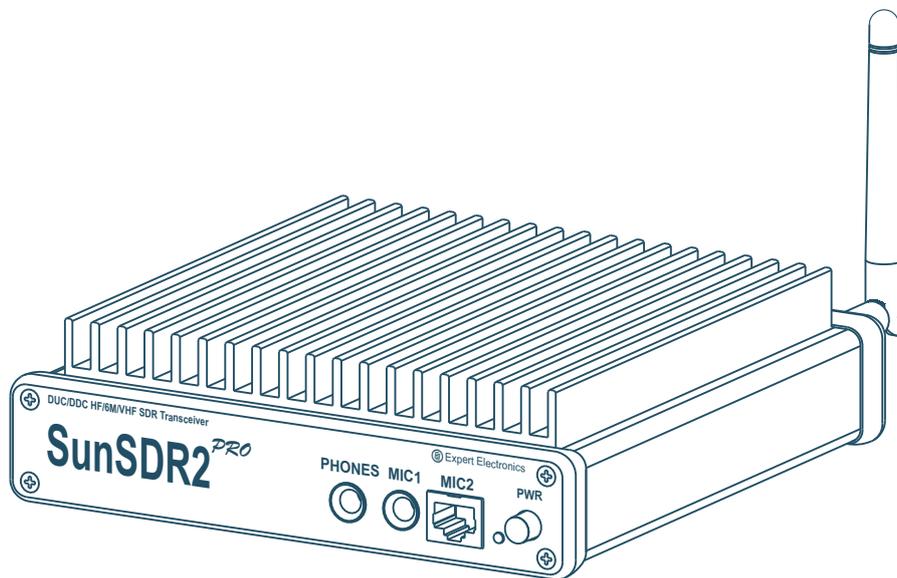


SunSDR2^{PRO}

DUC/DDC HF/6M/VHF SDR Transceiver



Getting Started

V1.0

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Introduction

Please, spend 5 minutes on reading this document and you will be able to start work with SunSDR2 PRO transceiver quickly and broadcast in a new way today. This document gives answers to the majority of the first questions, which new users meet when start working with the transceiver of a new type.

You have bought the most up-to-date radio amateur equipment which can be imagined today. This transceiver is a compound software defined radio, allowing to provide high quality of signal processing both in receiving and transmitting modes by modern digital methods. PC used in transceiver allows to provide qualitative service not only in receiving/transmitting, but also to use the HAM LOGs and DIGI software without wires.

Effective and quick mastering of SunSDR2 PRO PC transceiver is possible on the condition that the user has basic skills in using PC. It is considered that computer terms used in this Getting Started document are familiar to the user and won't cause any difficulties in searching one or another tab in Windows 7/8. For visualization and simplicity, screenshots of dialogue windows will be given here, necessary functions and fields for editing will be outlined with coloured contour.

SunSDR2 PRO transceiver is a software defined radio. It means that you will need PC or laptop for work with the transceiver. PC controls transceiver, RX/TX modes, band switching and data rate processing, coming from and to transceiver. These rates by PC at the input and

output gives audio signal and receive microphone signal and by transceiver they give HF-signal, transmitting into the air.

The main feature of this transceiver and its basic distinction from all the other recent output transceivers is the use of absolutely new principle of radio signal processing.

There are no frequency converting units in its classical variant. The signal is converted almost from the antenna, all the further signal processing is in the software. The same process is observed while transmitting. Forming of the necessary signal modulation type is made by digital method right at the required frequency. From all the classical nodes there is only preselector, power amplifier and low frequency filter for PA in the scheme.

1. Connection

The following components are required for starting SunSDR2 PRO transceiver's work:

- Transceiver power supply unit;
- PC;
- CW key (if it's required);
- Microphone or telephone headset;
- Computer net LAN – cable;
- Antenna, tuned into radio amateur frequencies.

Let's have a look at each component.

Power Supply unit must have power not less than 75 W, provide constant voltage of 15 V at the output with 5 A load current. Under 15 V supply voltage transceiver gives full output power of 20 W.

PC or notebook can be any modern configuration, produced in the latest 2-3 years.

Recommended configuration:

- 2 or 4 core processor Intel Core i3, Core i5 or Core i7;
- 4 GB or more RAM;
- 40 GB hard disk free space for the ExpertSDR2 software and the accompanied programs;
- 17 – 27" monitor;
- video card supporting OpenGL 1.5 and higher.

ExpertSDR2 software will work on less powerful PCs with processors Core2Duo and Dual-Core, but it will bring to the higher level of resource loading. The more powerful the PC, the fewer resources the program requires and the easier and more colorful "waterfall" and panorama can be drawn.

- **Operating system:** Windows XP 32/64 bit, Windows 7 32/64 bit or Windows 8/8.1 32/64 bit. The latest versions are preferable.

Microphone or Telephone headset can be either the simplest or the cheapest as, for

example, by Genius, or developed specially for radio amateurs by Heil Sounds. There is a usual 6,3 mm slot for electret microphone connecting on the transceiver's front panel. And also there is a jack, compatible with Yaesu PTT-switches of MH-31 type. This jack allows to connect PTT-switches of such popular transceiver as Yaesu FT-817/857/897 to transceiver.

Receiving/transmitting modes control is produced by pushing the PTT-footswitch, connected to **PTT** connector on the back panel of the transceiver.

