Fobos PRO SDR Quick Start Guide

RigExpert® Fobos PRO is high-performance general purpose Software Defined Radio (SDR) receiver with super speed USB 3.0 interface.

It has 0.1 to 8825 MHz total frequency coverage and up to 64 MHz sampling bandwidth with true 14bit waveform sampling resolution and full data integrity.

Board connectivity



Power and data port
USB 3.0 Type-B Male Socket

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

Clock input
10 MHZ, 1 V p2p, SMA Female, High impedance

RF
Primary Rx input channel. Double frequency conversion heterodyne, 25 to 8825 MHz covering, SMA Female, 50 Ohm



HF1 and HF2
Two suxiliary input channels, coherent direct sampling, 0.1-25 MHz covering SMA Female, 50 Ohm

Fobos PRO with Octopus



RF1-RF8
Octopus antenna inputs, SMA Female, 50 Ohm

Octopus
8-channel radio-frequency commutator

Fobos PRO
SDR receiver

Hardware setup

1. Connect VHF/UHF antenna to the **RF** connector to receive 25 to 8825 MHZ frequency range.

   ! To operate with RigExpert® Octopus connect antennas to the commutator inputs and interconnect the commutator output to receiver RF input with SMA-SMA pigtail cable.

2. Connect HF antennas to HF1 and/or HF2 connectors to receive 0.1-25 MHz frequency range.

   ! To operate with HF1 and HF2 inputs in direct sampling mode 50-64 MHz sample rates 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.

   ! 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.

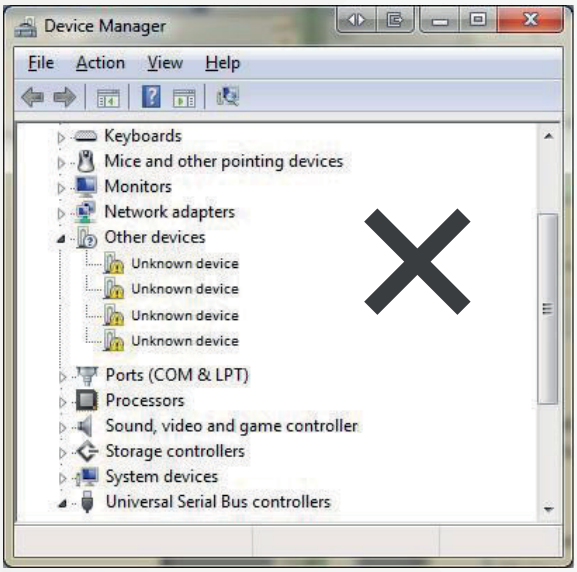
4. (Optional) Connect external clock source and use the board clock out to operate in very hig precision and synchronous clock domains. RigExpert® Fobos PRO SDR has on-board stable internal clock source suitable for most user cases.

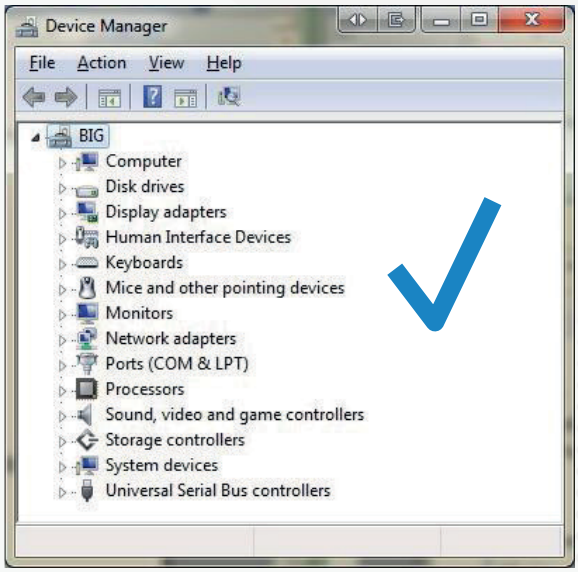
5. Disconnect the device from USB and jump to driver setup section.

