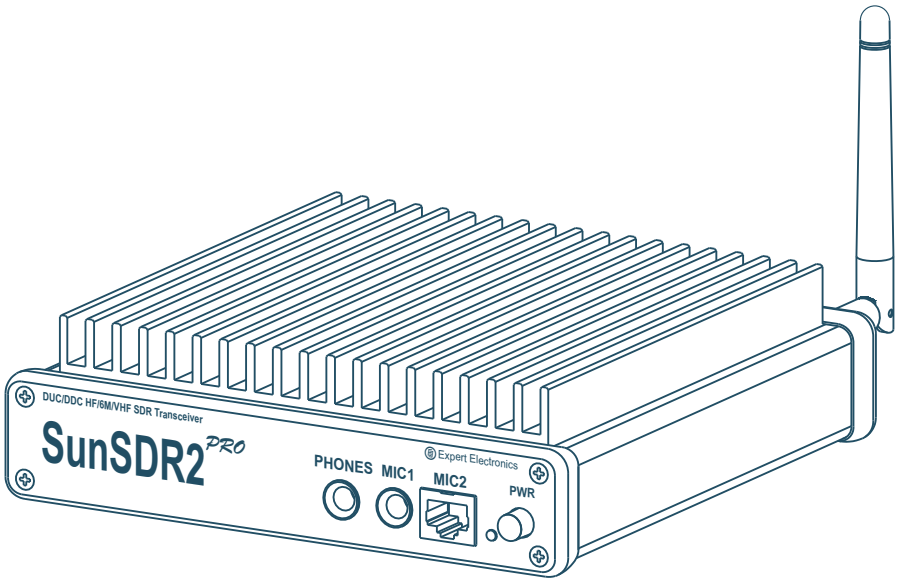
SunSDR2 PRO

DUC/DDC HF/6M/VHF SDR Transceiver



Getting Started

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Introduction

If you'll spend just 15 minutes to read this guide, you will be able to easily begin operating the SunSDR2 PRO transceiver and enjoy a modern way of listening the air. This guide will answer most of the first questions; which users might have when start working with the SDR transceiver.

You've got one of the most advanced HAM radio equipment which can be imagined today. This is a Software Defined Radio transceiver, it provides high quality of signal processing for both RX and TX modes by modern digital techniques. A PC used with the transceiver allows to use the HAM LOGs and DIGI software without wires.

Quick and efficient mastering of the SunSDR2 PRO transceiver requires a basic PC knowledge. We hope that the Windows terms, which are used in this guide are familiar to the user and won't cause any difficulties. To make this guide more user-friendly, we used screenshots of dialogue windows; necessary functions are highlighted with colored contour.

Since the SunSDR2 PRO is an SDR, it means that you will need a PC or laptop to use the transceiver. You control your transceiver via the ExpertSDR2 software installed on your PC, thus you can switch RX/TX modes, bands and data rate processing. The main feature of this transceiver is the new way of radio signals processing.

There is no signal processing path, in its classical meaning, in this transceiver. The signal is digitized from the antenna and all the other signal processing happens in the software. The same with the transmitting. The signals are generated digitally, with the certain mode type, already on the required frequency. Of all the classical hardware there are only the preselector, power amplifier and low pass filter.

1. Connection

The following components are required to operate the SunSDR2 PRO transceiver:

- Transceiver power supply unit;
- PC;
- CW key (if it's required);
- PTT microphone or telephone headset;
- Computer net LAN – cable;
- Antenna tuned on the HAM bands.

Let's have a look at each component.

Power Supply unit should have at least 75 W**,** provide constant voltage of 15 V output with 5 A load current. With 15 V supply, transceiver has max output power - 20 W.

PC or notebook might be any modern configuration, produced in the last 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 lead to higher level of CPU load. The more powerful the PC, the less resources the program requires to display colorful "waterfall" and panorama.

Operating system: Windows XP 32/64 bit, Windows 7 32/64 bit, Windows 8/8.1 32/64 bit Windows 10 32/64 bit. The latest versions are preferable.

Microphone or Telephone headset can be either the cheapest, as for example, by Genius, or developed specially for radio amateurs by Heil Sounds.

There is a standard 6,3 mm jack for electret microphone on the transceiver's front panel. Also there is a jack, compatible with Yaesu PTT-microphones like MH-31.

Control of the RX/TX modes can be managed by pressing the PTT-footswitch, connected to the **PTT** connector on the rear panel of the transceiver.

LAN – cable connects the transceiver with a PC by Ethernet-connection. PC connection is also possible "by air", via wireless net. The easiest and the quickest connection between the transceiver and a PC is by the LAN-cable, which supplied with the transceiver.

Antenna tuned on the HAM bands should have an impedance close to 50 Ohm on the bands where you plan to operate.

2. Ethernet-connection setting

There are two ways to connect the transceiver and a PC via the LAN-cable: direct connection to PC via Ethernet (LAN) interface and connection to an existing local net via router.

The first way:

- Connect your transceiver a to PC via the LAN-cable, supplied with transceiver.
- Switch on the transceiver.
- Set an IP address in Windows settings as it is shown in Section 3.
- Launch the ExpertSDR2 software for SunSDR2 PRO transceiver.
- Open **Options**-> press **Search** button, you should see a new window with your transceiver-> press **Use** button.
- Press the **Start** button in the program

If everything was set correctly, you will see the spectrum in the program's window and hear the air noise. You may start operating.