Computer net LAN – cable provides transceiver's connection to PC by Ethernet-connection. PC connection is also possible "by air", via wireless net. The easiest and the quickest transceiver's connection to PC is by the LAN-cable, supplied with the transceiver.

Antenna, tuned into radio amateur frequencies must have impedance close to 50 Ohm at those bands where the work is planned.

2. Ethernet-connection setting

To connect your transceiver to PC by wire net connection there are two possible variants: direct connection to PC by wire Ethernet(LAN) interface and by already working local net via router.

The first way:

- Connect your transceiver to PC by LAN-cable, supplied with transceiver.
- Switch on the transceiver.
- Set IP address in Windows as it is shown in Section 3.



- Start ExpertSDR2 software for SunSDR2 PRO transceiver by the double click.
- Press the button **Start** in the program



If everything is done correctly you will see the spectrum in the program's window and hear the air noise. You can start the work.

The second way:

If you already have local net with IP address not **192.168.16.xxx** and you need to change IP address in SunSDR2 PRO:

- Connect your transceiver to PC by LAN-cable, supplied with transceiver.
- Switch on the transceiver.
- Set static IP address in Windows as it is shown in Section 3.
- Start ExpertSDR2 software for SunSDR2 PRO transceiver by the double click
- Press the button Start in the program
- Change IP address in SunSDR2 PRO as it is shown in Section 4.
- Connect transceiver by LAN-cable to local net. Now at any PC in local net ExpertSDR2 software can be launched.

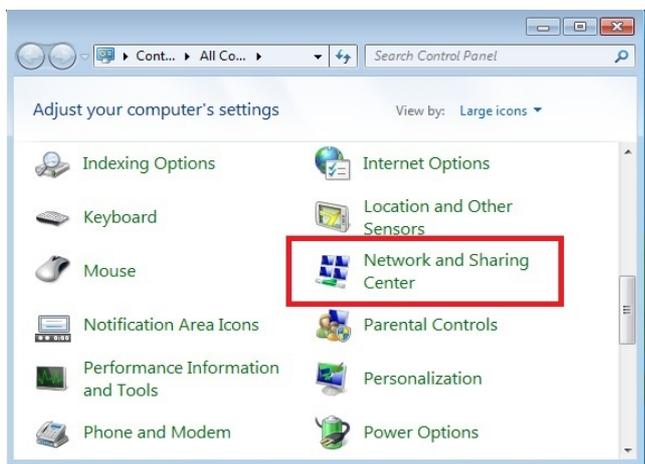
If everything is done correctly you will see the spectrum in the program's window and hear the air noise. You can start the work.

3. Network Settings

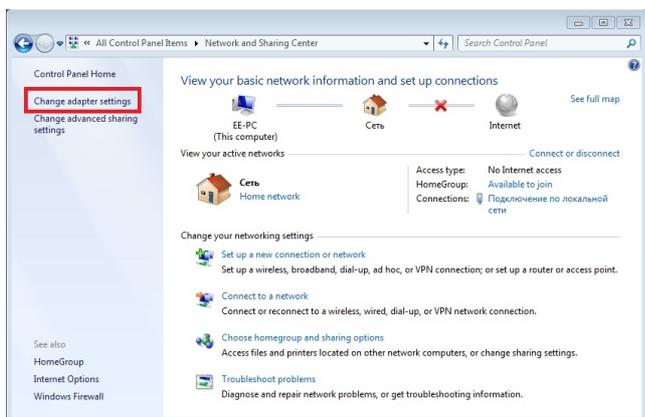
Transceiver doesn't need the installation of special drivers. The whole information exchange is carried out by the LAN network interface. There is given information how to connect the transceiver to PC using DHCP.

If your transceiver is connected directly to PC you should check that your PC's network settings are in the mode **Obtain an IP address automatically**, to get it do the following steps. If the network connection is already set this way leave this clause.

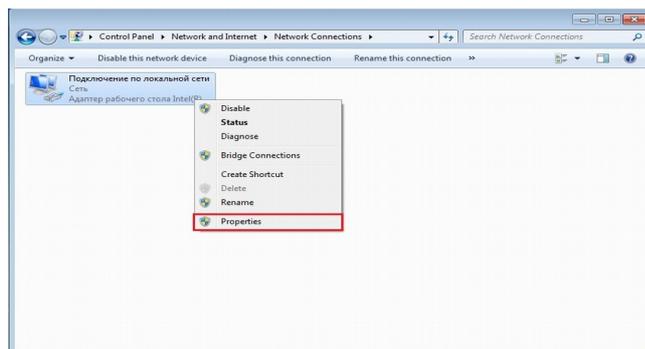
- Press the button **Start** in the low left corner in Windows. Choose **Control Panel**. Appear the menu, given at the figure below. Choose **Network and Sharing Center**;



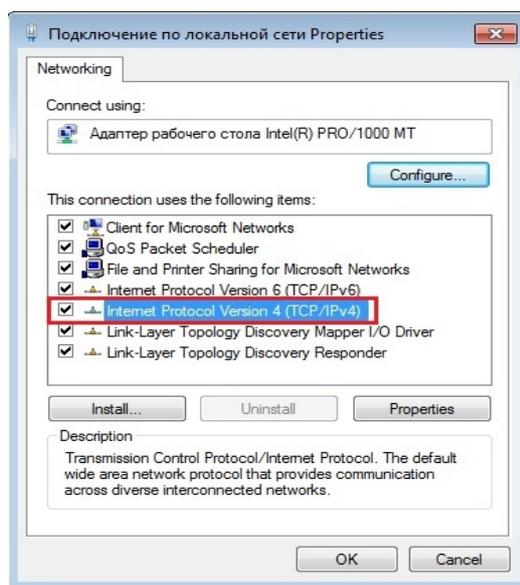
- In the appeared window choose **Change adapter settings**;



