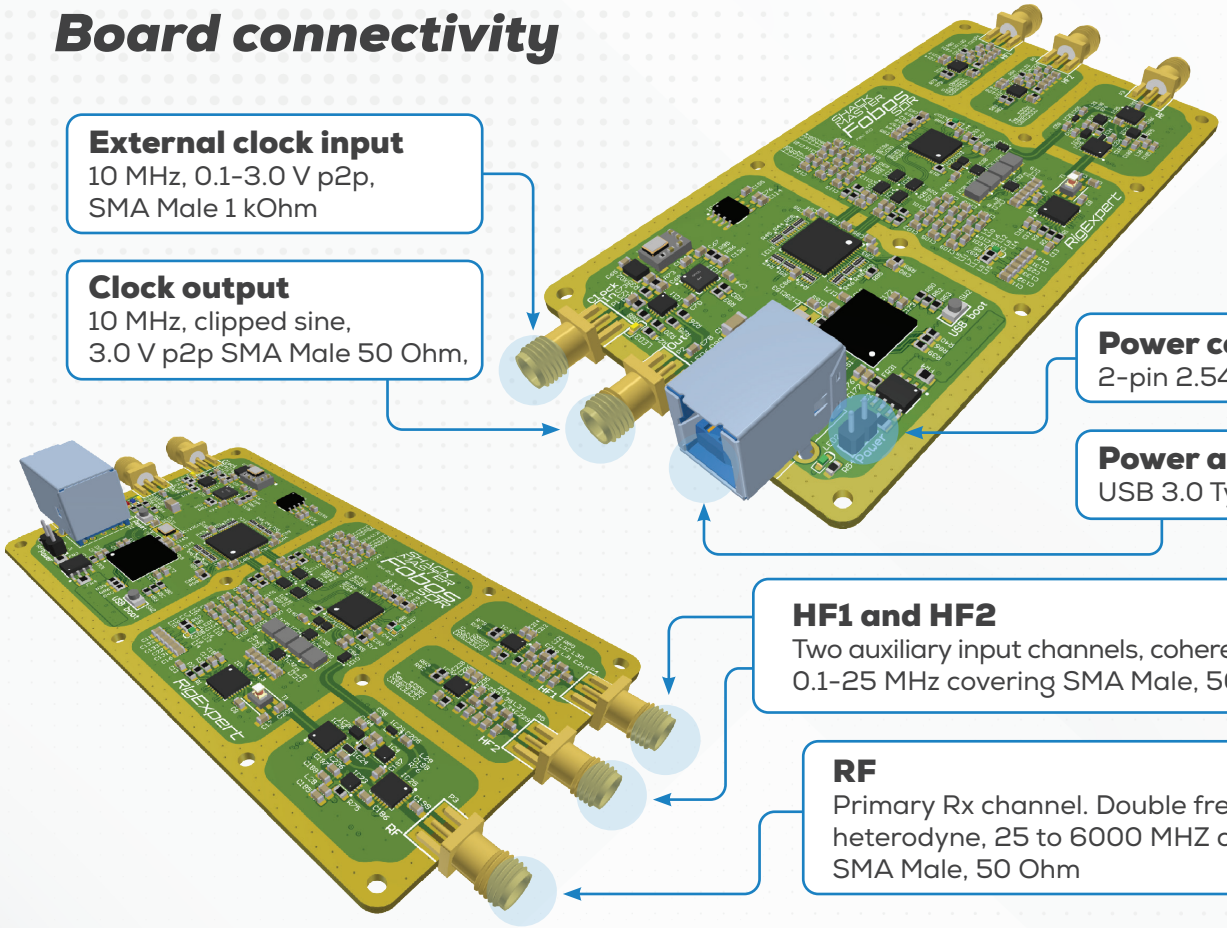
RigExpert

# Fobos SDR Quick Start Guide

RigExpert© Fobos is high-performance general purpose Software Defined Radio (SDR) acquisition board with super speed USB 3.0 interface.

It has continuous 25 MHz to 6GHz operating frequency range and up to 50 MHz bandwidth with true 14-bit waveform sampling resolution and full data integrity.

