

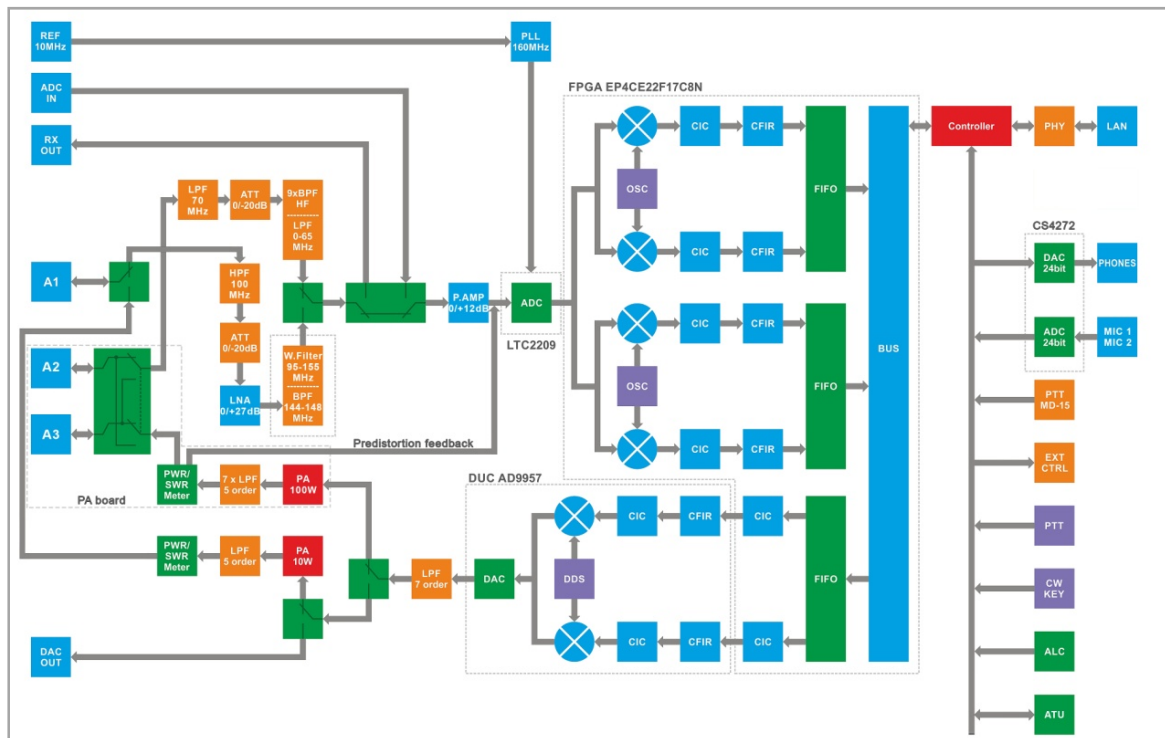
SunSDR2 DX – Remote Control



Based on the popular SDR transceiver SunSDR2 Pro, the manufacturer Expert Electronics offers the "SunSDR2 DX". This transceiver operates as a direct-sampling Software Defined Radio (SDR) with a high-resolution 16Bit A/D converter (LTC 2209), at a sampling rate of 160 MS/s. All amateur radio bands from 160 to 6m (0.09...65MHz) as well as the 2m VHF band (95...148MHz) are supported. The transmit power is 100W on shortwave, 50W on 6m and 7W on 2m. Changes compared to the SunSDR-Pro concern the filters. A new high-pass filter from 100 MHz is built in, which leads to a better sensitivity on VHF. For HF, 9 individual, optimized band-pass filters or a single low-pass filter from 65 MHz are available. This combination is complemented by an additional low-pass filter from 70 MHz, which improves the dynamic range on shortwave (HF) and 6m.

The transmitter is designed to be completely independent of the receiver with its own quadrature oscillator, allowing flexible half or full duplex operation. Together with the ExpertSDR2/3 software, two independent main receivers and two independent sub-receivers in the same band range are possible. Furthermore, the display of a wide spectrum of up to 80 MHz is possible.