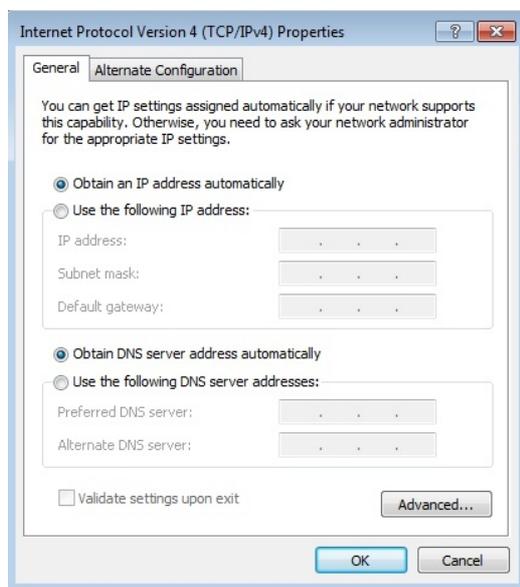
- Choose network connection, where the Transceiver is connected to. After that click the right button of the mouse on the icon and in the drop-down menu choose **Properties**;



- In the new window set the cursor on the **Internet Protocol Version 4** and press the button **Properties**;



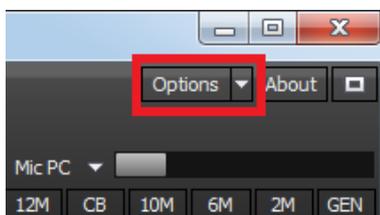
- Point **Obtain an IP address automatically** and **Obtain DNS server address automatically**;



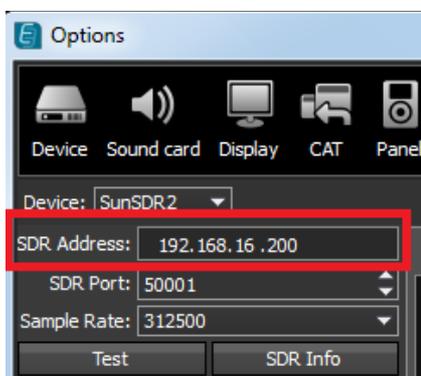
The network connection is set.

4. Transceiver's IP address changing

- Launch ExpertSDR2 software and open the settings menu **Options**.



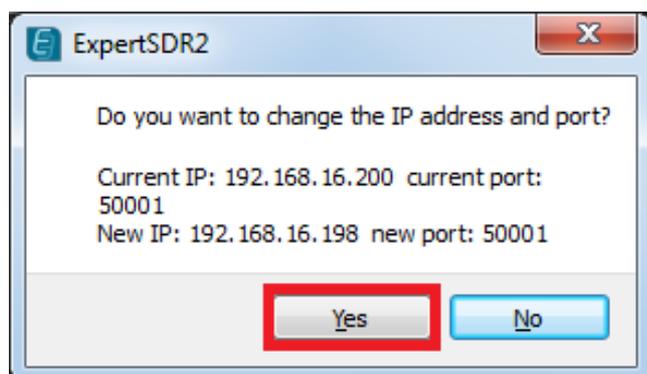
- At the figure below is shown that the **SDR Address** is now 192.168.16.200



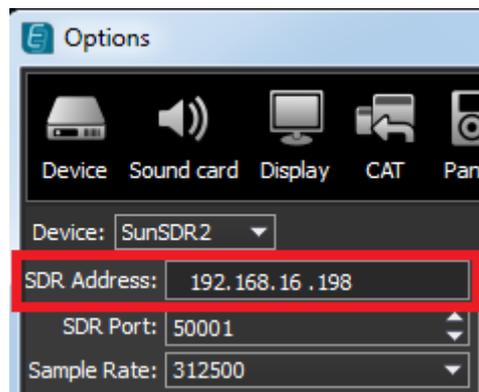
- If you want to change the IP address in the tab **Expert** at the field **New IP address** set necessary IP-address, in our case it is 192.168.16.198. And press the button **Set IP Address**.



- In the appeared window, choose **Yes**.



- If everything is done correctly and IP address is set, the new value of IP will be written in the field **SDR Address**



5. ExpertSDR2 software installation

Software installation is done by running the installation file, which is written on CD disk given at the complete set. The latest version of the software can be downloaded from our website <http://eesdr.com/>. To download them, on the front page of the site select Support -> Software.