## Board connectivity



**External clock input**
10 MHz, 0.1-3.0 V p2p,
SMA Male 1 kOhm

**Clock output**
10 MHz, clipped sine,
3.0 V p2p SMA Male 50 Ohm,

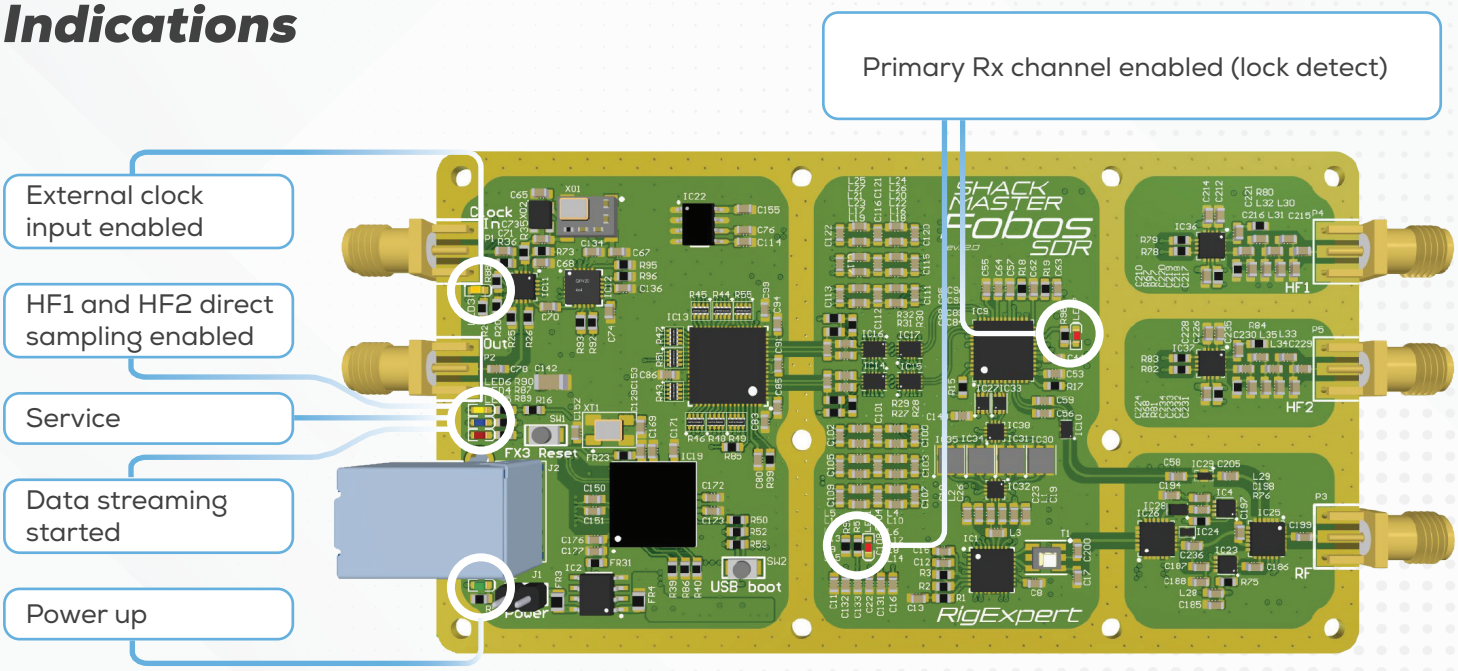
**Power control**
2-pin 2.54 mm header

**Power and data port**
USB 3.0 Type-B Male Socket

**HF1 and HF2**
Two auxiliary input channels, coherent direct sampling,
0.1-25 MHz covering SMA Male, 50 Ohm

**RF**
Primary Rx channel. Double frequency conversion heterodyne, 25 to 6000 MHZ covering,
SMA Male, 50 Ohm

## Indications



Primary Rx channel enabled (lock detect)

External clock input enabled

HF1 and HF2 direct sampling enabled

Service

Data streaming started

Power up

# Hardware setup

! To operate with HF1 and HF2 inputs in direct sampling mode only 50 MHz sample recomended. To operate with smaller sample rates please use external low pass filter with cutting frequency equals or less than a half of sample rate.

1. Connect VHF and /or UHF antenna to the **RF** connector to receive 25 to 6000 MHZ frequency range.
2. Connect HF antennas to **HF1** and/or **HF2** connectors to receive 0.1-25 MHz frequency range.

! HF1 and HF2 auxiliary inputs have fixed gain mode. To provide additional gain control please use external attenuators and/or amplifiers.

! Some third party general purpose software have limitations when operating in direst sampling modes.

3. Connect USB-3.0 **power and data** port to USB-3.0 port on your PC.

! Please use USB-3.0 ports only. The USB-2.0 operation mode is not supported.

! Please use brand quality shielded USB-3.0 data cable to provide proper control and data streaming at maximum sample rates.

! Connect USB cable directly to the root hub of your PC, do not use any splitters, converters, docking stations or extension cables.

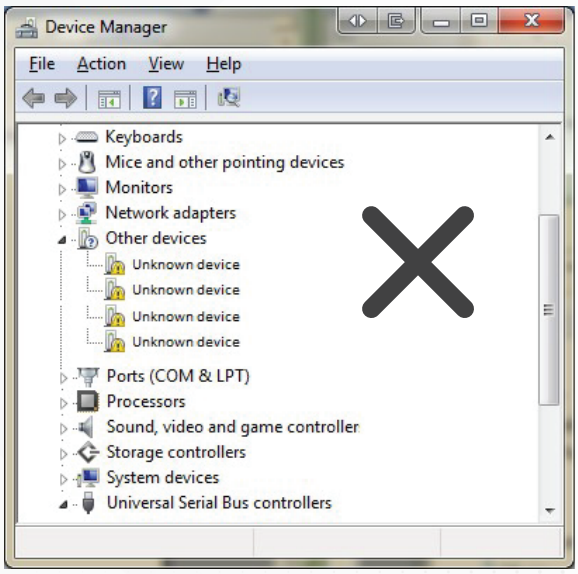
! Try to avoid connection to front panel USB sockets on your desktop, use rear panel sockets located directly on a motherboard.

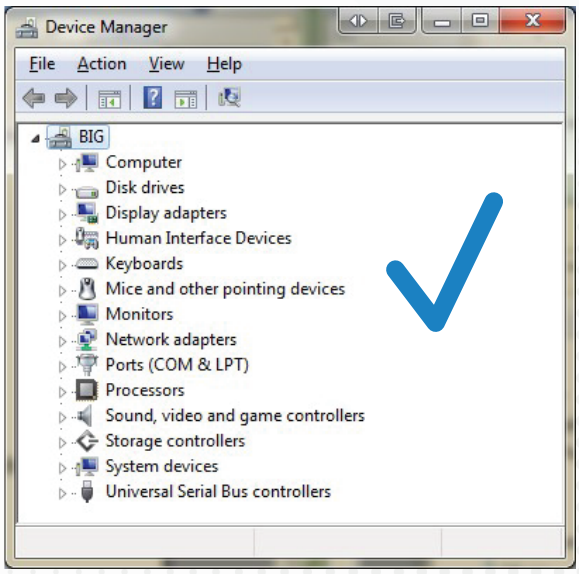
! Please disconnect all power-consuming devices connected to the USB ports (such as USB hard drives, charging mobile phones, desktop LED lamps, and other SDR devices).
You can reconnect them after the Fobos SDR hardware and driver setup is complete.

4. Put a jumper on the **power control** connector.
5. (Optional) Connect external clock source and use the board clock out to operate in very hig precision and synchronous clock domains. RigExpert© Fobos SDR has on-board stable internal clock source suitable for most user cases.
6. Disconnect the device and jump to driver setup section.

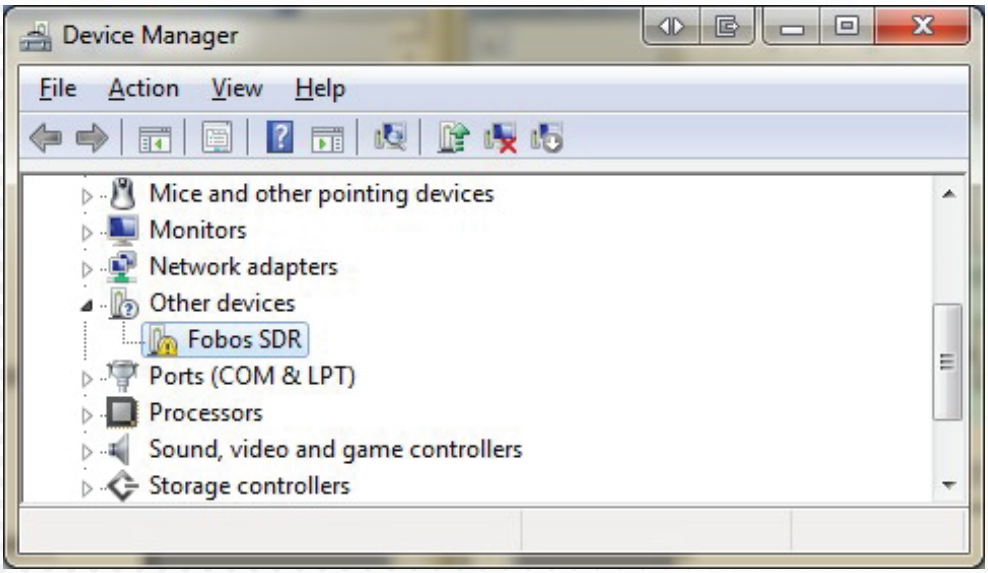
# Driver installation

1. Make sure that proper drivers for your motherboard USB-3.0 root hub controller are installed.
2. Please open the device manager and ensure that there are no unknown devices or conflicted drivers in your system.

