



User Manual

VER 1.2

Spectrum Core 10-3000 MHz

(FW V5.2.14.3)

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Spectrum Core does not contain serviceable parts. Warranty will not be applicable in the event Spectrum Core has been opened.

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To get up-to-date information about accessories and their availability, please contact the sales representative.

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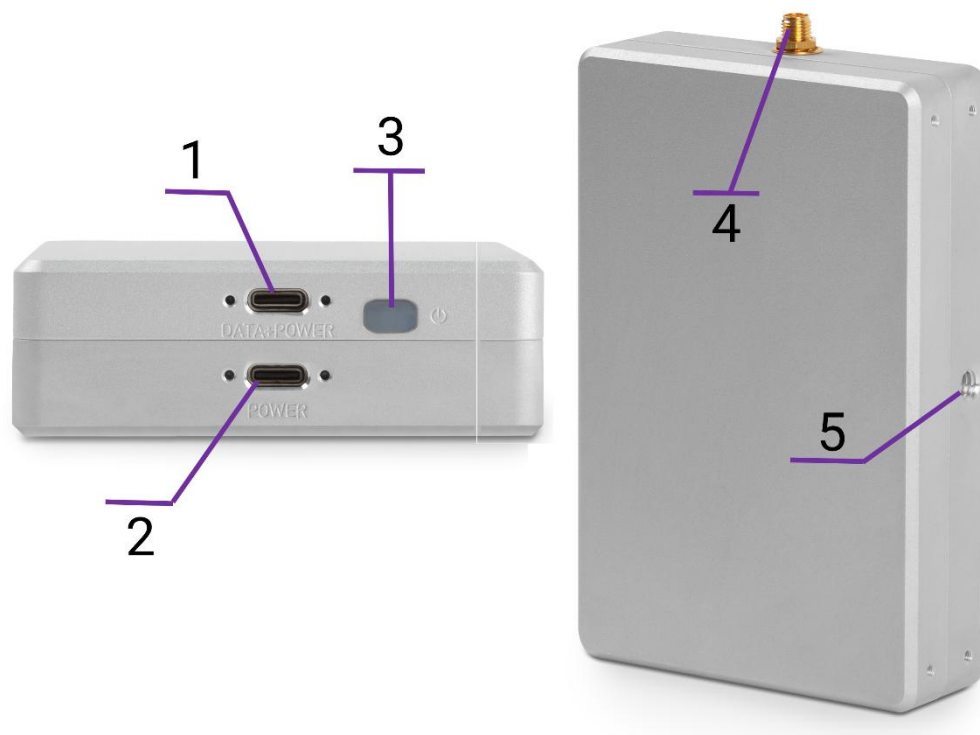
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1 OVERVIEW

Spectrum Core is a spectrum analyzer development kit designed for seamless integration with third-party systems. Device control and measurement results are accessed through a virtual COM port over a USB interface. Operating system agnostic, Spectrum Core allows direct communication with a PC without the need for any intermediate software or hardware.

