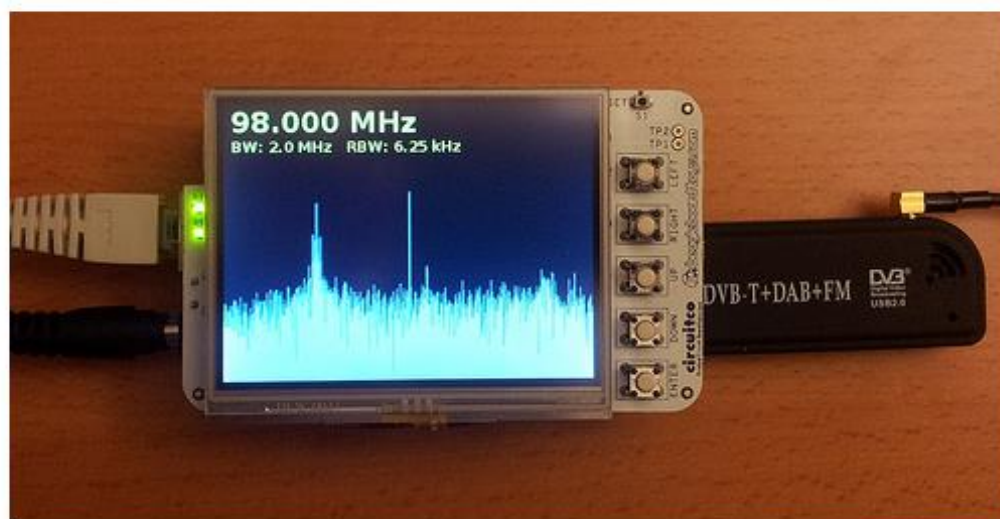
Home ▸ Beaglebone ▸ RTL-SDR spectrum analyzer on the Beaglebone

RTL-SDR spectrum analyzer on the Beaglebone

Monday, 18 February 2013 20:36 Alexandru Csete [Hardware Lab](#) - [Beaglebone](#)



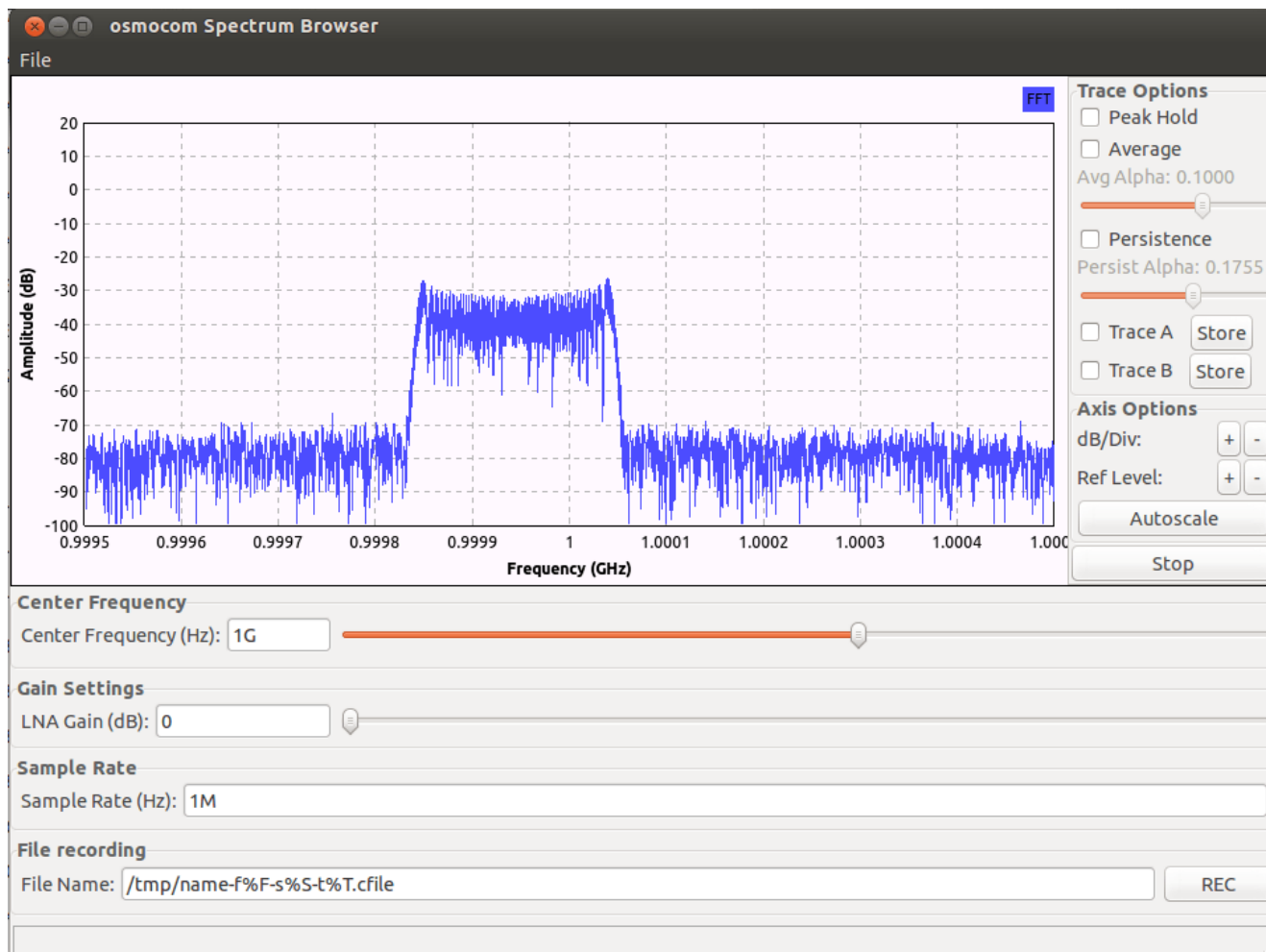
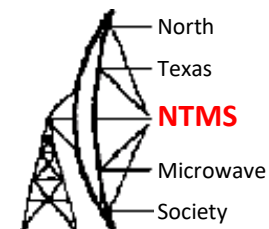
Take a Beaglebone, add an LCD cape and a £10 USB TV dongle, install [librtlsdr](#) and my [rtlizer](#) software and you have an awesome hand-held, real-time spectrum analyzer.



