



RTSA-Suite PRO

QUICK GUIDE

AARONIA RTSA-SUITE PRO



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RTSA-Suite PRO is the world's fastest real-time spectrum analysis software on the market and was developed specifically for our latest SPEC-TRAN® real-time instruments.

It allows various hardware components to be integrated and used for evaluation. A simple configuration via blocks allows optimal settings for almost all measurement scenarios.

The highlights of the software include the seamless real-time 3D view with up to 25 million samples/sec, unlimited recording time, automatic signal classification and remote controllability.

The comparatively low system requirements also allow working on "normal" PCs.

The RTSA-Suite is intuitively configurable via drag&drop to connect different hardware, no matter how complex, and to adjust settings/

views according to your wishes. With this system there are no limits, because there is also the possibility to program your own blocks.

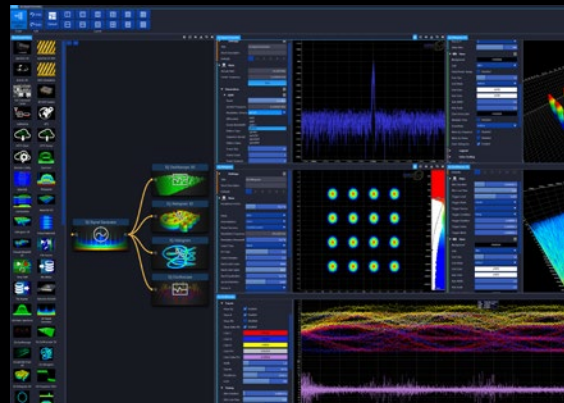
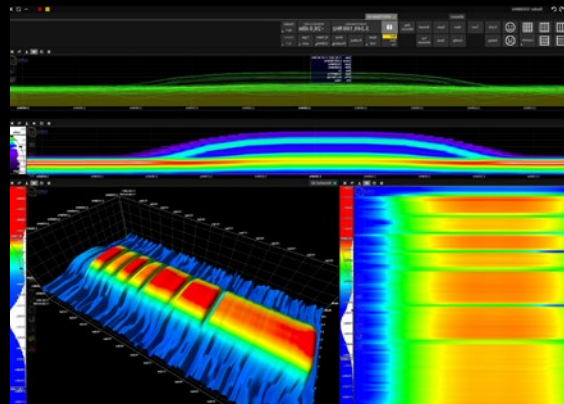
Already with the standard free basic blocks (worth more than 7000 Euro) of the RTSA-Suite PRO you are prepared for most tasks.

Included are among others: An HTTP Server and Client, the AM/FM Demodulator, Sweep Zoom, Filewriter/reader and the 32k FFT feature.

Through continuous expansions, we've developed an exceptionally powerful modular software system that empowers you to tackle virtually any measurement scenario with ease.

For a comprehensive list of all available RTSA-Suite PRO software blocks, visit:

www.aaronia.com/downloads

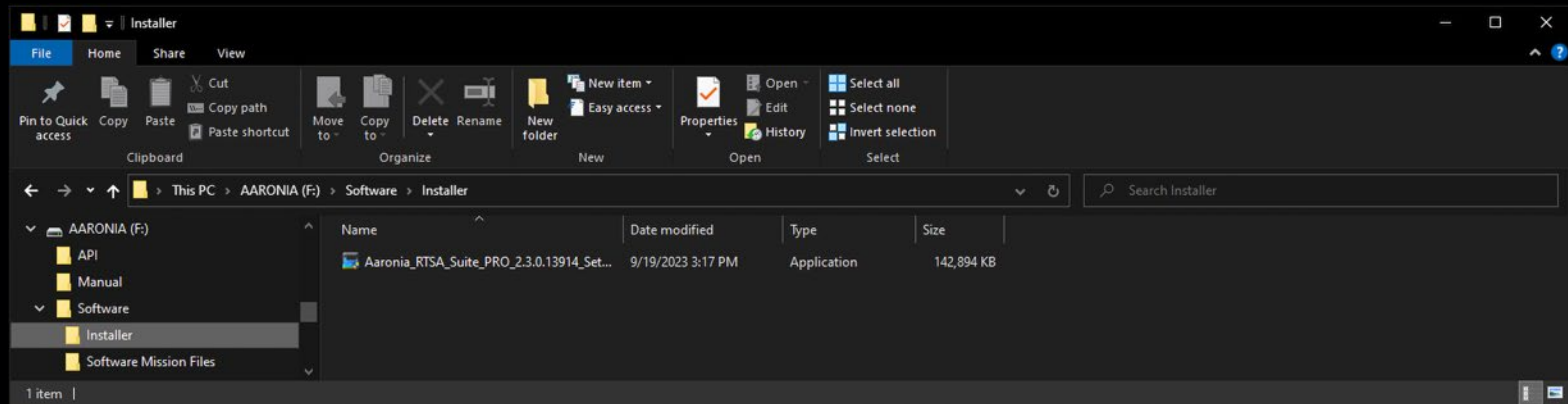


INSTALLING THE RTSA-SUITE PRO SOFTWARE

To use your SPECTRAN® V6 the Aaronia RTSA-Suite PRO analyzer software is required. A version of that is available on the USB stick included in the package under the “\Software\

Installer” folder, alternatively you can download the most recent version at www.aaronia.com/downloads/.

Installing the RTSA-Suite PRO on Windows 10 is pretty straightforward. Just double-click on the installer file on the USB stick or in your download folder:



The installation is similar to most other Windows applications. Read each screen carefully

before clicking “Next”. In particular make sure that the “Install SPECTRAN V6 Driver” option is

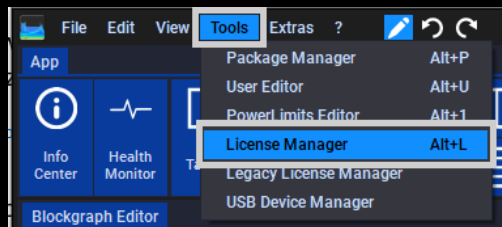
enabled (should be the default) on the last page of the installation process.

Linux users: The RTSA also works on Linux specifically tested on Debian versions, other popular distributions should also support our software. For obvious reasons the installer will have some differences to the Windows version, in particular it will not contain an “Install SPECTRAN V6 driver” option.

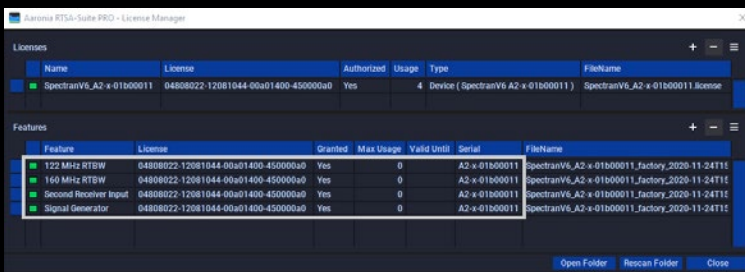
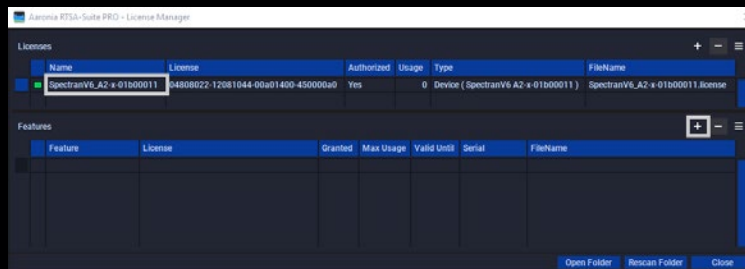
RTSA-SUITE PRO LICENSE MANAGER

To unlock your SPECTRAN® V6 device's full functionality, install the corresponding license information in the RTSA-Suite PRO software.

- Insert the USB memory stick shipped with your device into a free USB port of your PC.
- Start the RTSA-Suite PRO software, if not already running.
- Open the "License Manager" dialog by selecting the "License Manager" option in the "Tools" menu of the RTSA-Suite PRO.