1.1 Appearance



1. Data + Power port
2. Power port
3. Power button
4. SMA antenna connector
5. Tripod socket

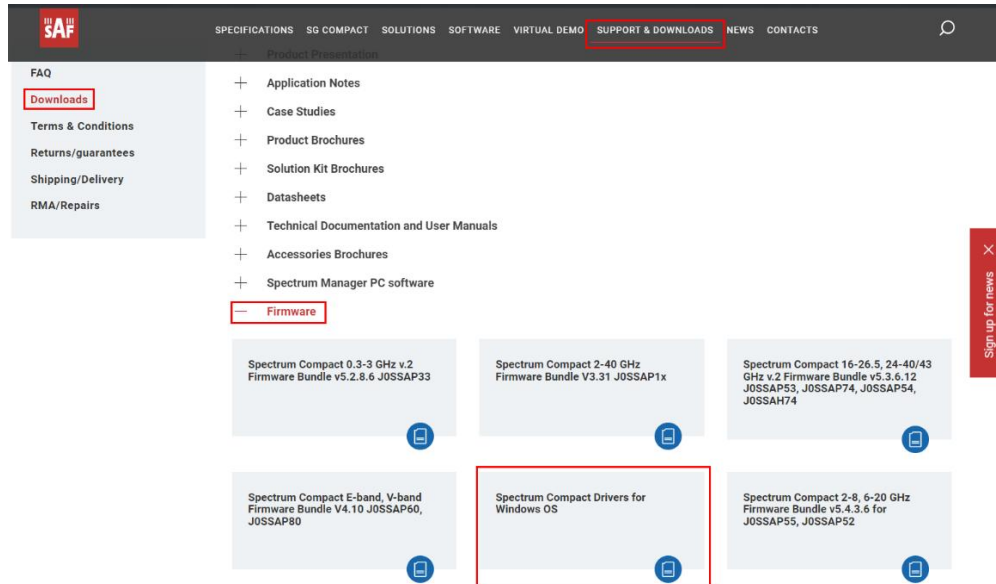
2 OPERATION

This guide is designed to show you how to use Spectrum Core via the Application Programming Interface (API). It contains two tutorials that demonstrate how to communicate with Spectrum Core through a USB interface.

Additionally, Spectrum Core is compatible with Spectrum Manager and can function as Spectrum Compact.

2.1 Spectrum Core driver installation

The Spectrum Core driver is available for download from the [Spectrum Compact website](#). Navigate to the **SUPPORT & DOWNLOADS** → **Downloads** → **Firmware** section.

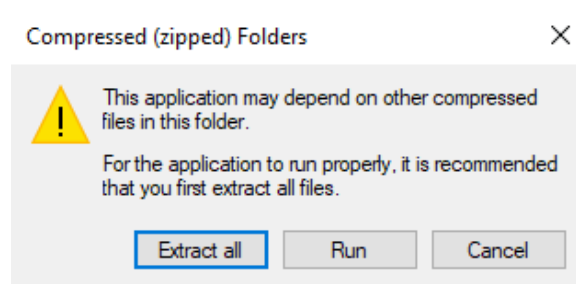


2.2 Installing Spectrum Core drivers

These drivers are the same as those for Spectrum Compact and enable communication with Spectrum Core via a USB interface.

To download and install the Spectrum Core Windows driver, follow these steps:

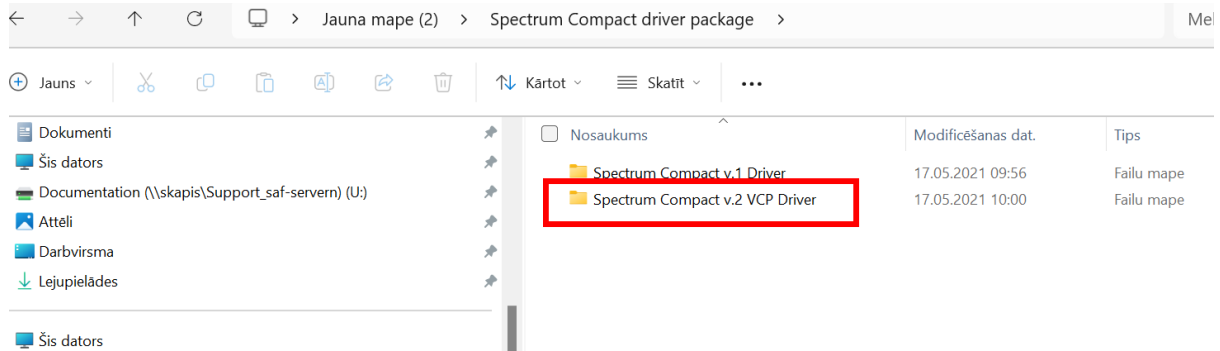
1. **Download the Driver:**
 - Visit the [Spectrum Compact website](#).
 - Navigate to **SUPPORT & DOWNLOADS** → **Downloads** → **Firmware**.
 - Click on “**Spectrum Compact Drivers for Windows OS**”.
 - You will be prompted to enter your registration credentials.
 - Complete the registration process to access the driver download package.
2. **Extract the Installation Files:**
 - After downloading, ensure the installation file is unzipped.
 - If it isn't, the Installation Wizard will prompt you with a dialog box.
 - Click “**Extract All**” to unzip the Windows driver installation file.