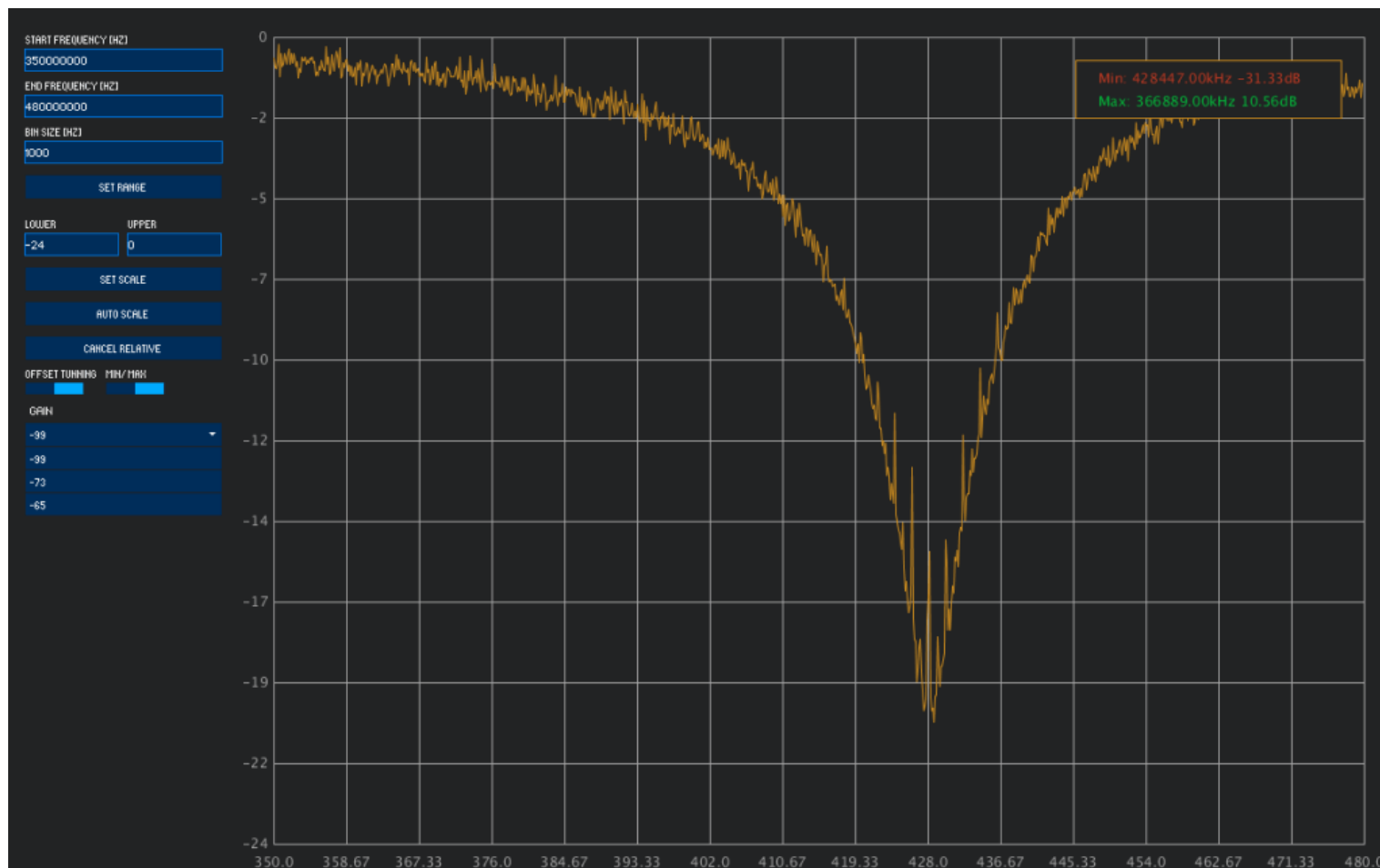
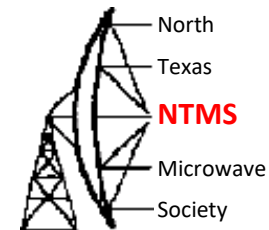
Introduction

Few weeks ago I gave a talk titled Software Defined Radios for VHF, UHF and SHF at the annual [Danish VHF-](#)