The SunSDR2 DX is controlled via an Ethernet cable, which is connected either directly to a PC or to the DSL router in the home network. With the help of the new ExpertSDR3 software and a "cloud" provided free of charge by EE, the SunSDR2 DX can be easily operated worldwide from the Internet. Complicated port forwarding and DynDNS are now a matter of the past.



Block diagram SunSDR2 DX

Installation

At first, download the software "ExpertSDR2_SunSDR2DX" from <https://eesdr.com/en/software-en/expertsdr3-en> and install it on a PC (Windows 10 32/64bit, Linux und macOS) and then connect the SunSDR2 DX to the PC via an Ethernet cable (**Fig. 1**). For the PC to recognize the transceiver its IP address must be changed.

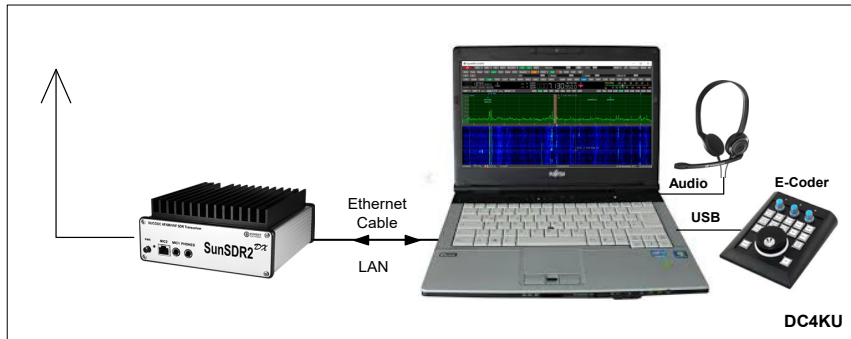


Figure 1: SunSDR-DX in direct connection with a PC

To do this, go to *Network and Sharing Centre -> Change Adapter Settings -> Ethernet -> Internet Protocol, Version 4 (TCP/IPv4)* and set the IPv4 address of the PC from "Obtain IP address automatically" to e.g. 192.168.16.50 (1...199) and save it (**Fig. 2**). After changing the address, the SunSDR2 DX is recognized by the PC and the software can be started. The connection to a single PC is now complete (**Fig. 3**).