Select the device you want to download the software for:

Download software

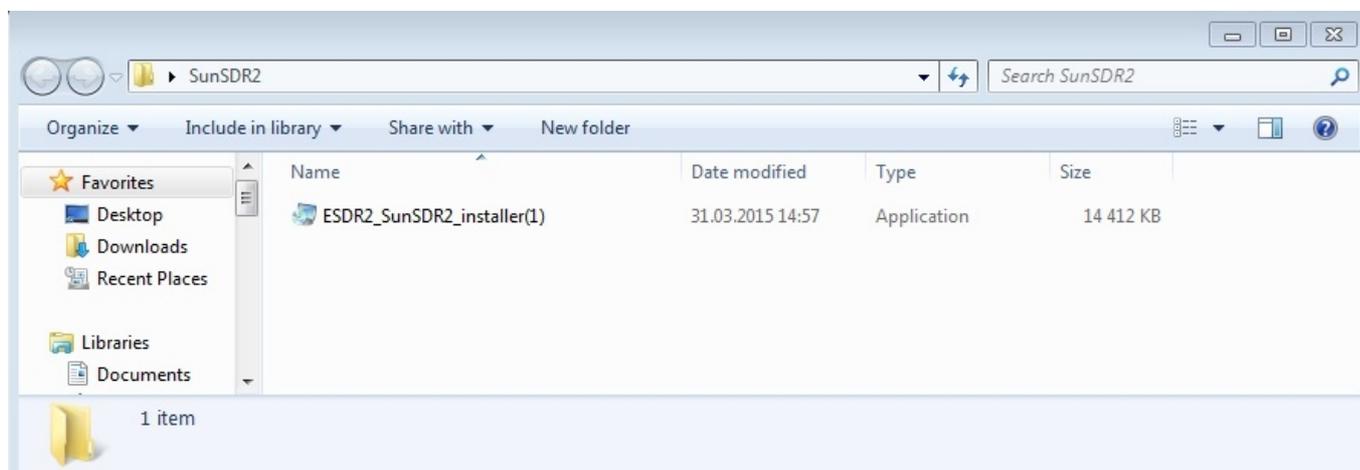
Choose the device

- » Transceiver SunSDR2
- » Transceiver SunSDR
- » Receiver ColibriDDC
- » Panel E-Coder
- » Panel E-Coder mini

Choose the necessary version of the installation file for SunSDR2 PRO transceiver from the list.

OS	Software Version
Windows	ExpertSDR2 v.1.0.1 for SunSDR2
	ExpertSDR2 v.1.0.0 for SunSDR2
	ExpertSDR2 v.0.8.4 for SunSDR2
	Microsoft Visual C++ 2010 (x86)
Linux	ExpertSDR2 v.1.0.0 for SunSDR2

Download installer version ExpertSDR2 for SunSDR2 PRO transceiver on your PC.



If you are installing a newer version of the software instead of the old one, firstly uninstall the old program. For that go to the control panel Windows and uninstall the old version of ExpertSDR2 program.

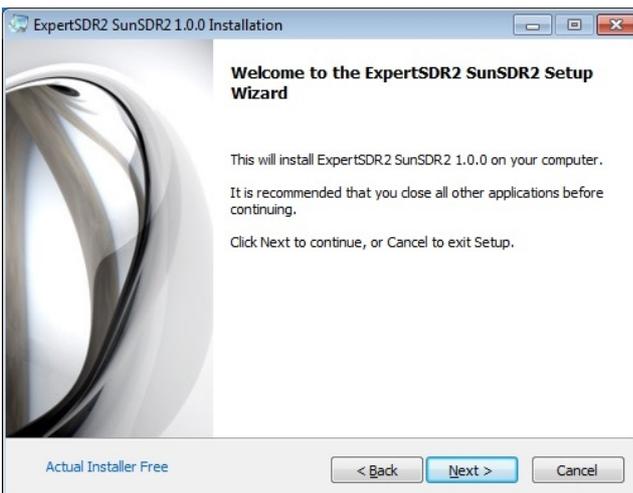
After downloading, run the file: **ESDR2_SunSDR2_installer(1).exe**

Note! New software releases may differ in name and numbers

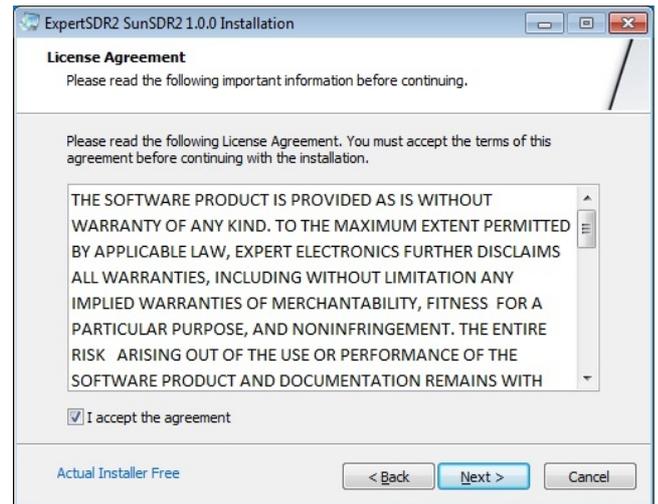
Double click on the installer to start the setup Wizard. Select the setup language



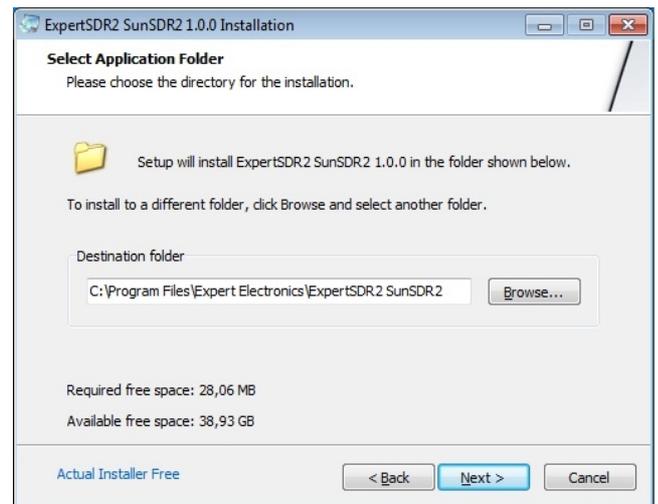
After selecting the language the main window of the installer opens. Press **Next** to continue or **Cancel** to exit Setup.