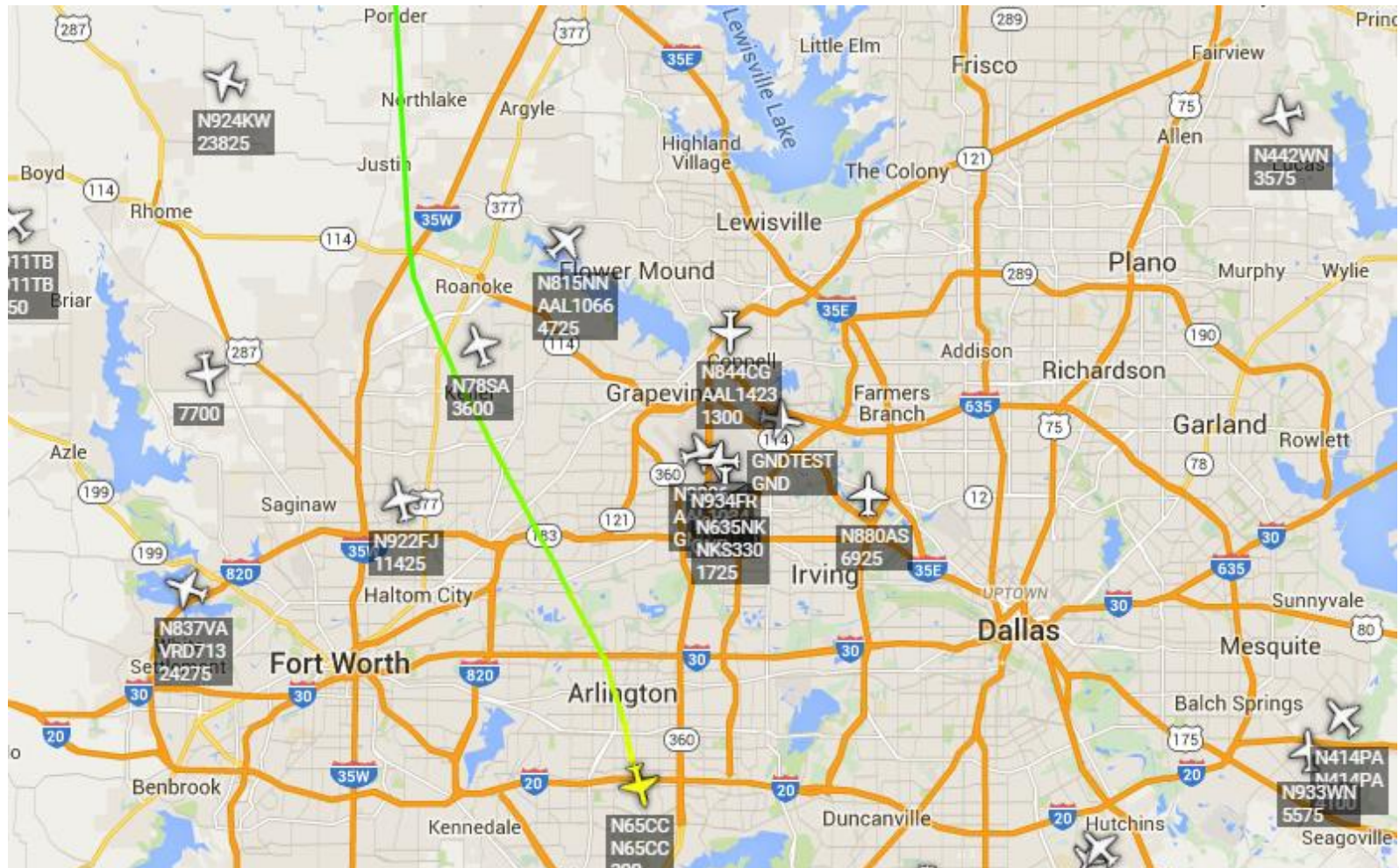
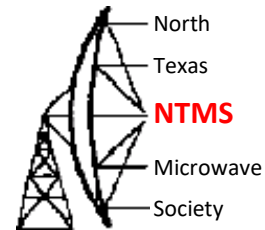
Spectrum Analyzer



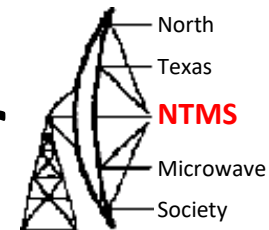
Spectrum Analyzer



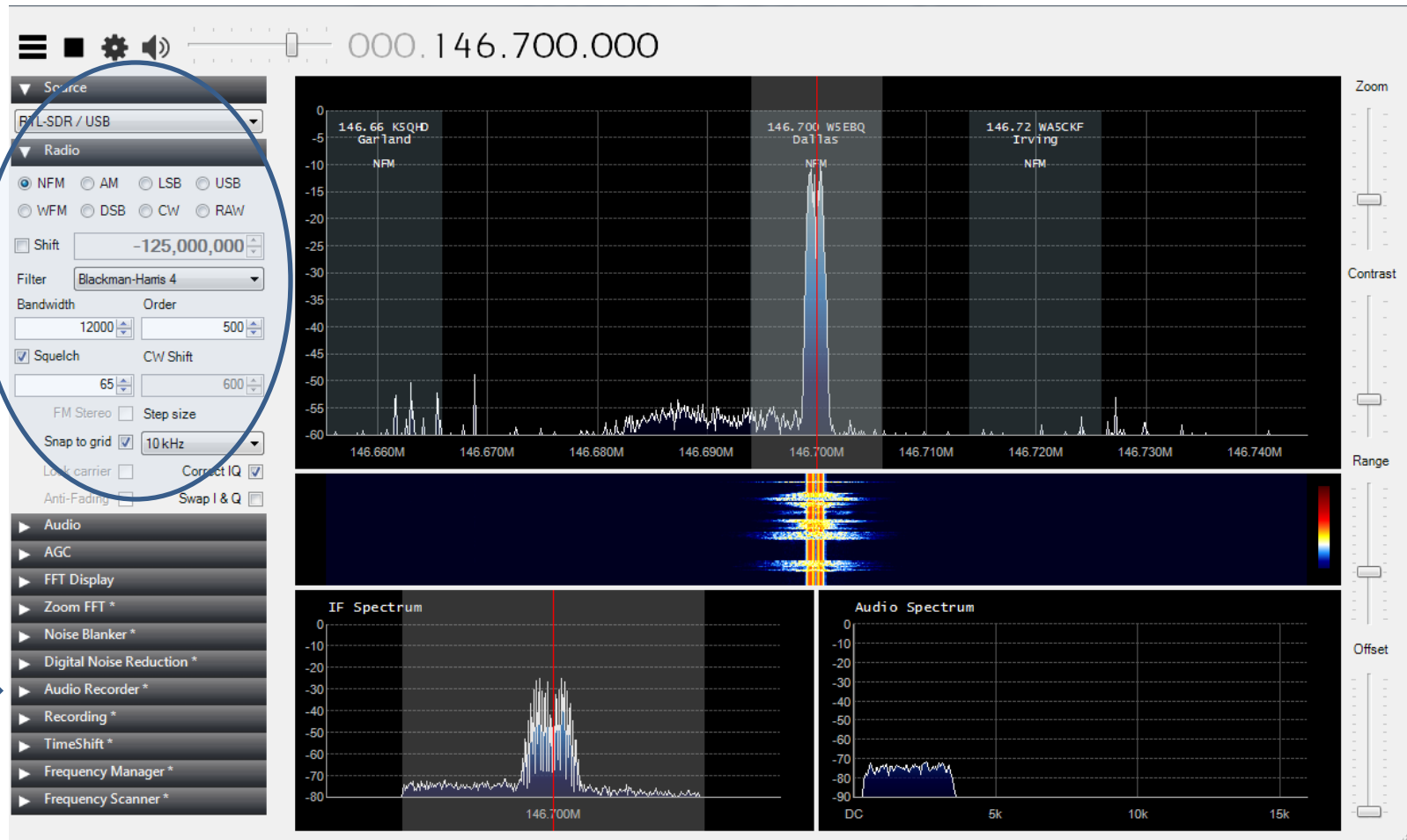
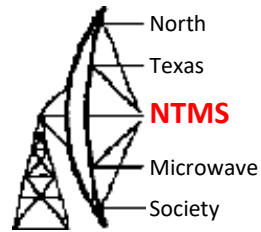
Automatic Dependent Surveillance-Broadcast