Driver installation

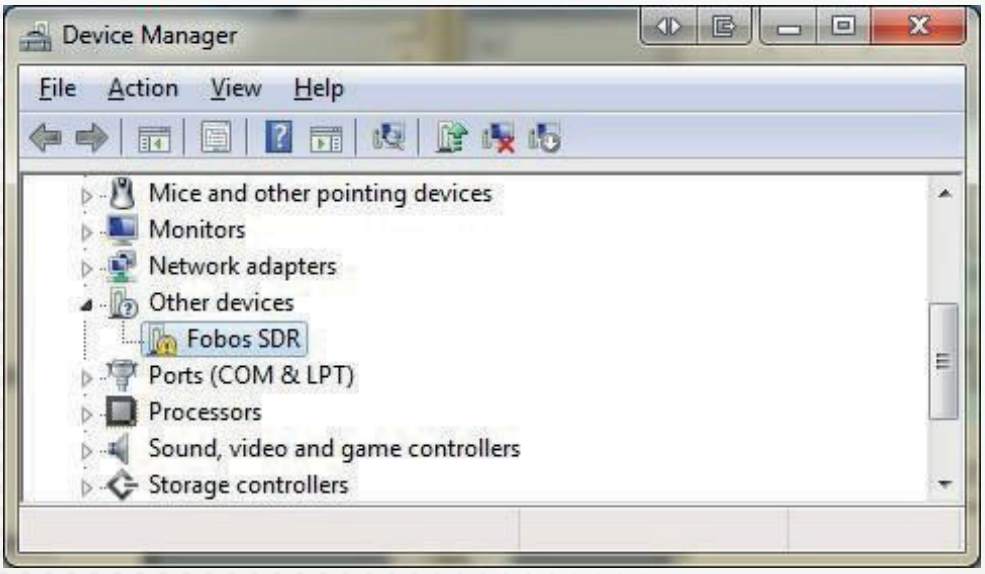
1. Make sure that proper drivers for your motherboard USB-3.0 root hub controller are installed.

2. Please open the device manager and ensure that there are no unknown devices or conflicted drivers in your system.

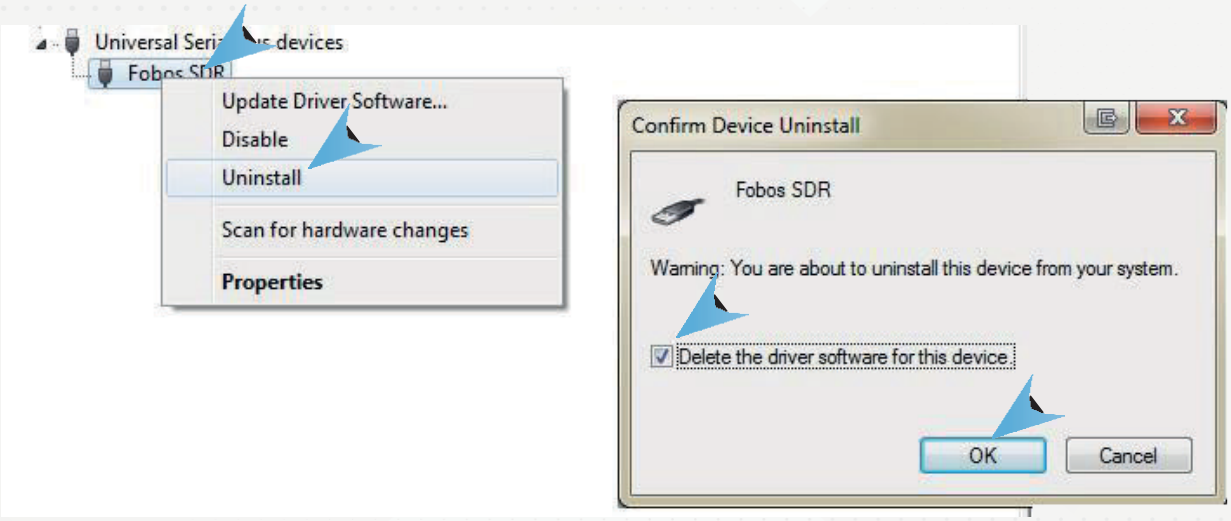




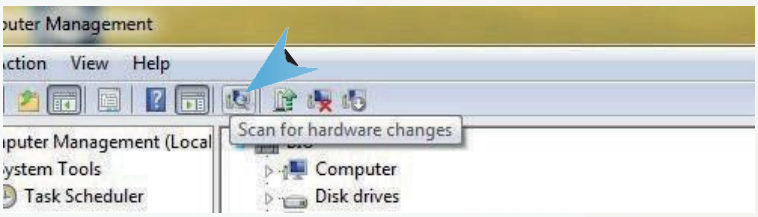
3. Connect RigExpert® Fobos PRO SDR to USB port, wait a second for device to boot up, make sure that new unknown device named Fobos SDR appeared in device manager tree view.