In the upper part of the dialog labeled "Licenses", you should see an entry for each SPECTRAN® V6 device that has been connected to the PC now or in the past. The "Usage" column shows the valid features attached to this license.



If your SPECTRAN® V6 device is not listed there, please check your USB connection and verify that the appropriate SPECTRAN® V6 drivers are installed within the Windows Device Manager.

To install the license information, click on the + button above the lower "Features" table. In the following file selection dialog, navigate to the USB memory stick. If you have purchased and downloaded a new license, please navigate to the corresponding download folder. Select the license file and confirm the selection by clicking the "Open" button.

After installation, the "Features" table should list one or more entries corresponding to features enabled on your device. Also, all corresponding controls in the "Spectran V6" block of the RTSA-Suite PRO should now be available to you. Now you can eject the USB memory stick.

STARTING THE RTSA-SUITE PRO SOFTWARE

After the RTSA-Suite PRO is installed, start it like any other application using the Windows start menu or desktop shortcut.

The start of the RTSA-Suite PRO may take some time during which you may not see any interface elements, please be patient in that case, the application windows should appear within a few seconds.

By default, the RTSA-Suite PRO will load a mission file that will connect to a connected SPECTRAN® V6, start a measurement and display the data as spectrum, waterfall and histogram view.

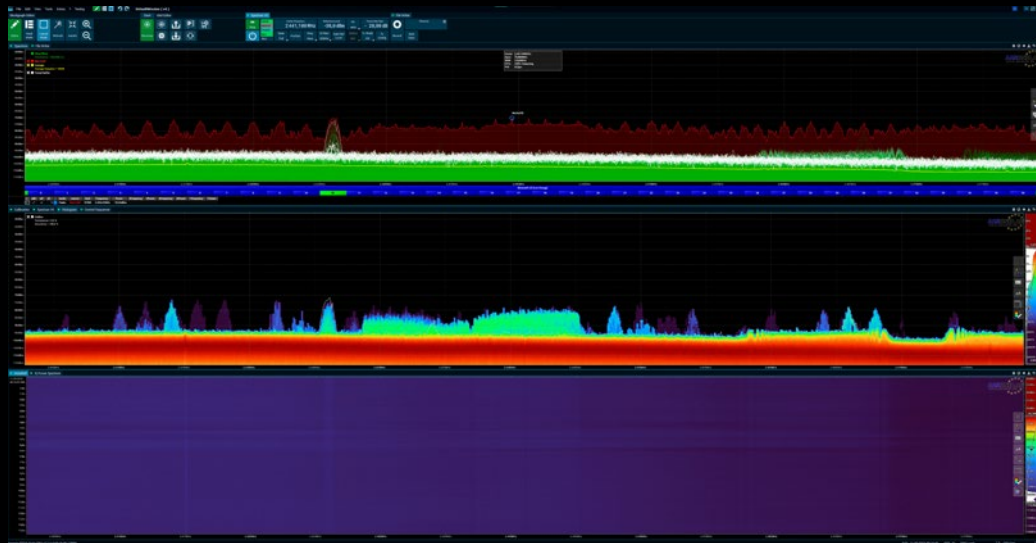
Of course, this only works if the device is correctly connected to the PC before starting the RTSA-Suite PRO.

If everything is functioning correctly, your RTSA-Suite PRO window will resemble the screenshot below within moments.

If your SPECTRAN® V6 is connected as instructed, but the RTSA-Suite PRO does not display a screen similar to the left please check for error messages in the bottom left corner of the screen and check the SPECTRAN® V6 forum at <https://v6-forum.aaronia.de> for solutions. There you will also find a lot of additional information for using your new SPECTRAN® V6.