The second way:

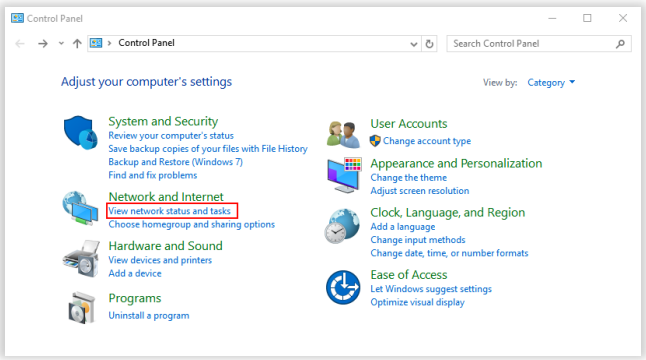
If you already have a local network with an IP address **not 192.168.16.xxx** and you need to change the IP address in SunSDR2 PRO:

- Connect your transceiver a to PC via the LAN-cable, supplied with transceiver.
- Switch on the transceiver.
- Set an IP address in Windows settings as it is shown in Section 3.
- Launch the ExpertSDR2 software for SunSDR2 PRO transceiver.
- Open **Options**-> press **Search** button, you should see a new window with your transceiver-> press **Use** button.
- Change IP address in SunSDR2 PRO as it is shown in Section 4.
- Connect the transceiver by the LAN-cable to a local net.

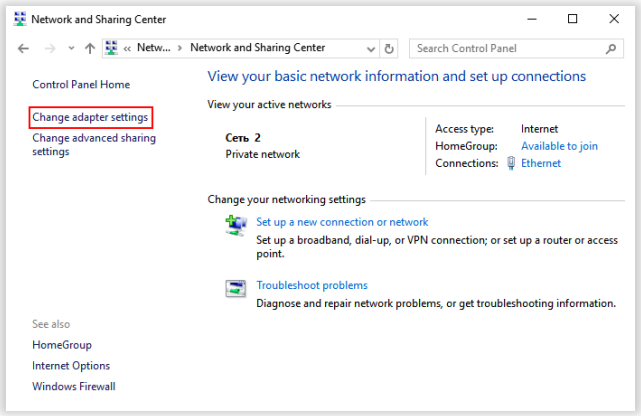
Now you can launch the ExpertSDR2 software with connected SunSDR2 PRO on any PC in the local network.
If everything was set correctly, you will see the spectrum in the program's window and hear the air noise. You may start operating.

3. Network Settings

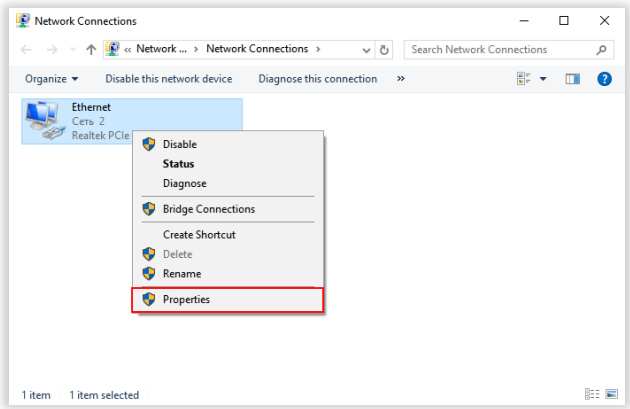
- Press the **Windows** button in the low left corner of the screen. Open the **Control Panel.** In the new window press **View network status and tasks**;



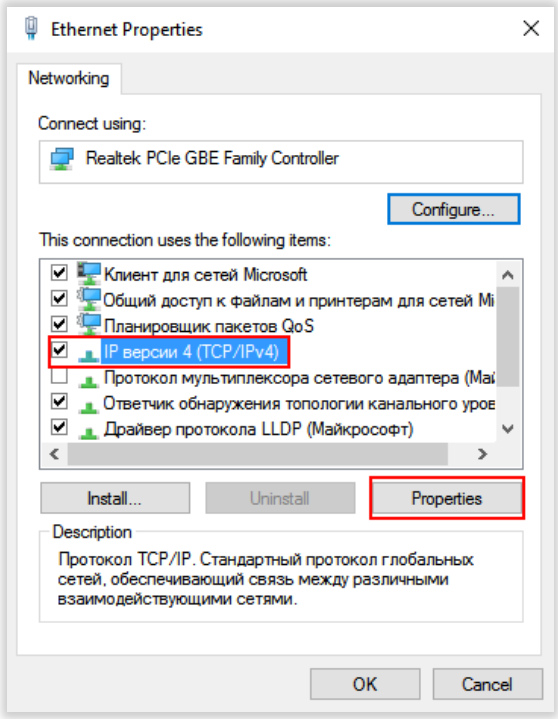
- In the next window press **Change adapter settings**;



