Communication Systems based on Software Defined Radio (SDR)

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SDR applications

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Recommendations for the installation of some applications for SDR

There are a wide variety of applications for the design and experimentation of Software Defined Radio systems.

In this class, some procedures and suggestions for installing applications and libraries to use SDR will be presented.

This will be a reference document from which you should search the Internet to see if there are more current versions of the procedures.

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MATLAB (2019 or higher)

Soporte de MATLAB y Simulink para hardware SDR

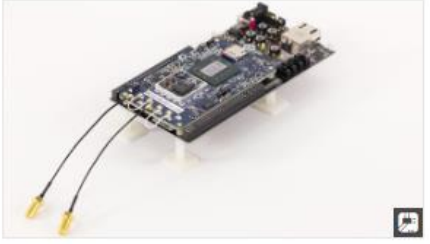
MATLAB y Simulink admiten hardware SDR más utilizado. Puede comunicarse con las plataformas SDR directamente desde MATLAB y Simulink para pruebas de radio-in-the-loop, prototipado y aprendizaje práctico.

Soporte de radio para ADALM-PLUTO en Communications Toolbox

Radio RTL-SDR

Hardware SDR de la serie X, Bus y Networked de USRP®

Wireless Testbench



Hardware SDR de Zynq, que incluye SOM PicoZed y ZC706 o ZedBoard con una tarjeta FMC de RF de Analog Devices

Serie (E310) Embedded de USRP®

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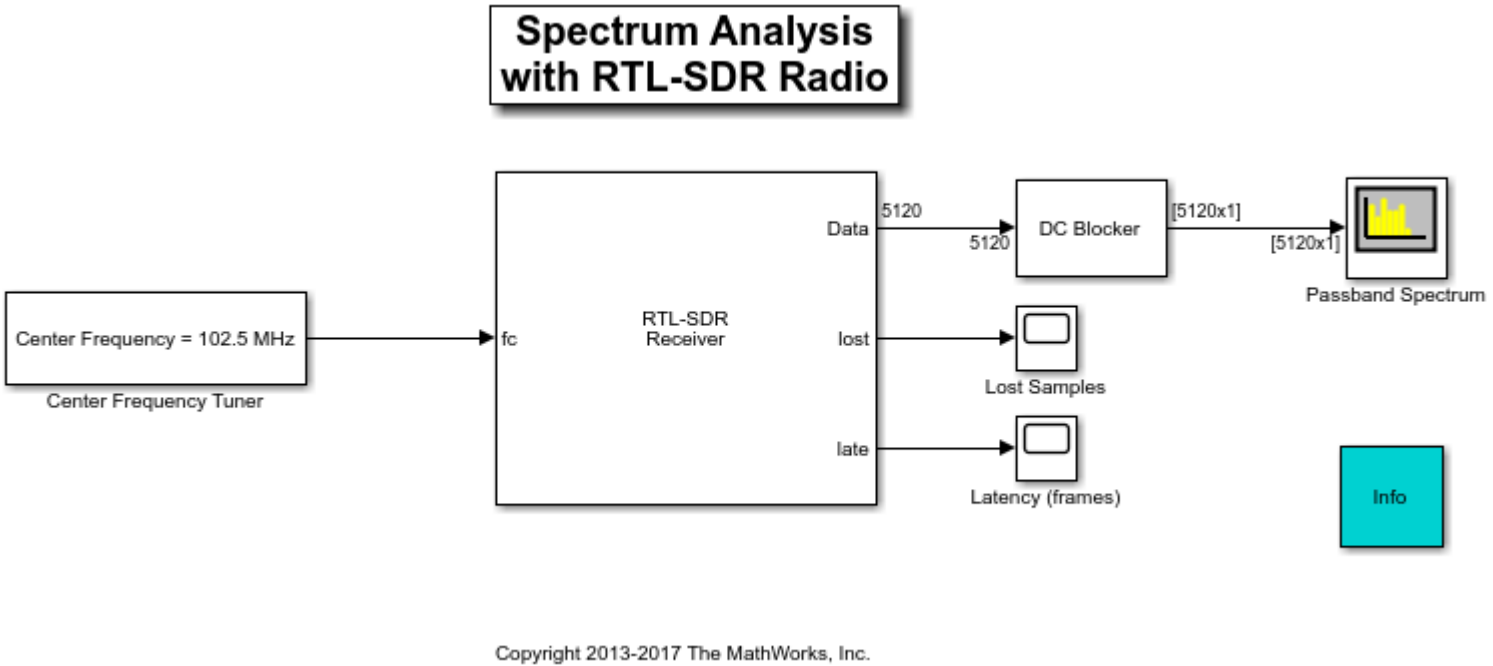
MATLAB (2019 or higher)



