AsteRx SB3

User Manual

User Manual Revision 1.4
Applicable to version 4.14.4 of the AsteRx SB3 Pro/Pro+ firmware
Applicable to version 4.14.4 of the AsteRx SB3 ProBase firmware
Applicable to version 4.14.4 of the AsteRx SB3 CLAS firmware

October 04, 2024
Thank you for choosing the AsteRx SB3! This user manual provides detailed instructions on how to use the AsteRx SB3 and we recommend that you read it carefully before you start using the device.

Please note that this manual provides descriptions of all functions of the AsteRx SB3 product family however, the particular AsteRx SB3 you purchased may not support functions specific to certain variants.

While we try to keep the manual as complete and up-to-date as possible, it may be that future features, functionality or other product specifications change without prior notice or obligation. The information contained in this manual is subject to change without notice. We recommend you to look for new or updated information in our Knowledge Base at https://customersupport.septentrio.com/s/topiccatalog

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Contents

1 Introduction **4**
1.1 User Notices 4
1.1.1 CE Notice 4
1.1.2 ROHS/WEEE Notice 4
1.1.3 Safety information 5
1.1.4 Support 6

2 AsteRx SB3 Overview **7**
2.1 Physical and Environmental Specifications 7
2.2 AsteRx SB3 design 8
2.2.1 Front Panel 8
2.2.2 Rear Panel 8

3 Configuring the AsteRx SB3 **9**
3.1 Connecting to the AsteRx SB3 9
3.1.1 Powering the AsteRx SB3 9
3.1.2 Connecting to the web interface via Ethernet 11
3.1.3 Connecting to the web interface via USB 12
3.1.4 Connecting via COM 13
3.2 How to configure the AsteRx SB3 for RTK 14
3.2.1 How to configure the AsteRx SB3 in RTK rover mode via Ethernet 14
3.3 How to configure the AsteRx SB3 for Attitude 16
3.4 How to configure the AsteRx SB3 as a Base station 21

4 Common Receiver Operations **31**
4.1 How to configure SBF and NMEA output 31
4.1.1 Output over a serial COM connection 31
4.1.2 Output over Ethernet 35
4.2 How to log data 39
4.2.1 Internal logging 39
4.3 Downloading logged data from the receiver 42

Appendix A Rear-panel port descriptions **43**
A.1 PWR-COM2&3/USB 43
A.2 COM1-GPIO 44
A.3 ETH 45
A.4 MAIN ANT / AUX ANT (TNC) 45

1 Introduction

1.1 User Notices

1.1.1 CE Notice

AsteRx SB3 receivers carry the CE mark and are as such compliant with the 2014/53/EU - Radio Equipment Directive (RED), 2011/65/EU - Restriction of Hazardous Substances (RoHS) Directive and 93/68/EC - CE-marking Directive.

With regards to EMC, the AsteRx SB3 receiver is declared as class A, suitable for residential or business environment. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

1.1.2 ROHS/WEEE Notice

The AsteRx SB3 is compliant with the latest WEEE, RoHS and REACH directives. For more information see www.septentrio.com/en/environmental-compliance.

1.1.3 Safety information

Caution: Shock hazard. The receiver can have multiple power sources. Make sure you disconnect all power sources when working with the receiver.

The power supply provided by Septentrio (if any) should not be replaced by another. If the receiver is used with a different power supply than provided by Septentrio, it must have a double isolated construction and must match the specifications of the provided power supply. In addition, the power supplies needs to comply with safety standard IEC 62368-1 and SELV.

Ultimate disposal of this product should be handled according to all national laws and regulations.

The equipment and all the accessories included with this product may only be used according to the specifications in the delivered release note, manual or other documents delivered with the receiver.

1.1.4 Support

For first-line support please contact your Septentrio dealer.

Additional documentation can be found in the following manuals:

- **The AsteRx SB3 Reference Guide** (available from the Support section of the Septentrio website) includes information on the receiver operation, the full list of receiver commands and a description of the format and contents of all SBF (Septentrio Binary Format) blocks.
- **The RxTools Manual** covers the RxTools software suite, including RxControl and RxLogger.
- **The Knowledge Base** on the Septentrio website contains a large number of articles and application notes which cover a wide array of technical and less technical topics. The Knowledge Base is part of Septentrio's Support Portal which can be accessed through the support section of the Septentrio website (see below).

The Septentrio website has a dedicated Support section (http://www.septentrio.com/support), where the User Manual, the Firmware Reference Guide and the latest officially supported Firmware version are readily available for download.

In case the AsteRx SB3 does not behave as expected and you need to contact Septentrio's Technical Support department, you should attach a short SBF log file containing the support blocks and a Diagnostic Report of the receiver.

http://www.septentrio.com

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2 AsteRx SB3 Overview

The AsteRx SB3 is a multi-frequency, multi-constellation GNSS receiver, available in several variants: Pro, Pro+ or ProBase. It is an IP68 compliant housed GNSS solution ideal for rapid integration in various applications.
AsteRx SB3 Pro/Pro+ is designed to be used as a dual antenna GNSS receiver for rover systems but it can also be used as a single antenna receiver for systems which do not require heading.
The AsteRx SB3 ProBase variant is a single antenna base station receiver with robust, top-quality measurements for RTK and differential corrections.

2.1 Physical and Environmental Specifications

Size:	102 x 36 x 118 mm (4.0 x 1.4 x 4.6 in)
Weight:	497 g (1.1 lb)
Input voltage:	5 to 36 V DC
Power consumption:	1.00 W typical (single antenna) 1.35 W typical (dual antenna)
Operating temperature:	-30 °C to +65 °C (-22 °F to +149 °F)
Storage temperature:	-40 °C to +75 °C (-40 °F to +167 °F)
Ingress Protection:	IP68
Humidity	MIL-STD-810G, Method 507.5, Procedure I
Dust	MIL-STD-810G, Method 510.5, Procedure I
Shock	MIL-STD-810G, Method 516.6, Procedure I/II
Vibration	MIL-STD-810G, Method 514.6, Procedure I

2.2 AsteRx SB3 design

2.2.1 Front Panel

The AsteRx SB3 's front panel features two antenna TNC connectors for the Main and Aux antennas.
Exception: AsteRx SB3 ProBase has only one antenna connector.

Figure 2-1: The front panel of the AsteRx SB3

2.2.2 Rear Panel

Figure 2-2 shows the layout of the rear-panel connectors of the AsteRx SB3 . The rear panel has three connectors: a 7-pin female PWR-COM2/3/USB socket, a 7-pin female COM1-GPIO socket and a 4-pin female ETH socket. A full description of the connector PIN layout of the rear panel ports can be found in Appendix A.

Figure 2-2: The rear panel of the AsteRx SB3

3 Configuring the AsteRx SB3

3.1 Connecting to the AsteRx SB3

3.1.1 Powering the AsteRx SB3

The AsteRx SB3 can be powered in a number of different ways. The first method is to power the receiver by supplying 5 to 36 VDC via the open-ended power cable connected to PIN 1 of the rear-panel 7-pin female PWR-COM2&3/USB socket.

Important notice on handling the ODU connectors

When connecting the cables to the AsteRx SB3 make sure the red dots on the cable side and on the socket side are aligned. Only push the connector into the socket when properly aligned.
Forcing the connector into the socket while misaligned can damage the connector, the socket or even the internal electronics (in case the cable is connecter to a power supply).

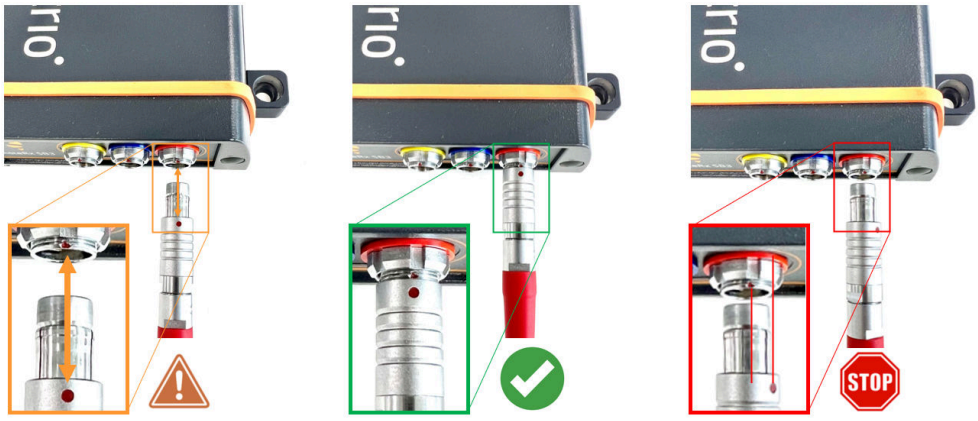

Figure 3-1: Mating ODU connectors: only push the connector in when red dots are aligned

You may also power the AsteRx SB3 by connecting an appropriate USB cable to the same 7-pin female PWR-COM2&3/USB socket, using either the recommended Septentrio USB adapter or the USB socket of a PC as shown in Figure 3-2.
Note: It is recommended to power the AsteRx SB3 by an unmanaged USB 3.0 port that can supply at least 900mA of current at 5V. Typical USB3.0 ports on PCâĂŹs are managed (charging/current draw negotiation) and powering the unit over such an USB port is not always guaranteed.

Figure 3-2: Connecting the receiver through USB using the rear panel PWR-COM2&3/USB socket

The AsteRx SB3 can also be powered through the ETH socket using power over Ethernet (PoE). All of the rear-panel ports and their pin assignments are described in more detail in Appendix A.

3.1.2 Connecting to the web interface via Ethernet

Step 1: Connect the Power and Ethernet cables

Connect the Ethernet cable to the connector labeled 'ETH' on the rear panel of the receiver as shown in Figure 3-3 and make sure it is connected to a LAN network. Then connect the power cable to the receiver and make sure the correct input voltage is applied (between 5 and 36 V DC). Note that in case the receiver is powered over Ethernet, connecting a power cable is not necessary.

Figure 3-3: Rear panel Ethernet socket

Step 2: Open a web browser and connect to the AsteRx SB3

By default, the AsteRx SB3 has the hostname 'http://asterxsb3-xxxxxxx', where xxxxxxx are the 7 digits of the serial number of the receiver board inside the AsteRx SB3 . This hostname can be used on a local area network to connect to the AsteRx SB3 if the IP address assigned by the DHCP server is unknown. The hostname can be found on a sticker on the bottom of the receiver housing. Figure 3-4 shows a screenshot of an Ethernet connection to a receiver with serial number 3238978 using 'http://asterxsb3-3238978'.

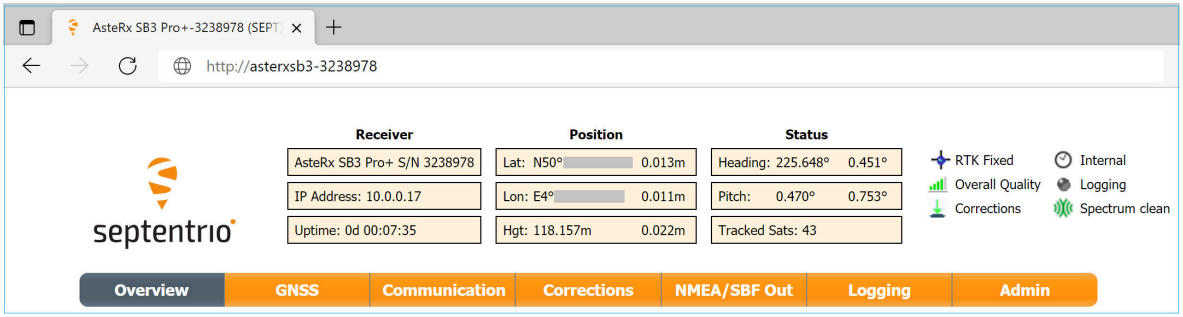

Figure 3-4: Connecting to the Web Interface via Ethernet

3.1.3 Connecting to the web interface via USB

Step 1: Connect the combined Power/USB cable

Connect the combined Power/USB cable to the 7-pin female PWR-COM2&3/USB socket on the rear panel of the receiver as shown in Figure 3-5 and make sure it is connected to a computer.

Figure 3-5: Rear panel 7-pin PWR-COM2&3/USB socket

Step 2: Open a web browser and connect to the AsteRx SB3

Once connected via USB, the AsteRx SB3 can be reached using the default Ethernet-over-USB IP address 192.168.3.1 as shown in Figure 3-6. Note that this address cannot be changed.

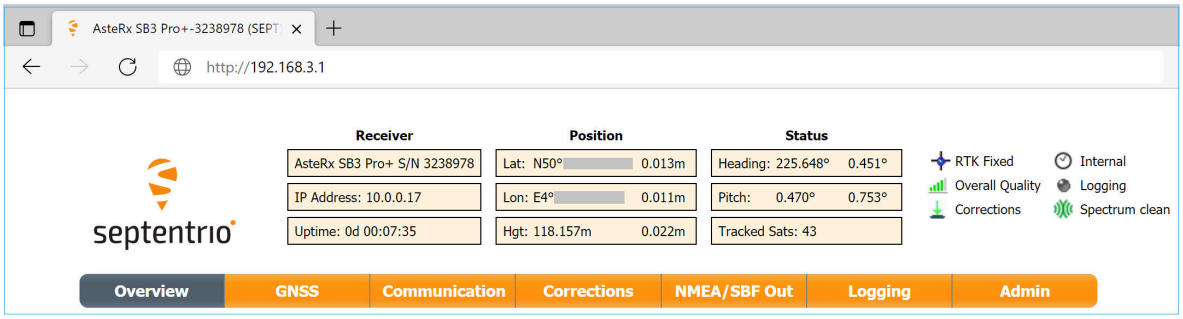

Figure 3-6: Connecting to the Web Interface via USB

3.1.4 Connecting via COM

In case you do not have an appropriate USB cable, Ethernet cable or a LAN network available, you may still connect to the receiver using one of the receiver's COM ports and RxControl.