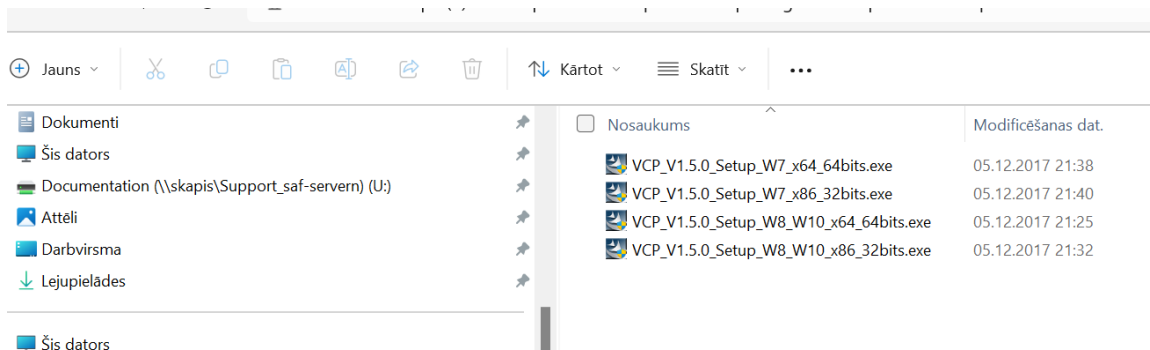
- **Note:** Installing all Spectrum Core driver files is required to communicate with Spectrum Core.

3. Select the Driver Folder:

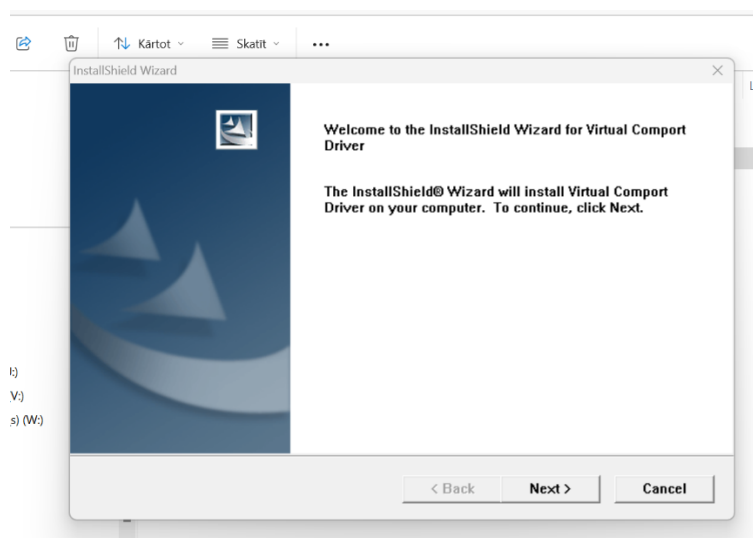
- Open the “Spectrum Compact v.2 VCP Driver” folder.

**4. Begin the Installation Process:**

- Choose the folder that matches your operating system.
- Double-click on the appropriate .exe file to start the installation.

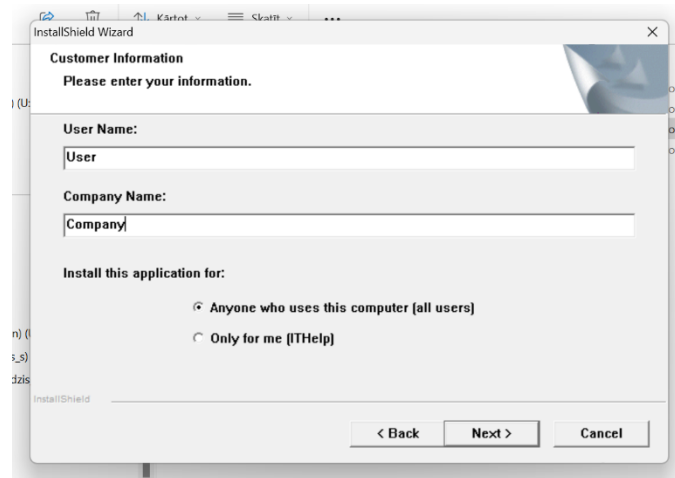
**5. Follow the Installation Wizard:**

- The installation will begin. Click “Next” to proceed.

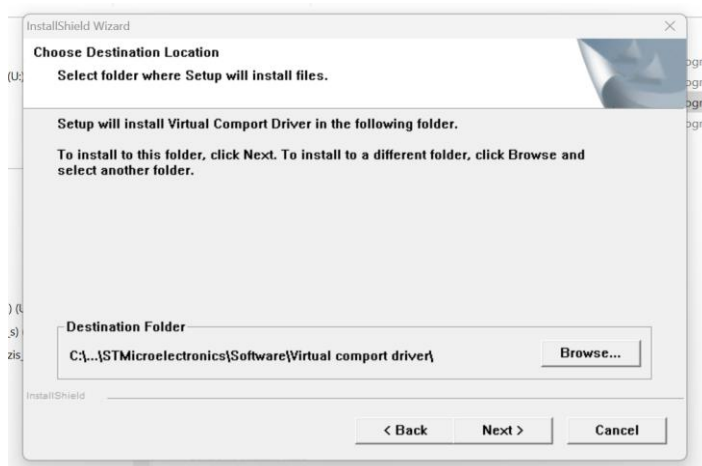


6. Enter Required Information:

- Fill in the necessary fields when prompted.
- Click “Next” after entering the information.