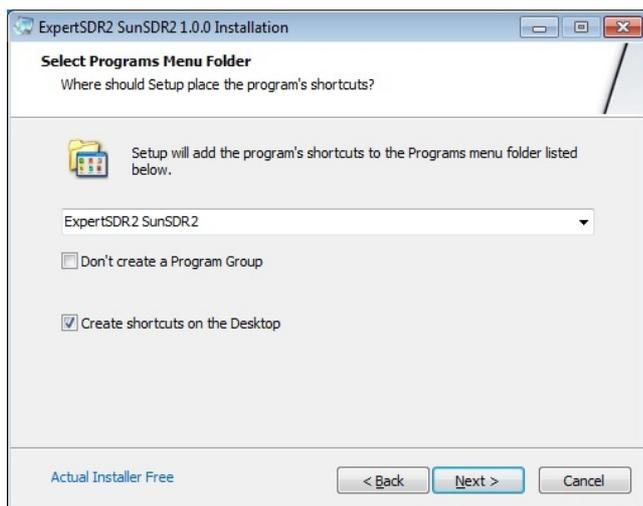
Accept the License Agreement. Press Next to continue



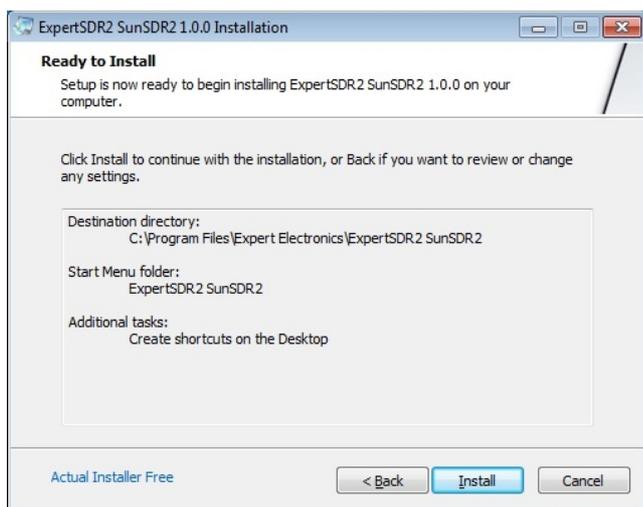
Specify the location where the software will be installed. By default, the program is installed on drive C: in the folder **c:\Program Files\Expert Electronics\ExpertSDR2 SunSDR2**. If necessary, you can choose your installation directory. Press **Next** to continue.



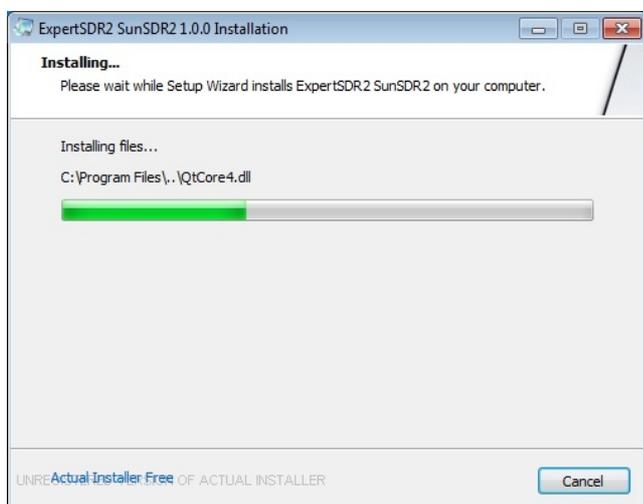
Select Program's Menu Folder. By default it will be the same to the name of the installation folder **"ExpertSDR SunSDR2"**



The installation wizard will inform you that it is ready to install the program to a specified location. Press **Install** to continue. If you want to change the installation location of the program, press **Back** to go back one or two steps.



Installation process



After installation is complete you will see the following window. Now you can run ExpertSDR2 automatically upon completion of installation. To do this, leave the check box **Launch ExpertSDR2 SunSDR2**. If you plan to run the program later, then clear the check box and press **Finish**.



Congratulations! You have successfully installed the program. Folder with the label for running the program will appear in START menu. The icon to run the ExpertSDR2 SunSDR2 program will be created on the desktop