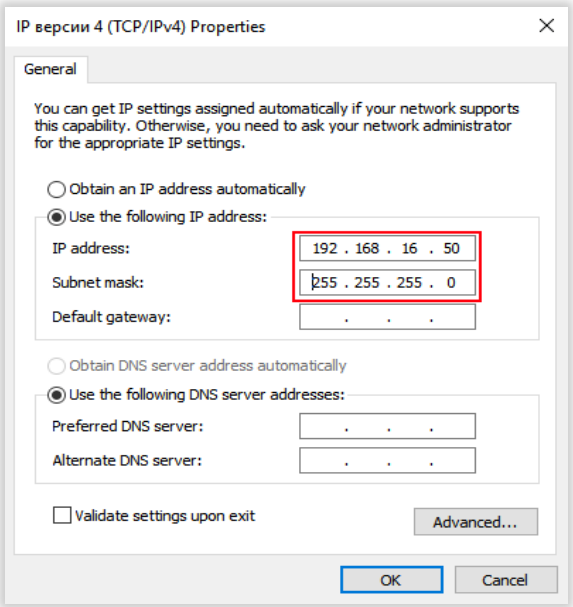
- Click with the right mouse button on the network connection with the connected transceiver, in the drop-down menu select **Properties**;



- In the new window select **Internet Protocol Version 4** and press **Properties**;



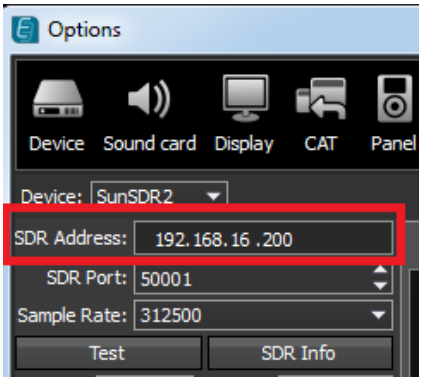
- Set the **IP-address** to **192.168.16.50** and **subnet mask** to **255.255.255.0** as it is shown below. These are the PC's network card parameters. Instead of the figure 50 in the IP-address you may set any number, except **255** or **200**. Transceiver IP-address is **192.168.16.200** by default. Press OK.



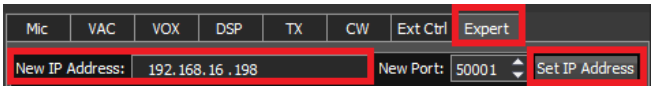
4. Transceiver's IP address changing

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

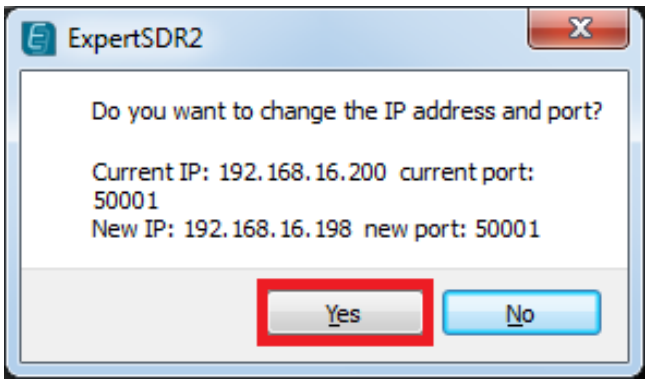
- As you can see below, the **SDR Address** is 192.168.16.200



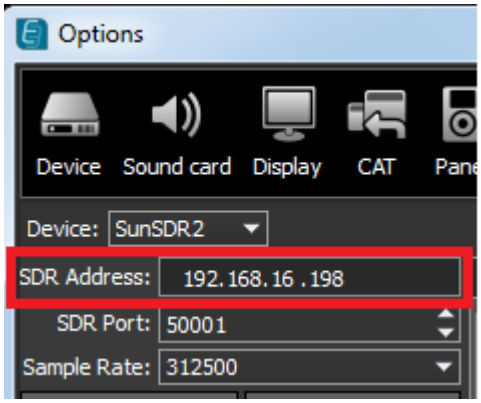
- If you want to change the IP address in the **Expert** tab, set the required IP-address in the **New IP address** input box, in our case it is 192.168.16.198. And press the **Set IP Address** button.



- In the new window press **Yes**.

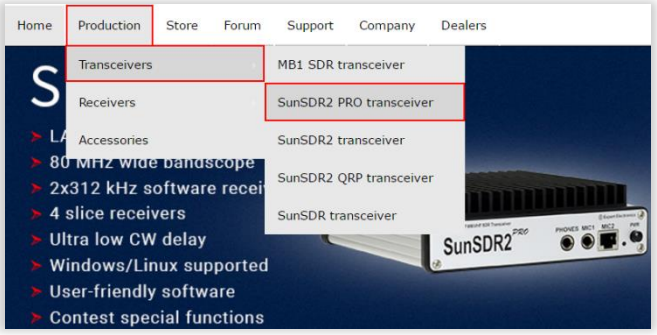


- If everything was done correctly and IP address is set, the new value of IP will be displayed in the **SDR Address** box