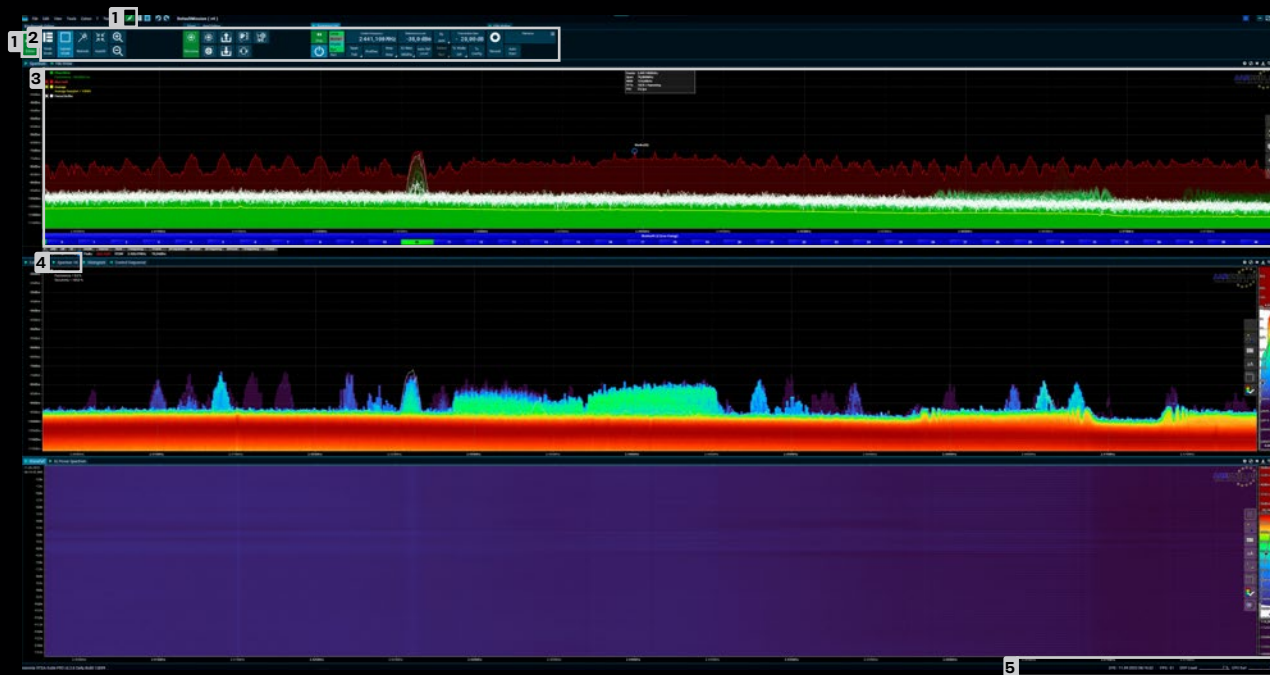
For more information about the RTSA-Suite PRO please visit our website at:

<https://aaronia.com/rtsa/> and consult the RTSA-Suite PRO software blocks overview at <https://downloads.aaronia.com>



RTSA-SUITE PRO INTERFACE OVERVIEW

The RTSA-Suite PRO is a very complex software, this quick start guide only references a few parts of the interface that are briefly described below:



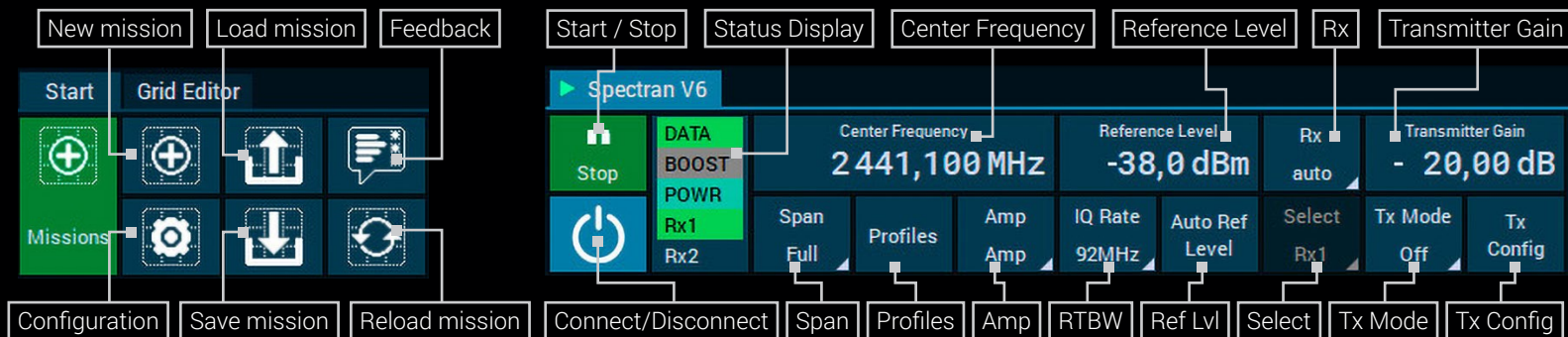
- 1** Access to the Block-graph Editor
- 2** SPECTRAN® V6 Ribbon Bar (more information on the following page)
- 3** Visualization area of the specific block
- 4** Access to RTSA blocks
- 5** CPU Saturation Performance Monitor