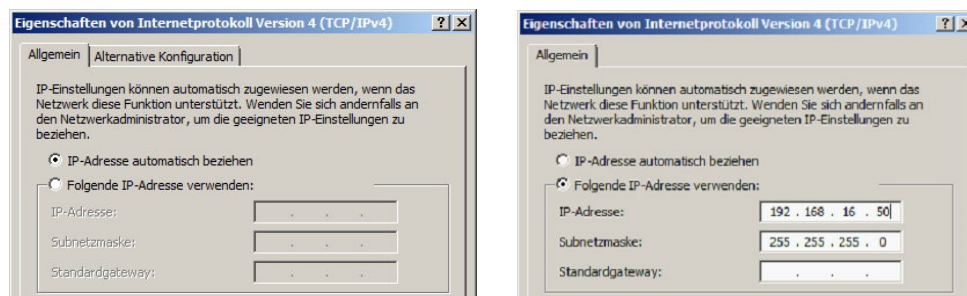


Figure 2: Setting the IP-Address in the PC

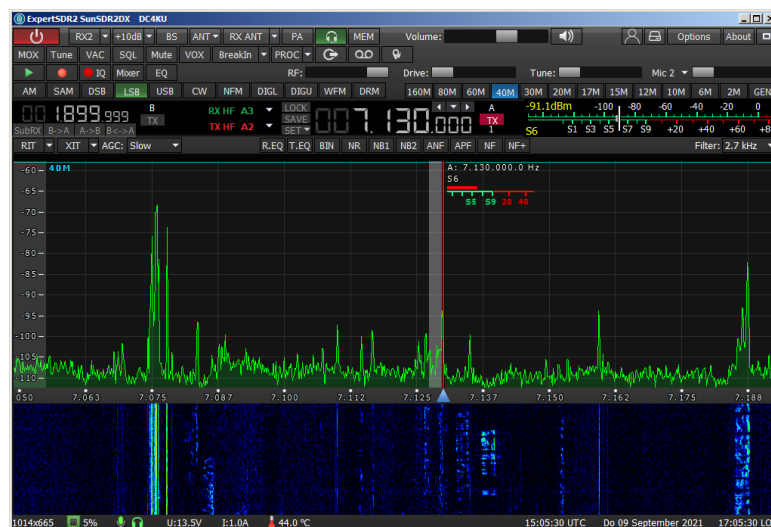


Figure 3: Display of the SunSDR2 DX under ExpertSDR2_SunSDR2DX

To enable remote control of the SunSDR2 DX from other PCs in the home network, it must be connected to the home DSL router (**Fig. 4**). To do this, enter a free IP address of the router in the

menu under *Options* -> *Expert* -> "Set IP Address", e.g. 192.168.178.**120** and save this with Write -> OK. If the preset "Port 50001" is already being used by the router for another application, enter a free port here, e.g. Port **50071**. Then switch off the SunSDR2 DX, disconnect it from the power supply and connect the Ethernet cable to the router as shown in **Fig. 4**.

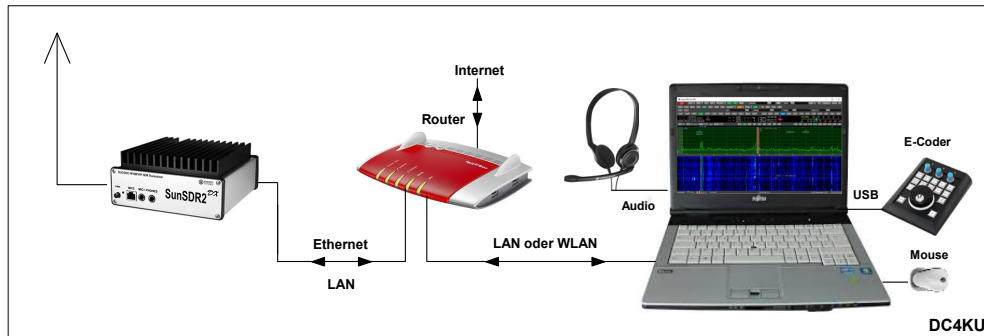


Figure 4: SunSDR2 DX connected to the home network

After switching on the transceiver again, it automatically connects to the router within a few seconds (**Fig. 5**). After restarting the software, the new SDR address and the new SDR port of the SunSDR2 DX can be seen under Options: **192.168.178.120:50071**. The SunSDR2 DX is now connected to the home network and can be reached from all PCs on which the ExpertSDR2_SunSDR2DX software has been installed.