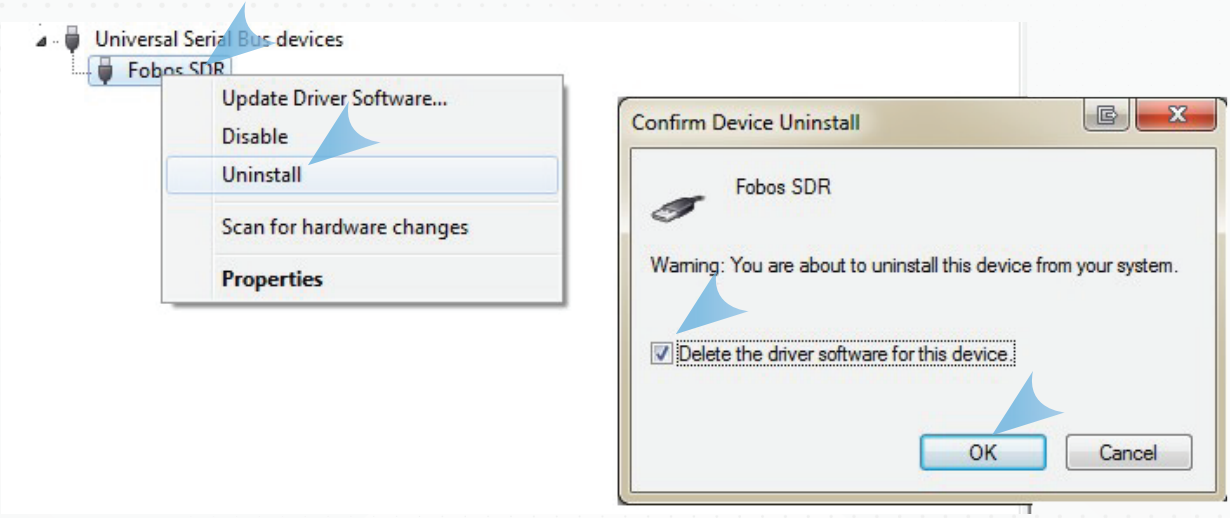


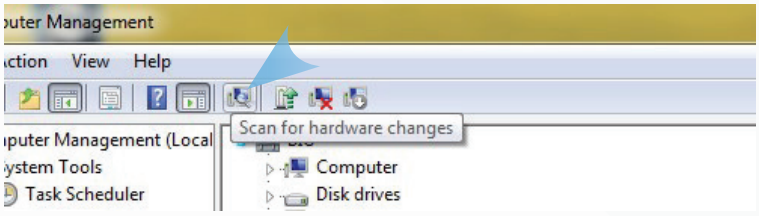
3. Connect RigExpert© Fobos SDR to USB port, wait a second for device to boot up, make sure that new unknown device named Fobos SDR appeared in device manager tree view.




! If your OS automatically installed some driver for Fobos SDR, uninstall it manually,

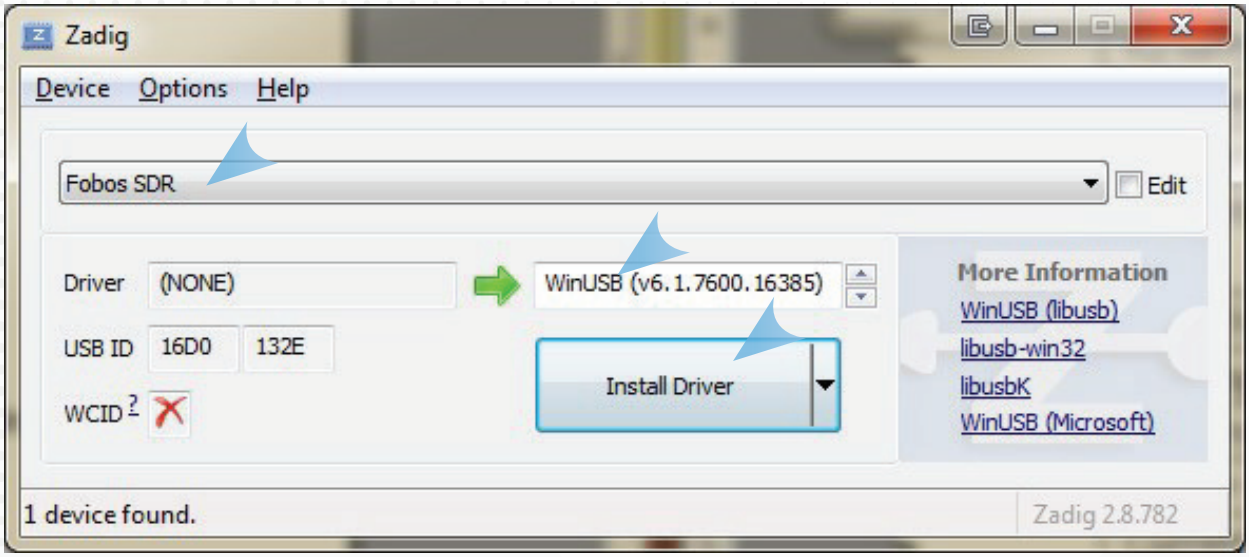



then replug the device or click
"Scan for hardware changes" button

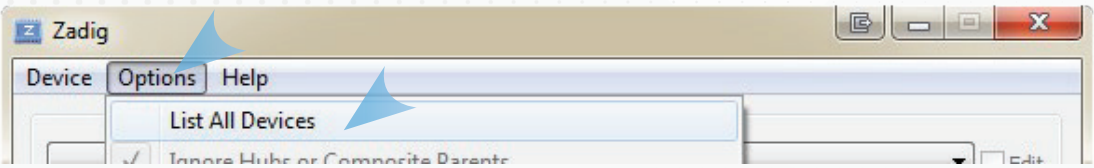



4. Open your favorite web browser and navigate to https://zadig.akeo.ie then download any version of **Zadig** executable - generic Windows USB driver installer.