5. ExpertSDR2 software installation

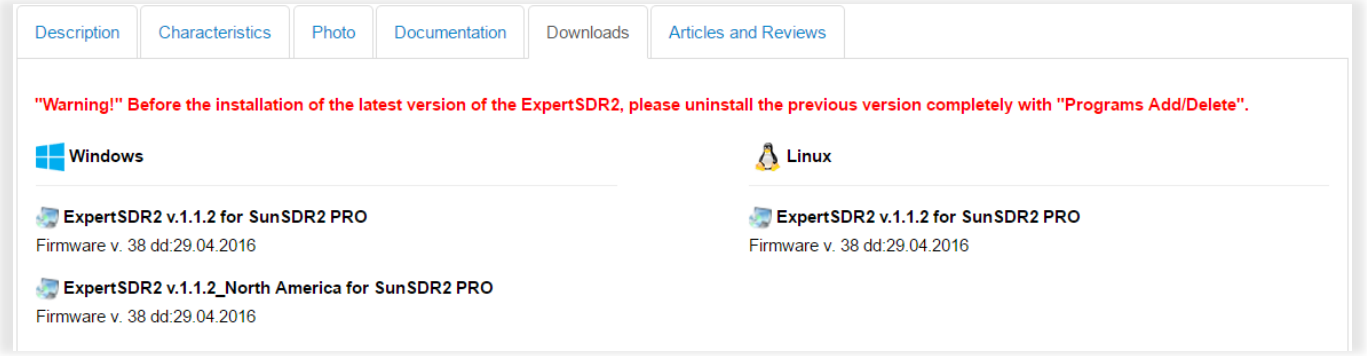
Download the latest software version from our web-site http://eesdr.com/ and install it. To download it open Production-> Transceivers-> SunSDR2 PRO transceiver.



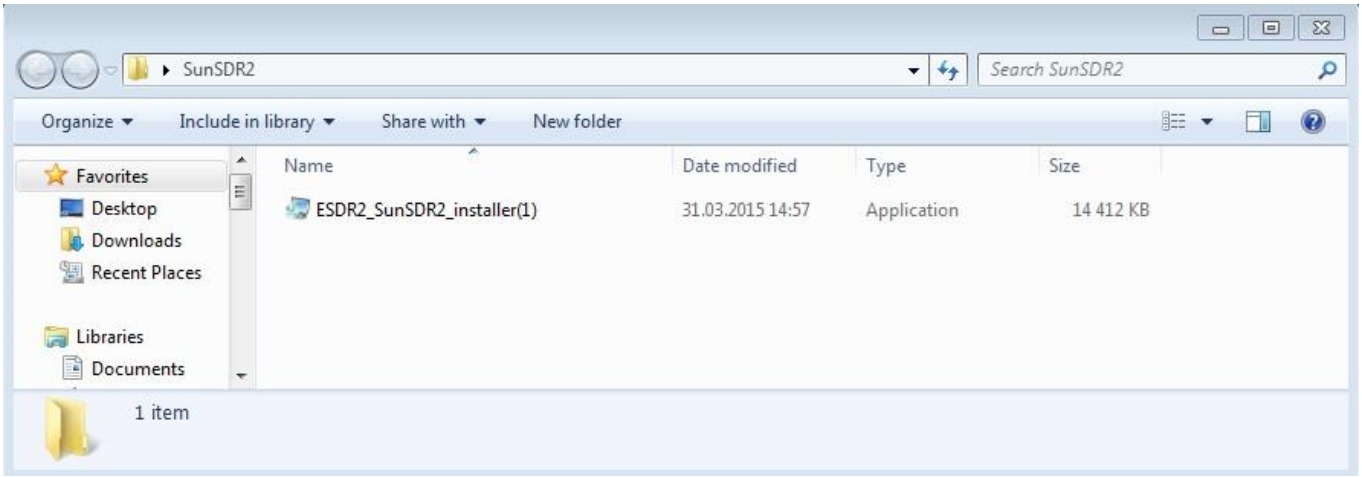
Choose the necessary version of the software from the list.

Note! New software releases may differ in name and numbers

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

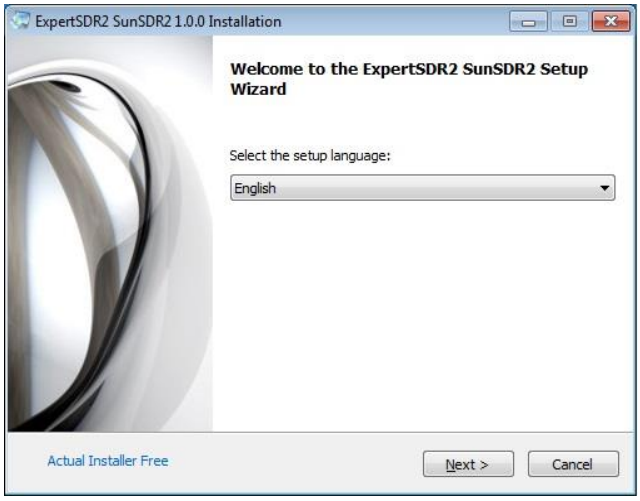


Download installer version ExpertSDR2 for SunSDR2 PRO transceiver on your PC.