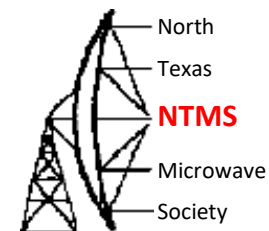
ADSB w/Virtual Radar Server



SDRSharp + Plugins



SDRSharp Plugins



- Some of the plugins to extend the capability of SDRSharp are;
 - Unitrunker Trunking Plugin
 - Orbitron Plugin
 - DDE Plugin for communicating data to other apps
 - Fast Scanner Plugin
 - QPSK Demodulator Plugin
 - Simple Audio EQ Balance Plugin
 - CTCSS Detector and Squelch Plugin
 - TimeShift SDR
 - RDS Logger Plugin

For More Information

- Everything you could possibly want to know and more can be found at the site
 - <http://www.RTL-SDR.com>

RTL-SDR.COM

RTL-SDR (RTL2832U) and software defined radio news and projects. Also featuring Airspy, HackRF, FCD and more.

[HOME](#)[ABOUT RTL-SDR](#)[QUICK START GUIDE](#)[FEATURED ARTICLES](#) ▼[SOFTWARE](#) ▼[SIGNAL ID WIKI](#)[FORUM](#)[RTL-SDR STORE](#)[GUIDE BOOK](#)[SUBMIT](#)

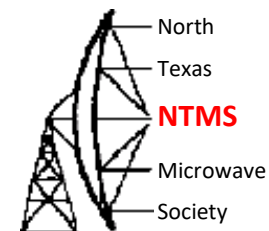
- Thank You, 73

A \$25 Pan Adapter (Using an RTL-SDR)

By

Eric Silverthorn – NM5M

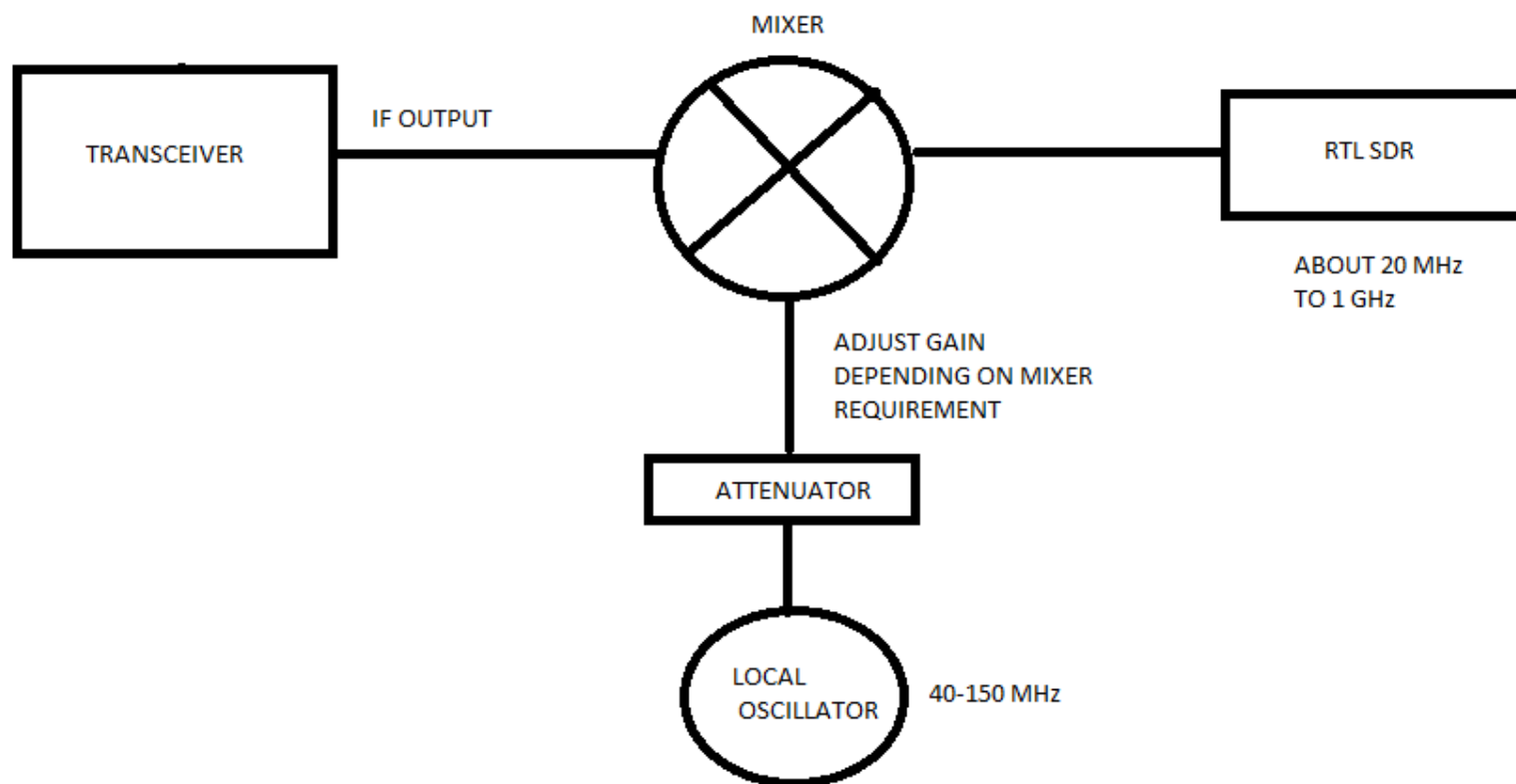
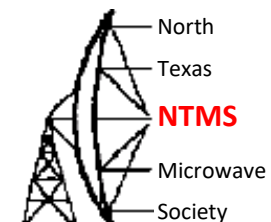
RTL-SDR