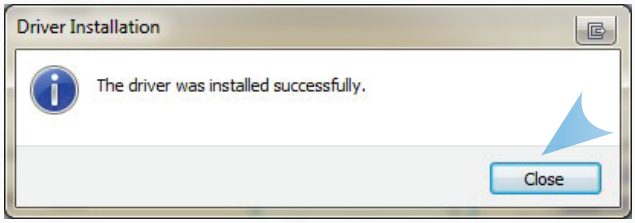
5. Start **Zadig** executable (administrator permissions may be required), select **Fobos SDR** item in the drop-down list, ensure the item WinUSB(v.6xxxxx) selected and hit **"Install Driver"** button



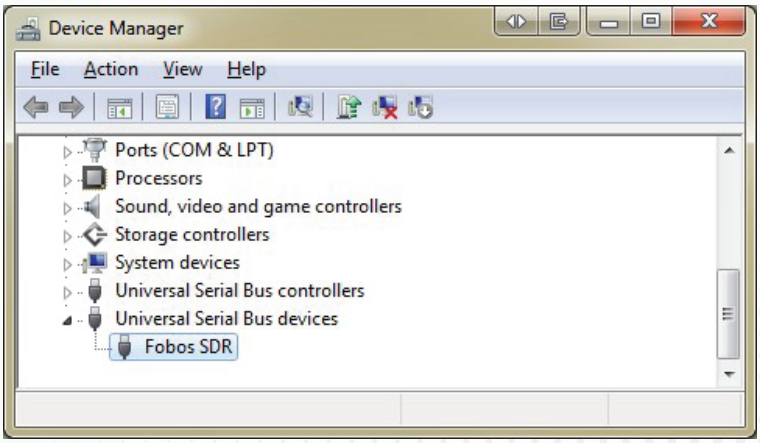

6. If your OS still installs its own driver - no problem, just select "List All Devices" in "Options" menu item,




then select **Fobos SDR** item in the drop-down list and pres this big button named **"Replace Driver"** or **"Reinstall Driver"**.
Finally press Ok in the message box appearing/




After successful driver installation your device manager should look something like this




If any issues or errors occur during driver setup, please double check the hardware setup and operating system configuration.
Otherwise jump to software installation and configuration section.

# Software installation and configuration

RigExpert© Fobos SDR is completely new product, thus supported software list is quite small. The most popular and convenient software to support the RigExpert© Fobos SDR are:

- SDR# via SDRSharp.FobosSDR.dll plugin.
- HDSDR and other ExtIO_*.dll compatible software via ExtIO_FobosSDR.dll plugin.
- uSDR via native Fobos SDR API.

None pure installed of them except uSDR could not work with RigExpert© Fobos SDR. Compatibility is provided via specific plugins and configurations.

## SDR-Sharp installation and configuration. The Easy Way.

You can try and evaluate RigExpert© Fobos SDR with your favorite SDR# software without any boring installation and configuration procedures. Just follow a few easy steps:

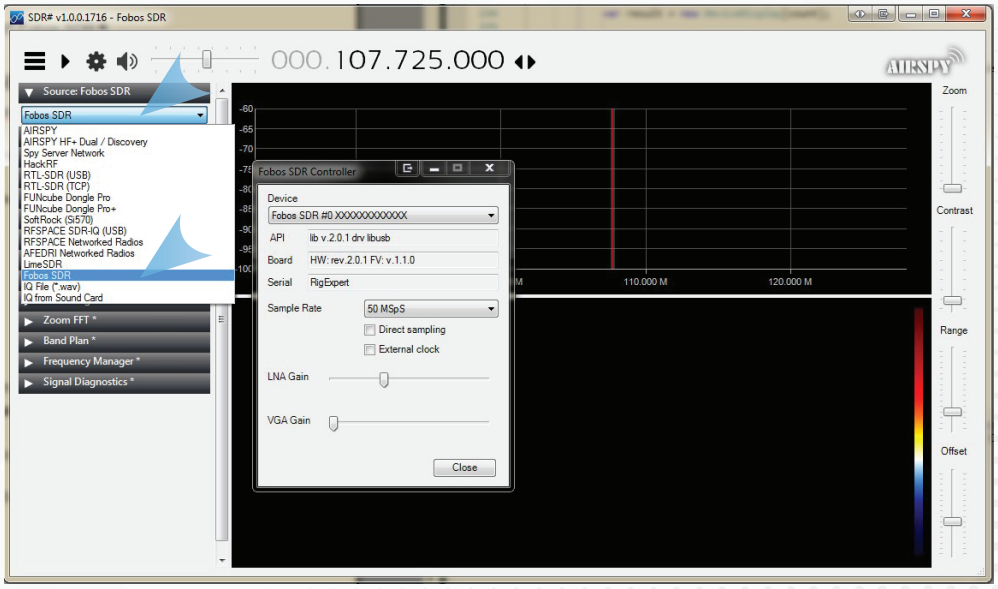
**0.** Make sure you have .Net framework v.4.6 installed on your OS.
Otherwise download it from Microsoft web site and install on your OS.

**1.** Visit https://rigexpert.com/downloads/
and in **"Fobos SDR"** section download **"SDR# Fobos SDR pack"**. It contains portable version of SDR# software with all the stuff needed to connect and operate Fobos SDR.

**2.** Unpack downloaded zip archive to any directory.

**3.** Run **SDRSharp.exe**

**4.** Select Fobos SDR item in source drop down list.




**5.** Click gear button to configure specific parameters of Fobos SDR frontend.

**6.** Enjoy using RigExpert© Fobos SDR with SDR# software.

**!** If you are not so familiar with SDR# but still want to master it please visit https://airspy.com download/ and download **SDR# Big Book** - the greatest SDR# user guide ever.

# SDR-Sharp configuration for Fobos SDR. Advanced.

If you're an experienced SDR (Software-Defined Radio) user and have already set up SDR# with your preferred plugins, frontends, and dependencies, you can manually install the **SDRSharp**. **FobosSDR** plugin into your existing system.