RIBBON BAR

Above the main display area of the RTSA-Suite PRO is the ribbon bar that allows quick access to some commonly used options. On the left there is a section called "Start" which includes usual actions for handling mission files like starting a new mission, loading and saving.

It is grouped together with a section "Grid Editor" that can be used to modify the display layout of the various blocks within the RTSA-Suite PRO in many different ways.

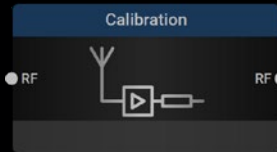
The remaining area of the ribbon bar displays the most frequently used settings of all currently used blocks. In this example it is possible to adjust different measurement parameters and settings of the „SPECTRAN V6 Block“.



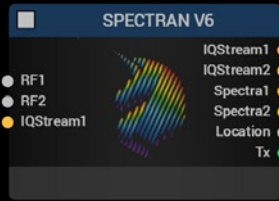
RIBBON BAR

| | | | |
|-----------------------------|--|-------------------------|---|
| Start / Stop | Start / stop the actual measurement. The default mission should automatically start it. "Start" will also automatically attempt to connect to a device if not already done. | Reference Level | This variable controls the sensitivity of the device. Strong signals may require turning this up, weak signals to tune it down. The available value range depends on the current amplifier configuration and can be changed with the „Rx Amplifier“ setting described before. |
| Connect / Disconnect | Enables manual control over the software connection to the selected device. While the default setting automatically establishes the connection, there may be situations where manual intervention is required. | IQ Rate | Select the bandwidth to be used. Values above 100 MHz are only available on the SPECTRAN® V6 2000XA-6 model or with a separate bandwidth option. |
| Status Display | Displays the current connection status and highlights any associated issues. A green background signals no problems, while a red background indicates a critical error. If there's a non-critical issue, a yellow exclamation mark is displayed. Hover your mouse cursor over the element to access a tooltip with detailed information about the issue. | Ref Level | Automatically controls the amp stage(s) and attenuator. |
| Center Frequency | Adjust this to match the frequency range to be measured. | Rx | Rx selects the Rx inputs that should be processed. |
| Span | Adjusts the span of the frequency range to be measured, based on the selected RTBW. "Full" yields the maximum frequency range, the other settings will reduce it by the selected factor. | Transmitter Gain | Adjusts the transmitter gain from -100 dB to +10 dB. |
| Profiles | Allows to select one of several predefined profiles to automatically adjust the measurement parameters to match the profile. | Select | Allows to select which Rx input should be active when "Rx1/Rx2" is selected in the previous setting. |
| Amp | Selects the amplifier stage(s) to use. Every SPECTRAN® V6 has an internal amplifier labeled „amp“ that can be enabled or disabled. There is also an optional second amplifier labeled „preamp“ right after the RF connector that needs to be unlocked by license key. It is also possible to use the „both“ setting to activate both. It is recommended to use „auto“ to enable / disable amplifiers based on the specified „Reference Level“ (as described next). | Tx Mode | Selects the operation mode for the Tx output. "Stream" will output whatever IQ data is provided at the IQStream1 input of the "Spectran V6" block, while "Signal Generator" will generate a signal on the PC using the parameters defined by „Tx Config“. „Pattern Generator“ works similar, but will use the SPECTRAN® V6 hardware to generate the signal, which significantly reduces the load of the USB connection. |
| | | Tx Config | This button opens a dialog to define the signal parameters for the „Signal Generator“ and „Pattern Generator“ Tx modes as described above. |