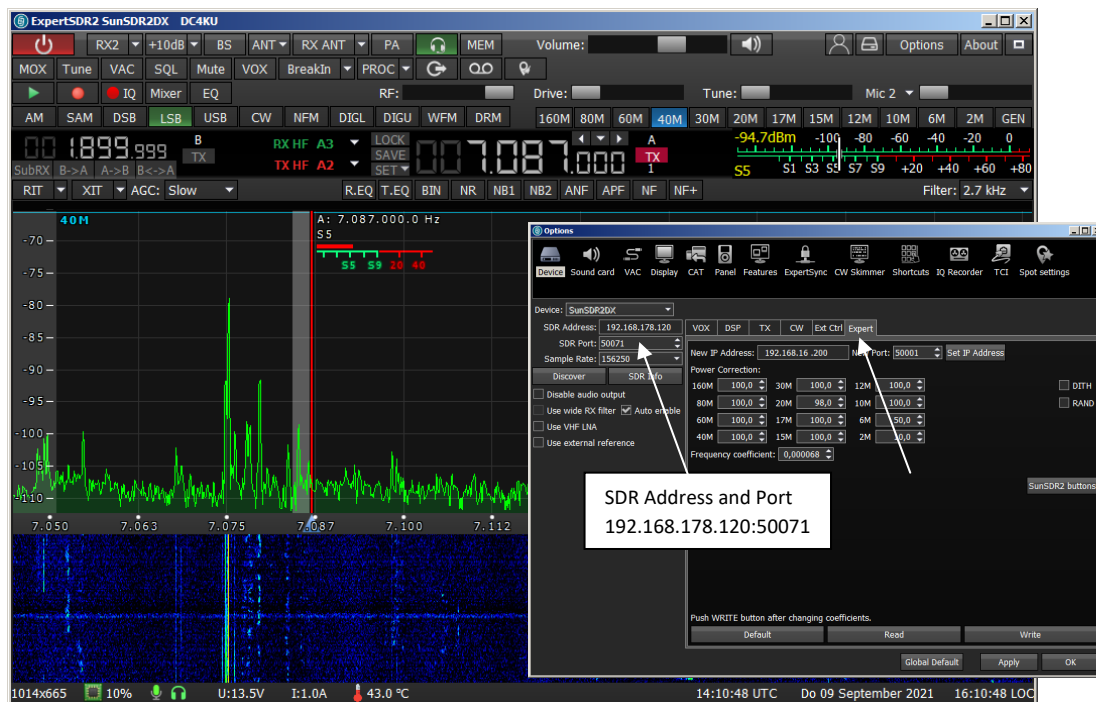


Figure 5: SunSDR2 DX started with its correct IP- and port-settings

Remote control via internet

For remote control via the Internet, a server/client connection is required (**Fig. 6**). Any PC in the home network can act as a server PC. Download the software ExpertRS (Remote Server) and ExpertRC (Remote Client) from <https://eesdr.com/en/software-en/expertremote-en> and install them on the Server- and Client-PC (**Fig. 6**). Open "ExpertRS" on the Server-PC (**Fig. 7**) and enter 50071 under SDR Port and click on Search. The server of the SunSDR2 DX is now activated and on stand-by for a connection. The program can then be closed again, but the server remains open in the

background.

In order for the transmission to the Internet to work, the Server-PC needs a "Port Forwarding". To do this, open the router, go to *Internet -> Release* and release ports 50071 to 50073 (data and audio) on the Server-PC via TCP and UDP. Then open "ExpertRC" on the Client-PC, select *Options -> Device* and enter the public IPv4 address of the router and the port of the SunSDR2 DX, in the example: 92.36.144.213:50071 (**Fig. 8**).