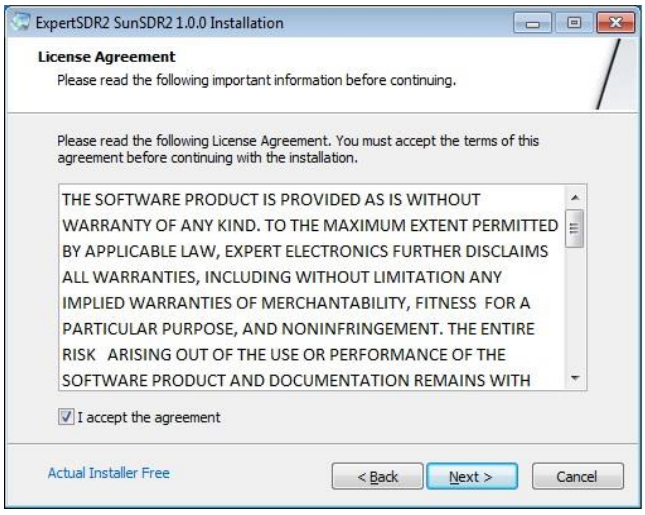


Before the installation of the latest version of the ExpertSDR2 software, please uninstall the previous version completely with "Programs Add/Delete" After downloading, run the file: **ESDR2_SunSDR2_installer(1).exe**

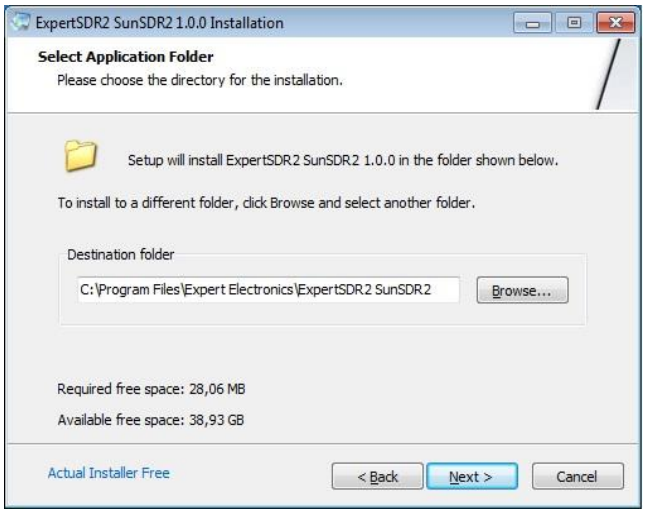
After selecting the language, the main window of the installer opens. Press **Next** to continue or **Cancel** to exit Setup.



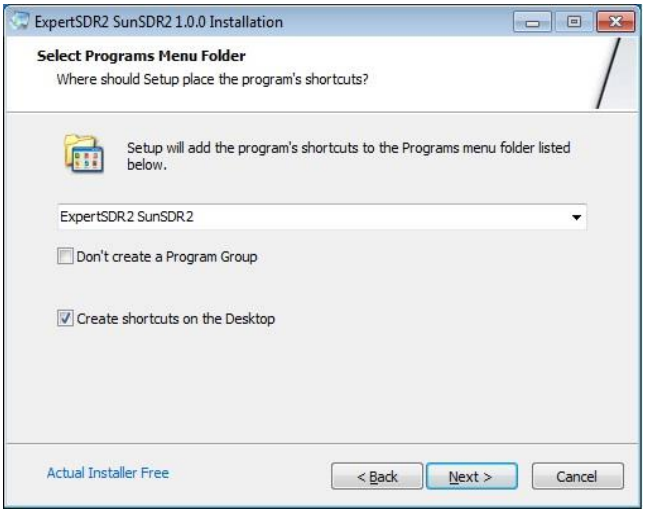
Accept the License Agreement. Press **Next** to continue



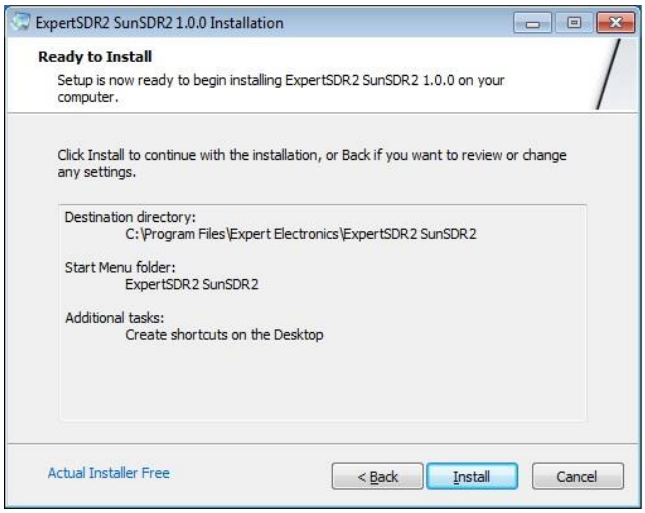
Specify the location where the software will be installed. By default, the path id is disk C: in the folder **c:\Program Files\Expert Electronics\ExpertSDR2 SunSDR2**. If necessary, you can choose your installation directory. Press **Next** to continue.