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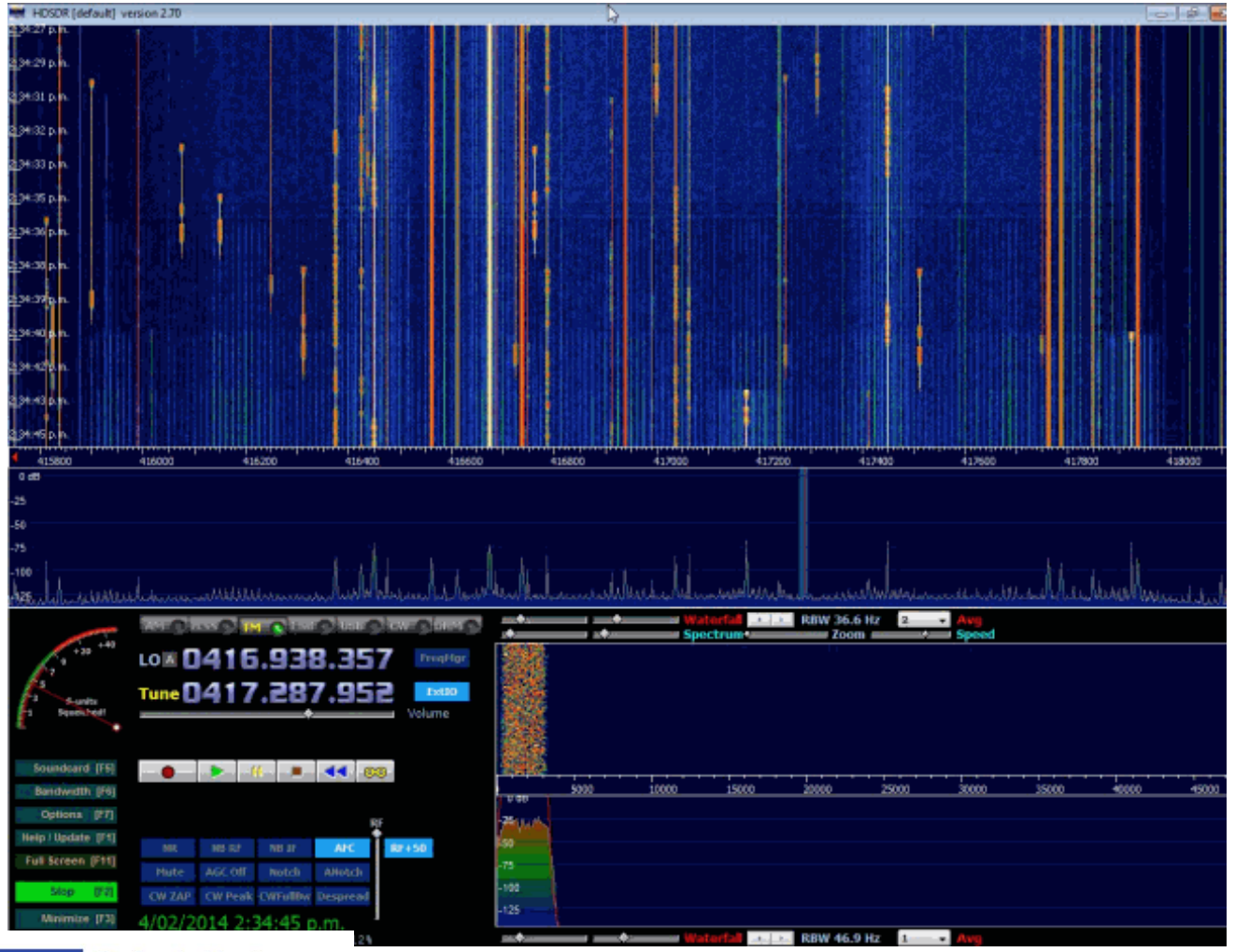
HDSDR



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Classic HDSDR installation

For updated information, refer to: https://www.hdsdr.de/

- Install the software. The Zadig driver for the RTL2832U must be installed separately (Windows).

GETTING THE RTL-SDR TO WORK IN WINDOWS 10

The RTL-SDR is fully compatible with Windows 10. However with the recent release of Windows 10 some users have been having trouble using their RTL-SDR after upgrading. We thought that we'd announce **that the simple solution to most problems is to reinstall the SDR drivers with Zadig**. The latest version of Zadig can be downloaded from zadig.akeo.ie or if you use SDR# then it will already be in your SDR# folder. The process is:

1. Plug in the RTL-SDR.
2. Run Zadig as administrator by right clicking it and choosing run as administrator.
3. Go to Options -> List all devices and make sure it is checked.
4. In the drop down box choose Bulk-In, Interface (Interface 0). This may also sometimes show up as something prefixed with "RTL28328U". That choice is also valid.
5. Make sure that WinUSB is selected as the target driver and click on Replace Driver.