Step 1: Connect the Power and COM cables

Connect the COM cable to the connector labeled 'COM-GPIO' on the rear panel of the receiver as shown in Figure 3-7 and connect the other end to a computer. It may be necessary to use a serial-to-USB converter. Now connect the power cable to the receiver and make sure the correct input voltage is applied (between 4.5 and 36 V DC).

Figure 3-7: Rear panel COM 1 socket

Step 2: Open RxControl and connect to the AsteRx SB3

Once connected, open RxControl on the computer to which the receiver is connected and follow the sequence of steps described in Figure 3-8 to open a connection to the AsteRx SB3 . Note that RxControl is part of the RxTools software suite which can be freely downloaded from the Septentrio website.

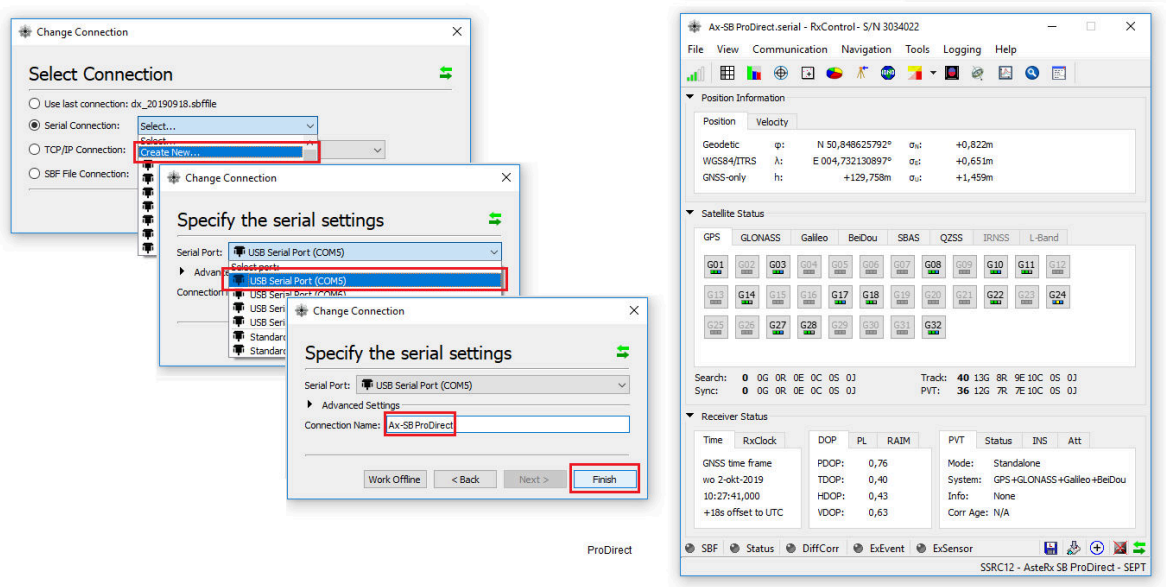

Figure 3-8: Connecting to the receiver via COM using RxControl. Select 'Serial Connection' and choose 'Create New'. Next, choose the correct serial port, define a name for the connection and press Finish.

3.2 How to configure the AsteRx SB3 for RTK

The AsteRx SB3 can use correction data to calculate a cm-level RTK position. The AsteRx SB3 can obtain this correction data in several ways: over the internet via NTRIP, using a serial or USB connection or via Ethernet. The example below shows how to set up the receiver for RTK using using TCP/IP in a closed network.
Note: this function is not available in the AsteRx SB3 ProBase model.

3.2.1 How to configure the AsteRx SB3 in RTK rover mode via Ethernet

Step 1: Enable RTK positioning mode

Ensure that RTK is enabled as a positioning mode. This can be done in the GNSS Position tab by checking the 'RTK' box in the 'Position Mode' field as shown in Figure 3-9.

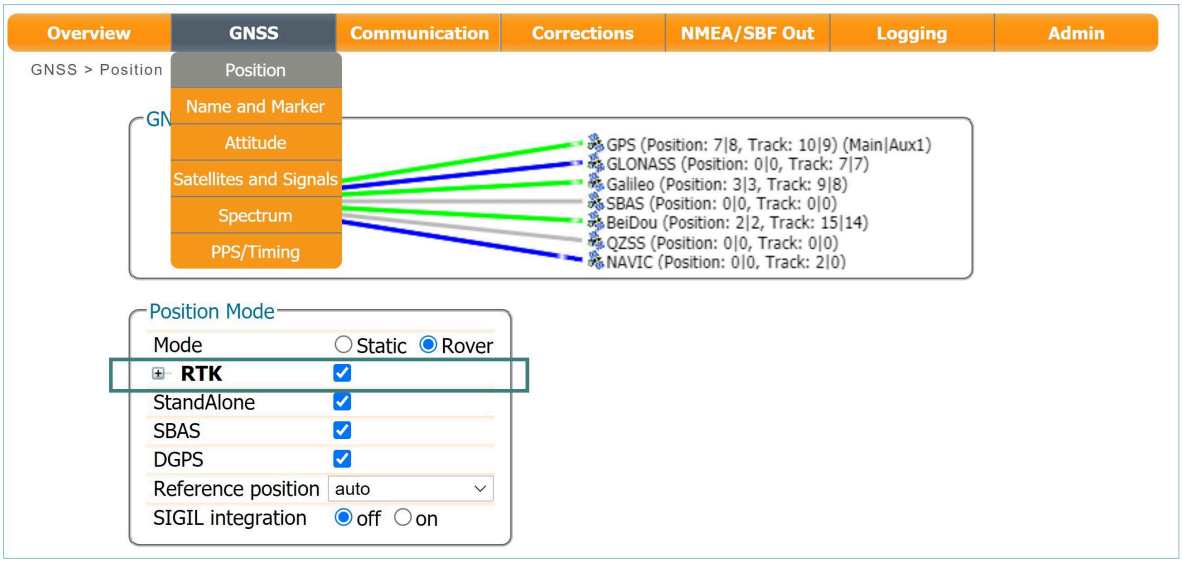

Figure 3-9: Ensure that RTK is enabled as a positioning mode

Step 2: Configure the Ethernet connection

On the **IP Ports** window of the rover receiver, click on **New IP Receive Connection** as shown in Figure 3-10 to start configuration sequence. The **Port** and **TCPAddress** should match the port and IP address of the Base station receiver.

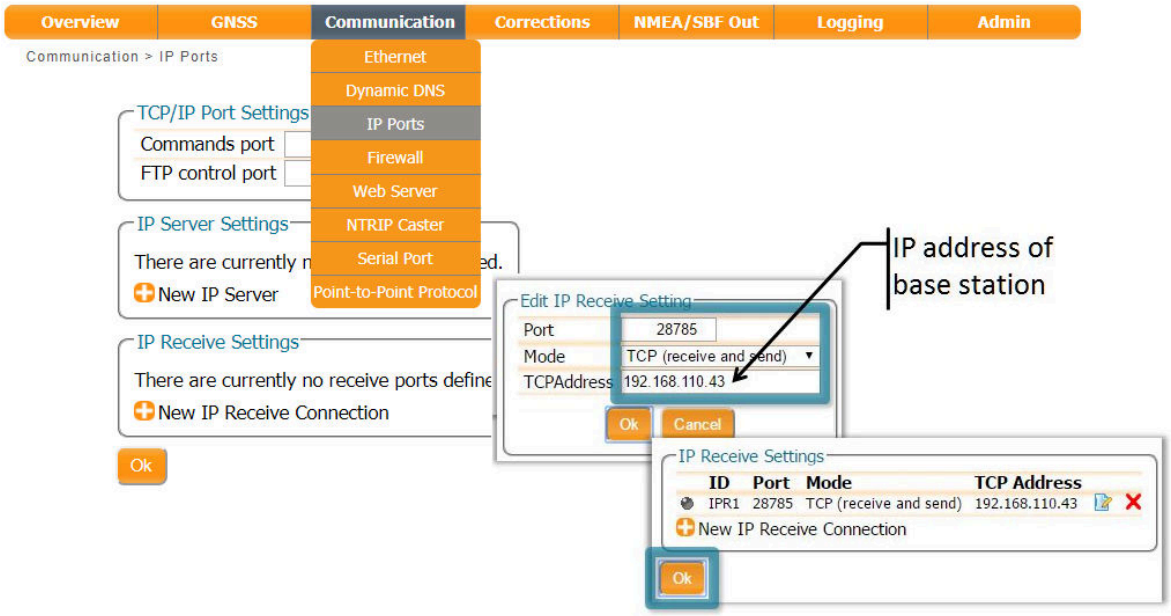

Figure 3-10: In the **IP Ports** window, click on **New IP Receive Connection** to configure the connection with the base station

Step 3: Verifying the configuration

If the Base station and rover receivers have been configured correctly then the Communication Ethernet window should appear similar to the window shown in 3-11.

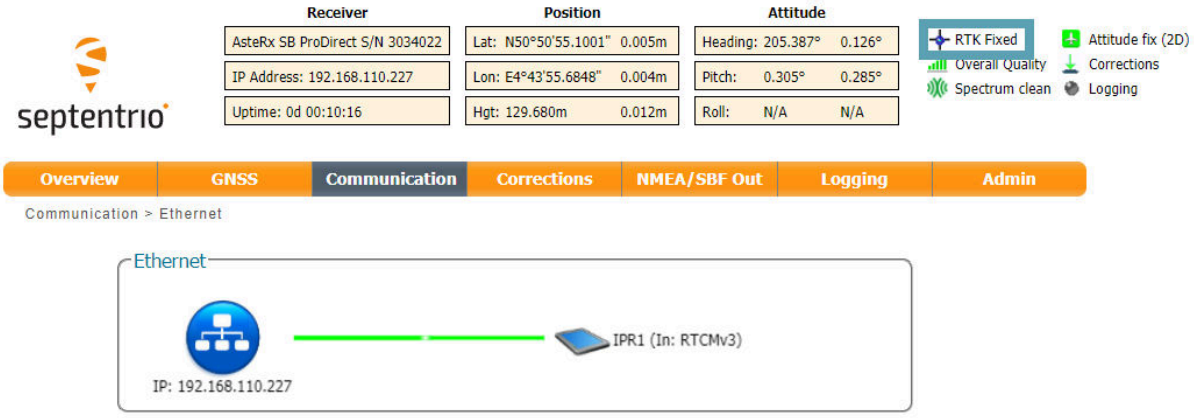

Figure 3-11: Ethernet tab of the **rover receiver** showing a fixed RTK position and reception of RTCMv3 diff corr on receiver port IPR1

3.3 How to configure the AsteRx SB3 for Attitude

With two antennas connected to the AsteRx SB3 , the receiver can calculate Heading and either Pitch or Roll. This section details how to configure the AsteRx SB3 in a two-antenna setup.
Note: this function is optional in the AsteRx SB3 Pro model and not available in the AsteRx SB3 ProBase model.

Step 1: Connect a second antenna

Connect a second antenna to the front panel connector labeled **AUX ANT** as indicated in Figure 3-12.

Figure 3-12: Auxiliary antenna connector on front panel

Step 2: Configure attitude settings

The attitude settings of the AsteRx SB3 can be configured in the **GNSS, Attitude** window as shown in Figure 3-13.

Figure 3-13: GNSS Attitude window when two antennas are connected

GNSS Attitude field

The recommended settings for a Heading setup are **MultiAntenna** mode with attitude calculated using **Fixed** ambiguities as shown. These settings are configured by default.

Antenna Location and Antenna Offset

The AsteRx SB3 assumes that the main and auxiliary antennas are placed along the longitudinal axis of the vehicle with the auxiliary in front of the main antenna. If the antennas cannot be placed in such a configuration, the reported heading and pitch may be biased. The default settings in the **Antenna Offset** and **Antenna Location** fields shown in Figure 3-14 can be altered to compensate for these biases.

In many cases the antenna baseline will not align perfectly with the vehicle's longitudinal axis or its perpendicular and in these circumstances the provided attitude offset value can also be used to compensate for small angular deviations. Note that, in order to ensure the integrity of the solution, offsets greater than 5 degrees from the longitudinal axis or its perpendicular are not recommended.

An increase in angle between the antenna baseline and the vehicle's longitudinal axis in the clockwise direction corresponds to a positive change in the value of the heading offset To better explain this, a few examples of possible setups are given below in Figure 3-14.