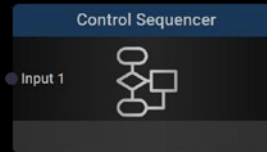
DEFAULT MISSION - BLOCKS IN USE



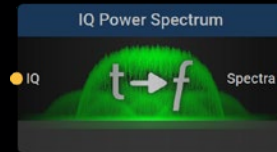
The "Calibration" block offers full control over the loss and gain from all connected loads to Rx1 and Rx2.



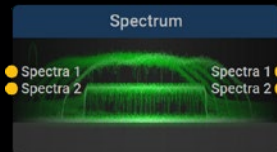
This block controls the SPECTRAN® V6 hardware and allows to configure all relevant settings of the device(s).



Sends a series of commands to all directly or indirectly attached blocks. In this case it autostarts the SPECTRAN® V6 and begins streaming data.



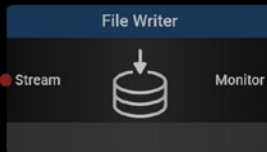
It converts I/Q data in real-time to SPECTRA using an highly optimized FFT algorithm to reduce CPU load.



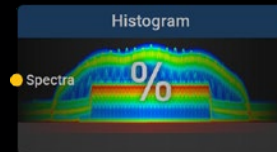
This shows the power over frequency spectrum with different trace types and can handle up to two independent input streams.



The "Waterfall" block (Spectrogram) shows the frequency spectrum over time.



The "File Writer" block records any incoming data stream to disk.



This block shows frequency domain, power domain and time domain in one single 2D view.

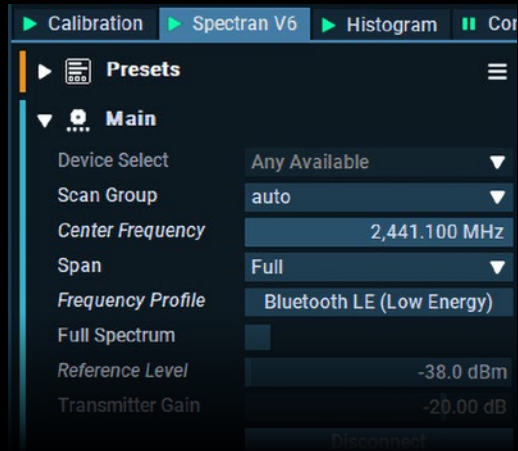
The ribbon bar provides quick access to the most commonly used settings, but there are many more settings that can be adjusted for the SPECTRAN® V6, and also every block within the current mission. By

default all available screen space is used for displaying data. To access the settings of the SPECTRAN® V6, it is necessary to open the "Spectran V6" block by clicking on the "Spectran V6" tab above the histo-

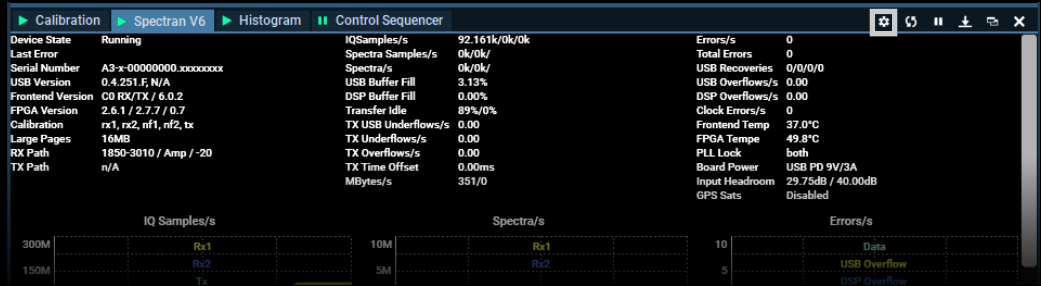
gram display in the center part of the RTSA-Suite PRO window. This will switch the center window section from the "Histogram" block to the "Spectran V6" block where the device parameters can be adjusted.