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



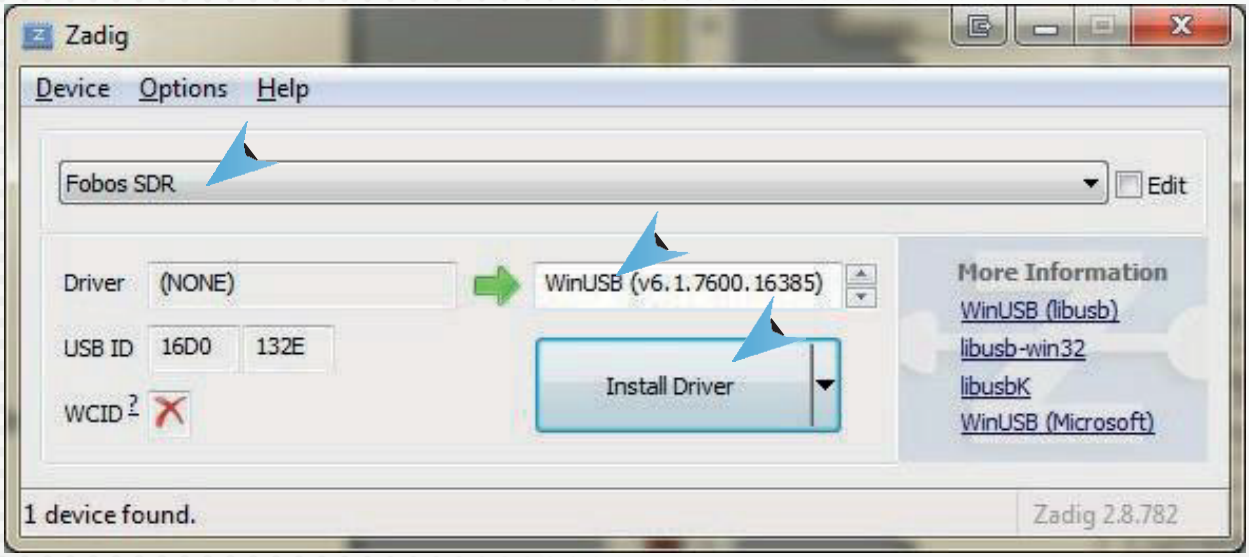
then replug the device or click "Scan for hardware changes" button



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



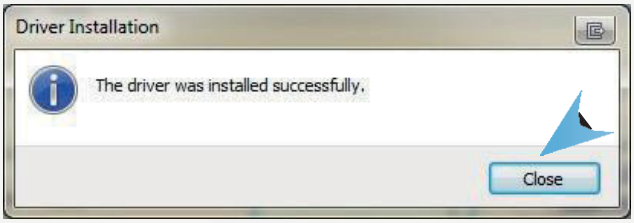
5. Start **Zadig** executable (administrator permissions may be required), select **Fobos SDR** item in the drop-down list, ensure the item WinUSB(v.6xxxxx) selected and click "**Install Driver**" button



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 press 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 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

The most popular and convenient software to support the RigExpert® Fobos SDR are:

- Spectrozir SA.
- uSDR (native).
- SDRangel.
- SDR++.
- GNU Radio.
- SDR# via SDRSharp.FobosSDR.dll plugin.
- HDSDR and other ExtIO_*.dll compatible software via ExtIO_FobosSDR.dll plugin.