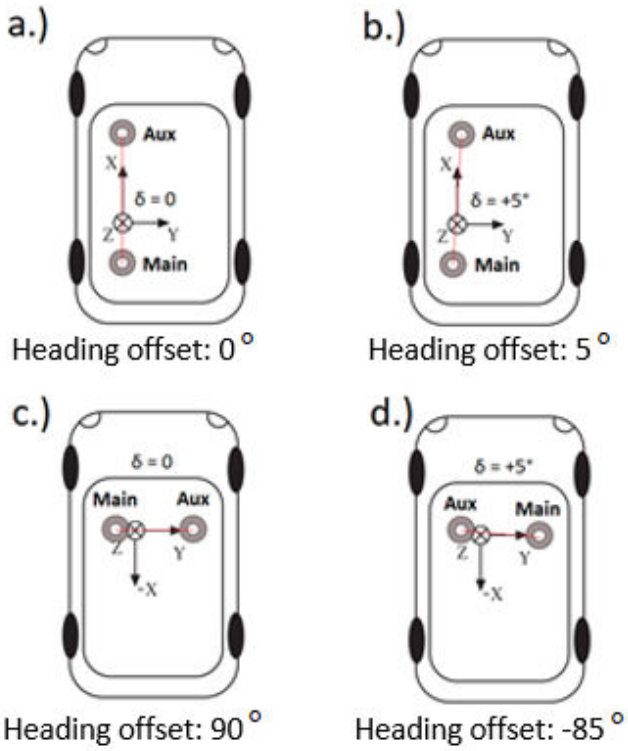

Figure 3-14: Examples of a number of antenna setups and the corresponding heading offsets. a.) The default setup for which the angle between the antenna baseline and the longitudinal axis is 0 and no heading offset needs to be set. b.) a slight deviation (5 degrees) from the longitudinal axis in the clockwise direction is reflected by a positive increase in the heading offset. c.) An alternative antenna configuration where the antennas are placed perpendicular to the longitudinal axis. d.) An alternative antenna configuration where the antennas are placed perpendicular to the longitudinal axis with a small deviation.

The examples above all relate to a heading offset but the antenna orientation can also be characterized by a vertical offset. Vertical offsets can be compensated for by adjusting the Pitch offset. This may be necessary in cases where the antenna baseline is not exactly parallel to the longitudinal axis of the vehicle or in situations where the two antenna ARPs

may not be exactly at the same height in the vehicle reference frame. Since pitch is defined as the right-handed rotation about the vehicle Y axis, a situation where the main antenna is mounted lower than the aux antenna (assuming the default antenna setup) will result in a positive pitch a shown in Figure 3-15.

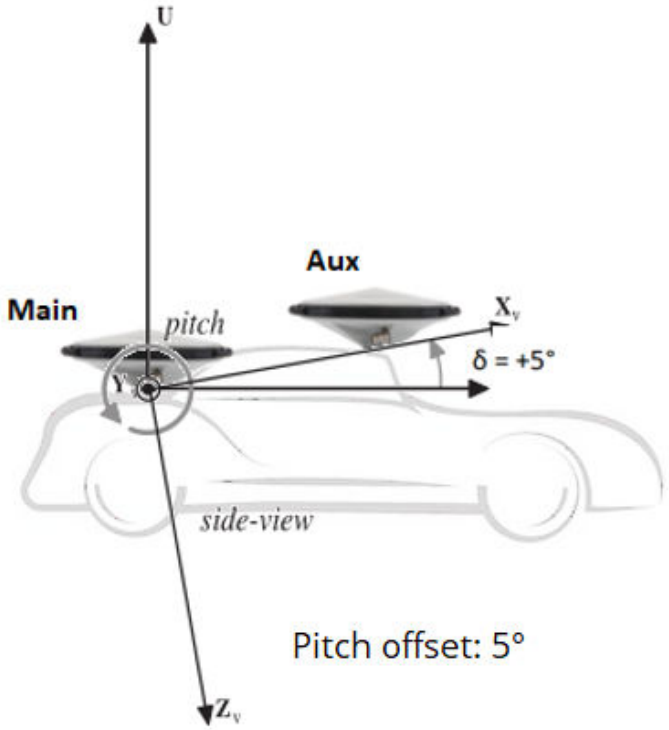

Figure 3-15: Visual representation of the effect of vertical offset between the two antennas on the Pitch offset. Assuming the default antenna configuration, the aux antenna being mounted higher will result in a positive value for the pitch.

Step 3: Attitude information in SBF and NMEA data

Details on how to output SBF and NMEA data can be found in Section 4.1.

SBF

Attitude information is contained in the SBF blocks *AuxAntPositions*, *AttEuler*, *AttCovEuler* and *EndOfAtt*. These blocks are selected automatically when checking the 'Attitude' box when configuring SBF output via the **NMEA/SBF Out** window as Figure 3-16 shows.

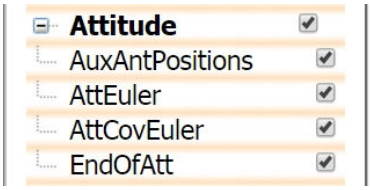

Figure 3-16: SBF blocks containing attitude information

NMEA

You can output the attitude information from the AsteRx SB3 in NMEA format by selecting the standard NMEA HDT sentence or the Septentrio proprietary HRP sentence as shown in Figure 3-17.

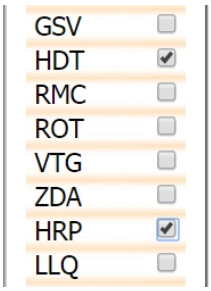

Figure 3-17: NMEA sentences containing attitude information

3.4 How to configure the AsteRx SB3 as a Base station

This section describes the Base station configurations applicable to the AsteRx SB3.
Note: this function is not available in the AsteRx SB3 Pro model.

If the feature is included with the purchased product variant, the AsteRx SB3 can be set up as a Base station receiver and provide differential corrections data to one or more rover receivers.

Step 1: Preparing the AsteRx SB3 as a Base station

Set the Base station position as static

To work as a Base station, the position of the AsteRx SB3 should be set to static. The **Static** position mode can be selected in the **GNSS** tab as shown in Figure 3-18.

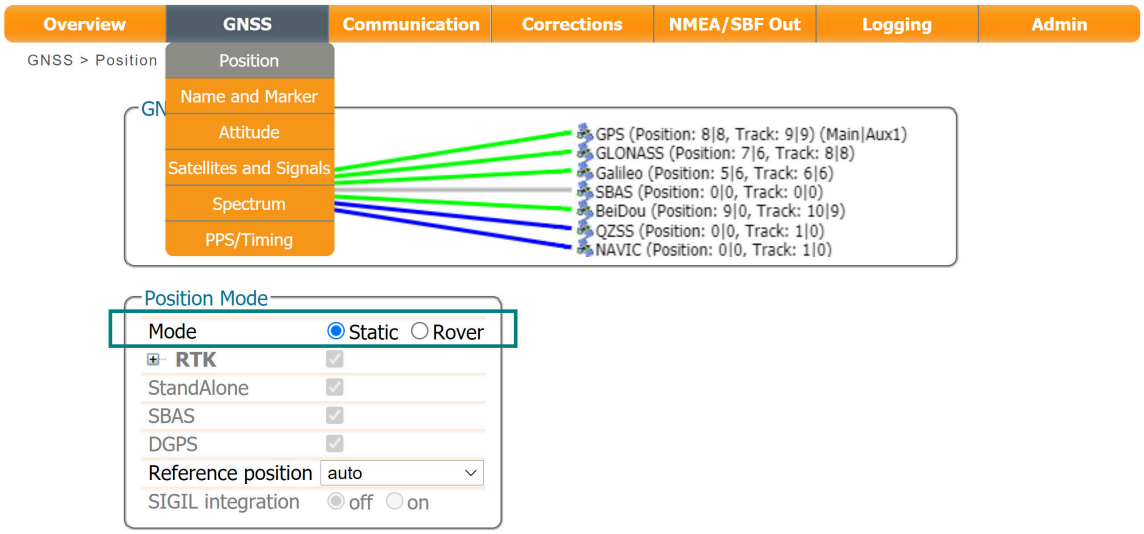

Figure 3-18: Setting the AsteRx SB3 Base station position to static

Set the correct position

An accurate position of the antenna that is connected to the AsteRx SB3 should also be set. A Rover receiver in RTK mode calculates a position relative to the Base station receiver. The default setting of 'auto' can be used for demonstrations however, for most other purposes where an accurate absolute position is important, a properly surveyed position is advisable. In the example shown in Figure 3-19, the position stored under 'Geodetic1' is used. The static positions can be entered via the **Advanced Settings** menu on the same page. Pre-set positions can be entered in either Geodetic or Cartesian coordinates as shown.

In the **Datum** field, you can select the datum to which the antenna coordinates refer. The selected value is stored in the Datum field of position-related SBF blocks (e.g. `PVTCartesian`) and also in any output differential corrections. Please note that the **Datum** setting does not apply any datum transformation to the antenna position coordinates.

Click **OK** to apply the new settings

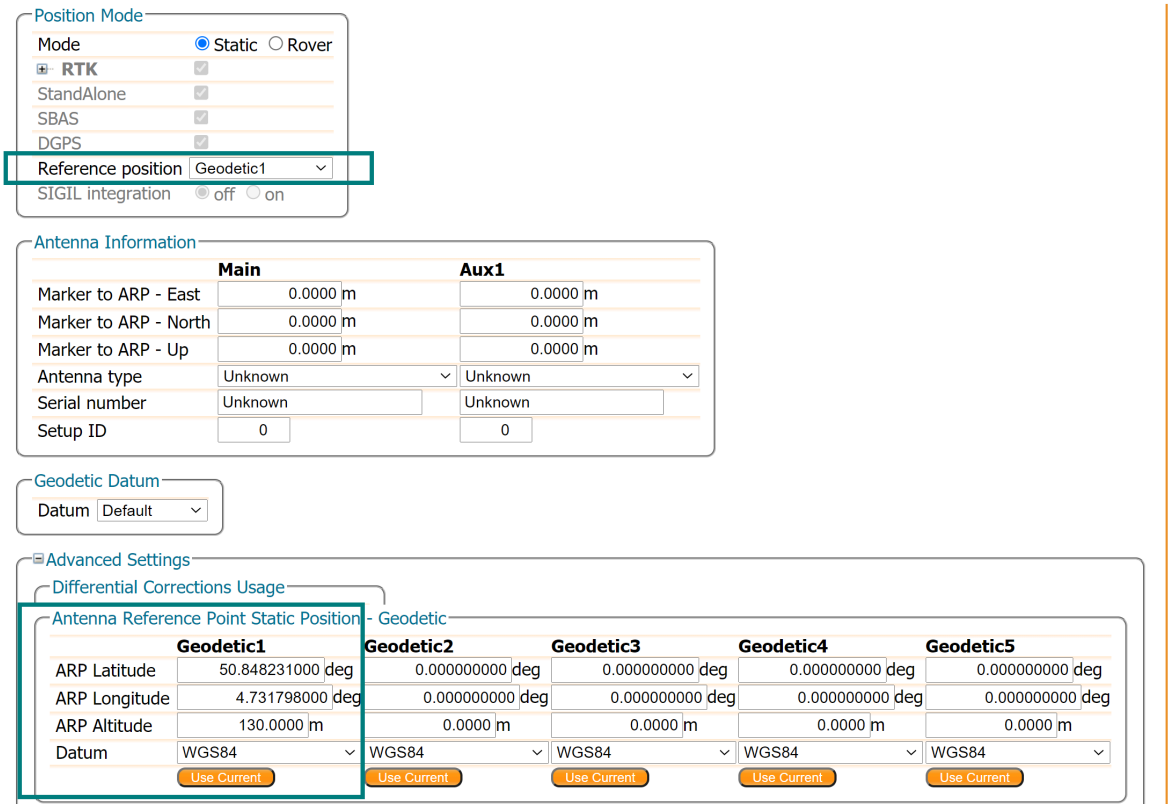

Figure 3-19: Setting the static position to the pre-set 'Geodetic1' position

Set Marker/Station name

A **Marker name** and **Station code** can also be defined through the **GNSS/Name and Marker** menu as shown in Figure 3-20.

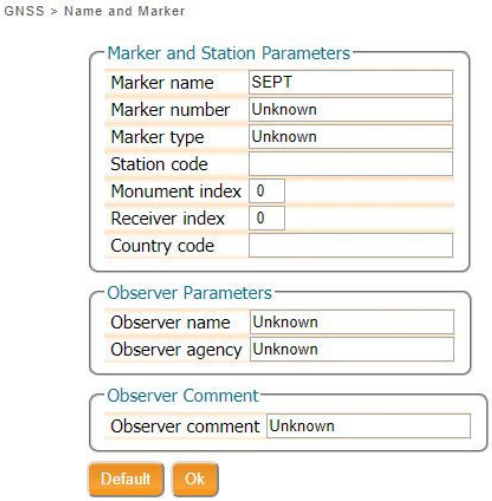

Figure 3-20: Setting the Station settings

Step 2: Configure the internet connection

An internet connection can be achieved by using the Ethernet connector or the USB connector of the AsteRx SB3. When using Ethernet, make sure your network has internet access. Contact your system administrator to confirm that your network is properly configured. Extra settings are available on the **Ethernet** settings page under the **Communication** menu.

Internet access can be enabled via USB (RNDIS IP interface), however this will depend on the PC or device you are connected to. Specific settings on the PC or device will be necessary so that internet can be shared over USB (e.g. by ssh port forwarding). Please contact your system administrator or PC/device manufacturer to guide you in realizing this connectivity.

Step 3a: Configure the output of differential corrections using an NTRIP Caster

The AsteRx SB3 includes a built-in NTRIP Caster that makes correction data from the AsteRx SB3 available to up to 10 NTRIP clients over the internet. The caster supports up to three mount points and can also broadcast correction data from a remote NTRIP server.

All settings relating to the AsteRx SB3 NTRIP Caster can be configured on the **NTRIP Caster** window from the **Communication** menu.