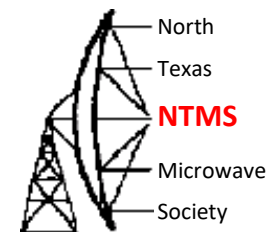
- The RTL Software Defined Receiver (SDR) has been around for quite a while, and is sold on eBay and Amazon for under \$10. Many of these receivers have a tuning range between 18 Mh and 1 Ghz
- I wanted to use the 8.2 Mhz output from my Elecraft K3 along with an RTL-SDR to provide an inexpensive Pan Adapter view



Block Diagram

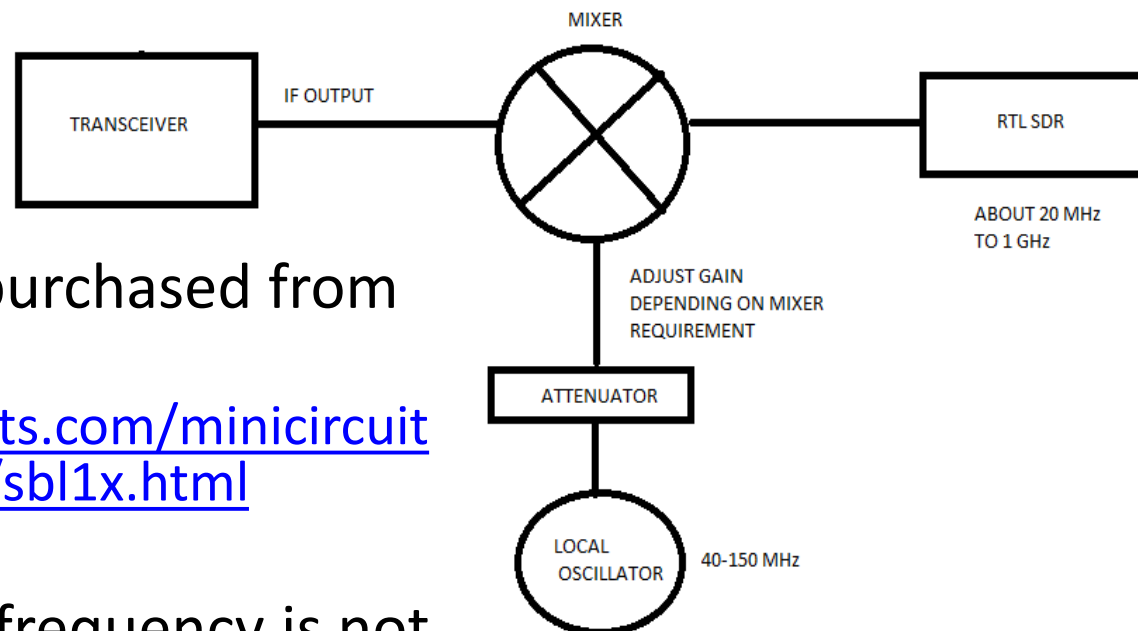


What was needed to make it work on HF...



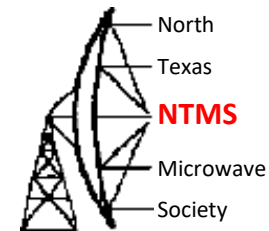
- From the Block Diagram you will see 4 subsystems, they are;
 - Mixer
 - Local Oscillator
 - Attenuator
 - RTL-SDR

How to build it



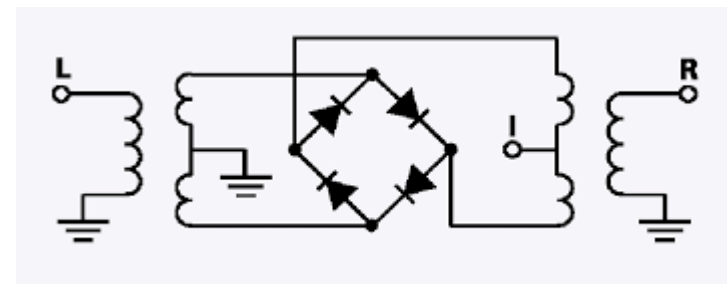
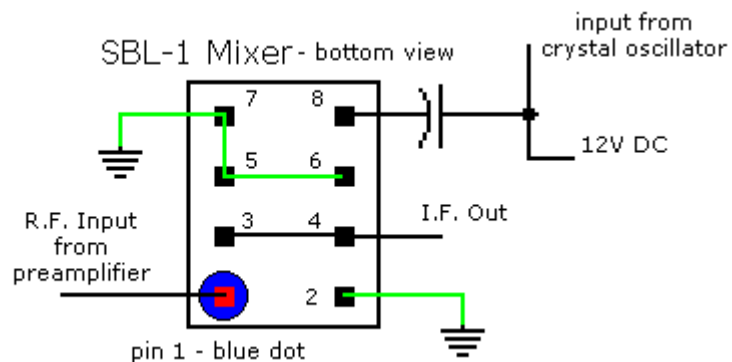
- The mixer may be purchased from RF Parts
 - <https://www.rfparts.com/minicircuits/mini-freqmixers/sbl1x.html>
- The local oscillator frequency is not critical, you may use anything above 40 Mhz, I used a surplus TTL oscillator that I had on hand that operated on 50.2 Mhz.