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

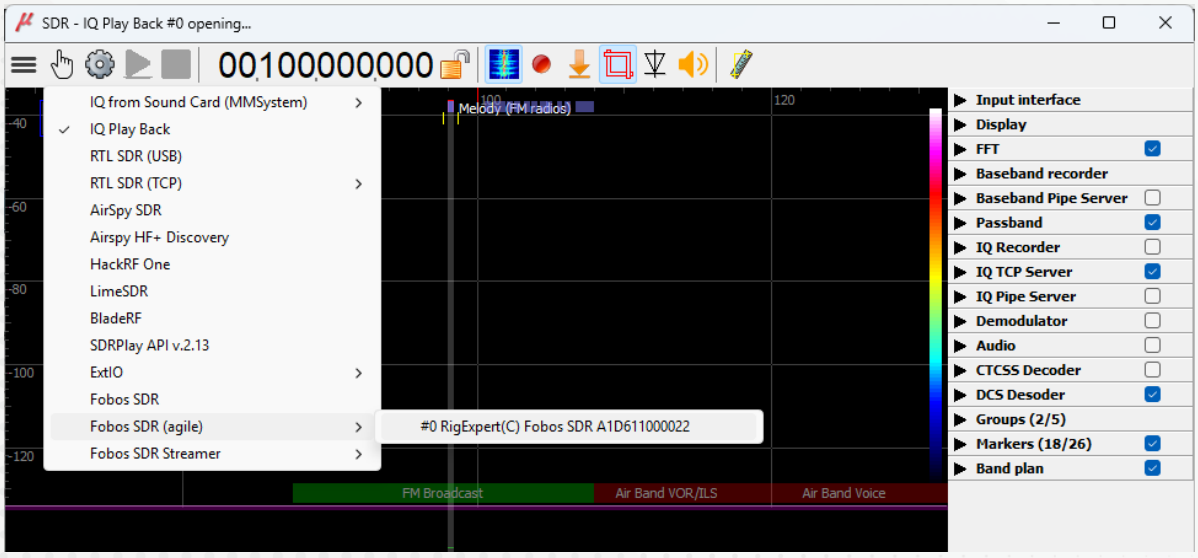
uSDR software and Fobos SDR API setup

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

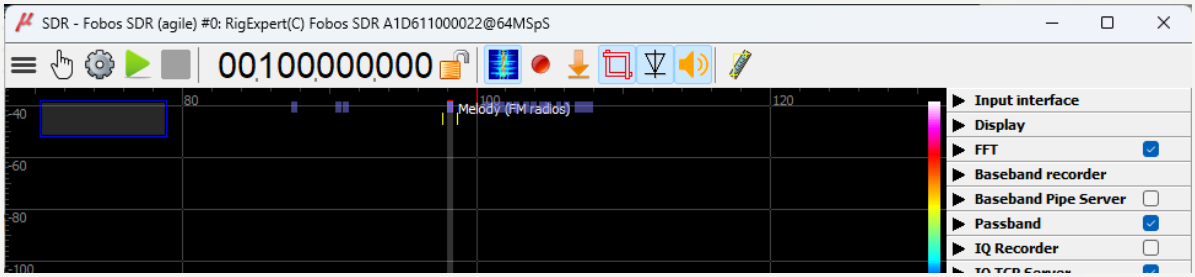
Since v.0.1.8.1 Fobos PRO SDR API native support was added. To evaluate all the features just follow these steps:

1. Navigate to https://sourceforge.net/projects/u-sdr/files/
2. Download **uSDR_0.1.8.1.zip** or late release archive
3. Unpack the archive to any directory
4. Run **uSDR.release.exe**
5. Click on the **"Hand"** button, navigate to "Fobos SDR (agile)" section and select the connected device item

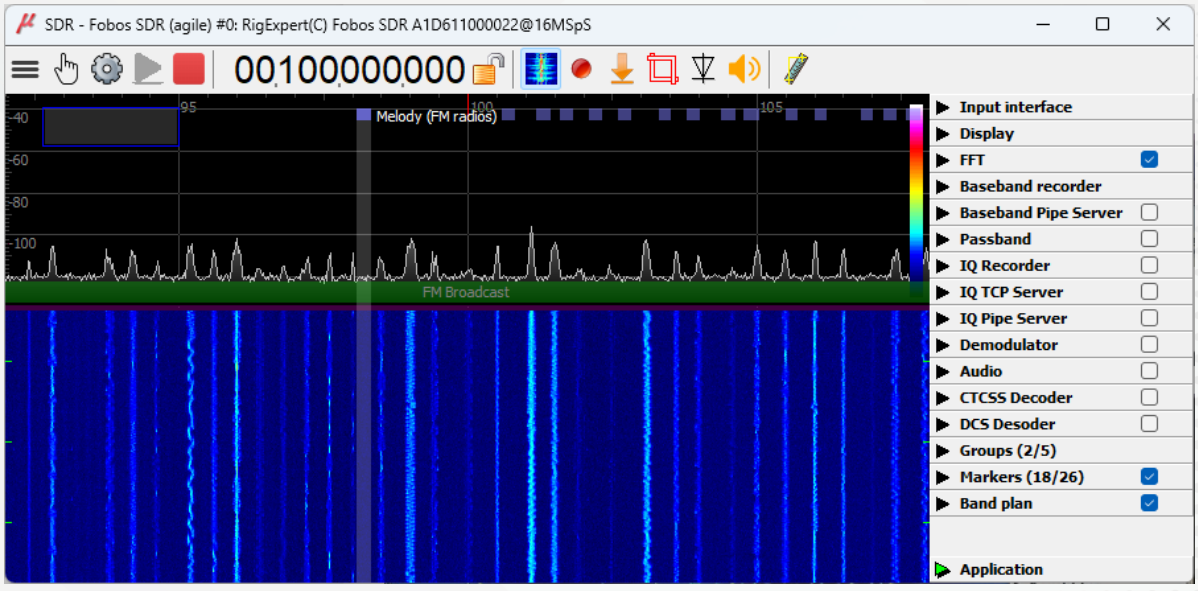


On successful connection the main form caption becomes informative and gray triangle button becomes green

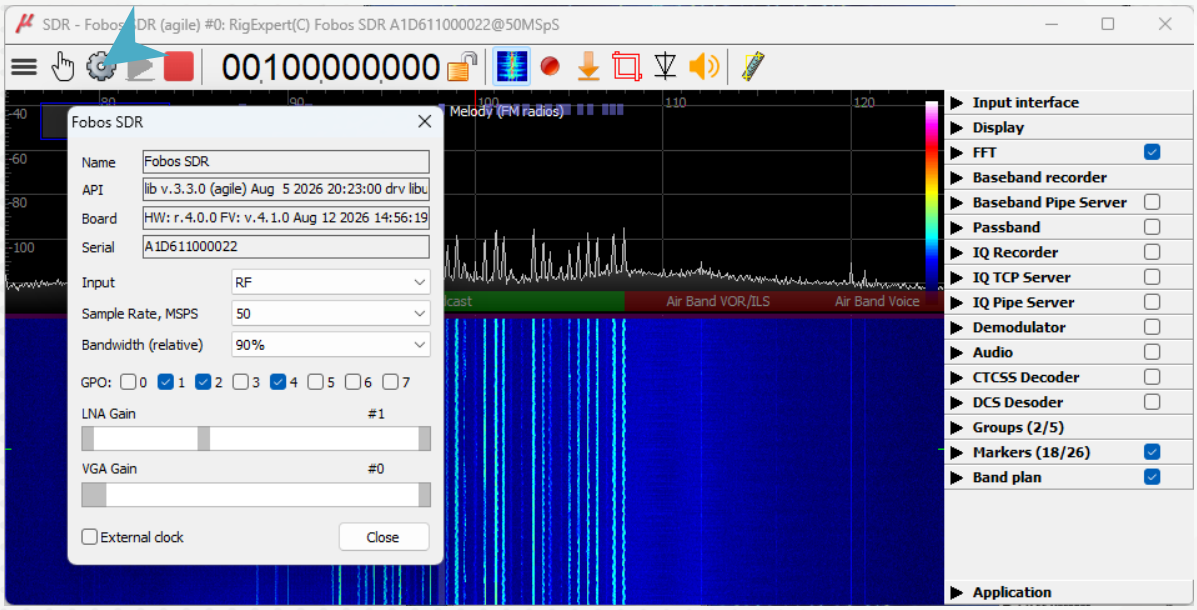
6. Click the green triangle button to start Rx streaming