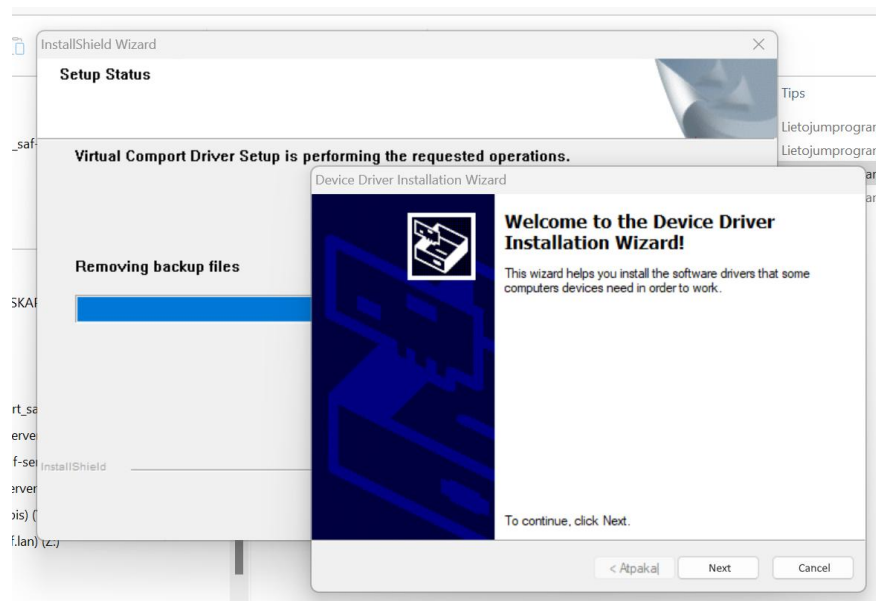
**7. Choose the Installation Folder:**

- Select your preferred installation directory or use the default path.
- Click “Next” to continue.

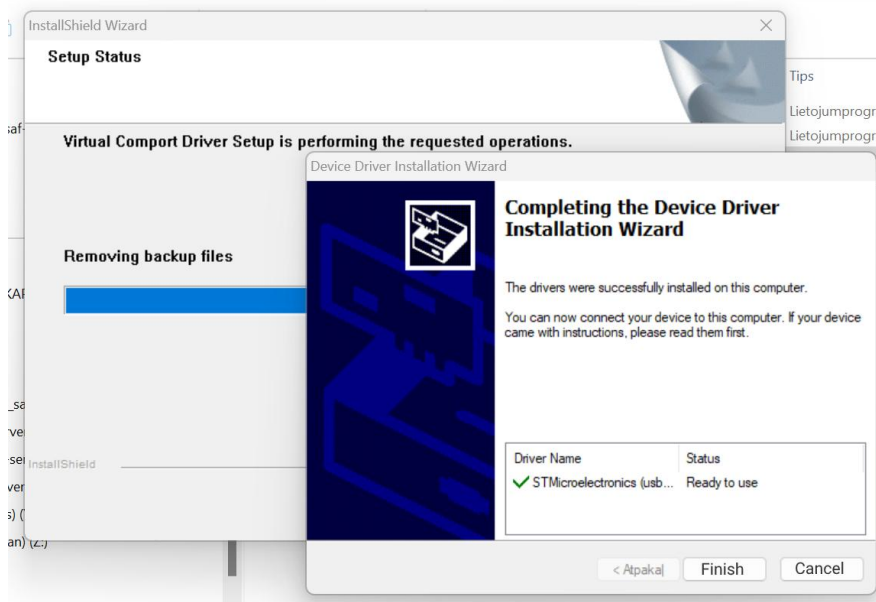


8. Proceed Through the Installation:

- Continue clicking “Next” on any additional screens.