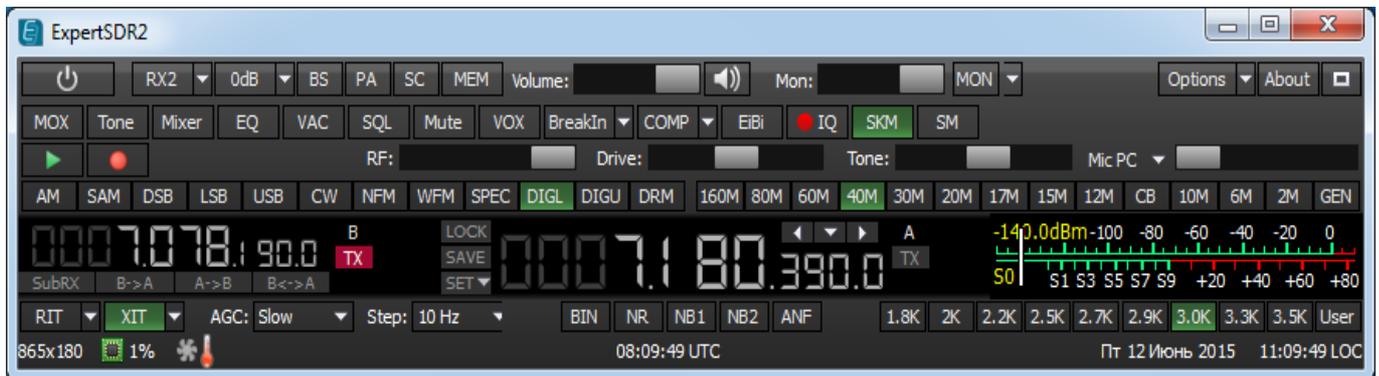


Double click on the program icon and the program will start.

6. Software interface description

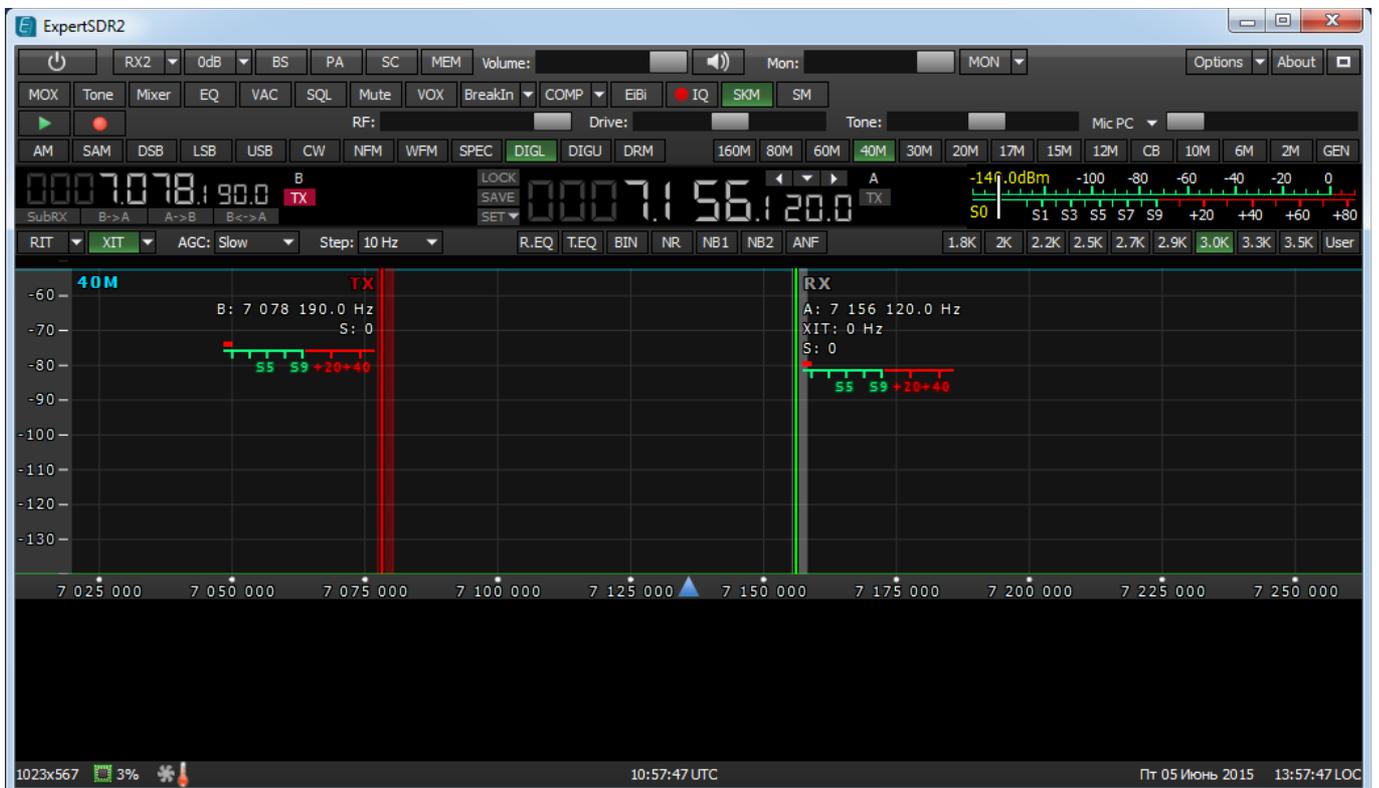
After installation the ExpertSDR2 software, the first start of the program is done in a completely "folded" form, with the minimum possible size of the window – 865x161 px.

Pressing the standard button **Maximize** disclose the entire program on the whole screen. The desired size of the program can be set by dragging out the edges of the program.



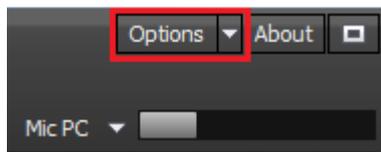
$\frac{3}{4}$ of the panel size of the program panel is occupied by the panorama spectrum analyzer or panadapter and the "waterfall" region. The waterfall is a convenient function which allows you to observe the dynamics of signals' changing in time.