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.

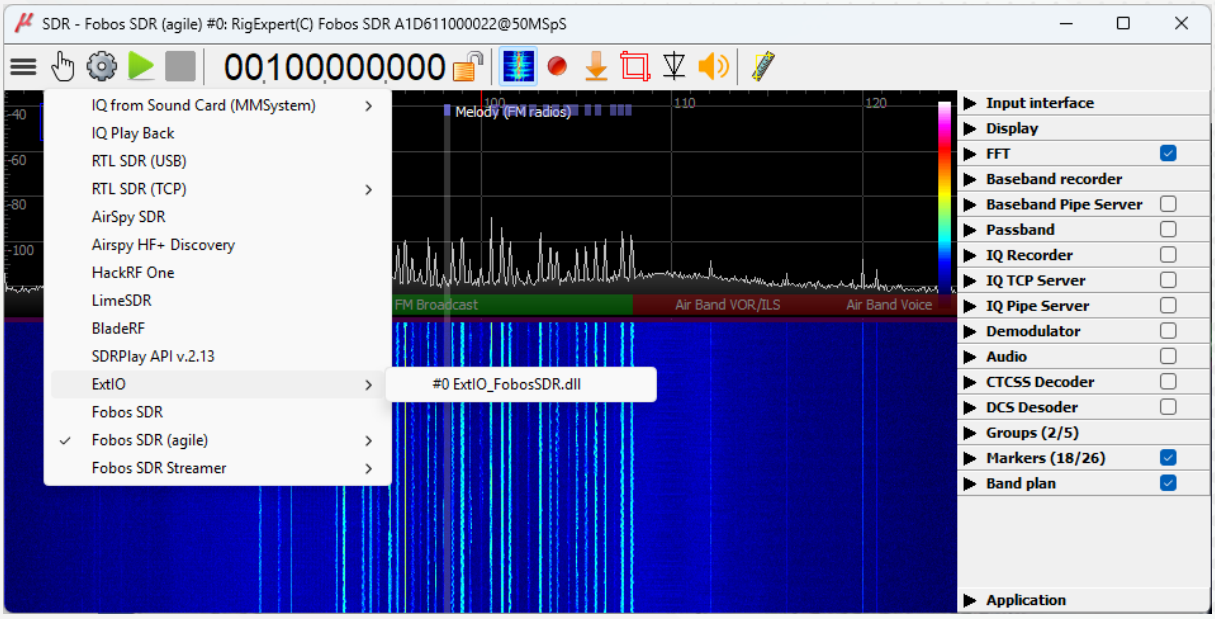


! To operate with RigExpert Octopus antenna commutator please select the GPO checkboxes to activate the appropriate antenna input.

GPO					RFC to
B0	B1	B2	B3	Value	
0	0	0	0	0	RF1
1	0	0	0	1	RF2
0	1	0	0	2	RF3
1	1	0	0	3	RF4
0	0	1	0	4	RF5
1	0	1	0	5	RF6
0	1	1	0	6	RF7
1	1	1	0	7	RF8
x	x	x	1	8	All off

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.