Define a new mount point

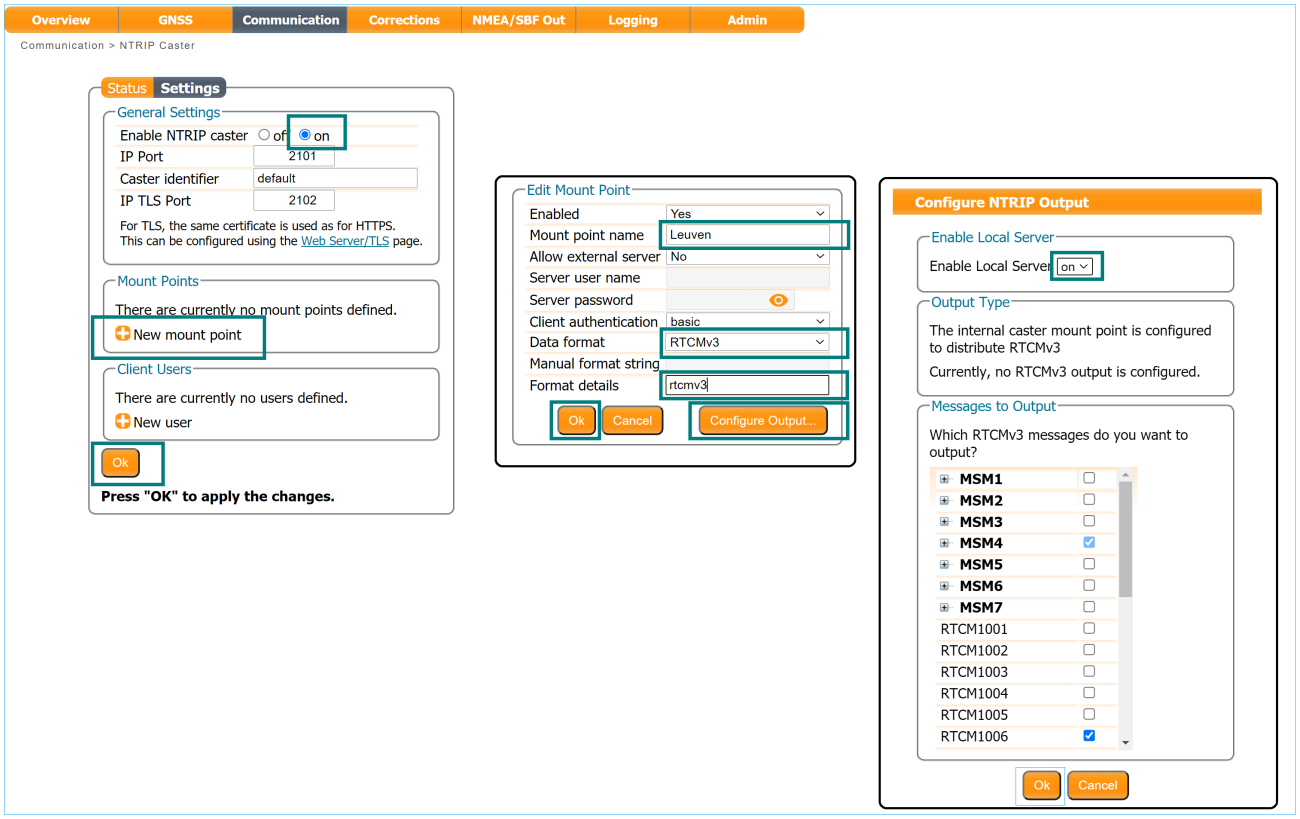

Figure 3-21: The configuration sequence for defining a new mount point

In the NTRIP Caster window, click on the **Settings** tab.

In the General Settings field, enable the NTRIP Caster and select the IP port over which you wish to send correction data: the default port is 2101.

Click on **New mount point** as indicated in Figure 3-21. Select **Yes** to enable the mount point and give it a name. This is the name that will appear in the caster source table. Up to 3 mount points can be defined each with a different name. You can also select the type of **Client authentication** for the mount point: **none** - any client can connect without logging in or, **basic** - clients have to login with a username and password.

By default, the field **Allow external server** is set to **No**. By setting **Allow external server** to **Yes** the mount point can receive a stream from a remote NTRIP server.

Click on the **Configure Output ...** button to enable the local NTRIP server of the AsteRx SB3 and to select the individual messages you want to broadcast. By default, RTK correction messages necessary for GPS, GLONASS, Galileo and BeiDou are pre-selected. Click **Ok** to apply the settings.

Define a new user

If you selected **basic** client authentication when configuring the mount point in the previous step, you will need to define at least one user. The user name and password are the credentials needed for the NTRIP client to access the correction stream.

In the **Client Users** section, click on **New User** as shown in Figure 3-22. Enter a User Name and Password for the user and select the mount points that they will have access to. Up to 10 NTRIP clients can log in as a particular user. Click **Ok** to apply the settings.

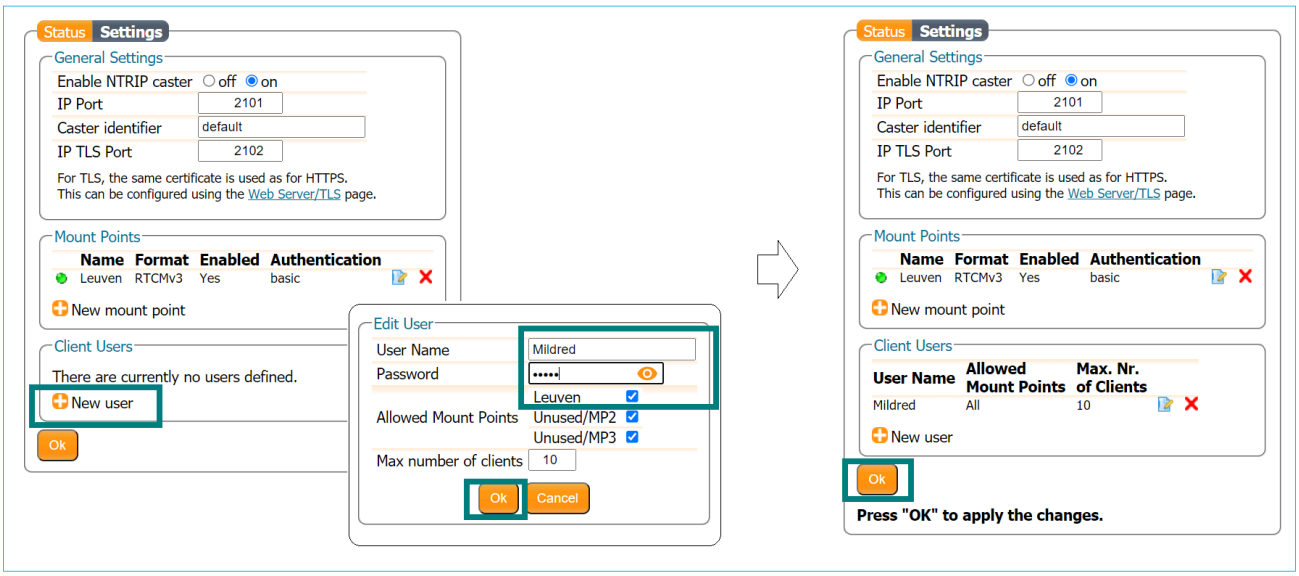

Figure 3-22: Configuring the login credentials for a user

Is the NTRIP Caster working?

In the **Status** tab of the NTRIP Caster window, you can see a summary of the NTRIP Caster to make sure that it has been properly configured. In the example shown in Figure 3-23, a client is connected to the mount point named **Leuven** as user **Mildred**.

If the client receivers are configured to send a GGA message to the caster (as was the case in Figure 3-24), then their position will also be visible.

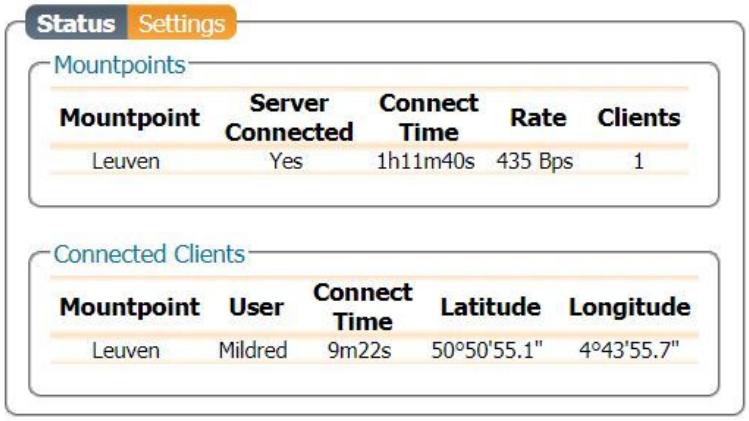

Figure 3-23: Connecting as a client to the AsteRx SB3 NTRIP Caster

On the NTRIP Client side

Rover receivers can connect to the NTRIP Caster by entering its IP address and Port as shown in Figure 3-24. After clicking **Ok**, the mount point source table will be filled and a mount point can be selected. The user name and password can then be entered and within a few seconds, the Rover receiver should report an RTK fixed position.

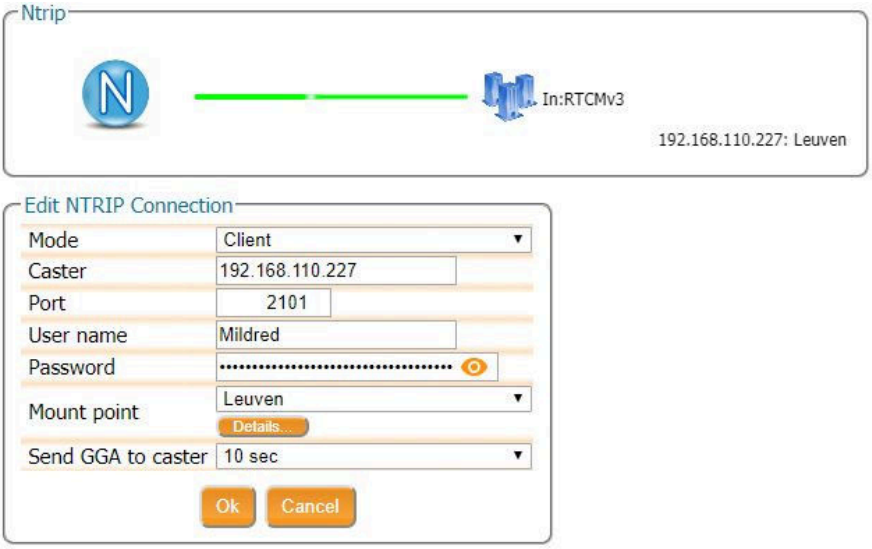

Figure 3-24: Connecting as a client to the AsteRx SB3 NTRIP Caster

Step 3b: Configure the output of differential corrections using a TCP/IP in a closed network

Configure the IPS connection

Setup an IPS connection over which the differential corrections can be streamed. On the **IP Ports** page, click on **New IP Server** as shown in Figure 3-25, then insert the port number and mode of the connection. When choosing a port number avoid conflicts with other applications such as the commands port (28784), the webserver port (80), the FTP port (21) as well as the default NTRIP port (2101) and the NTP port (123).

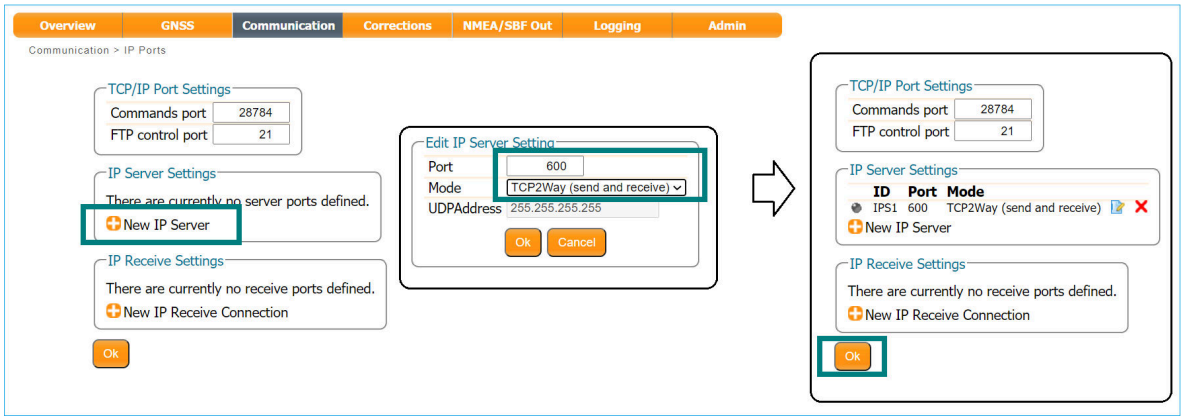

Figure 3-25: Select and configure an IP Server port on which to output differential corrections

Configure the correction stream

On the **Corrections Output** window, click on **New RTCM3 output** as shown in Figure 3-26. You can then select the IPS connection configured in the previous step. The messages necessary for RTK and DGNSS (for GPS, GLONASS, Galileo and BeiDou) are selected by default[1] but you can select any combination of correction messages that you want to output. A summary of other RTCM messages can be found in the 'AsteRx SB3 Reference Guide'.