**9. Complete the Installation:**

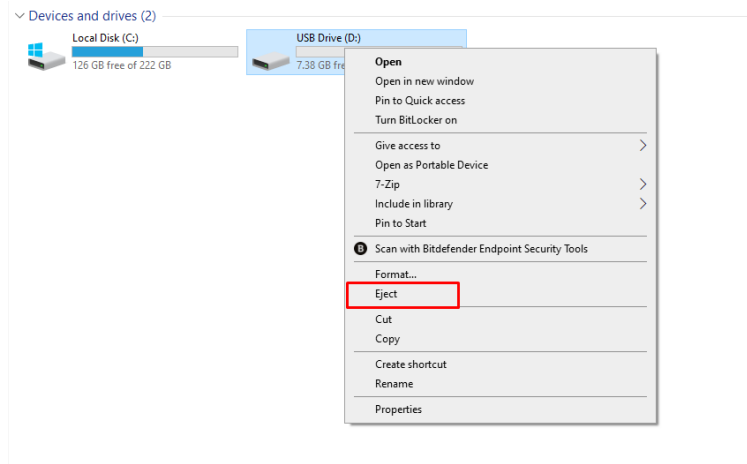
- Click “Finish” on the final screen to complete the installation.



2.3 FW upgrade

To upgrade the Spectrum Core FW, please do the following steps:

- 1) Enter the “fwupload” command.
- 2) you will get the message “You have 1 second to close COM port”, wait until the serial connection is interrupted, and SC appears as a USB mass storage device (MSD) on your PC.
- 3) Copy the FW file to the Spectrum Core.
- 4) Eject the USB storage device:



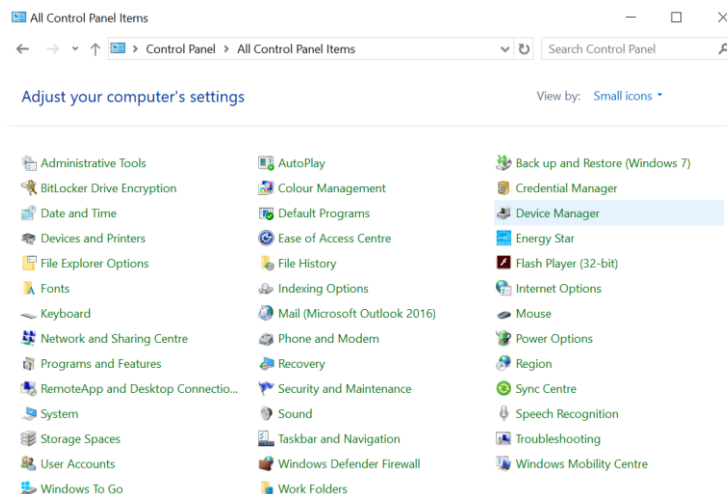
- 5) Spectrum Core will start updating automatically, there will be several restarts, please do not switch off or disconnect the power.

2.4 Establish PC connection with Spectrum Core

To connect your PC with the Spectrum Core device, follow these steps:

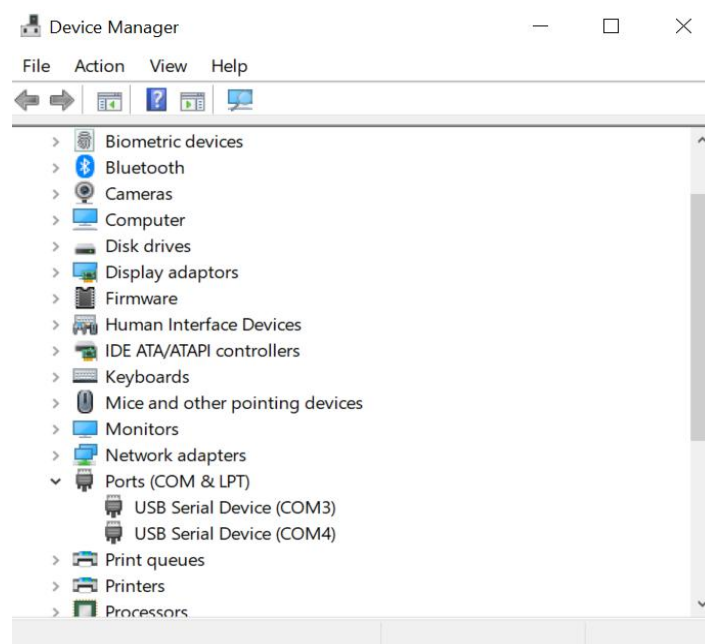
1. Open Device Manager

- Open the **Control Panel** in Windows.
- Select **Device Manager**.