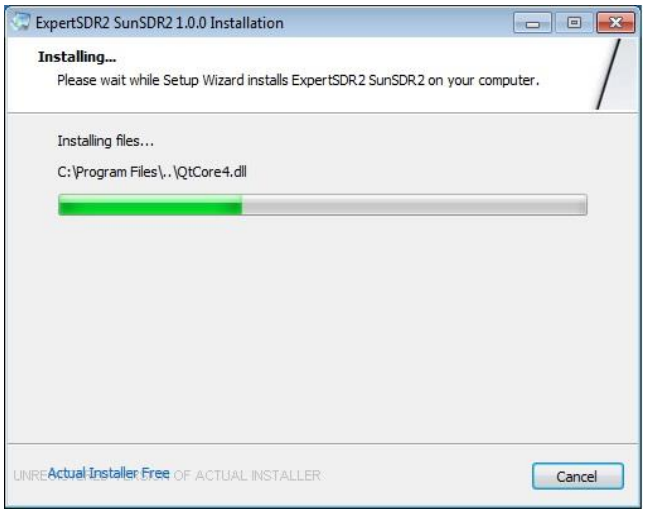
Select Program's Menu Folder. By default, it will be the same as the name of the installation folder "**ExpertSDR SunSDR2**"



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 launch the 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**.

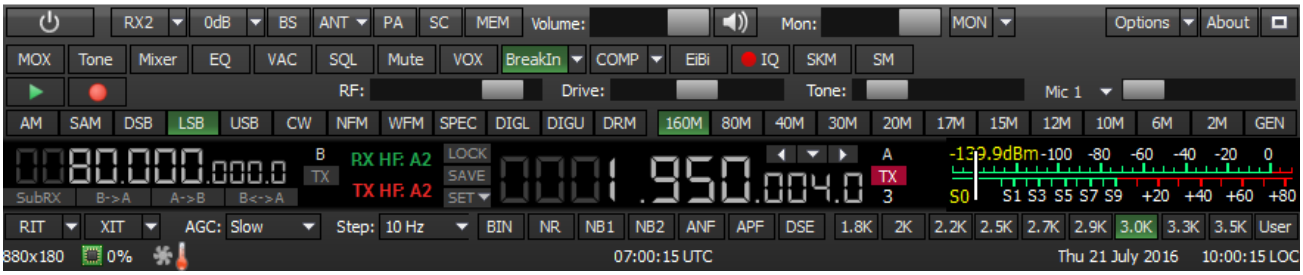
Congratulations! You have successfully installed the program. Folder with the label for running the program will appear in START menu. The shortcut for the ExpertSDR2 SunSDR2 program will be created on the desktop.

Double click on the shortcut to launch the software.

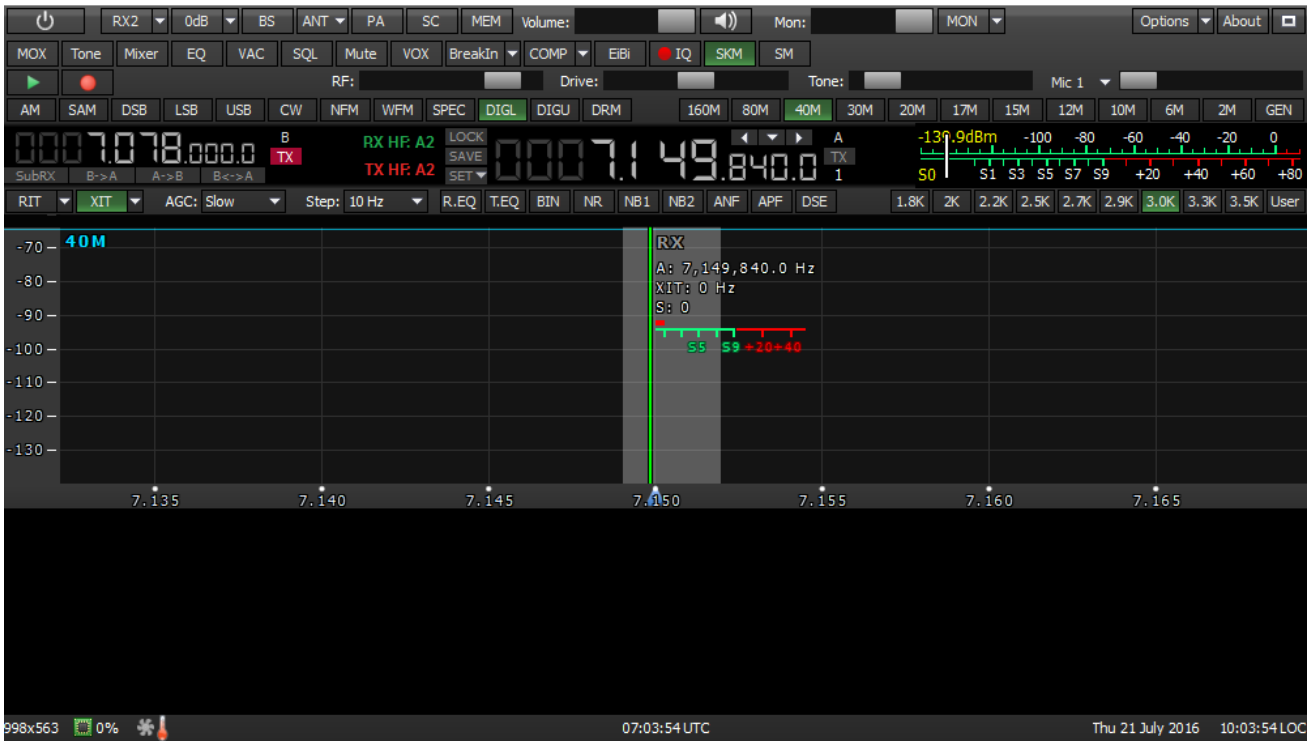
6. Software interface description

In the first start, the ExpertSDR2 software opens in a completely "folded" window, with the minimum possible size – 865x161 px.