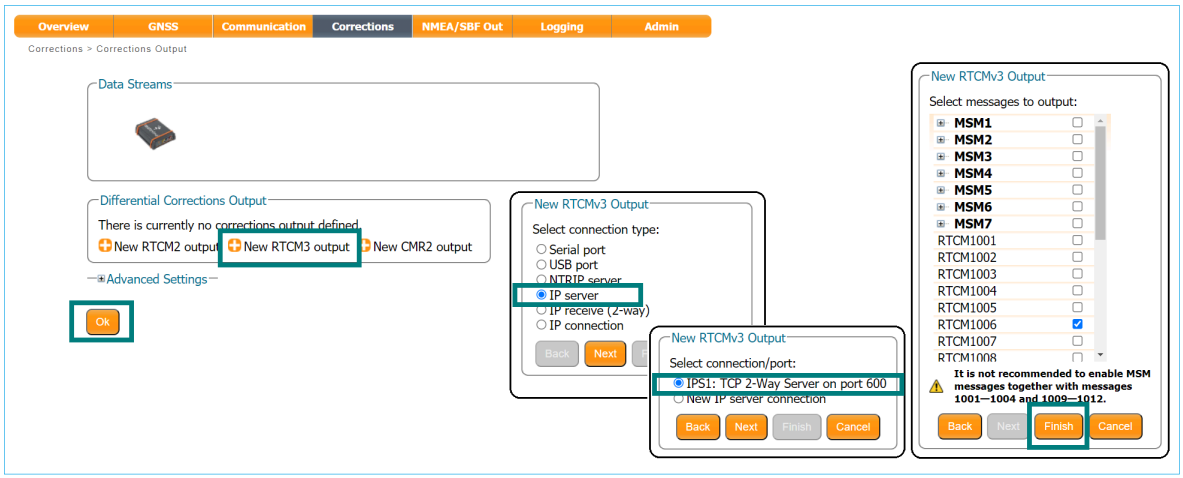

Figure 3-26: Output RTCMv3 differential corrections on the configured TCP/IP server port of the Base station receiver

[1] Note that if you do not have permissions for RTK Base corrections, you will only be allowed to output RTCM2 DGPS messages

Verifying the configuration

Having configured the settings and clicked **Ok** to apply them, you can now connect to the configured Ethernet port of the AsteRx SB3 using a terminal emulator tool such as Data Link[2]. The Ethernet IP address is IP address shown under **Ethernet Status** on **Communication > Ethernet** page.

This IP address and the port number 600 can then be used to configure a Data Link connection as shown in Figure 3-27.

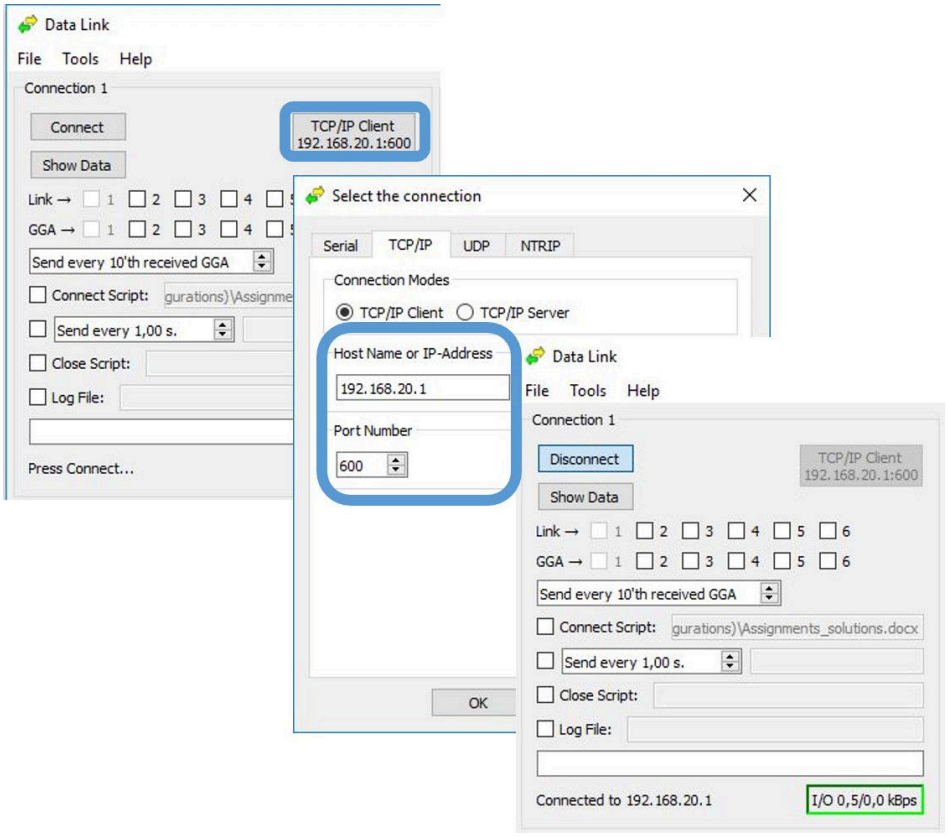

Figure 3-27: Configure the Data Link terminal emulator tool to connect to the AsteRx SB3 Ethernet port over which differential corrections have been configured

When connected to the output correction stream, click on the **Show Data** button on Data Link and you should see output similar to that shown in Figure 3-28.

[2]Data Link is part of Septentrio's RxTools suite of GUI Tools supplied with the AsteRx SB3

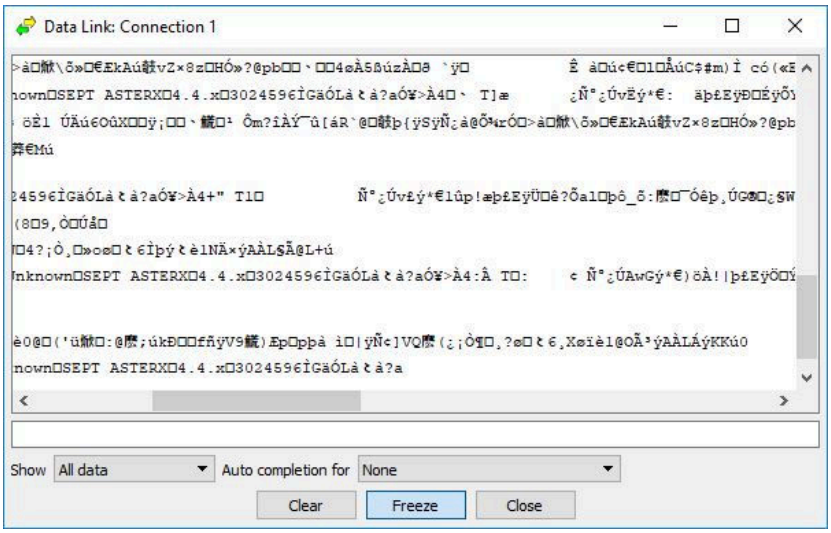

Figure 3-28: The RTCMv3 differential correction stream output from the IPS1 Ethernet connection of the AsteRx SB3

When a connection to the configured Ethernet port has been established, in this example using Data Link, the **Data Streams** field on the Corrections Output window should now show the active blue connection shown in Figure 3-29 and the corrections output icon in the information panel should appear active.

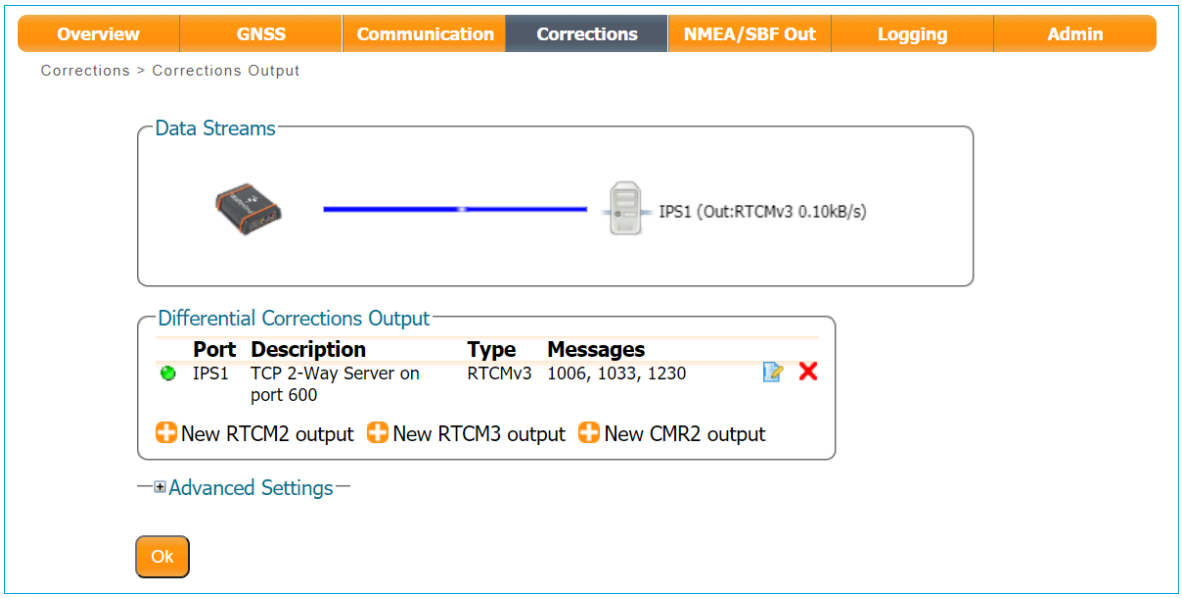

Figure 3-29: Web Interface showing differential corrections output over an Ethernet connection

4 Common Receiver Operations

4.1 How to configure SBF and NMEA output

The AsteRx SB3 can output position and GNSS data in both standard NMEA format and Septentrio's proprietary compact binary format SBF. The following sections detail how to configure connections to other devices in order to send data.

SBF and NMEA can also be logged on the internal 16 GB disk of the AsteRx SB3 . Section 4.2.1 and 4.3 detail how to log data on the receiver and how to download data logged on the receiver.

4.1.1 Output over a serial COM connection

The AsteRx SB3 can be connected via a serial COM cable to an RS-232 compatible secondary device.

Step 1: Configure the serial COM port

The COM port of the AsteRx SB3 should be configured with the same baud rate and flow control setting as the coupled device. These settings can be configured via the **Communication/Serial Port** tab as shown in Figure 4-1. In this example, COM3 is set with a speed of 19200 baud.

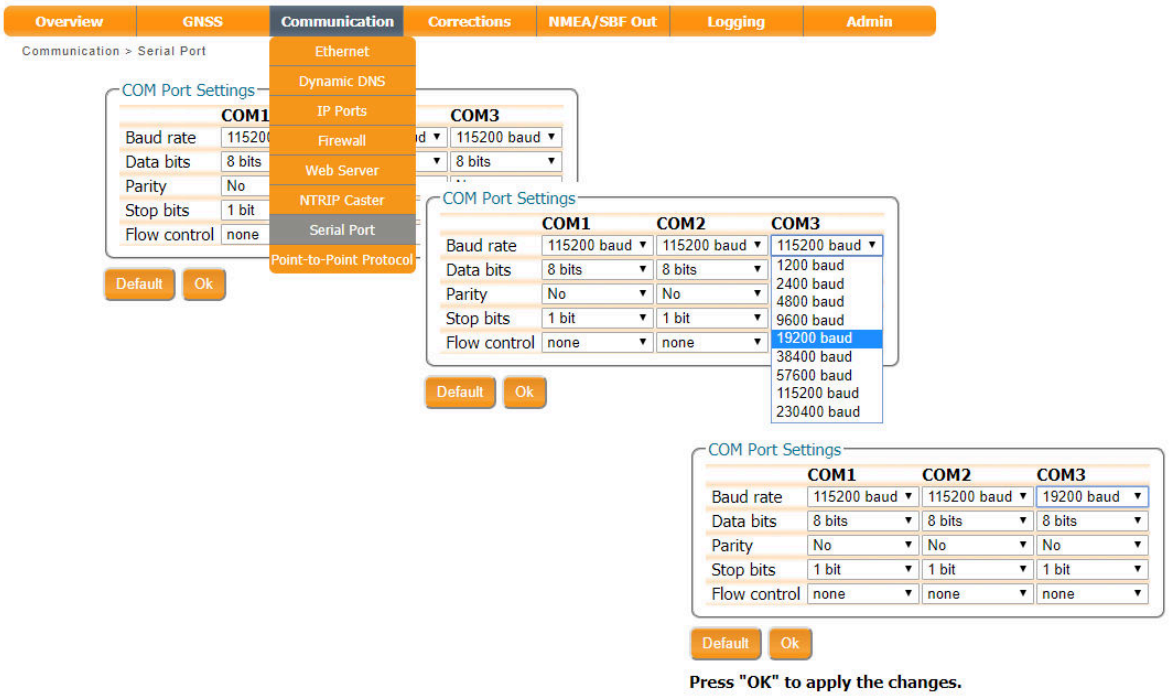

Figure 4-1: Configure the baud rate and flow control of the AsteRx SB3

Step 2: Configure data output

NMEA

In the **NMEA/SBF Out** tab, clicking on **New NMEA Stream** will guide you through the steps needed to configure NMEA output as shown in Figures 4-2 and 4-3.