If you need more help see the Quickstart Guide.

The Windows 10 upgrade process appears to replace the WinUSB drivers with the Windows DVB-T ones, so reinstalling the SDR drivers is necessary. It shouldn't be necessary, but one user also reported the need to log in to Windows with an administrator account and to uninstall the current drivers before running Zadig, so try that if you continue to have problems.

As in our previous post we can confirm that several popular SDR apps such as SDR#, HDSDR, SDR-Radio, CubicSDR and

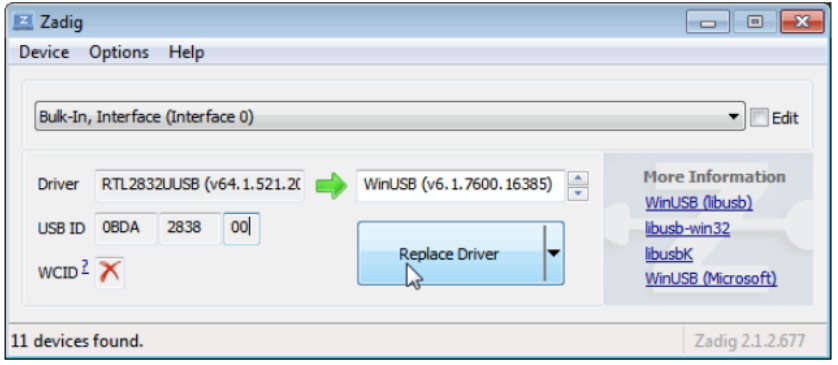
Fuente: https://www.rtl-sdr.com/getting-the-rtl-sdr-to-work-on-windows-10/

Classic HDSDR installation

For updated information, refer to: https://www.rtl-sdr.com/rtl-sdr-quick-start-guide/

WARNING: DO NOT select *anything else* or you will overwrite that device's driver! DO NOT click around randomly in Zadig. If you do you are likely to overwrite your mouse, keyboard, printer, soundcard etc drivers. Many bad reviews we get are due to people clicking around randomly in Zadig, so PLEASE check what you are doing first.

10. We need to install the WinUSB driver, so also **ensure that WinUSB is selected** in the box after the arrow next to where it says Driver (this is the default selection). The box to the left of the green arrow is not important, and it may show (NONE) or (RTL...). This left hand box indicates the currently installed driver, and the box to the right the driver that will be installed after clicking Replace/Install Driver.



11. **Click Replace Driver**. On some PC's you might get a warning that the publisher cannot be verified, but just accept it by clicking on "Install this driver software anyway". This will install the drivers necessary to run the dongle as a software defined

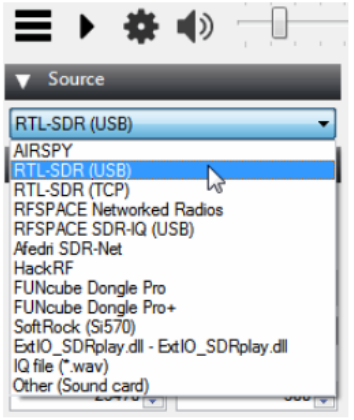
Classic HDSDR installation

For updated information, refer to: https://www.rtl-sdr.com/rtl-sdr-quick-start-guide/