**0.** Make sure you have SDR# v.1.0.0.1716 with all dependencies installed.

**1.** Visit https://rigexpert.com/downloads/ and in **"Fobos SDR"** section download **"SDR# Fobos SDR pack"**.

**2.** Unpack downloaded zip archive to any directory.

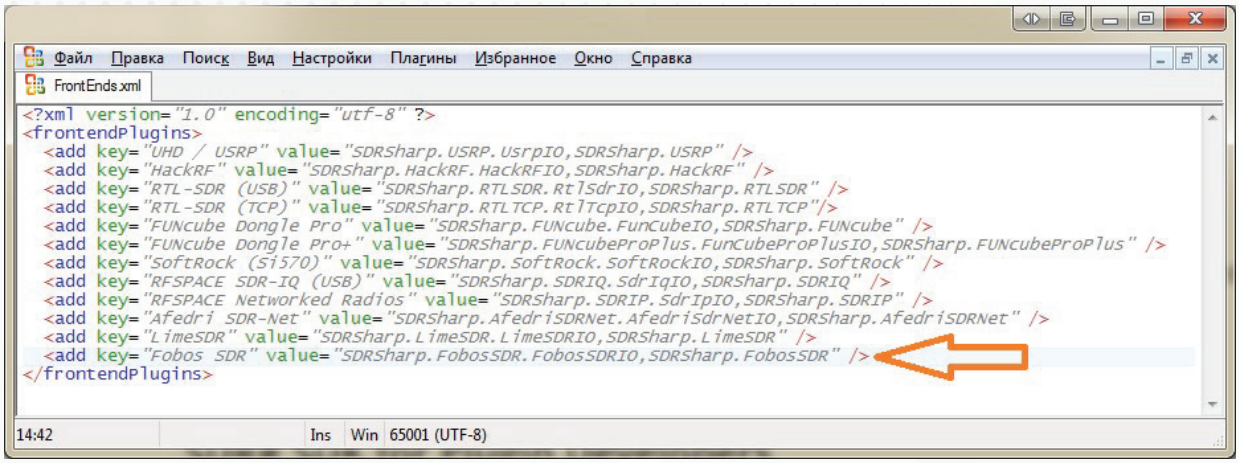
**3.** Copy **SDRSharp.FobosSDR.dll** and **fobos.dll** from unpacked archive to your SDR# directory.

**4.** Open **FrontEnds.xml** in your SDR# directory with any text editor.

**5.** Add the magic line

***‹add key="Fobos SDR" value="SDRSharp.FobosSDR.FobosSDRIO,SDRSharp.FobosSDR" /›***

Finally, **FrontEnds.xml** file should look like this




**6.** Close and save **FrontEnds.xml** file.

**7.** Run SDRSharp.exe.

**8.** Select Fobos SDR item in source drop down list and enjoy using RigExpert© Fobos SDR with SDR# software.

# SDR-Sharp and for Fobos SDR plugin. Very advanced.

Unfortunately, SDR# developers radically changed the software architecture and plugins paradigm since revision 1919 (2023-07-28). If you consider yourself very advanced SDR user and upper-middle level C# developer, If you are ardent fan of SDR# and familiar with SDR# SDK for Plugin Developers you can try to build and install SDRSharp. FobosSDR plugin from sources. Just few easy steps:

**1.** Clone SDRSharp.FobosSDR plugin sources from https://github.com/rigexpert/SDRSharp-FobosSDR-plugin

**2.** Port the sources to the new SDR# SDK

**3.** Build it

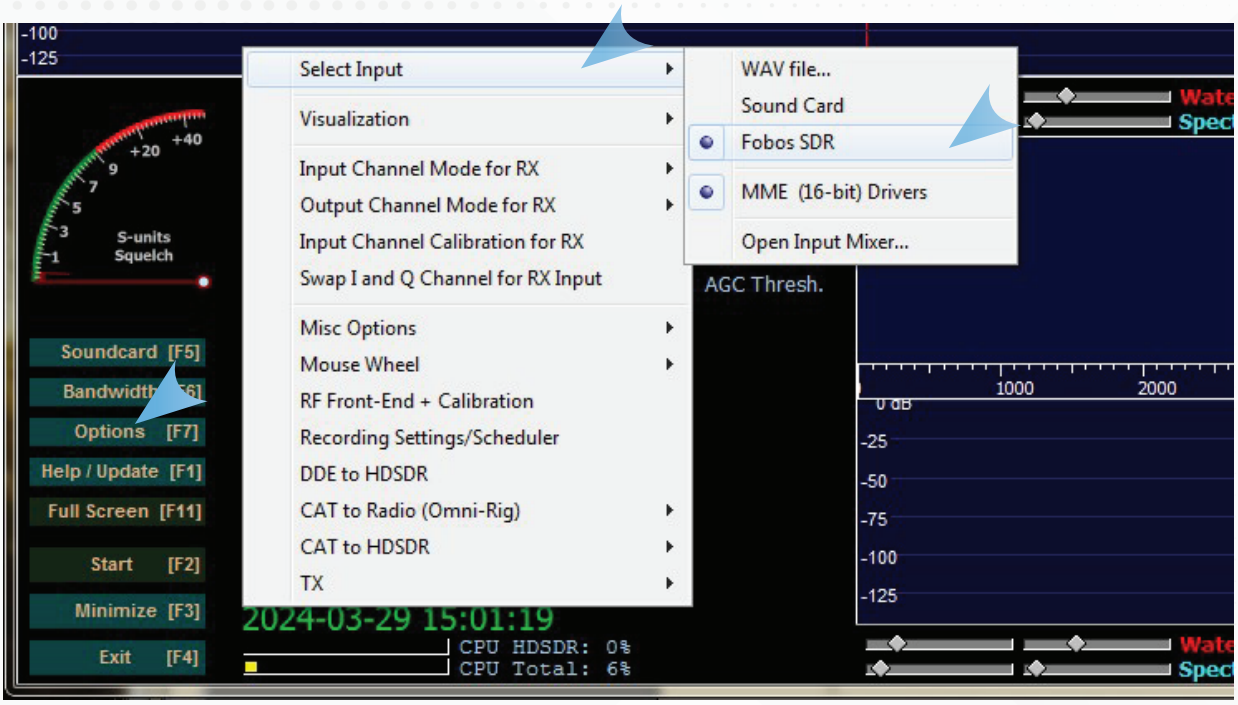
**4.** Have a fun

**5.** Fill free to commit and push back your work

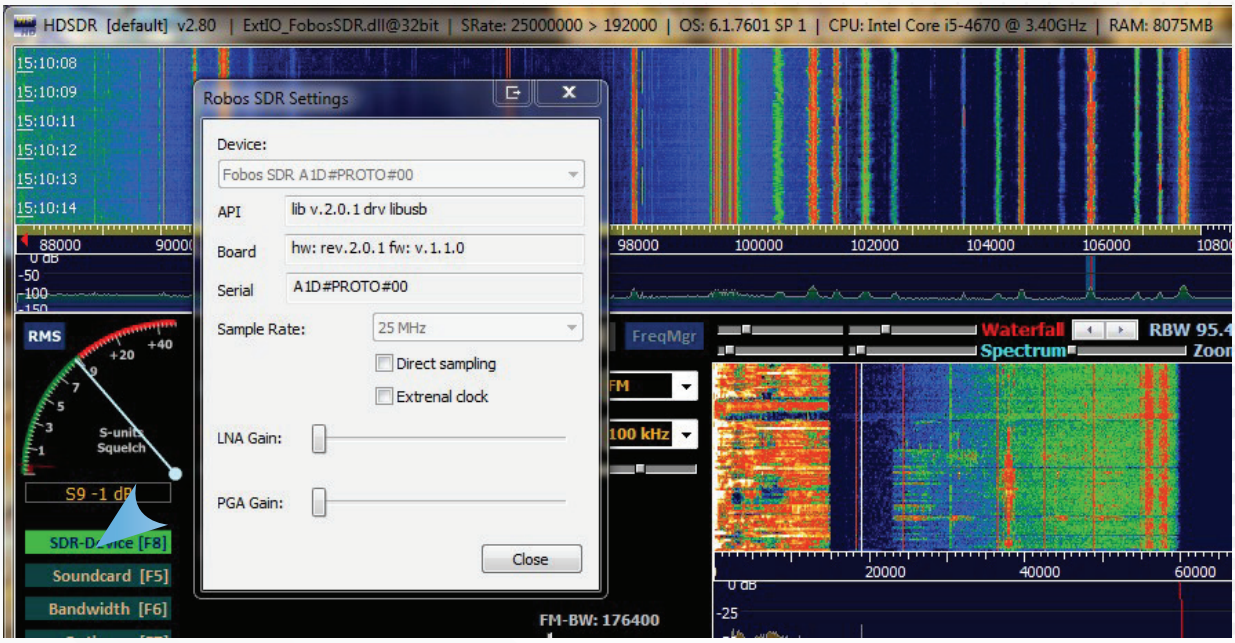
# HDSDR installation and configuration for Fobos SDR. The Easy Way.

There is an easy way to evaluate RigExpert© Fobos SDR with old-school and state-of-art HDSDR software.

1. Go to the https://rigexpert.com/downloads/ and download the "HDSDR Fobos SDR pack" from the "Fobos SDR" section. This pack includes HDSDR executables ver.2.70 and ver.2.80, an ExtIO_FobosSDR.dll plugin, and all necessary libraries.
2. Unpack downloaded zip archive to any directory.
3. Run HDSDR_270.exe or HDSDR_280.exe running HDSDR ver.2.70 and ver.2.80 respectively.
4. Hit Options[F7] → Select input → Fobos SDR to select or configure the device




5. In HDSDR ver.2.80 and later hit SDR Device [F8] to configure specific options in popup dialog.




6. Use other HDSDR GUI controls in casual way.

# *HDSDR configuration for RigExpert© Fobos SDR.*

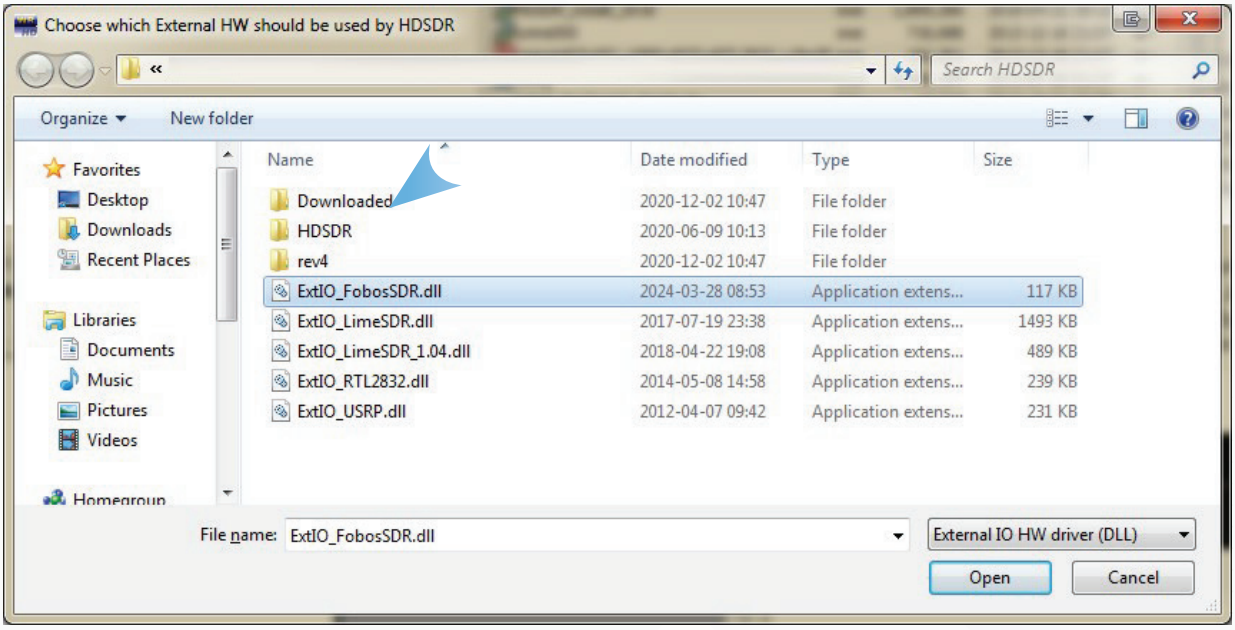
If you have your own version of HDSDR installed a configured you can add the RigExpert© Fobos SDR support in a such steps:

**1.** Visit https://rigexpert.com/downloads/ and download **"HDSDR Fobos SDR pack"** in **"Fobos SDR"** section.

**2.** Unpack downloaded zip archive to any directory

**3.** Copy three files **ExtIO_FobosSDR.dll**, **fobos.dll** and **libusb-1.0.dll** from unpacked directory to your HDSDR directory.

**4.** Hit Options[F7] → Select input → Fobos SDR to select or configure the device




**5.** Configure Fobos SDR in the popup dialog (SDR Device [F8]) and use other your favorite HDSDR GUI controls in casual way.