The image on the right only shows some of the available settings, it could be necessary to scroll down and possibly open the available sub-menus by clicking on the arrow on the left side of the setting.

ACCESSING MORE SETTINGS



NOTE: If the configuration menu on the left side is not displayed it can be toggled on/off by clicking on the gears icon on the right side of the title bar (see image below)



In the same way it is possible to access the settings of any other block. For example the FFT parameters can be accessed in the "IQ Power Spectrum" block, or the processing or display parameters of any other block.

FFT Size Mode Allows to select between different options to specify parameters.


FFT Size Adjusts the conversion from IQ to Spectra data. Higher values will result in a smaller RBW value of the Spectra data.

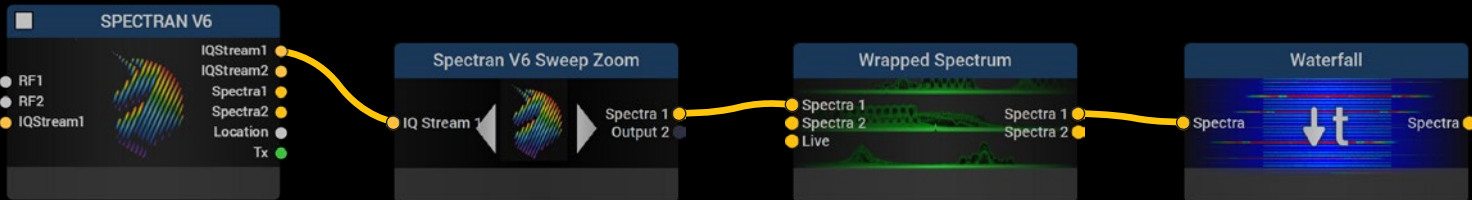
FFT RBW Frequency When setting "FFT Size Mode" to "RBW" you can directly enter the desired RBW value of Spectra data here, which will automatically adjust the FFT parameters accordingly.

When using the "IQ Power Spectrum" block (as done in the default mission) there are some relevant settings related to the conversion of IQ into Spectra data:

Attention: Changing these parameters can result in a significant increase of CPU and memory consumption. Please monitor the "CPU Saturation" level in the bottom-right corner of the RTSA window. When the bar turns red the current configuration might be too much for your hardware to handle.

SWEEP MISSION EXAMPLE AND CUSTOMIZATION

The default sweep mission "DefaultSweep_v2.0" consists of the blocks described below. When the default mission does not meet your requirements, you can of course change it to fit your needs. To do so open the blockgraph editor by clicking on the pen button  at the top of the application window.



This block controls the SPECTRAN® V6 hardware and allows to configure all relevant settings of the device(s).

Enables complete SPECTRAN® V6 receiver control, including I/Q to Spectra FFT switch between Sweep and Real-Time mode.

Offers a super high spectrum resolution by "wrapping" the spectrum into multiple rows.

Shows the frequency spectrum over time. In this mission it's configured to show a selected area within the wrapped spectrum.



Modify, arrange and connect blocks to analyze data using drag & drop. Blocks have connectors with colors and labels representing supported data types.

Connect only compatible data types; for example, IQ output cannot connect to a Spectra input. To remove blocks, select them and press the "Delete" key.