Have a look at the general buttons and sliders: The **Start** button in the top left corner switches on/off the ExpertSDR2 software.

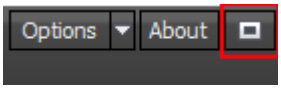


¾ of the software window is occupied by the panorama: spectrum scope and waterfall. The waterfall is a convenient feature which allows you to observe the signals' changing dynamic in time.

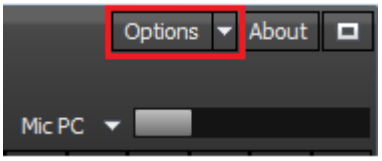


¼ of the software window is occupied by the functional buttons and operational indicators (frequency, S-meter etc.)

Pressing the **Fullscreen mode** button will unfold the software window on the whole screen. The required size of the program can be set by dragging the edges of the software window.

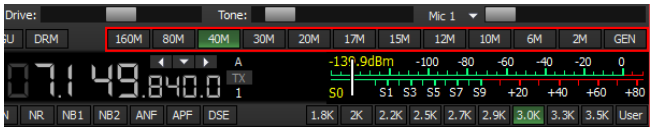


Options button in the top right corner of the software window opens the settings window.



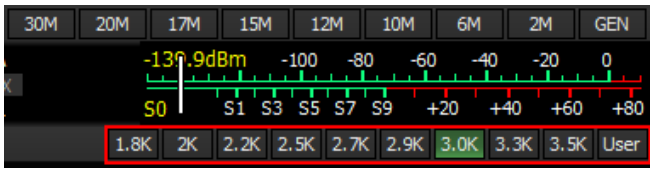
Tuning frequencies are displayed in the middle (for the VFO A) and on the left side (for the VFO B) of the control panel. Slightly below them, you can select the frequency tuning step.

On the picture below you can see the band buttons. There is also a possibility to open general coverage - **GEN** button.



Below are the mode type buttons.

The RX filter bandwidth buttons (for DIGL as an example). For each mode type you can select the preset RX bandwidth or tune your own with the **User** button.



DSP buttons: **R.EQ** and **T.EQ** buttons enable equalizer for RX/TX; **BIN** – binaural audio, pseudo stereo reception**;** **NR** – noise reduction; **NB1** and **NB2** – impulse interference noise blankers, each has its own algorithm; **ANF** – automatic notch filter for narrowband interference; **APF** – analog peak-filter creates the triangle filter's AFC in the filter bandpass; **DSE** – digital surround effect for CW signals.

For operating control, you may use the following drivers: **Volume** - volume control level; **Mon** – monitoring control level; **RF** - AGC gain level; **Drive** – speech/CW output power level; **Tone** – carrier signal TX output power level; **Mic** – microphone control level.

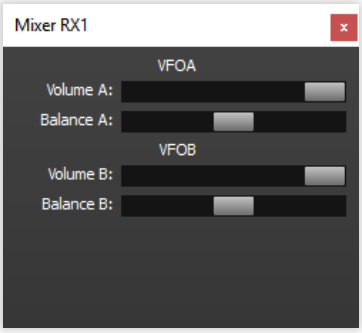
AGC processing speed can be adjusted in a separate drop down menu.

Rarely used functional buttons, detailed description of each button is below the picture.

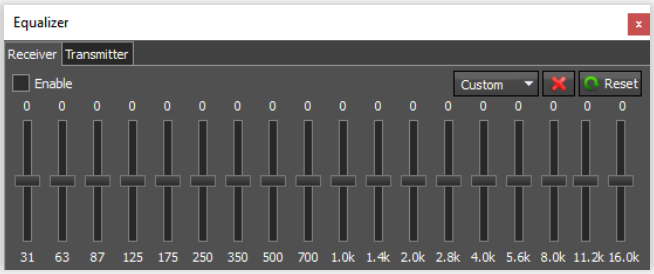
MOX – enable/disable manually operated transmit mode.

Tone – enable/disable tone signal in TX mode.

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



EQ – button opens 18-band equalizer menu. You can set different settings for Receiver and Transmitter. Each has its own indicator below the VFO A frequency tab (both are enabled on the picture below).



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

SQL – enables the squelch. Displayed as the vertical yellow needle on the S-meter. If the air signal – green needle, surpasses the SQL trigger threshold - yellow needle, then you'll hear the sound of the received station on the receiver's LF output. If the signal level is lower than the trigger threshold, you'll hear nothing.

Mute – mutes LF signal.

VOX (Voice Activated Transmit) - switches the transceiver in TX mode when you speak in the microphone.

BreakIn – transceiver will automatically turn to the TX mode by the press on the CW keyer. Drop-down menu with CW settings:

Speed - Speed of the CW signal being sent.