Submit

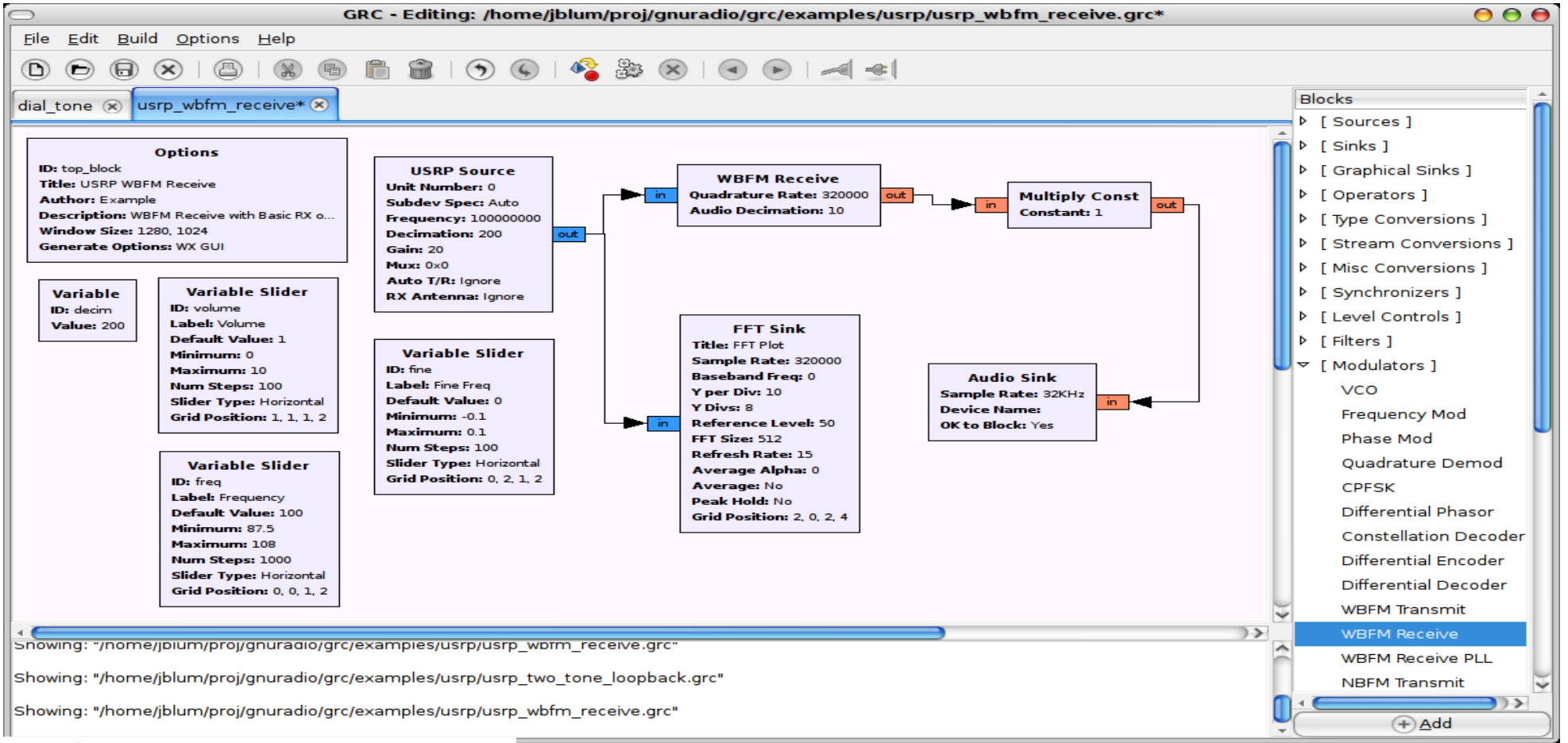
12. **Open SDRSharp.exe and set the "Source" drop down box to 'RTL-SDR USB'**. This "Source" tab is on the lower left menu bar by default. ***On newer version of SDR# you may need to scroll down in the drop down box a little to find the RTL-SDR USB entry.***

13. **Press the Play button** (the right facing triangle in the top left of the program). Your RTL-SDR software radio should now be set up and ready to use! If everything has worked you should be able to start tuning to frequencies.



14. **Important!** Don't forget to also **adjust the RF gain settings** by pressing the Configure button (looks like a cog/gear) up the top next to the Play button. By default the RF gain is set at zero. A gain of zero will probably receive nothing but very strong broadcast FM - increase the gain until you start seeing other signals.

GNU RADIO



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Installation

For updated information, refer to: https://wiki.gnuradio.org/index.php/InstallingGR

- **Windows Instalation:**
  - RadioConda (recomended)
  - Windows 10 o higher (recomended)
  - Se debe instalar el driver Zadig para el RTL2832U por separado.

- **Ubuntu Instalation:**
  - **Ubuntu 18.04LTS:** It is suggested to Install GNU Radio 3.8 following the tutorial (includes installation of SDR libraries) ->(Instalacion_GNU_38_v5.pdf)

  - **Ubuntu 20.04 or higher:** It is suggested to install GNU Radio 3.10 with native library support.

Installation

For updated information, refer to: https://wiki.gnuradio.org/index.php/InstallingGR

- **Ubuntu 20.04 or higher:** It is suggested to install GNU Radio 3.10 with native library support

1- sudo add-apt-repository ppa:gnuradio/gnuradio-releases-3.9

2- sudo apt-get update

3- sudo apt-get install gnuradio python3-packaging

Some GNU Radio Companion libraries

Some examples of modules to install in GNU Radio are listed below :

- gr-satellites
- gr-adsb
- gr-IEEE802-15-4
- gr-lora
- gr-gsm
- gr-isdtv
- gr-bluetooth
- gr-iridium
- gr-IEEE802-11

More information: https://www.cgran.org/

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Some GNU Radio Companion libraries

Always follow Instructions in the repository. Typical example for installation on Ubuntu:

1- sudo git clone -b maint-3.8 https://github.com/daniestevez/gr-satellites

2- cd gr-satellites/

3- sudo mkdir build

4- cd build

5- sudo cmake ../

6- sudo make

7- sudo make install

8- sudo ldconfig

9- cd ..

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Now... to Install!