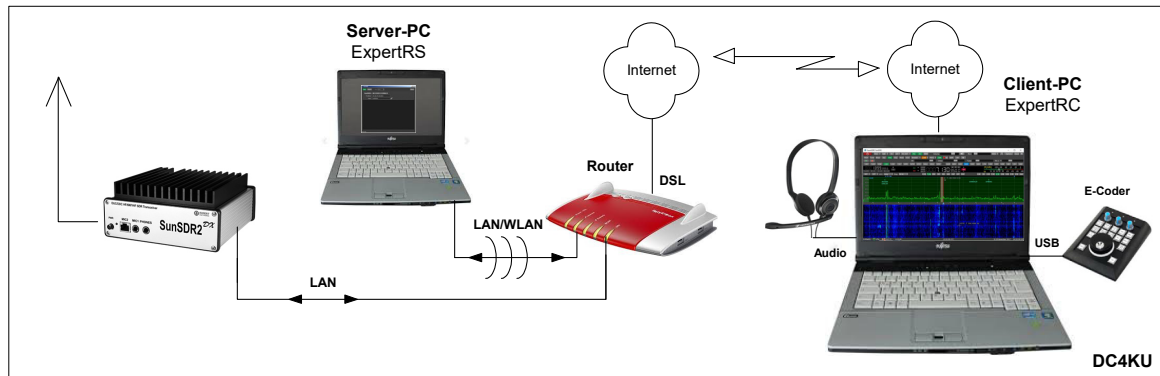


Figure 6: SunSDR2 DX on the internet

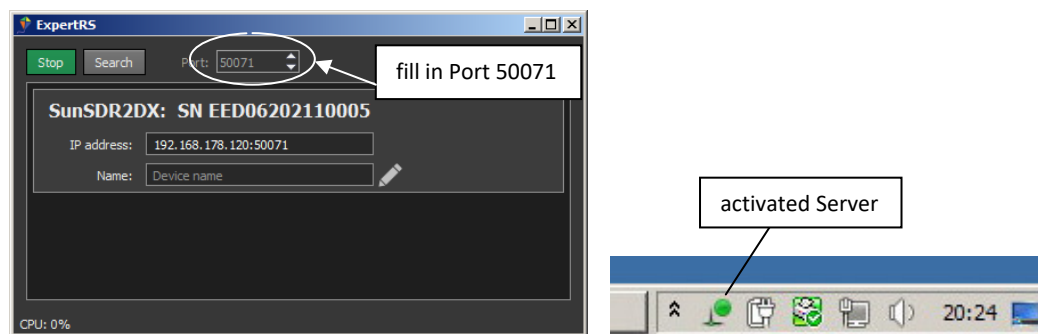


Figure 7: ExpertRS started (left) and server marked at the bottom of the PC screen (right)

Finally, the SunSDR2 DX can be remotely controlled from anywhere in the world via the Internet (**Fig. 8**). The access works under LAN, WLAN and LTE (3G, 5G) with a selectable traffic from 70kbit/s to over 1Mbit/s and a sample rate from 39062 to 312500Hz.



Figure 8: After entering the URL, the SunSDR2 DX can be reached worldwide via the Internet.

ExpertSDR3

Shortly ago, Expert Electronics introduced a new software under the name ExpertSDR3, which works according to a completely new concept (<https://eesdr.com/en/software-en/expertsdr3-en>). After installing and starting the software, a menu opens in which all radios within the home network are listed, in the example a SunSDR2 Pro and SunSDR2DX (**Fig. 9, left**). After selecting one of the radios via "Start", it opens and can be operated (**Fig. 9, right**). If necessary, all radios can be opened and remote-controlled on different frequencies at the same time.

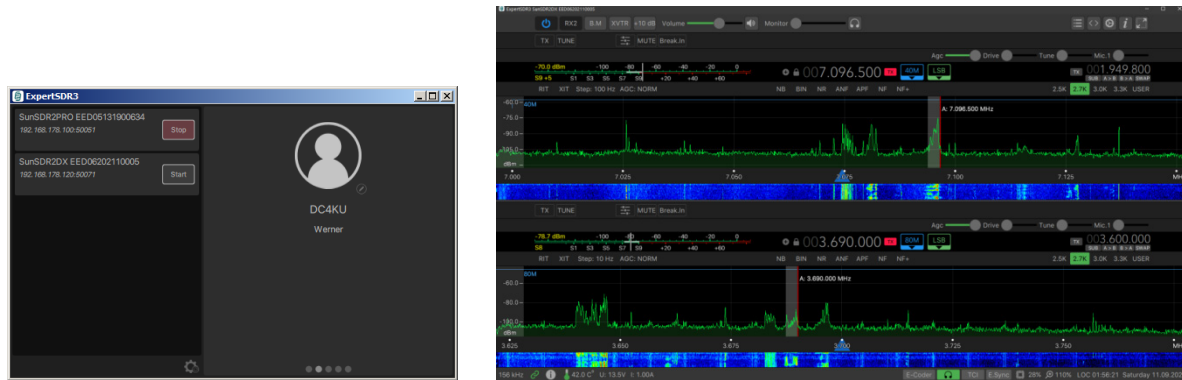


Figure 9: List of available radios (left) and Start of the SunSDR2 DX (right).

A special feature - which is not offered by any other manufacturer - is the remote control of the radios via a "cloud", which Expert Electronics provides free of charge. Here, server and client PCs are connected via a cloud-server (**Fig. 10**). Port-Forwarding and DynDNS are no longer necessary!