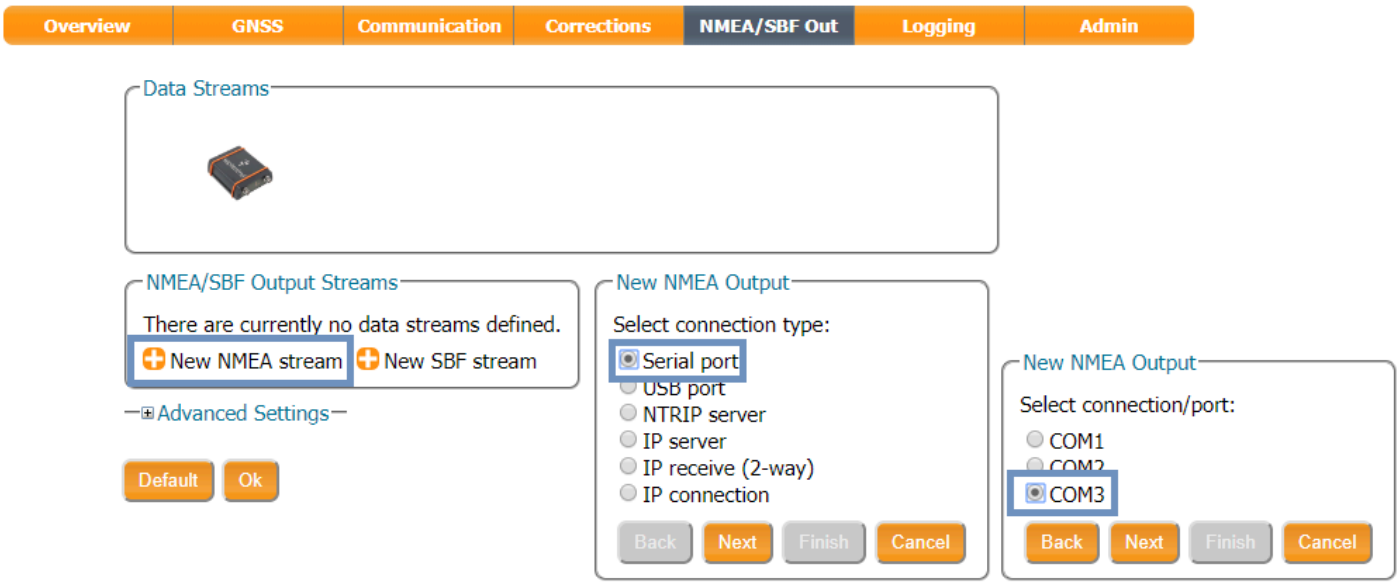

Figure 4-2: Selecting to output NMEA data on COM3

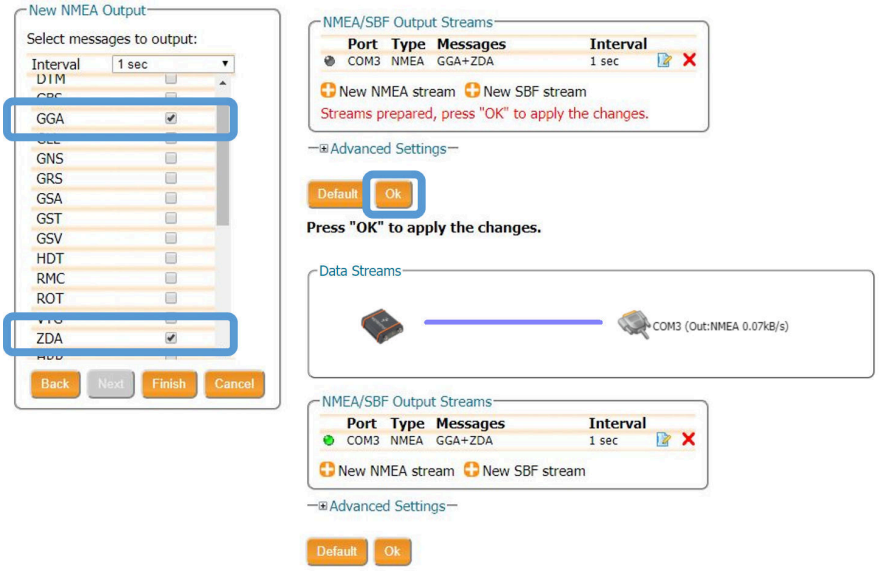

Figure 4-3: Selecting to output the GGA and ZDA NMEA message every second

SBF

By clicking **New SBF stream** in the **NMEA/SBF Out** window, a second output stream can be configured. In the example shown in Figures 4-4 and 4-5 the PVTCartesian SBF data block will be output over COM1 once per second.

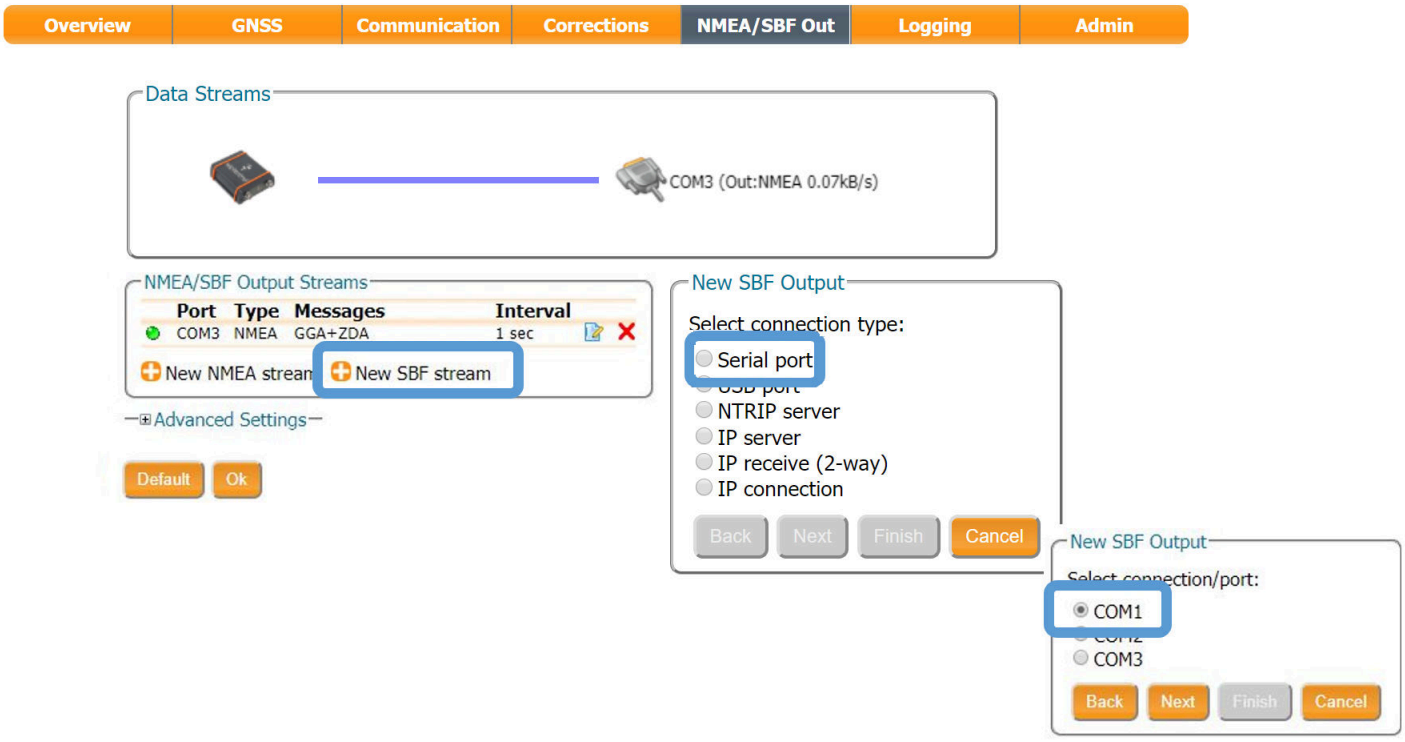

Figure 4-4: Selecting to output SBF data on COM1

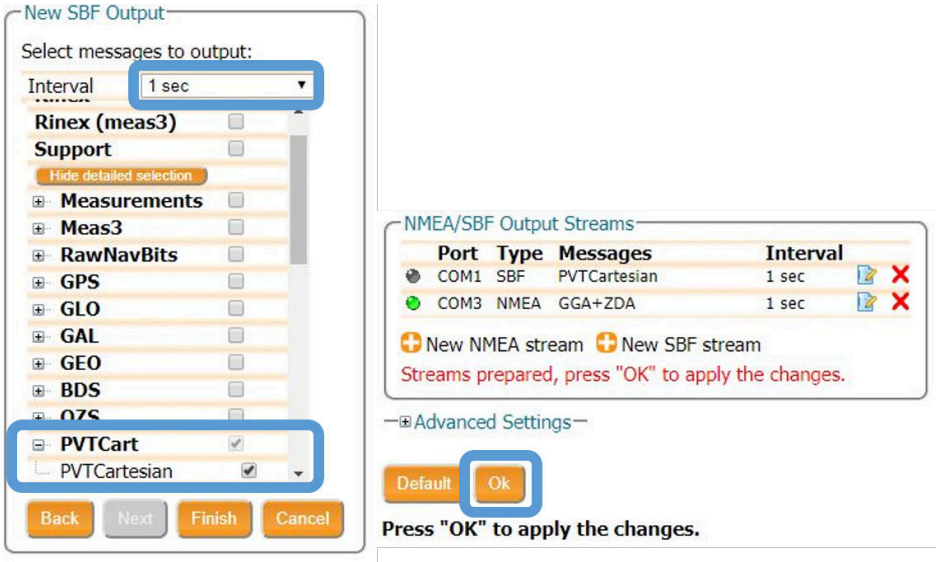

Figure 4-5: Selecting to output the PVTCartesian SBF block every second

Step 3: Verifying the configuration

Having configured the data output and clicked on **Ok**, the **NMEA/SBF Out** page will now display a summary of all data output as shown in Figure 4-6.

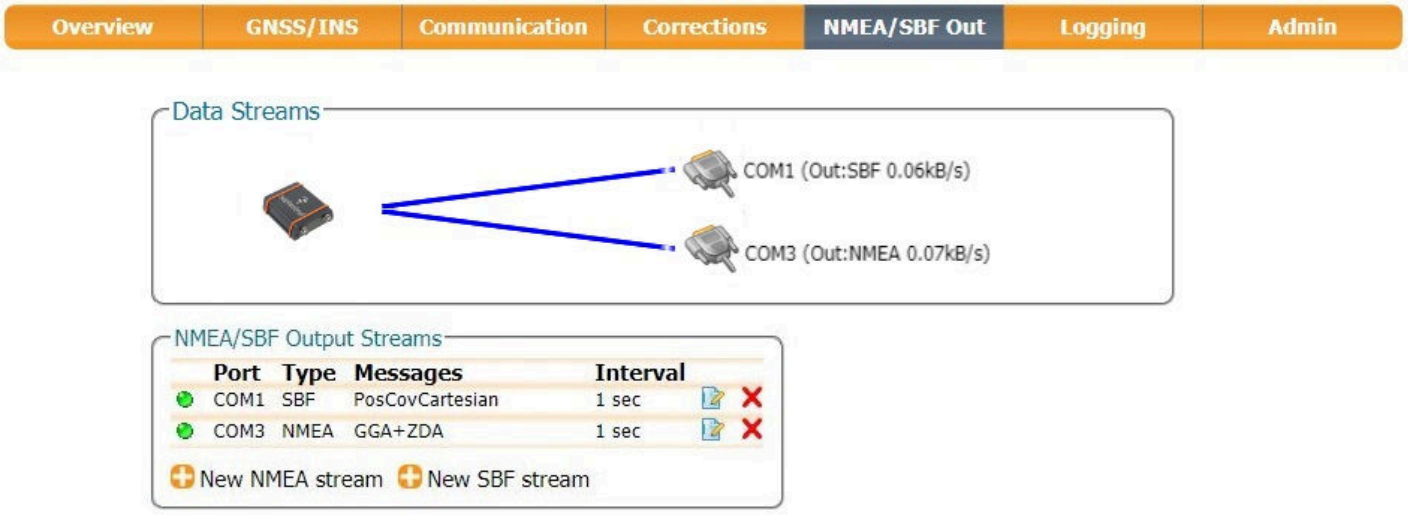

Figure 4-6: Summary of all configured data output streams

Figure 4-7 shows the actual data output. NMEA is in ASCII and is thus readable unlike SBF which is formatted in binary. In this example, the serial COM was connected to a PC via a USB adapter which maps the serial connection to a virtual COM9 of the PC.