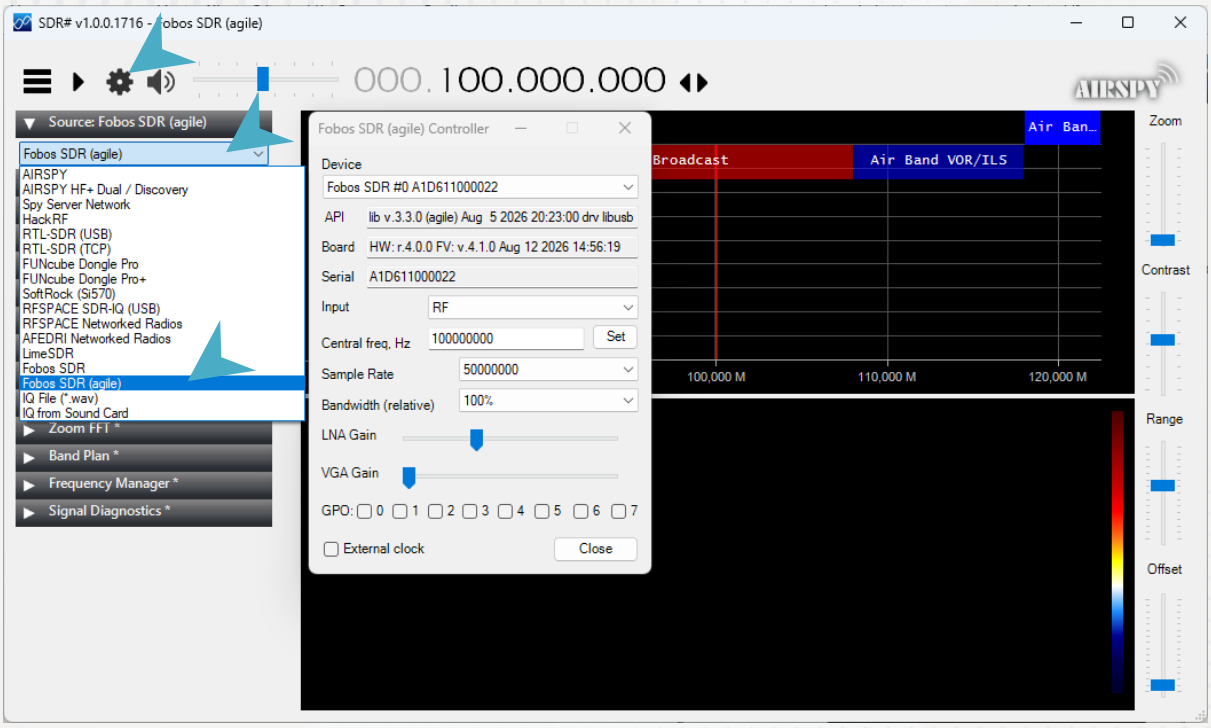


SDR-Sharp installation and configuration. The Easy Way.

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/files/software/FobosSDR/

   download **"SDRSharp_v1716_FobosSDR_pack_portable.zip" archive**. 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 (agile)** item in source drop down list.



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

! To operate with RigExpert® Octopus antenna commutator please select the GPO checkboxes to active the appropriate antenna input the same way as in uSDR.

! 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.

SDR-Sharp configuration for Fobos SDR. Advanced.

If you're an experienced SDR 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/files/software/FobosSDR/ download **"SDRSharp_v1716_FobosSDR_pack_portable"** archive.

2. Unpack downloaded zip archive to any directory.

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

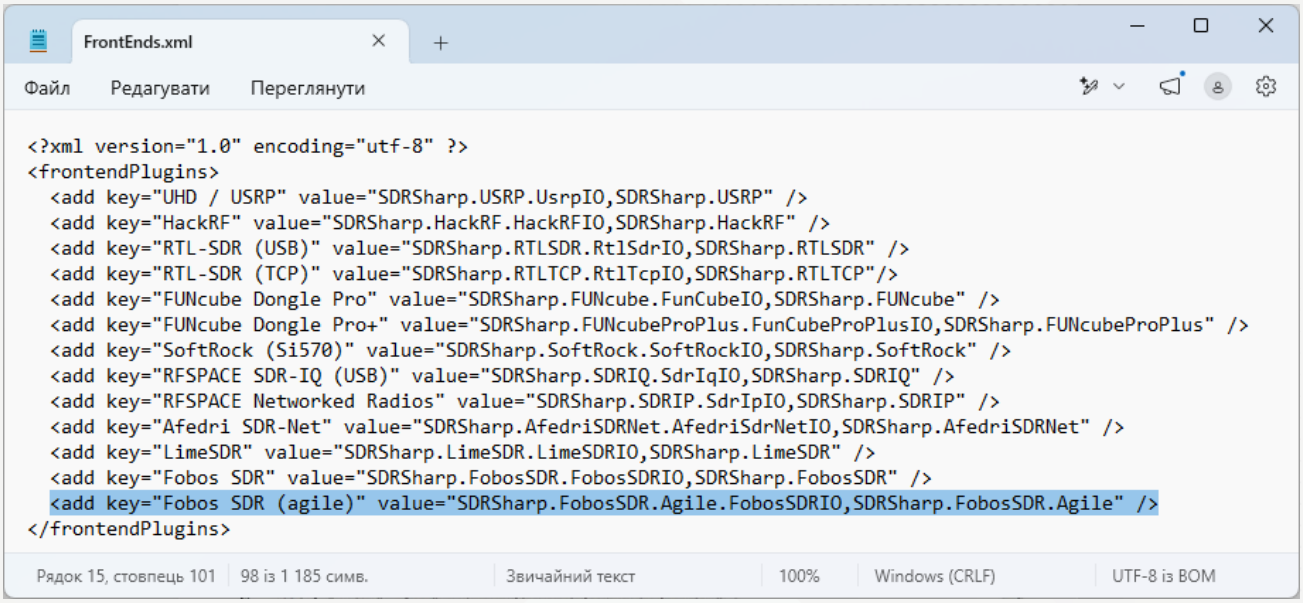
4. Open **FrontEnds.xml** in your SDR# directory with any text editor.