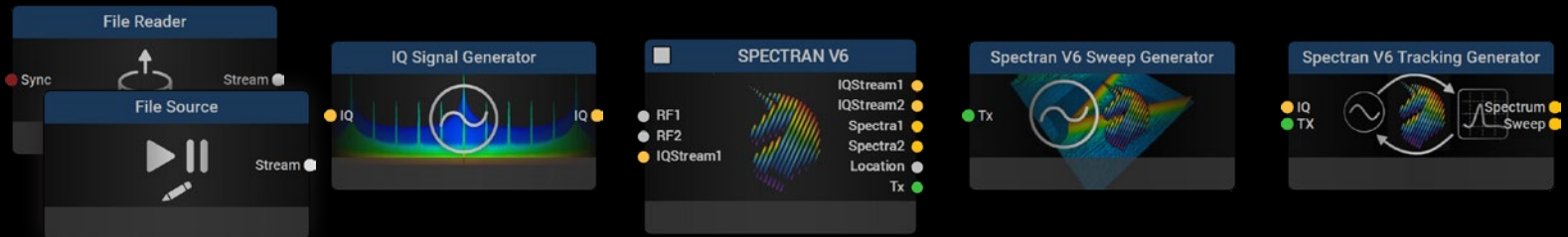
In this example the "Calibration" block, the "File Writer" block and the "RF Drive Test" block was added to the default sweep mission.

USING THE VECTOR SIGNAL GENERATOR



Tx Mode activates the **SPECTRAN V6 Tx** connection and chooses the desired mode.

Tx Config configures the **Generator Type** when using the Tx in either **Signal** or **Pattern Generator** mode



File Reader: Import and playback a previously recorded signal file from disk.

File Source: Import and playback a previously recorded signal file from RAM (faster but less available space).

The "IQ Signal Generator" block generates an I/Q stream, the sample rate (up to 20GHz) and center frequency is adjustable. It is connected to the "IQStream" input of the "SPECTRAN V6" input of the "SPECTRAN V6" block.

This block controls the SPECTRAN® V6 hardware and allows to configure all relevant settings of the device(s).

The optional "SPECTRAN V6 Sweep Generator" block can sweep over the full frequency and is connected to "Tx" of the "SPECTRAN V6" block.

This optional block offers an impressive tracking generator, e.g. for rejection measurement of a DUT and is connected to "Tx" of the "SPECTRAN V6" block.

PROBLEMS AND SOLUTIONS

When starting RTSA Suite Pro, the measurement does not start automatically.

This may be caused by power management settings, timing problems or software issues. Starting the measurement manually by clicking on the Start/Stop button in the ribbon bar should work without problem.

Pressing the „Connect“ button has no effect.

Check that all cables are connected correctly, that the power supply is properly plugged into the power socket and check if you selected the correct device within the „SPECTRAN V6“ block.

The device appears to be working (fan is on), but no data is displayed.

This can be caused if the connections of the "Spectran V6" block does not match the configuration settings. In particular using the "Spectra" connectors while using IQ "Output Format", or using "IQ 2" or "Spectra 2" outputs without changing the "Receiver Channels" setting.

The status display in the ribbon bar shows a „USB underflow“ error.

The USB connection does not provide enough bandwidth to transfer all data from the device to the PC. There are two types of causes for this:

- 1 The "DATA" connection does not support USB 3 SuperSpeed. Please make sure the port is connected to a USB 3.x port on the PC or the cable does support the USB 3 "SuperSpeed" standard.
- 2 The current measurement parameters are set too high. Some parameter combinations require more bandwidth than a single USB 3 connection can handle. This can be caused by using both Rx1 and Rx2 in parallel, or using more than 122 MHz RTBW. When using such setups please also connect the "BOOST" cable in addition to the "DATA" cable.

The status display in the ribbon bar shows a „DSP buffer overflow“ error.

The RTSA-Suite PRO is receiving more data than it can process with the current mission configuration. Either reduce the amount of data generated (lower Receiver Clock setting or use Spectra instead of IQ as Output Format) or adjust the mission configuration to perform less processing (for example by reducing the FFT size in the "IQ Power Spectrum" block settings).

SPECTRAN® V6 FORUM

Visit our official SPECTRAN® V6 Support Forum.

TECHNICAL DATA

EXAMPLE MISSIONS

CUSTOMER APPLICATIONS

SUPPORT & HELP

API / SDK

Here you will find current information, latest products of the SPECTRAN® V6 family, explanations of individual software features and get professional help for the operation of your real-time spectrum analyzer.

We also welcome new ideas and suggestions.

Visit us at <https://v6-forum.aaronia.de>





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MADE IN GERMANY