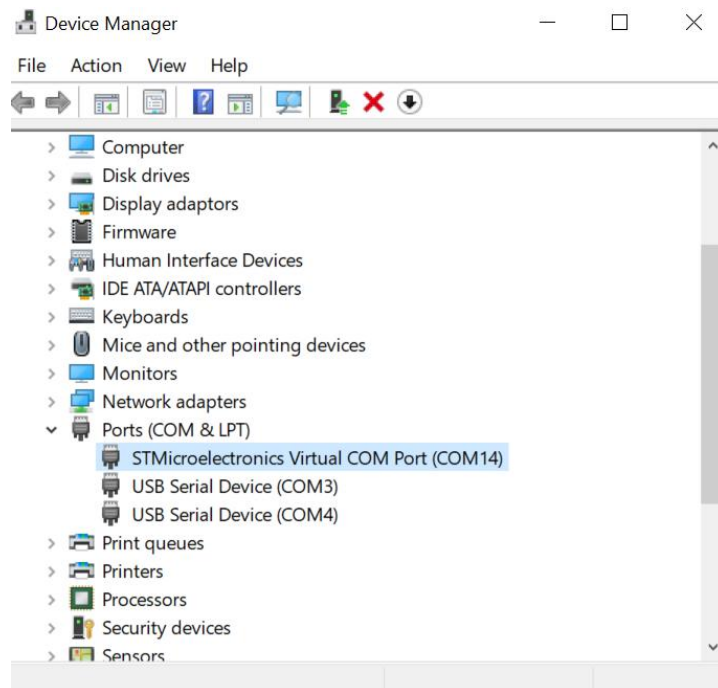
2. Identify Existing COM Ports

- Before connecting the Spectrum Core to your PC, identify any COM ports currently in use by other devices in the **Ports** section.



3. Power On the Spectrum Core

- Turn on the Spectrum Core unit by pressing the **Power** button.

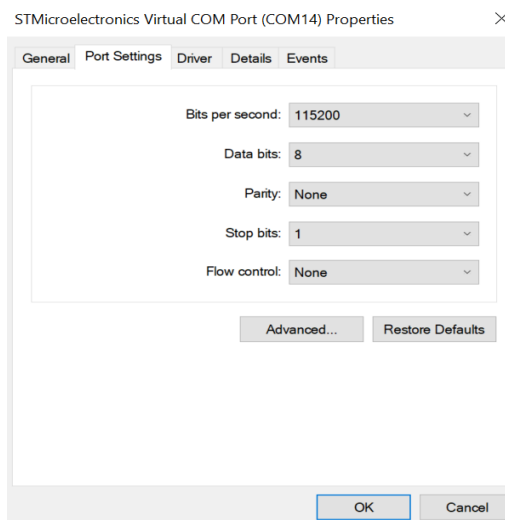
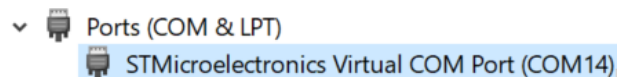


4. Connect the Spectrum Core to PC

- Connect the Spectrum Core to your PC using a USB cable.
- A new COM port should appear in the **Ports** list within Device Manager.

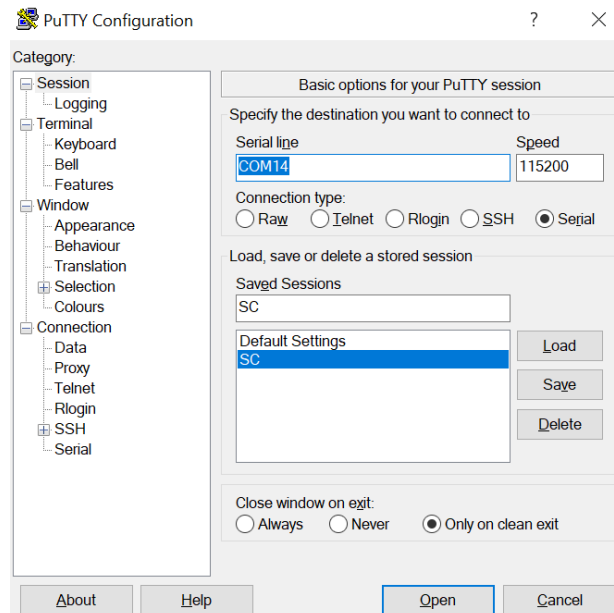
5. Configure the COM Port

- Right-click on the new COM port in the **Ports** list.
- Select **Properties**.
- Adjust the communication settings as required.



6. Open a Terminal Emulator

- Launch a terminal emulator program such as **Termite** or **PuTTY**.
- Set the connection type to **Serial**.
- Select the COM port assigned to the Spectrum Core.
- Set the **Speed** (baud rate) to **115200**.