$\frac{1}{4}$ of the program panel is occupied by the control buttons for the functions of the SunSDR2 PRO transceiver, the settings displaying panels of the transceiver's operational tuning and its state at the moment.



Have a look at buttons and power plants appointment:

- The **Power** button  in the upper left corner switches the transceiver on and off.
- Button **Options** in the upper right corner of the window opens general settings and preliminary parameters settings windows.



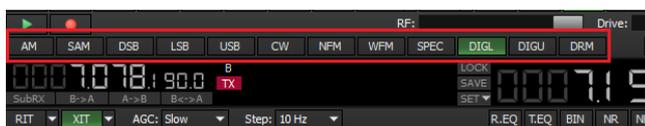
- In the middle and from the left side of the basic panel the frequencies are set. In the middle of the panel there is basic frequency VFO-A. Frequency VFO-B is from the left side written with less prominent letters. Below them can be chosen the frequency tuning step.



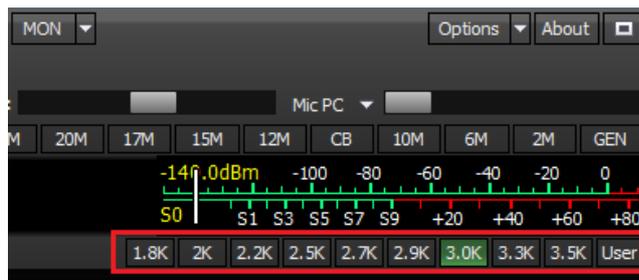
- In the control panel showed below there are band switching buttons. There is also quick **CB** band opening button and possibility to open general coverage - **GEN** button.



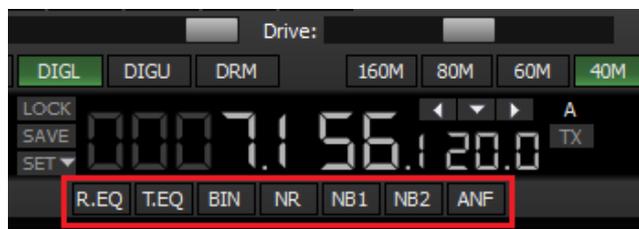
- The buttons for choosing a type of used modulation. In the lower part of control panel can be set a type of filter used for the required modulation mode.



- The receiving signal band pass filter choosing buttons. For each modulation type can be chosen the required band pass or tuned the own band pass by pushing **User**.



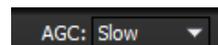
- Special DSP buttons. They are noise reduction **NR**, short time impulse noise blankers **NB1** and **NB2** and carrier signal automatic notch filter **ANF**. **R.EQ** and **T.EQ** buttons enable equalizer on reception/transmission. As a separate DSP function pseudo stereo reception **BIN** can be singled out.



- Transceiver parameters operating controls: volume control - **Volume**, microphone level – **Mic**, output power level – **Drive**, monitoring – **Mon**, HF manual amplification – **RF**.



- AGC rate is regulated by a separate field **AGC**.



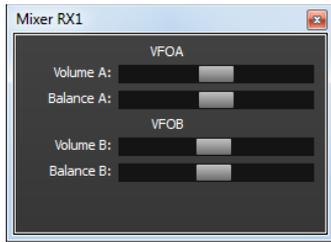
Rare used functional button shortcuts. They are **SQL** button, transmitting button **MOX**, virtual audio cables setting and equalizer menu, etc. More detailed description of each this button can be found below the figure.



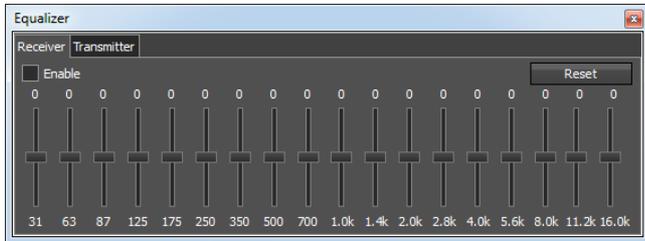
MOX - manual operation the transmission mode.

Tone – enables the transmission mode with the carrier signal at the output. The power output is set by the slider **Tone**.

Mixer – balance and volume control menu for the first and second receiver separately



EQ – button opens equalizer panel. Multi-band signal's tone control is accessible for receiving. Pressing the open button the S-meter window separates out of panel and can be dragged to any place of the screen. It has separate settings for receiving mode (Receive) and separate settings for transmitting mode (Transmitter).



VAC – button enables the VAC function (data exchange over virtual audio cables).

SQL – enables the noise gate. Pressing this button a vertical yellow line appears on the S-meter that sets the level of noise blanker opening.

Mute – mutes LF signal.

VOX (Voice Activated transmit)- button activates voice transmission control of the transceiver.

BreakIn – button calls the settings of the telegraph filter carrier shift.

COMP - turns on the microphone signal compressor. Clicking on the context menu triangle appears a slider to adjust the compression level.



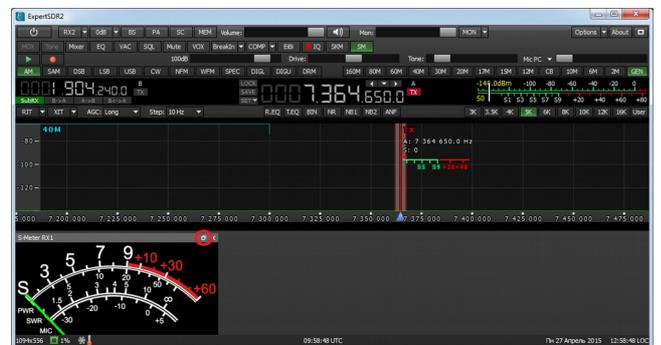
EiBi – button calls the labels of the broadcasting radio stations to appear in the spectrum analyzer window. Hovering the mouse arrow on the label shows the name of the radio station.