5. Add the line

<add key="Fobos SDR (agile)" value="SDRSharp.FobosSDR.Agile.FobosSDRIO,SDRSharp.FobosSDR.Agile" />

! Please, use standard ASCII double quotes " (0x22 hex, 34 decimal), neather “ ” nor «» nor << >>.

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.

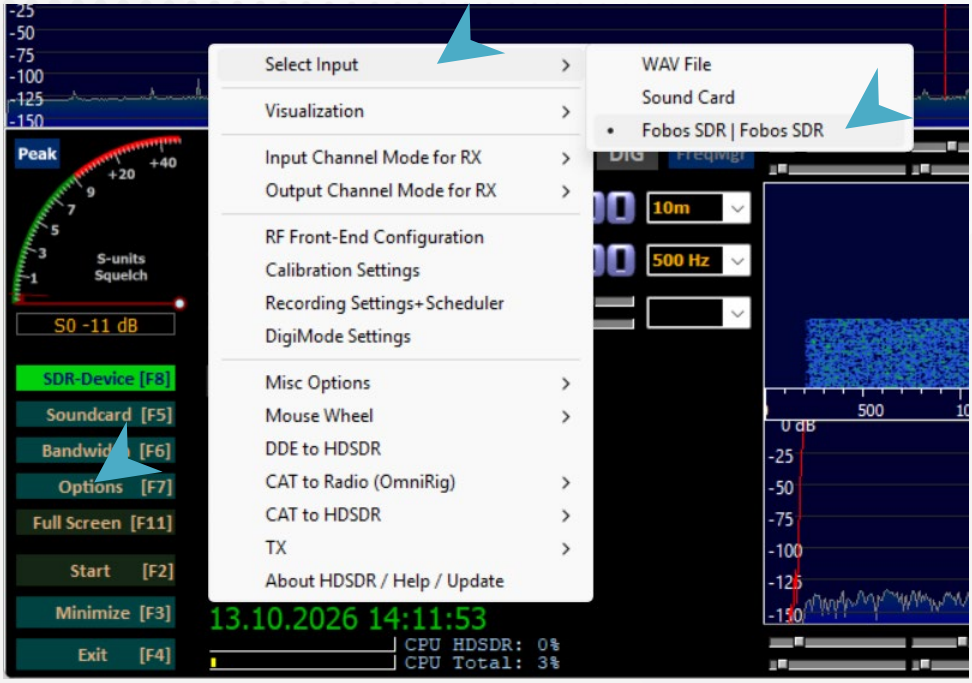
1. Clone SDRSharp.FobosSDR plugin sources from https://github.com/rigexpert/SDRSharp-FobosSDR-plugin

2. Port the sources to the new SDR# SDK

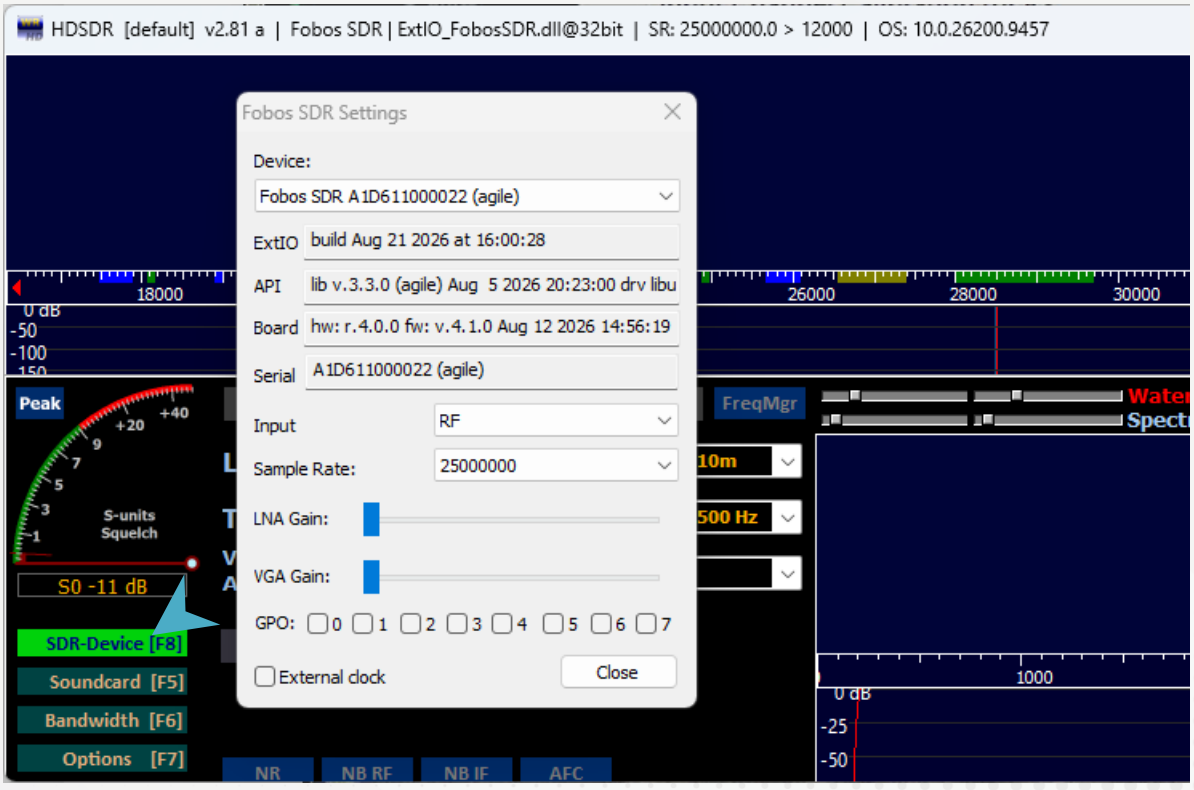
3. Build it.