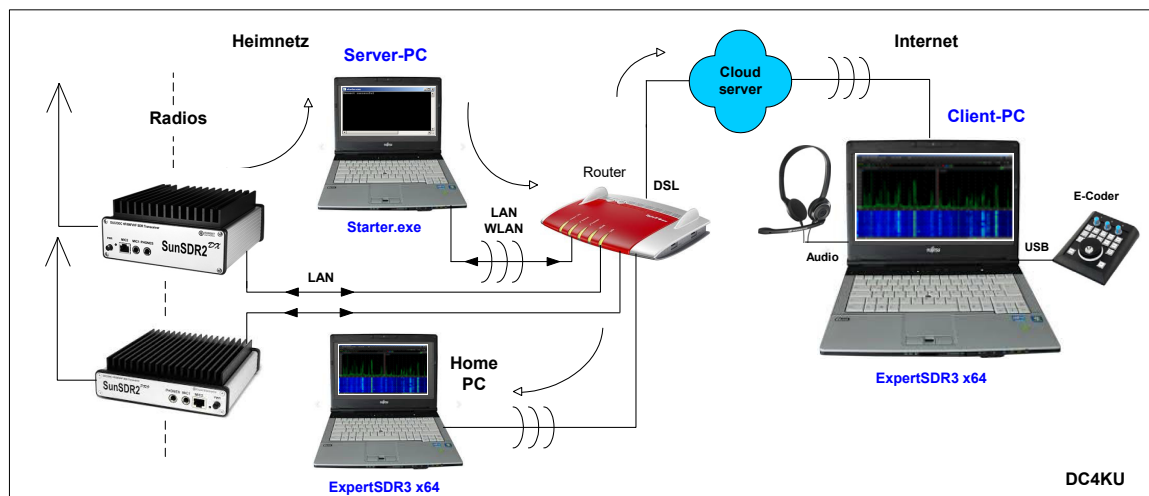


Figure 10: Remote control of all radios and via a cloud

First, register with the EE Cloud (**Fig. 11**). To do this, open the URL <https://cloud.eesdr.com:5450/reg.html> and enter an email address and password in the Cloud menu. The successful registration is then confirmed by Expert Electronics by email, which must be reconfirmed for security reasons.

Then download the file "Starter_Win64" from <https://eesdr.com/en/software-en/expertsdr3-en> on to the Server-PC and open it. Under Starter_Win64 -> 20210702 you will find the file **config.json**. Open it with a text editor and enter the email address and the password of your cloud under "email" and "Secret" and save it. After double-clicking on "starter.exe", the message "Connect Successful" appears on the screen (**Fig. 12**), which means that all radios in the home network are connected to the Cloud. That's all!

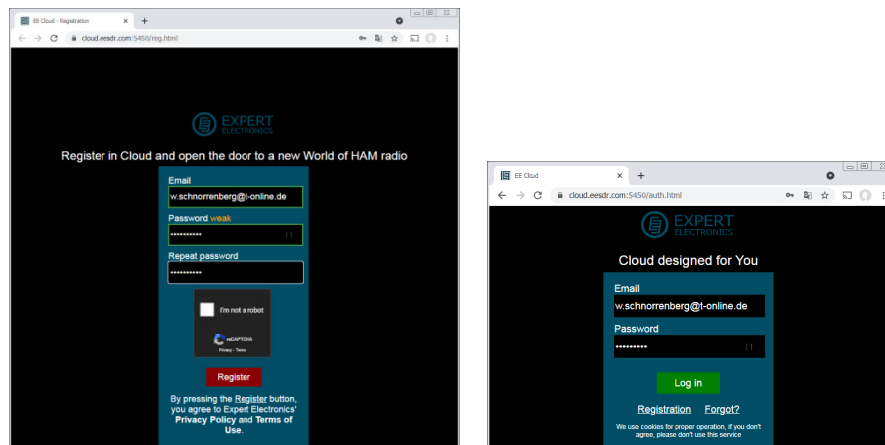


Figure 11: Registering at the EE-Cloud by email and password (left) and Log In (right).

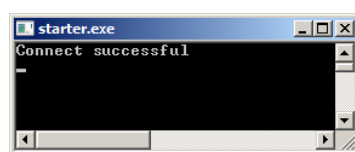


Figure 12: Successful connection

Now there are two ways to connect server with client: Either via Web-Browser or via ExpertSDR3.

a) After entering the URL <https://cloud.eesdr.com:5450.auth.html> in a browser (Opera), all radios connected to the cloud are displayed in a menu and can be started via "Connect" (**Fig. 13, left**). Since the connection works via the WEB, Smartphones or Tablets can also be used as clients.