7. Connect to Spectrum Core

- Click **Open** to launch a new terminal window connected to the Spectrum Core.



With the terminal connected, you can now use Spectrum Core API commands to configure the device and control measurement parameters.

3 SPECTRUM CORE API COMMAND LINE COMMANDS Table 1

Num	Frequency range	10-3000 MHz
	FW version	V 5.2.14.3
	Product number (P/N)	J0SSAP31
1	?	Yes
3	ver	Yes
3	freq	Yes
4	stop	Yes
5	trace	Yes
6	trace < 1 – 8 >	Yes
7	lna	Yes
8	lna < 0 – 1 >	Yes
9	bwidth	Yes
10	bwidth <10 30 100 300> <1 3 10 30 100>	Yes
11	att	Yes
12	att < 0 – 31 >	Yes
13	sweepu	Yes
14	sweepu <start> <end> <step>kHz	
	Minimum start frequency	10000 kHz
	Maximum end frequency	3000000 kHz
	Min. span (end freq. – start freq.)	
	if RBW = 10 kHz	500 kHz
	if RBW = 30 kHz	1500 kHz
	if RBW = 100 kHz	5000 kHz
	if RBW = 300 kHz	15000 kHz
	Minimal frequency step	
	if RBW = 10 kHz	2 kHz
	if RBW = 30 kHz	7 kHz
	if RBW = 100 kHz	25 kHz
	if RBW = 300 kHz	75 kHz
	Maximal frequency step	
	for all RBW settings	10000 kHz



Num	Frequency range	10-3000 MHz
	FW version	V 5.2.14.3
	Product number (P/N)	J0SSAP31
15	gain	Yes
16	gain < -12, -6, 0, 6, 12 >	Yes
17	sweepc <start><end>	
	Minimum start frequency	10000 kHz
	Maximum end frequency	3000000 kHz
	Min. span (end freq. – start freq.)	
	if RBW = 10 kHz	500 kHz
	if RBW = 30 kHz	1500 kHz
	if RBW = 100 kHz	5000 kHz
	if RBW = 300 kHz	15000 kHz
18	dtmode	Yes
19	dtmode < 0 1 2 >	Yes
21	time	Yes
22	time <hours> <minutes> (<sec>)	Yes
23	date	Yes
24	date <year> <month> <date>	Yes
25	pib <start> <end>	Yes
	Minimum start frequency	10000 kHz
	Maximum end frequency	3000000 kHz
26	zspan <center>	Yes
	Minimum center frequency	10000 kHz
	Maximum center frequency	3000000 kHz
28	orient	Yes
28	dir	Yes
29	dir <folder name>	Yes
30	file CURVES <filename.scc>	Yes
31	sn	Yes
32	fwupload	Yes

4 API CLI COMMANDS AND DESCRIPTION Table 2

Below is a list of available API commands for the Spectrum Core, along with their descriptions and usage.

General commands											
Command	Description										
?	Displays available commands.										
ver	Shows hardware version, firmware version, and firmware release date.										
freq	Displays selected frequency information in kHz : <table> <tr> <td>Start Freq -</td><td>sweep start frequency</td></tr> <tr> <td>End Freq -</td><td>sweep end frequency</td></tr> <tr> <td>Span -</td><td>selected span</td></tr> <tr> <td>Min -</td><td>minimum allowed frequency</td></tr> <tr> <td>Max -</td><td>maximum allowed frequency</td></tr> </table>	Start Freq -	sweep start frequency	End Freq -	sweep end frequency	Span -	selected span	Min -	minimum allowed frequency	Max -	maximum allowed frequency
Start Freq -	sweep start frequency										
End Freq -	sweep end frequency										
Span -	selected span										
Min -	minimum allowed frequency										
Max -	maximum allowed frequency										
Sweep commands											
Command	Description										
sweepu	Displays current sweep settings in kHz : <table> <tr> <td>Start Freq -</td><td>sweep start frequency</td></tr> <tr> <td>End Freq -</td><td>sweep end frequency</td></tr> <tr> <td>Freq step -</td><td>frequency step size.</td></tr> </table>	Start Freq -	sweep start frequency	End Freq -	sweep end frequency	Freq step -	frequency step size.				
Start Freq -	sweep start frequency										
End Freq -	sweep end frequency										
Freq step -	frequency step size.										
sweepu <start frequency in kHz> <end frequency in kHz> <frequency step in kHz> kHz	Performs a single sweep over the specified frequency range with a specific step size. Returns detected values in dBm. <table> <tr> <td>Start Freq -</td><td>sweep start frequency in kHz</td></tr> <tr> <td>End Freq -</td><td>sweep end frequency in kHz</td></tr> <tr> <td>Freq step -</td><td>frequency step in kHz.</td></tr> </table> Notes: - Each sweep starts with a # character. - Tracepoints are returned as 2-character hexadecimal unsigned byte strings. An overload is indicated by a ^ character. - The frequency step depends on the selected RBW (see Table 1). - The minimum allowed span depends on the selected RBW. - If external attenuation is used, add it as an offset to obtain the actual power value. - To stop the data stream, send any character (the sweep continues on the device; see <code>stop</code> command). - Each sweep starts after a '#' character	Start Freq -	sweep start frequency in kHz	End Freq -	sweep end frequency in kHz	Freq step -	frequency step in kHz.				
Start Freq -	sweep start frequency in kHz										
End Freq -	sweep end frequency in kHz										
Freq step -	frequency step in kHz.										
sweepc <start frequency in kHz> <end frequency in kHz>	Continuously sweeps the specified frequency range with the minimum allowed frequency step. Returns power values in dBm. <table> <tr> <td>Start Freq -</td><td>sweep start frequency in kHz</td></tr> <tr> <td>End Freq -</td><td>sweep end frequency in kHz.</td></tr> </table> Note: For parameter settings and data description, see the <code>sweepu</code> command.	Start Freq -	sweep start frequency in kHz	End Freq -	sweep end frequency in kHz.						
Start Freq -	sweep start frequency in kHz										
End Freq -	sweep end frequency in kHz.										