Mixer MiniCircuits SBL-1 (or SBL1x)



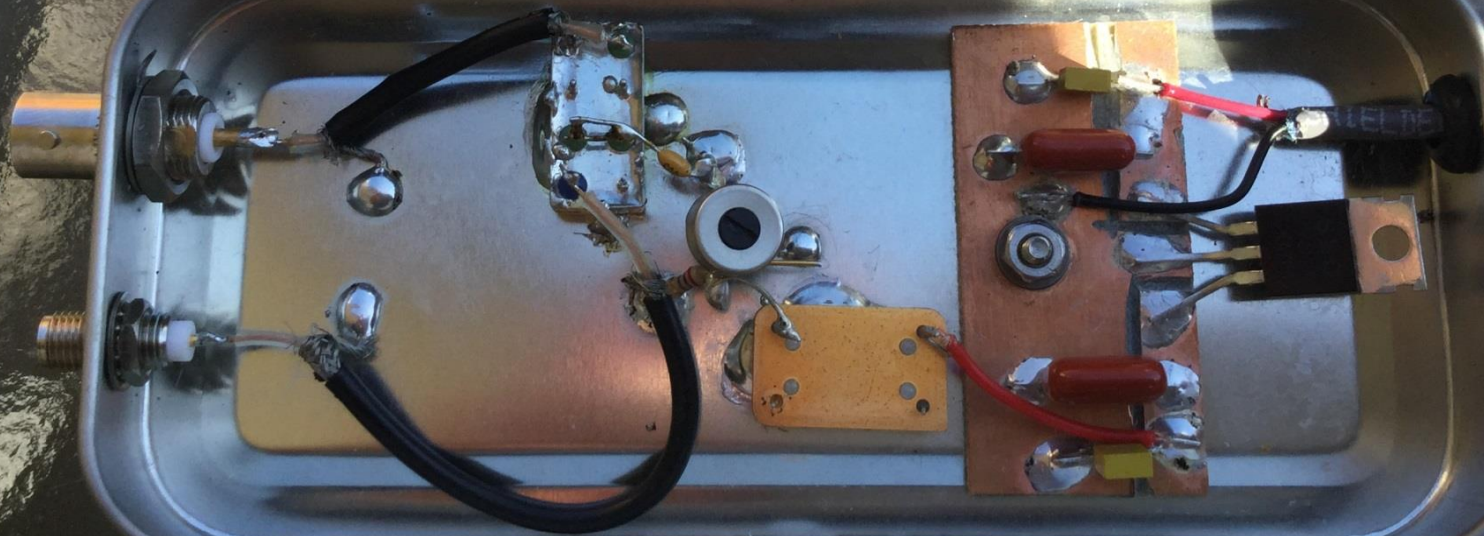
PINS

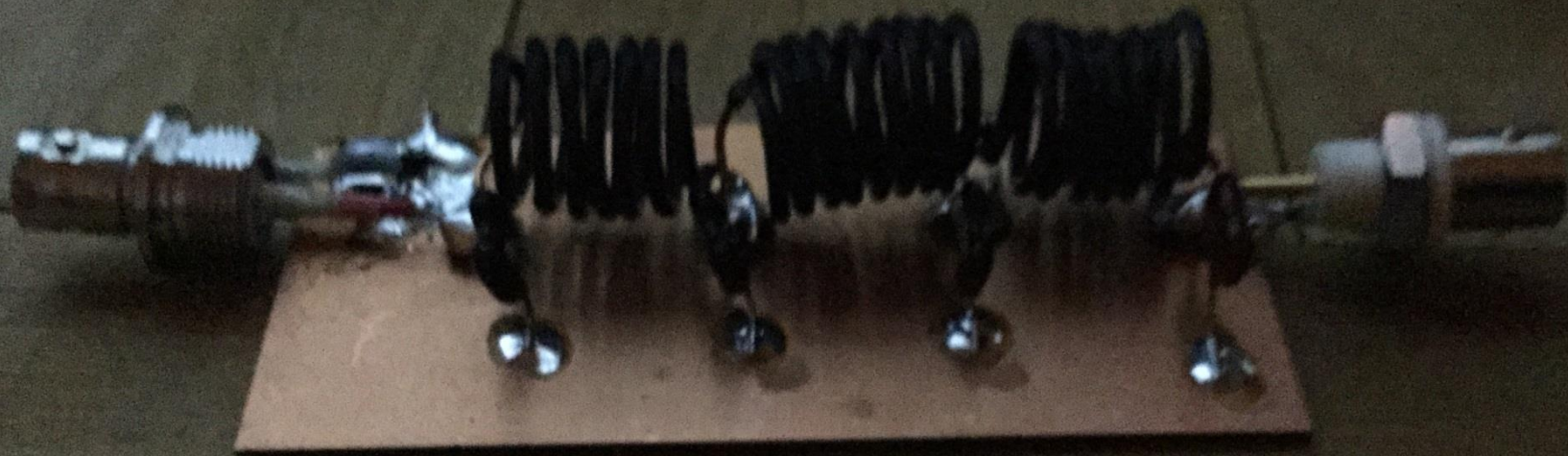
- 1, R.F. Input
- 2, 5, 6, 7, Ground
- 3, 4, I.F. Output
- 8, Osc. input



