

Radio Club of Redmond's SDR Special Interest Group (SIG)

RTL 2832U TV Dongle *An Inexpensive SDR Receiver*

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Agenda



- ▶ SDR Simplified
- ▶ Anatomy of TV Dongle
- ▶ Anatomy of SDR# Software
- ▶ Demo: TV Dongle & SDR# Software
- ▶ TV Dongle as an HF Receiver
- ▶ Overview: Author Your Own DSP with GNU Radio Companion (GRC) Software
- ▶ Demo: GRC in Action



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SDR Simplified

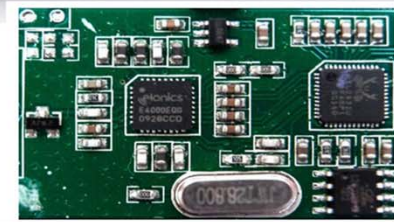


- ❑ TV Dongle = "front end"
 - Captures and digitizes the signal for "back end" signal processing
- ❑ SDR# Software = Digital Signal Processing (DSP) = "back end"
 - Processes the digitized signal from the "front end" and extracts information
- ❑ Windows XP, Vista Win7/8 = Operating System (OS)
 - Common platforms for the DSP software program

Anatomy of TV Dongle

- ❑ Two commodity IC's comprise the entire VHF / UHF receiver
- ❑ Tuner IC: Elonics 4000; 64 to 2100 MHz
- ❑ A/D converter and USB interface: RTL 2832U

2832U+E4000

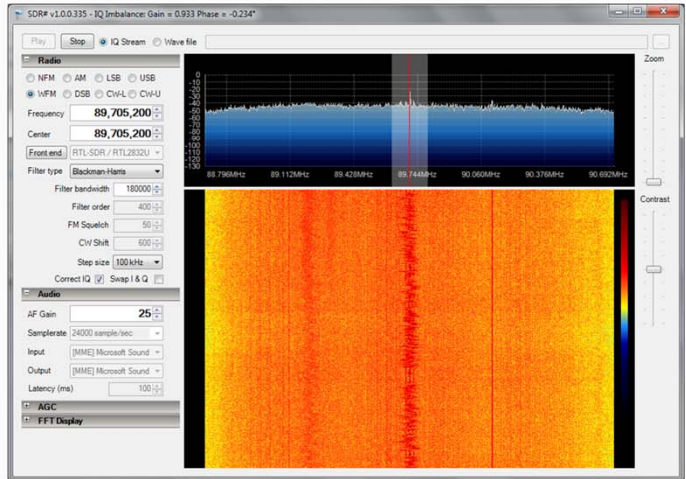


Anatomy of SDR# Software (Fundamental Elements of DSP's)

- ❑ Digital control of tuner IC
 - Tune Frequency, Preamp Gain, Tuner AGC, etc.

- ❑ Conditioning of Signal
 - Sample Rate, Filters, CW, SSB, FM, AM, Squelch, etc.

- ❑ Display (optional)
 - Panadapter, Waterfall



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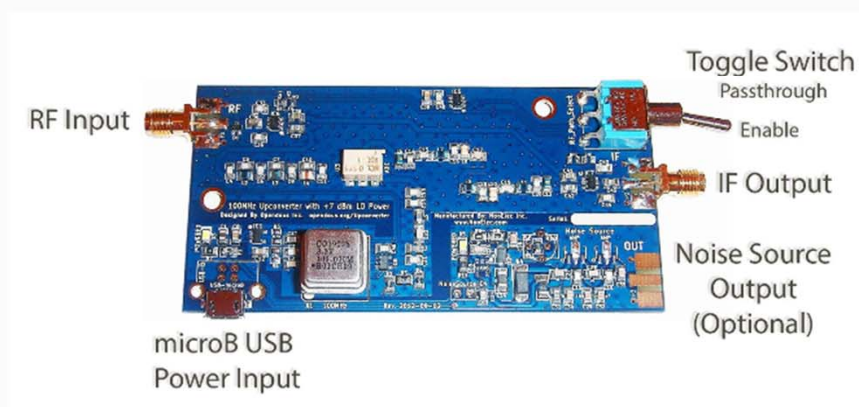
3 Steps to Installation Success

1. Download the SDR# install package inclusive of the Zadig driver utility
2. Install the WinUSB driver for the TV Dongle using the Zadig utility
3. Launch SDR#.exe and configure settings



Using Your TV Dongle as an HF Receiver

- ❑ HF Converter converts HF signals to a VHF IF in the range of the TV Dongle
- ❑ Configure the SDR# DSP software for "shift" operation via the SDR# user interface



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Author Your Own DSP With GNU Radio Companion (GRC)

- ❑ Why author your own? Opportunity to learn more about DSP software, and signal flow fundamentals. Makes it possible to homebrew your own functional SDR.

- ❑ GNU Radio Companion (GRC)
 - Linux based, open source, software DSP library

- ❑ Manipulate GUI 'blocks' to create a DSP "flow diagram"

GRC Demo: Flow Diagrams

- ❑ Basic sine wave oscillator with audio, spectrum, and oscilloscope outputs
- ❑ Functional TV Dongle NOAA weather station and FM Broadcast Receiver

Questions



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