**!** If you are not familiar with HDSDR please visit http://hdsdr.de/index.html and feel free to read FAQ section.

# uSDR software and Fobos SDR API setup

uSDR is a general-purpose multimode software defined radio receiver Windows application. “u” (μ) means micro because of lightweight binaries distributive, simple and compact user interface, highly optimized digital signal processing routines to minimize CPU usage. The software supports a long list of SDR devices and interfaces:

- RTL-SDR (USB)
- RTL-SDR (TCP)
- AirSpy SDR
- AirSpy HF+ Discovery
- HackRF One
- LimeSDR
- BladeRF
- SDRPlay
- ExtIO_*.dll compatible devices

Since v.0.1.7.0 Fobos SDR API native support was added.
To evaluate all the features just follow these steps:

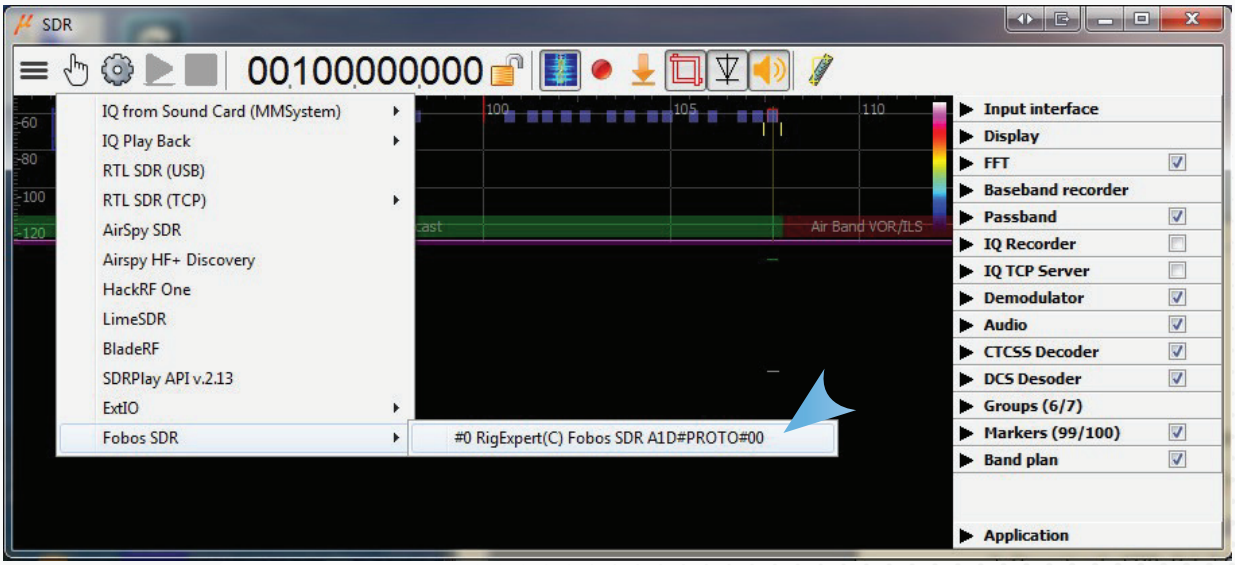
**1.** Navigate to https://sourceforge.net/projects/u-sdr/files/

**2.** Download uSDR_0.1.7.0.zip or late release archive

**3.** Unpack the archive to any directory

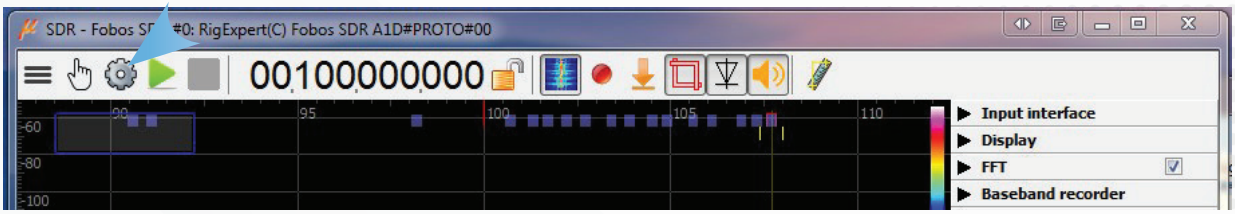
**4.** Run uSDR.release.exe

**5.** Hit on the “Hand” button and select Fobos SDR device item

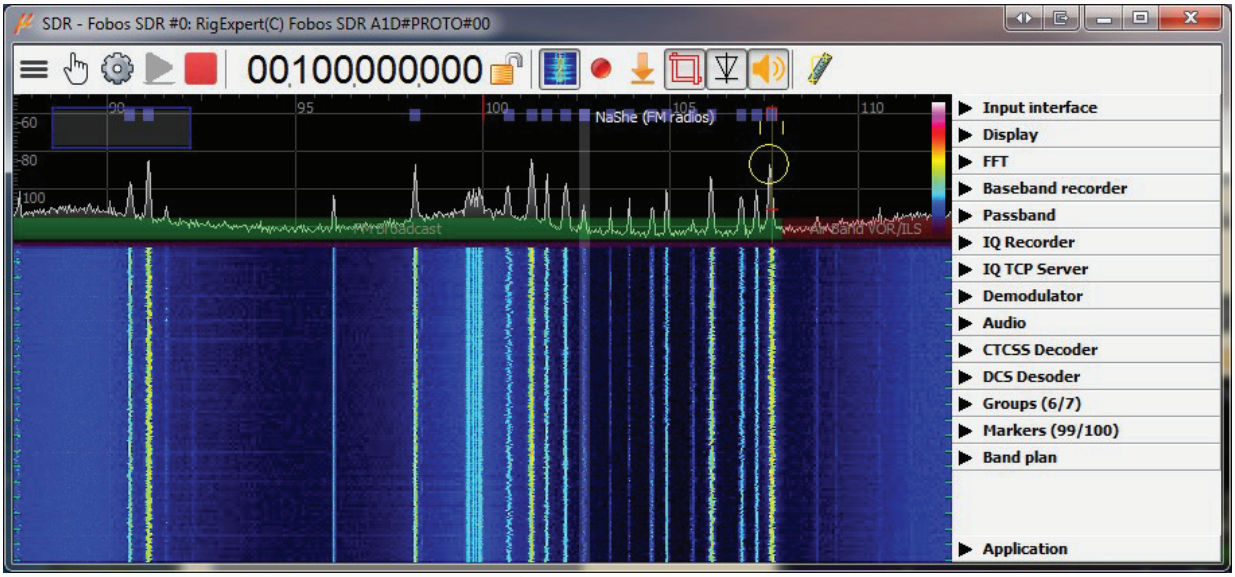



On successful connection the main form caption becomes informative and gray triangle button becomes green