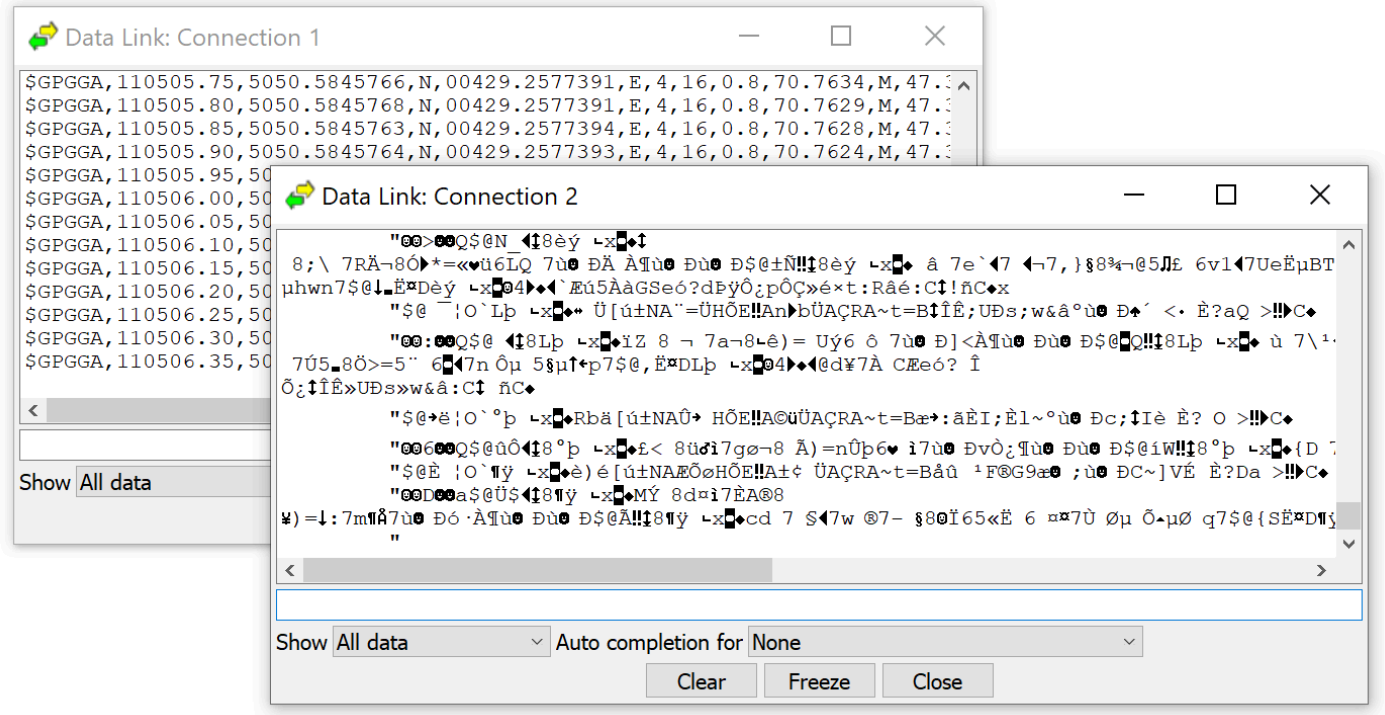

Figure 4-7: Example showing output of NMEA GGA (left panel) and SBF PVTCartesian (right panel) data

4.1.2 Output over Ethernet

SBF and NMEA data can be sent over an Ethernet connection from the AsteRx SB3 .

Step 1: Configure an IP connection on the AsteRx SB3

The Ethernet port settings can be configured by selecting **IP Ports** from the **Communication** menu. In the example shown in Figure 4-8, port 600 has been configured as connection IPS1 in **TCP2Way** mode so data can be received as well as transmitted over the connection. When choosing a port number, avoid conflicts with other applications such as the commands port (28784), the webserver port (80), the FTP port (21) as well as the default NTRIP port (2101) and the NTP port (123).

Note that a new IP port can also be configured by following the sequence of settings for NMEA output described in ***Step 2***.

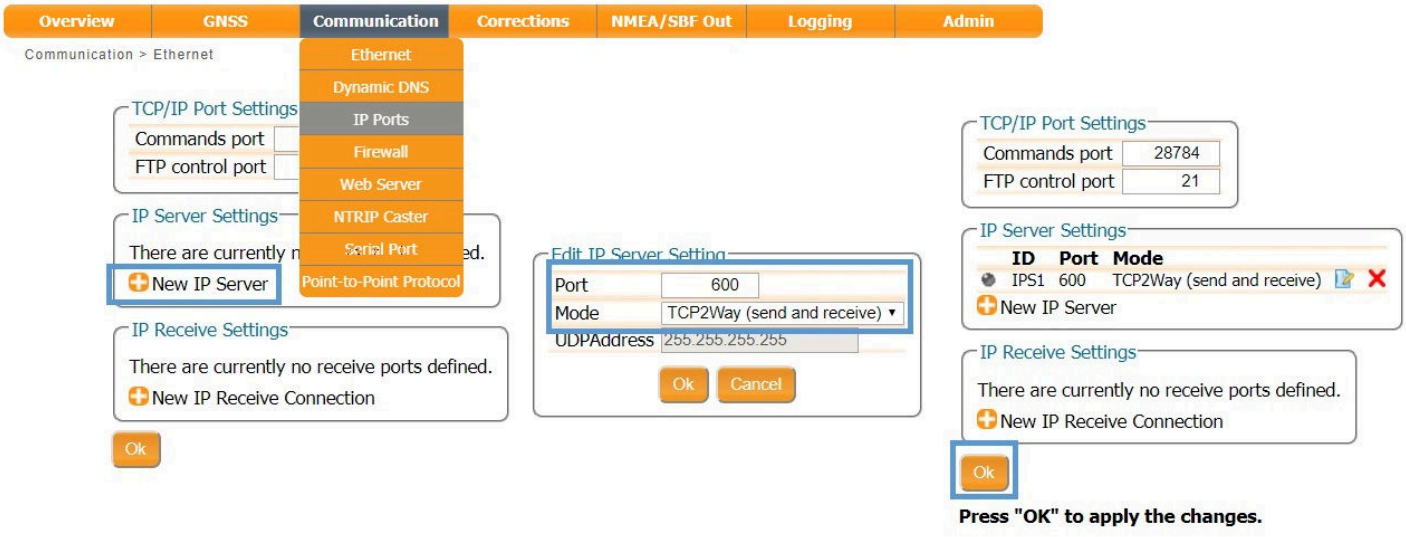

Figure 4-8: Configuring the TCP/IP server port setting for data output

Step 2: Configure output of NMEA messages

In the **NMEA/SBF Out** window, click on **New NMEA stream** and follow the sequence of windows to configure the data you want to output. In the example shown in Figure 4-9, the NMEA GGA message will be output every second. Ensure that the previously configured IPS1 port is selected for output as highlighted.

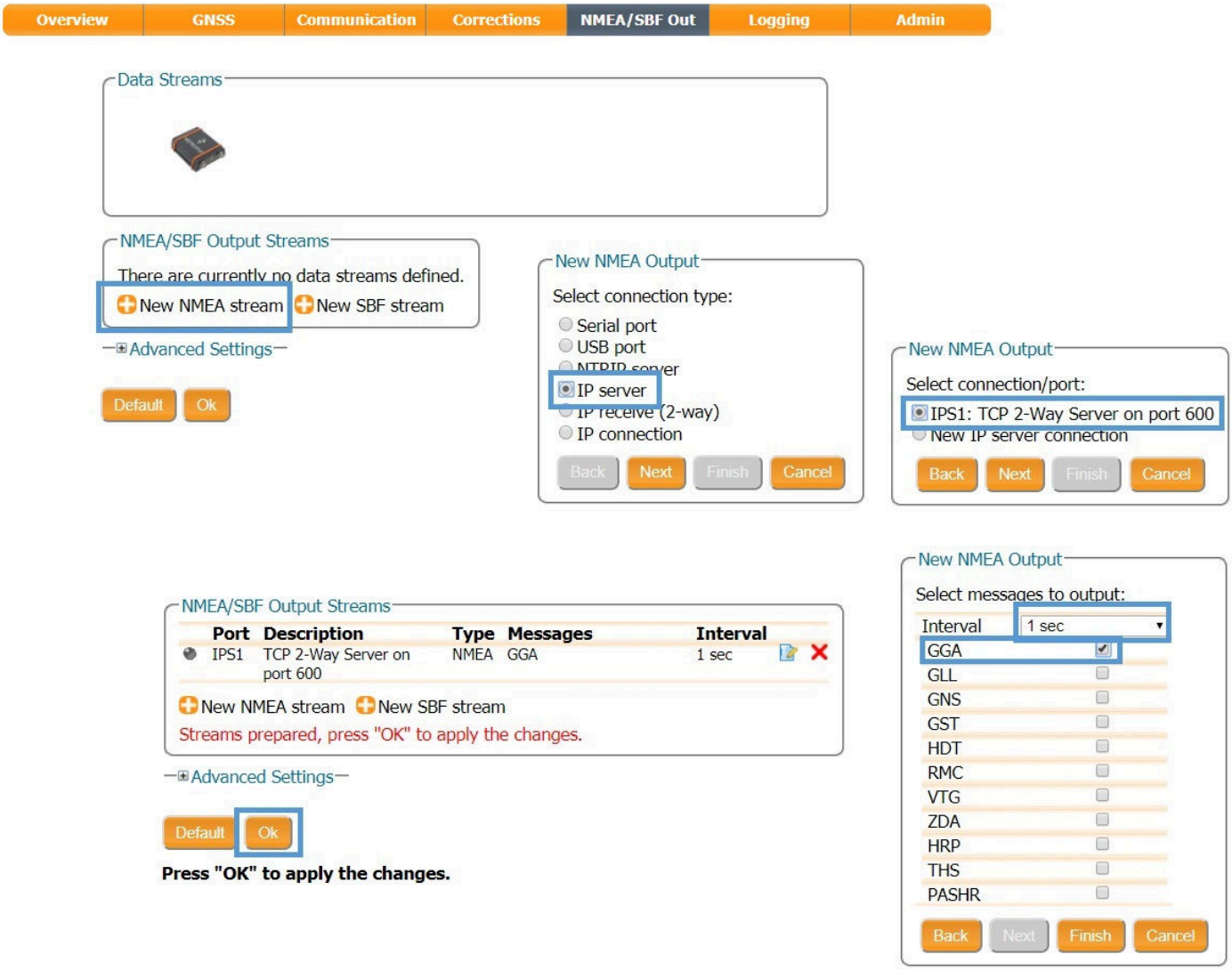

Figure 4-9: Outputting NMEA GGA over the configured IPS1 connection

Similar steps can be followed to output SBF messages.

Step 3: Configure Data Link to listen for NMEA output

The screenshots in Figure 4-10 show how the Septentrio GUI tool Data Link can be configured to listen for the AsteRx SB3 GGA output.

Click on the **TCP/IP Client** button to configure the connection. In the highlighted fields insert the IP address or hostname of the receiver and the port number configured in ***Step 1***. Click on **Connect**.

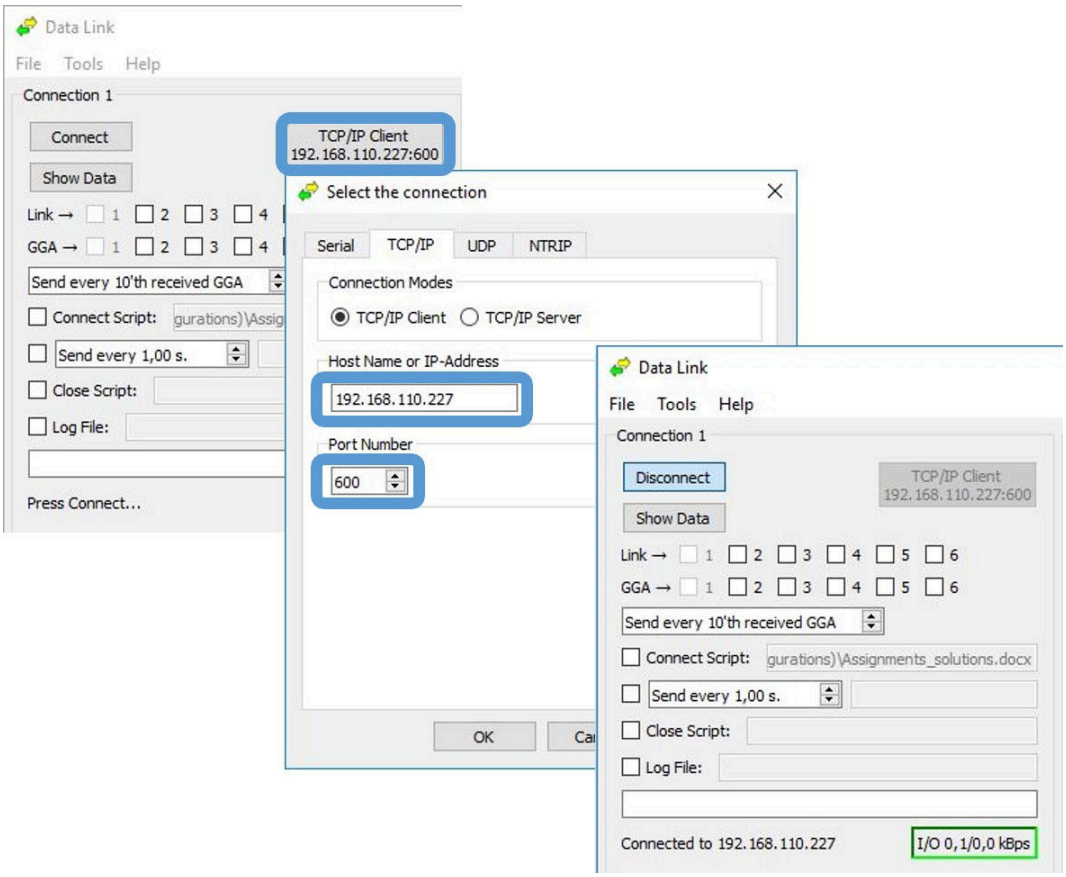

Figure 4-10: Configure the TCP/IP connection settings in Data Link

The info line at the bottom of the window should indicate that a connection has been made. Click on the **Show Data** button to display the GGA data coming from the receiver as in Figure 4-11.