stop	Stops continuous sweeping and returns control to the Spectrum Core.
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Amplifier and Bandwidth Commands

Command	Description
lna < 0 1 >	Sets LNA (Low Noise Amplifier) on or off with the following arguments: 0 - Off 1 - On
bwidth	Displays current bandwidth settings: RBW - resolution bandwidth in kHz VBW - video bandwidth in kHz
bwidth <RBW> <VBW>	Sets RBW and VBW values in kHz. RBW options: 10, 30, 100, 300 VBW options: 1, 3, 10, 30, 100 Recommendation: Use an RBW/VBW ratio of 10:1 for optimal sweep speed and accuracy.

Attenuation and Gain Commands

Command	Description
att	Returns current internal attenuation value in dB.
att <value>	Sets internal attenuation value in dB. - Range: 0 to 31 dB
gain	Returns current gain adjustment value in dB.
gain <value>	Sets gain value in dB. - Options: -12, -6, 0, 6, 12

Detector and Trace Commands

Command	Description
dtmode	Returns current detector mode: 0 - MAX 1 - MIN 2 - AVG
dtmode < 0 1 2 >	Sets detector mode in the following format: 0 - MAX 1 - MIN 2 - AVG
trace	Returns current trace mode: 1 - normal 2 - maxhold 3 - minmaxhold 4 - cumulative 5 - average2 6 - average 4 7 - average 8 8 - average16
trace < 1 – 8 >	Sets the trace mode.



	Note: The <code>sweepu</code> and <code>sweepc</code> commands always return data in "normal" trace mode; any processing must be done separately.
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Time and Date Commands

Command	Description
time	Returns current system time.
time <hours> <minutes> <sec>	Sets system time. - Hours: 00–23 - Minutes: 00–59 - Seconds: 00–59
date	Returns the current system date.
date <year> <month> <date>	Sets system date. - Year: e.g., 2021 - Month: 01–12 - Day: 01–31

File System Commands

Command	Description
dir	Lists directories and files in the main directory.
dir <folder name>	Lists files in the specified directory.
file CURVES <filename.scc>	Returns power values saved in a spectrum curve file.
fwupload	Allows uploading of FW file, switches the device to MSD mode

Device Information Commands

Command	Description
sn	Returns product number and serial number: P/N - product number S/N - serial number

Measurement Commands

Command	Description
pib <start_freq> <end_freq>	Returns calculated Power-in-Band value in dBm* for the specified frequency range. Formula - $RESULT = -VALUE + (ATT - REF)$ Start Freq - start frequency in kHz End Freq - end frequency in kHz * returns calculated Power-in-Band values continuously
zspan <center_freq>	Returns continuous measured signal level in dBm at a specific center frequency (zero span). Center Freq - frequency in kHz Notes: - Data is returned as ASCII hexadecimal strings (xxY), where xx is the value in dBm and Y is a counter (0–9). - To stop the command, send any character while data is being received.