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

1. Visit https://rigexpert.com/files/software/FobosSDR/ and download the "**HDSDR_v270v280v281_FobosSDR_pack_portable**" archive. This pack includes HDSDR executables ver.2.70, 2.80 and ver.2.81, 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 or HDSDR_281.exe.
4. Click **Options[F7]** → **Select input** → **Fobos SDR** to select or configure the device



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



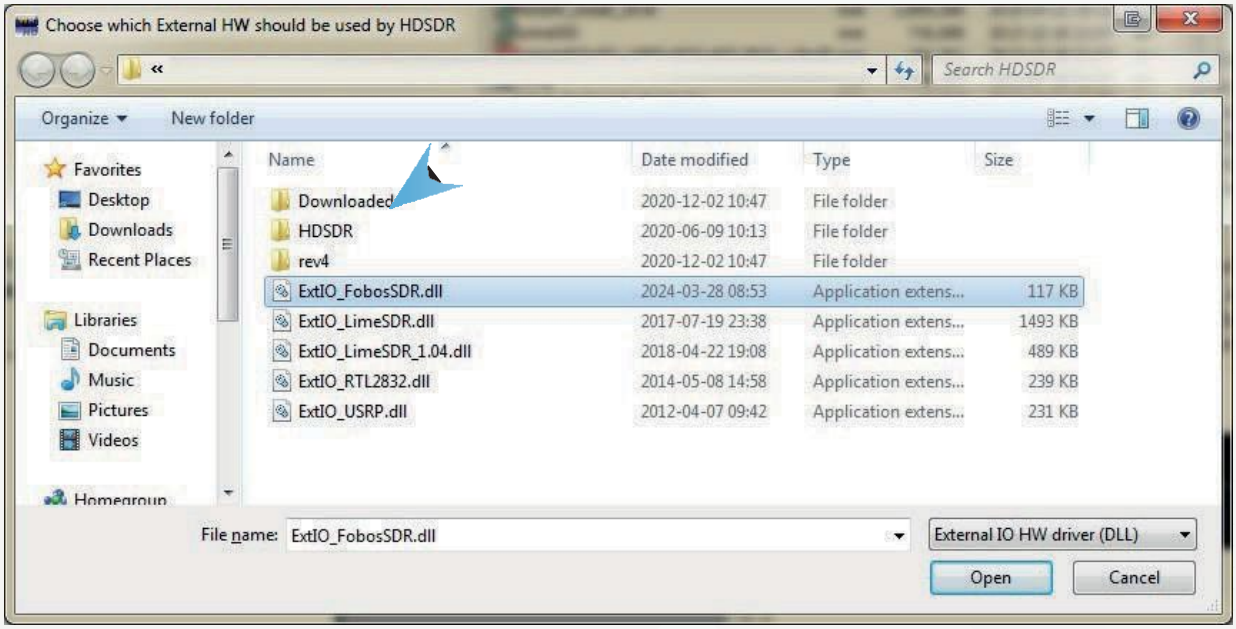
6. Use other HDSDR GUI controls in casual way.

! To operate with RigExpert® Octopus antenna commutator please select the GPO checkboxes to activate the appropriate antenna input the same way as in uSDR and SDR#.

HDSDR configuration for RigExpert® Fobos SDR.

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

2. Visit https://rigexpert.com/files/software/FobosSDR/ and download "**HDSDR_v270v280v281_FobosSDR_pack_portable**" archive.
3. Unpack downloaded zip archive to any directory
4. Copy **ExtIO_FobosSDR.dll**, **fobos.dll**, **fobos_sdr.dll** and **libusb-1.0.dll** files from unpacked directory to your HDSDR directory.
5. Click **Options[F7]** → **Select input** → **Fobos SDR** to select or configure the device



6. Configure Fobos SDR in the popup dialog **(SDR Device [F8])** and use other 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.

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