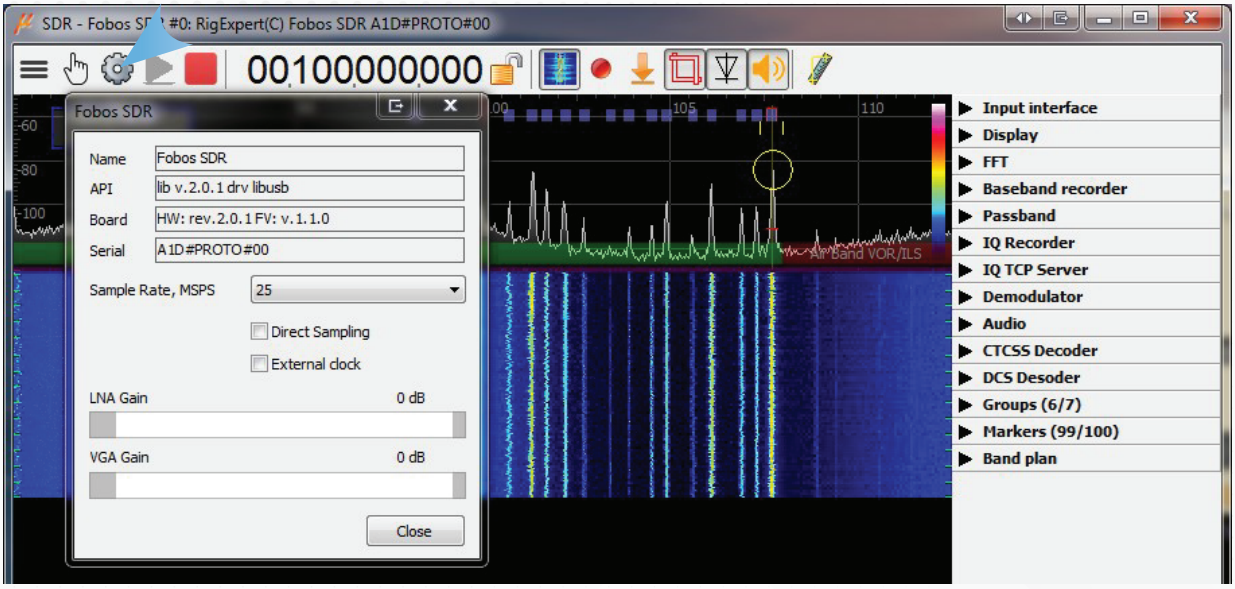
**6.** Hit the green triangle button to start Rx streaming




Streaming should start immediately; the spectrum and waterfall should look like follows.

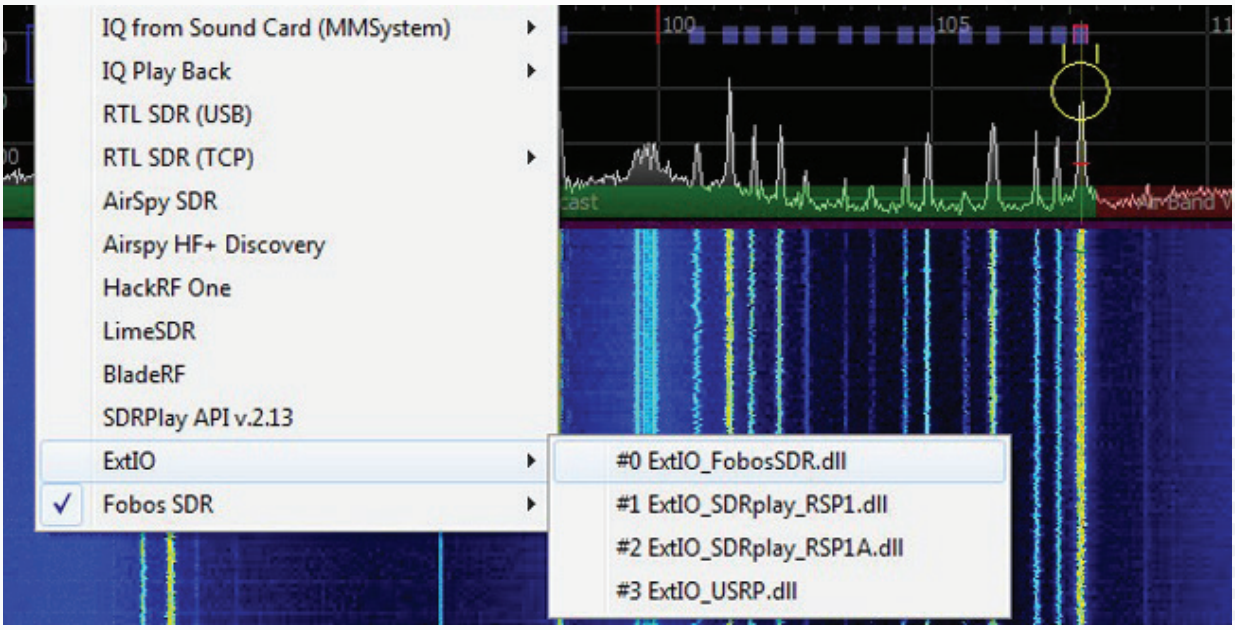



**7.** Set the specific device parameters in a popup window under the "gear" button.




**8.** Zoom the spectrum with the mouse wheel, navigate by dragging the spectrum or waterfall, tune to frequency by dragging the band, demodulate it and use all the features of uSDR.

uSDR also supports ExtIO_*.dll interface and can deal with the Fobos SDR via ExtIO_FobosSDR.dll as well.



# *Acknowledgments*

We would like to extend our deepest gratitude to the **SDR# developers**, for their exceptional work in advancing the field of software-defined radio. Their dedication and expertise have been instrumental in the creation of this guide. A special thanks goes to Youssef Touil, whose vision and leadership have undoubtedly paved the way for countless innovations within the SDR community.

Furthermore, our appreciation goes out to the team behind **HDSDR**. Their contributions have significantly enriched the user experience for radio enthusiasts worldwide.
We are particularly grateful to **Alberto di Bene (I2PHD)**, whose technical prowess and commitment to excellence have been a driving force in the project.

Without the hard work and passion of these individuals and all contributors to both SDR# and HDSDR, this Quick Start.

The RigExpert Team