IQ - recording the IQ receiving channel on/off. The recording band is equal to the band displayed on the panadapter. The file is saved to the folder "C:\Users\User\ExpertSDR2\wave".

SKM – turns on the CW Skimmer.

SM – button calls the large S-meter



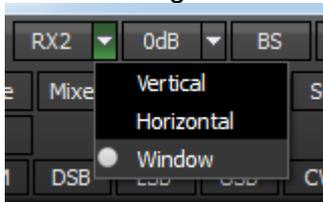
• Transceiver has two microphone jacks, which are chosen by pushing **MIC** button. **Mic 1** is chosen when electret microphone is connected to the corresponded jack on the front panel of the transceiver. **Mic 2** is chosen when Yaesu transceiver PTT – switch is connected. PC or laptop microphone headset can be used, chosen as **Mic PC**.



- Attenuator on or preliminary amplifier is activated by corresponded button within -20 dB up to +10 dB with 10 dB step

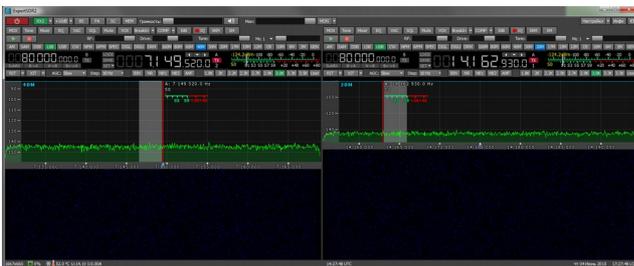


- Transceiver gives a possibility to watch simultaneously two radio bands and also receive signals simultaneously from two receivers. For the second receiver activation push **RX2** button, next to software launching button

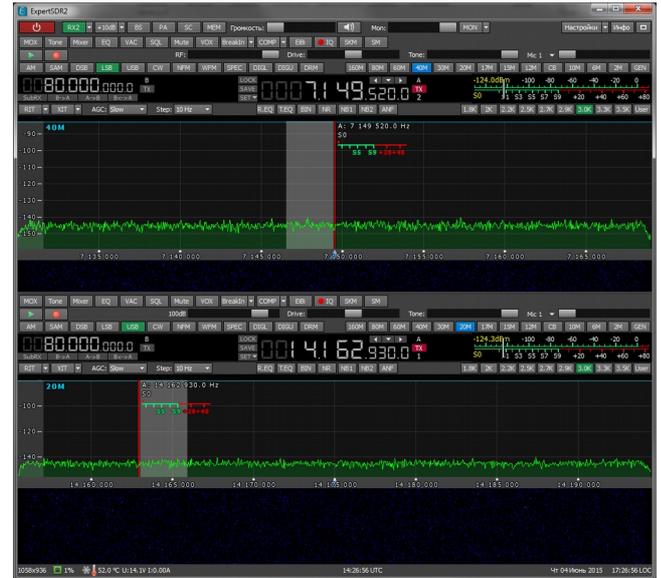


Operating controls arrangement and second receiver panel duplicate completely first receiver window. Receiver can be also put in different parts of the screen or even in two different monitors. In the figures below are shown three possible configuration types of receivers windows:

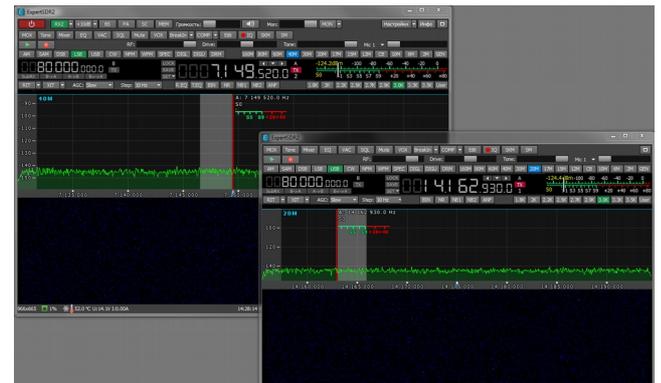
- Horizontal arrangement of two receivers. Such arrangement is convenient if operator's work place is equipped with one or better two big monitors with diagonal from 22" and more.



- Vertical arrangement of one receiver above the other. Such arrangement is convenient when an old big monitor with 4:3 side correlation is used or a modern monitor is put vertically deliberately.



- Two receivers separately. Configuration when each receiver's window is in its own window and can be moved easily along the screen.



Conclusion

This brief description of SunSDR2 PRO transceiver connection to PC and basic controls will allow you to master quickly this up-to-date transceiver, learn its work and broadcast quickly with it. More thorough description of all settings and capabilities will be described in the full user manual.

Wish you success in mastering SDR\DDC-radio!

11.06.2015

Expert Electronics LLC.

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DUC DDC SDR Series, SunSDR2 PRO Transceiver. Specifications are subject to change without notice or obligation and specifications are only guaranteed within the amateur radio bands.

V1.0 - 11.06.2015