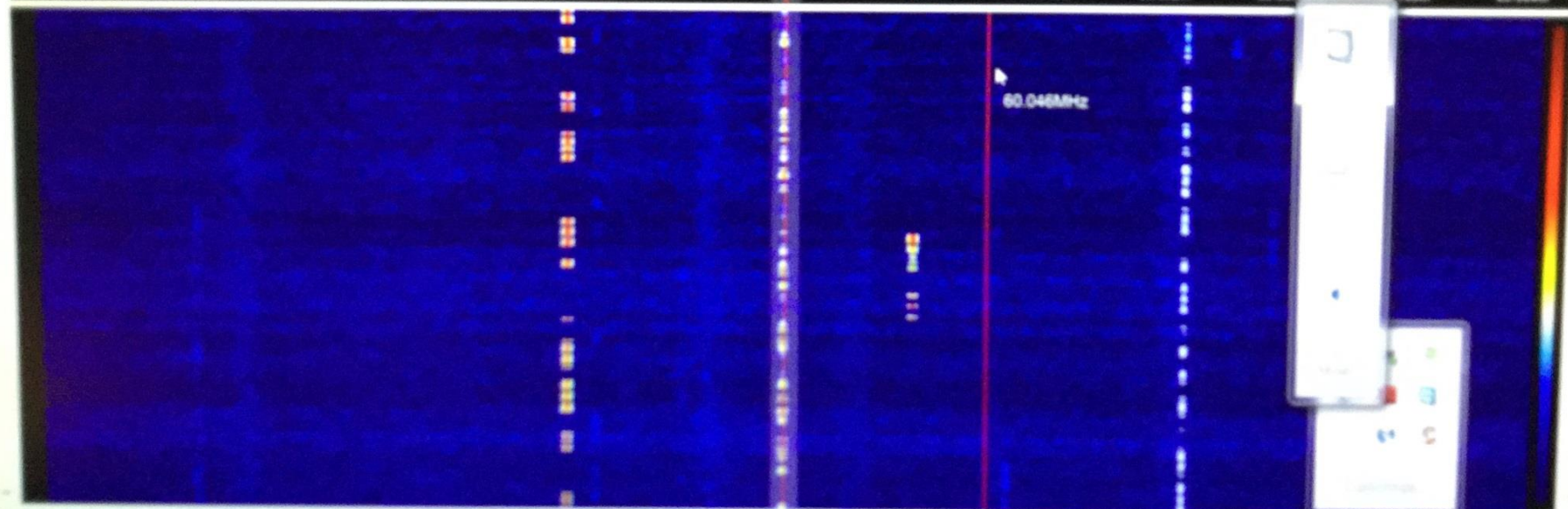
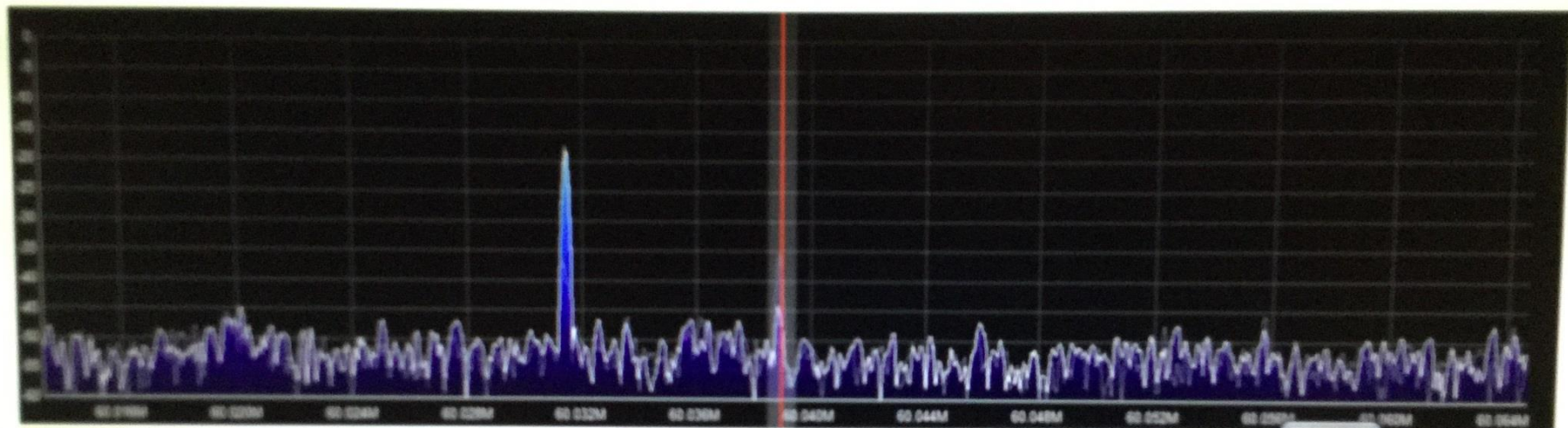
Palace of Fine Arts

The Palace of Fine Arts was built for the Panama-Pacific International Exposition in 1915, and is the last, glorious vestige of San Francisco's only world's fair. The exhibition hall is now home to the fun and educational Exploratorium, an interactive science museum. Surrounded by an emerald-green park and duck pond, the colonnaded Palace dome is a unique sentinel to visitors driving into San Francisco from the Golden Gate Bridge.