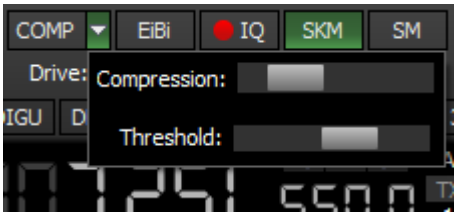
BreakIn delay (ms) - timing control, to keep the transceiver in the TX mode. Set the required time for the transceiver to hold in the TX mode, after you let go of the CW keyer.

Pitch (Hz) - CW signal's frequency tone control. Set the required CW signal's frequency tone (also used for the RX mode).

Width (%) - Dot to Dash ratio control. Set the required Dot to Dash ratio.

Ramp (ms) - CW signals' slope length control. Set the required CW signals' slope length. The higher manipulation speed the shorter should be slopes.

COMP - turns on the compression of the transmitted signal. Via the drop-down menu you can adjust the compression and threshold level.



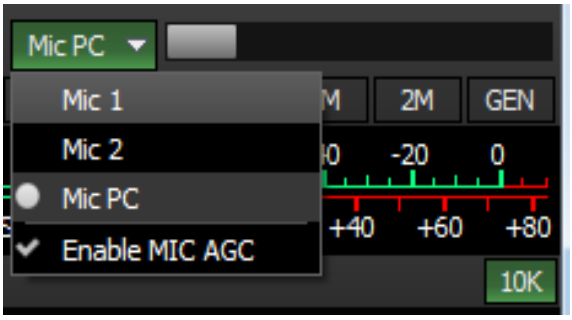
EiBi – show the HF stations markers on the panorama from the EiBi data basis. Hover with the mouse pointer on the station frequency and you'll see it's name.

IQ - IQ-files recording is required for storing the RX bandwidth panorama. The file is saved to the "**C\Users\User\ExpertSDR2\wave**".

SKM – turns on the CW Skimmer.

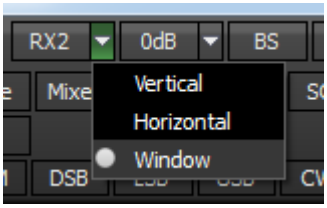
SM – bigger S-meter button. The S-meter window can be separated from the software window and moved to any place on the screen.

Transceiver has two microphone jacks, which could be selected via the drop-down menu on the **MIC** button. **Mic 1** is for the electret microphones. **Mic 2** is for the PTT microphones. **Mic PC** the PC or laptop microphone headset



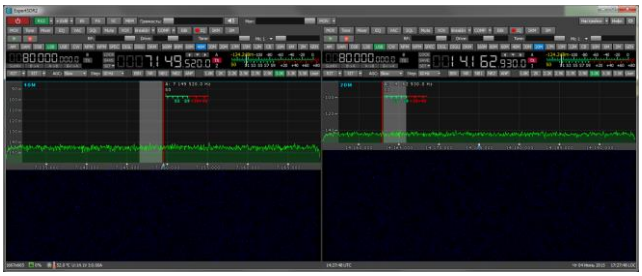
Attenuator can be set via the drop down menu or by successive presses of the indicator button, which cycles upwards the attenuation coefficient in the following order: -20dB, -10dB, 0dB, +10dB

The transceiver has the second software RX2 receiver with the panorama up to 312 kHz and two independent Sub-receivers VFO A and VFO B. The second receiver may receive on any band in one Nyquist zone, in other words RX1 and RX2 may simultaneously receive in the 0...80 MHz or 80-160 MHz. RX2 has independent controls and indicators.



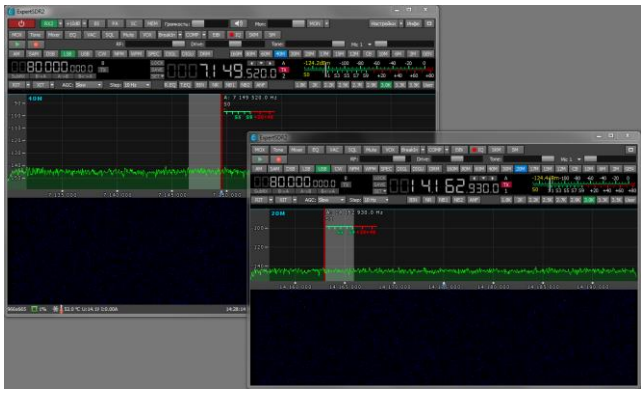
There are three ways to display the RX2 window:

1) Horizontal arrangement of two receivers. Such arrangement is convenient if operator's work place is equipped with one or two big monitors with 16:9/16:10 aspect ratio and diagonal from 22" and more.



2) Vertical arrangement of one receiver above the other. Such arrangement is convenient when you use an old big monitor with 4:3 aspect ratio or modern monitor turned vertically.

3) Two receivers separately. This way each receiver has its own window and can be moved easily along the screen.



Conclusion

This brief description of the SunSDR2 PRO operation will allow you to quickly master this modern transceiver. Detailed description of all settings and capabilities is described in the ExpertSDR2 user manual.

Good luck mastering SDR\DDC-radio!

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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.

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