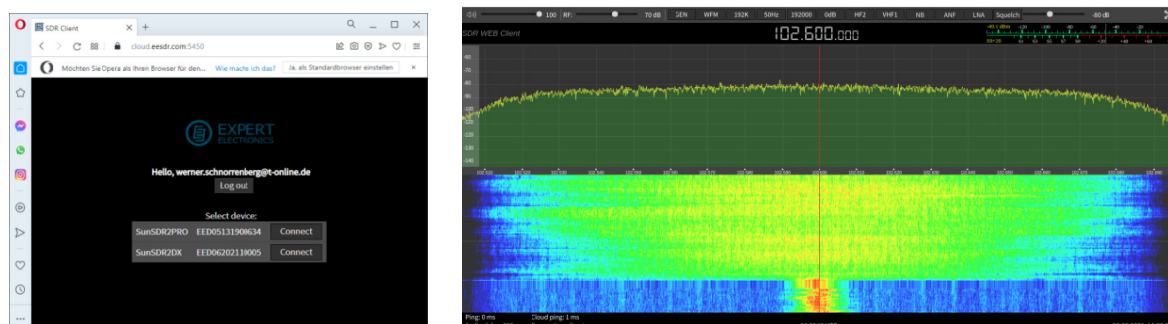


Figure 13: Radio opened via a Web-Browser on PC or Smartphone/Tablet

b) After starting the software ExpertSDR3 on the client PC, a menu also opens in which the URL, e-mail address and password of the cloud are entered (**Fig. 14, left**). After clicking on "Login", all available radios appear again, which can be started after clicking on "Start".

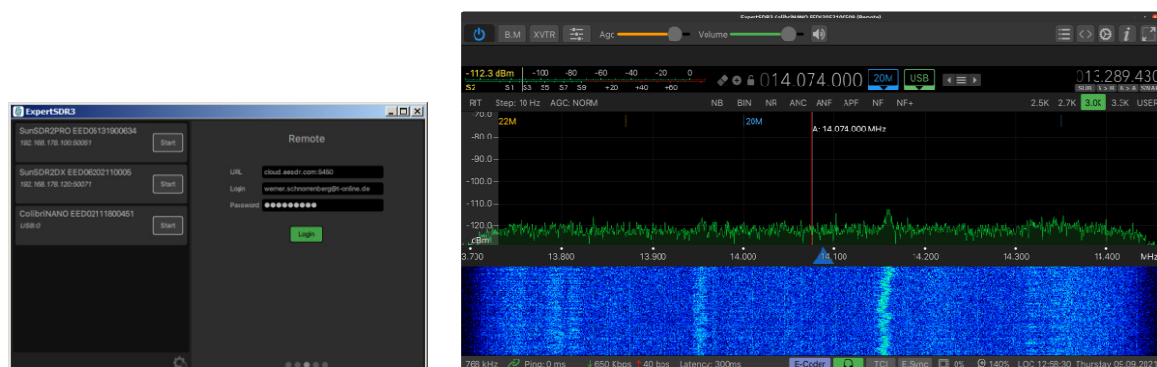


Figure 14: Radio opened via the Software ExpertSDR3_x64

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Literature

- (1) **Expert Remote System, User Manual**
https://eesdr.com/images/Document/Expert%20Remote%20system_ENG.pdf
- (2) **SunSDR2DX, HF/50MHz/VHF-Transceiver, User Manual**
https://eesdr.com/images/Document/SunSDR2_DX/SunSDR2_DX_User_Manual_ENG.pdf
- (3) **Expert SDR3 Software**
<https://eesdr.com/en/software-en/expertsdr3-en>
- (4) **Noise Power Ratio (NPR) Testing of HF Receivers**
https://www.ab4oj.com/test/docs/npr_test.pdf
- (5) **Seitenbandrauschen von Sendern**
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