60 039 000



USB

RAW

0

800

601

Correct IQ ☒

Swap I & Q ☐

Soft Sounc

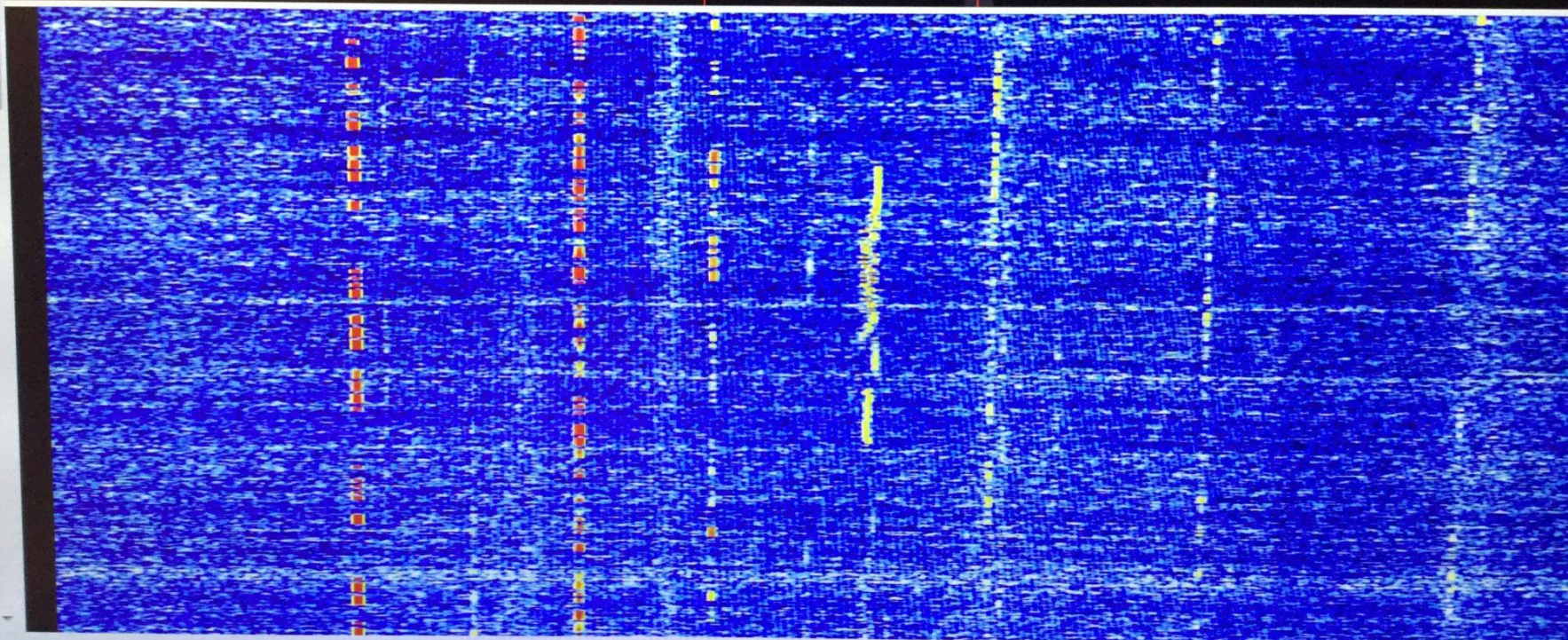
100

-50

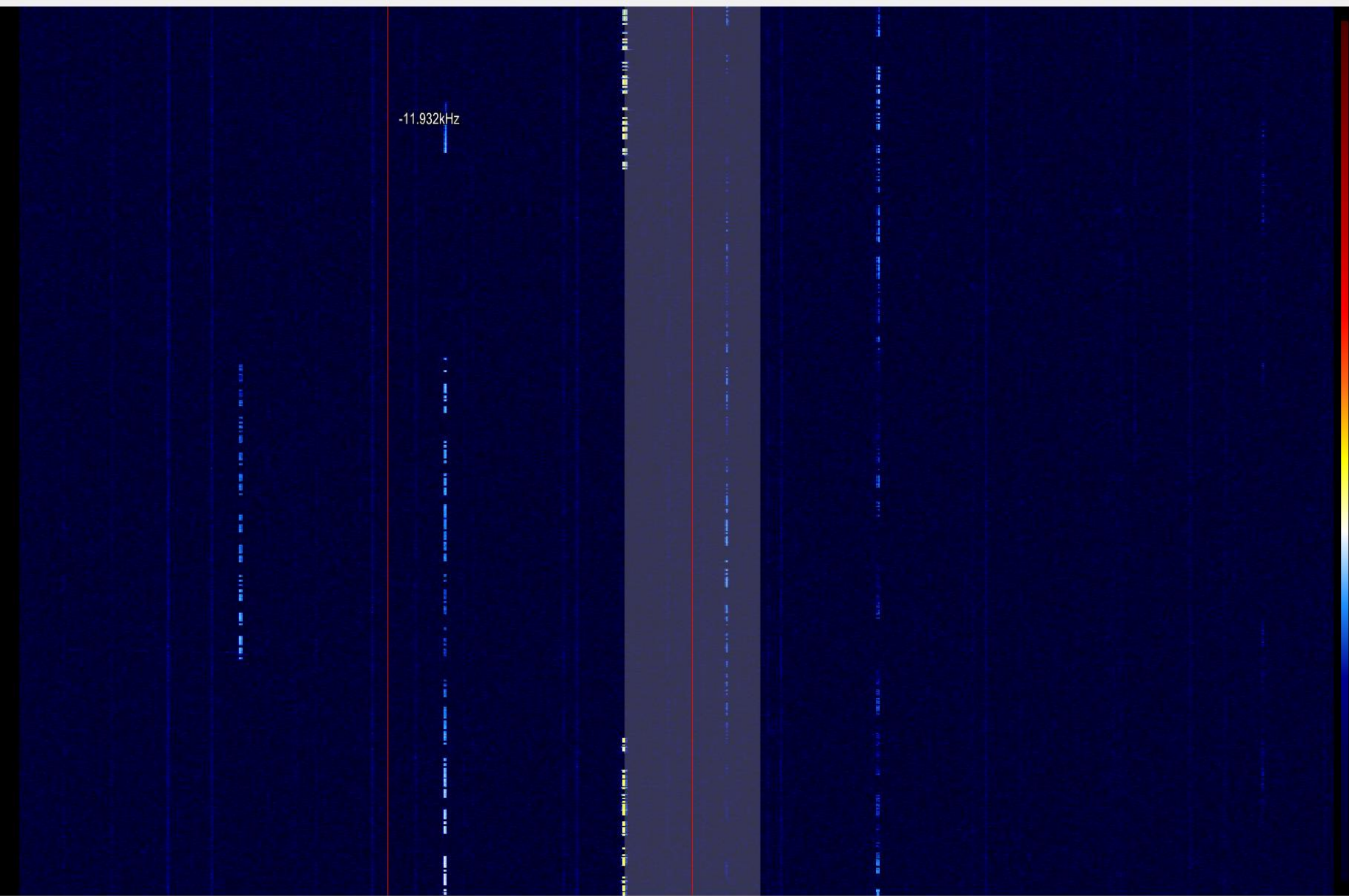
100

0

Uptime 7



Navigation and volume controls including menu, settings, mute, and a volume slider. A digital display shows "000.000.000.000" with a play/pause button.



Vertical control panel on the right side with sliders for Zoom, Contrast, Range, and Offset, each accompanied by a color calibration bar.