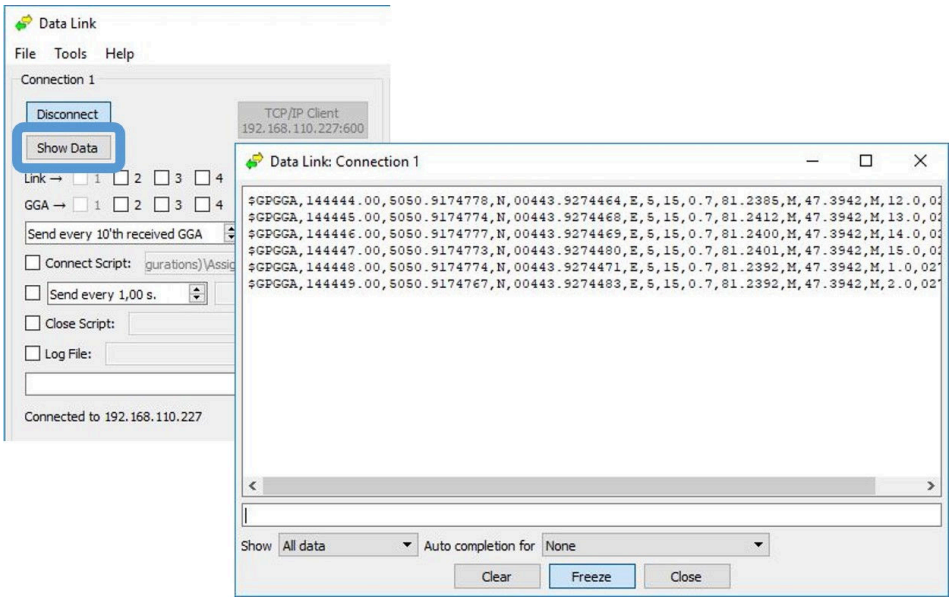

Figure 4-11: The **Show data** window of Data Link showing the NMEA GGA message coming from the AsteRx SB3

4.2 How to log data

The AsteRx SB3 has 16 GB of memory for internal data logging.
Note: this function is not available in the AsteRx SB3 Pro model.

4.2.1 Internal logging

Step 1: Defining the Disk Full action

When setting up a logging session for the first time, it is a good idea to define what you would like to happen when the internal memory is full. This can be configured in the **Advanced** tab of the main page of the **Logging** menu as shown in Figure 4-12. There are two options, either the receiver stops logging when the memory is full or it continues logging by making space for new files by deleting the oldest files. The default setting is 'Stop logging in all sessions'.

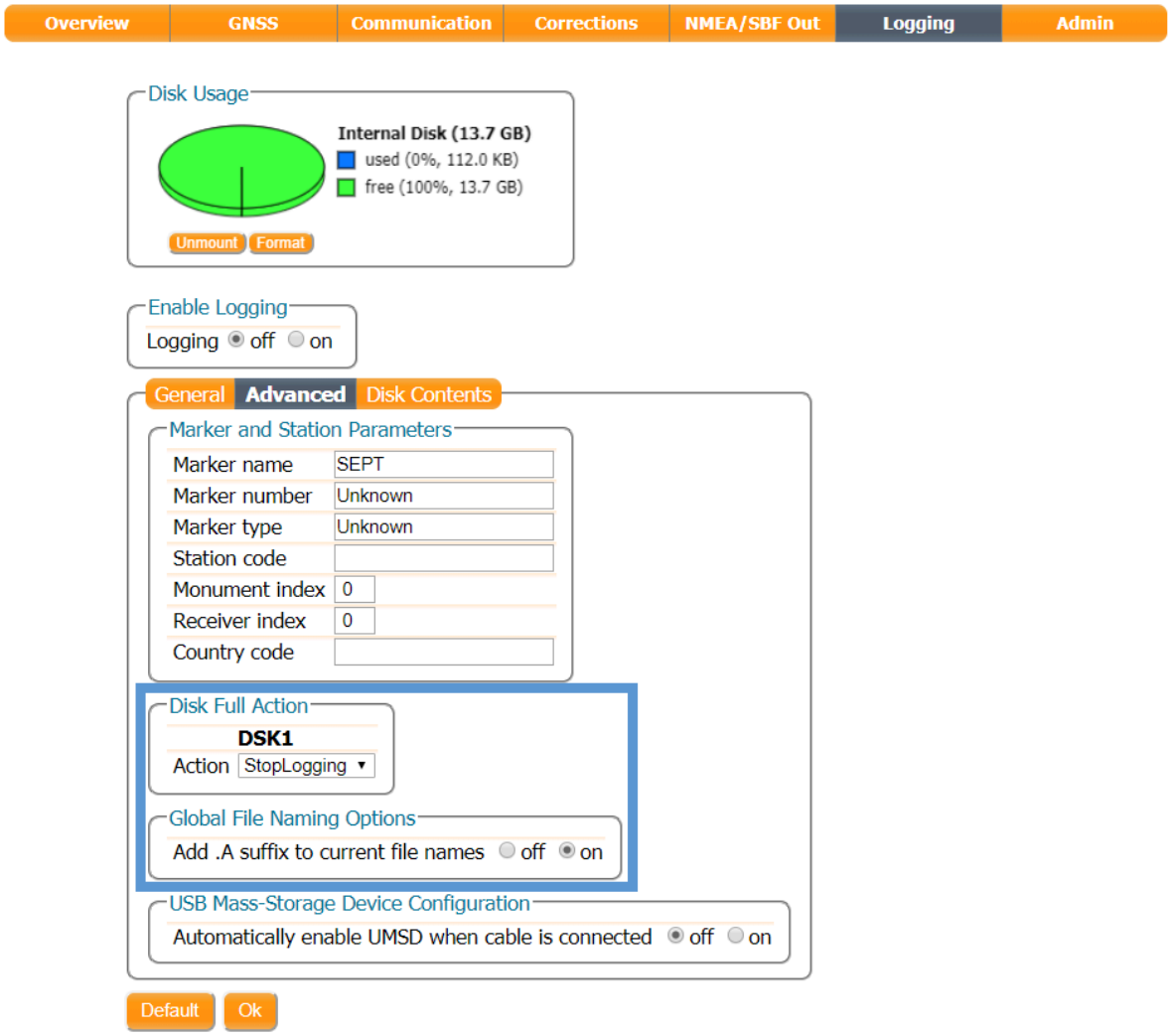

Figure 4-12: Selecting what you wish to happen when the internal 16 GB memory is full

Step 2: Configuring a logging session

To define a new logging session, press **New NMEA Stream** or **New SBF Stream** as shown in Figure 4-13.

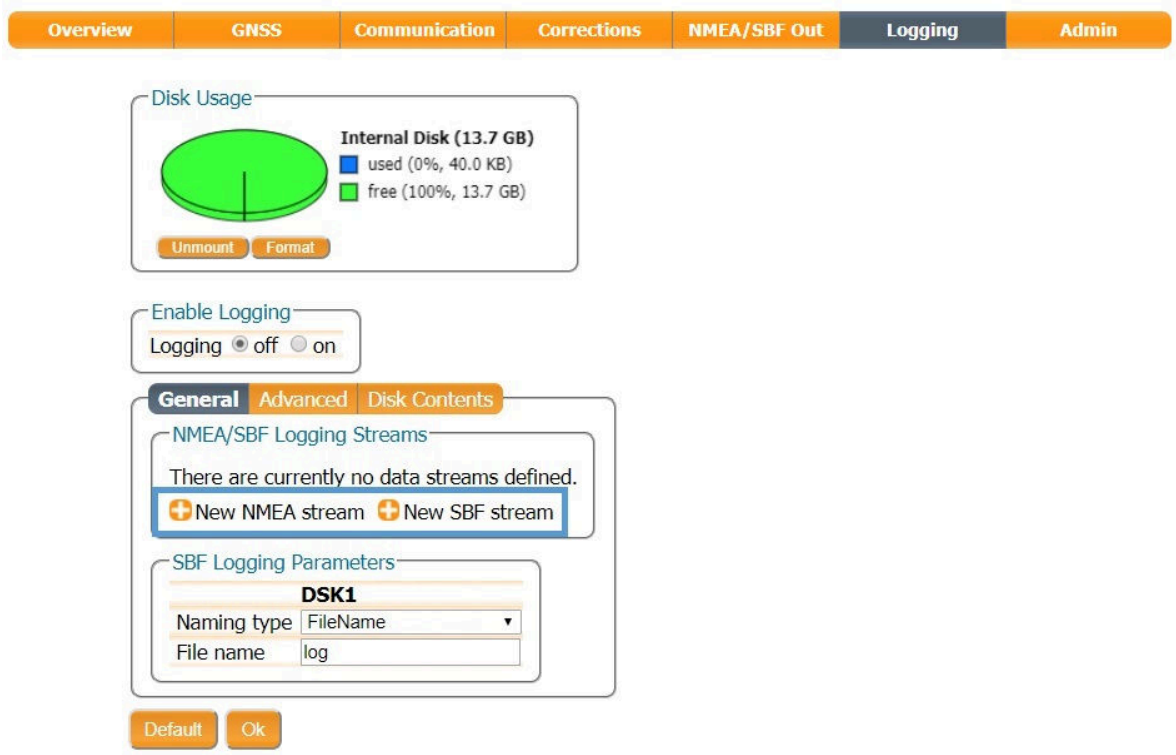

Figure 4-13: Defining a new logging session

You can then follow the sequence of steps shown in Figure 4-14, selecting the various configuration settings for the logging session. In the **Edit SBF Stream** window, the messages required for RINEX generation have been selected as well as those useful for the Support department for diagnosing problems. SBF messages can also be selected individually. In the **SBF Logging Parameters** field you can select the naming convention. The **IGS** options names files according to IGS convention but files can also be freely named using either **Filename** or **Incremental** options. After you have finished configuring the log session, do not forget to enable logging and press Ok.

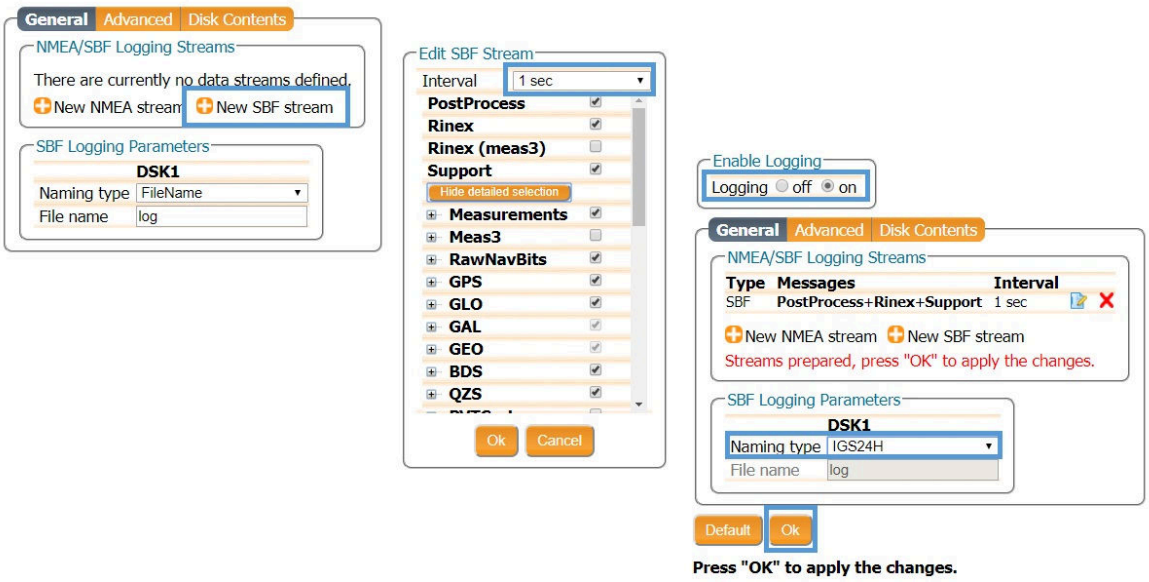

Figure 4-14: Follow the sequence of windows to fully configure the logging session

Step 3: Verifying the configuration

When you have finished configuring the logging session, the **Log Sessions** window will show a summary of the defined logging sessions as in Figure 4-15. An estimate of the daily size of data generated with the current logging configuration is also given.

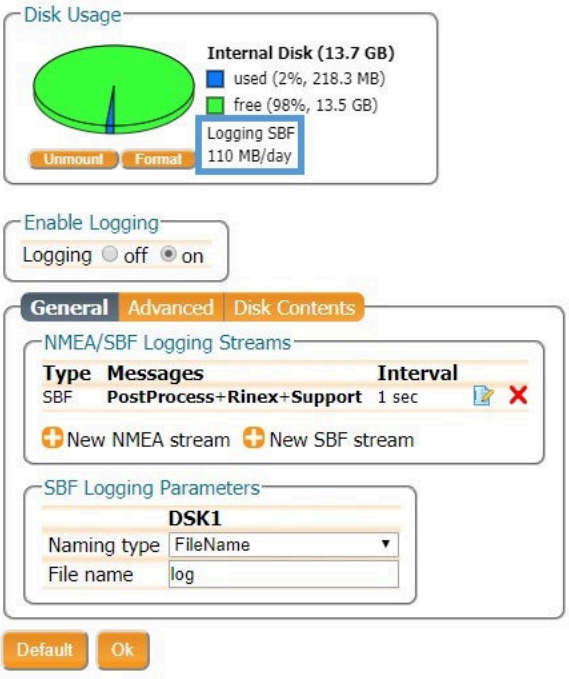

Figure 4-15: A summary of the newly defined logging sessions showing the expected amount of data generated daily

4.3 Downloading logged data from the receiver

Data files logged by the AsteRx SB3 can be downloaded using the web interface using the **Disk Contents** tab on the main page of the **Logging** menu. Individual files can be downloaded by clicking on the green download arrow next to the file name as shown in Figure 4-16. Obsolete files can be deleted by clicking the button.

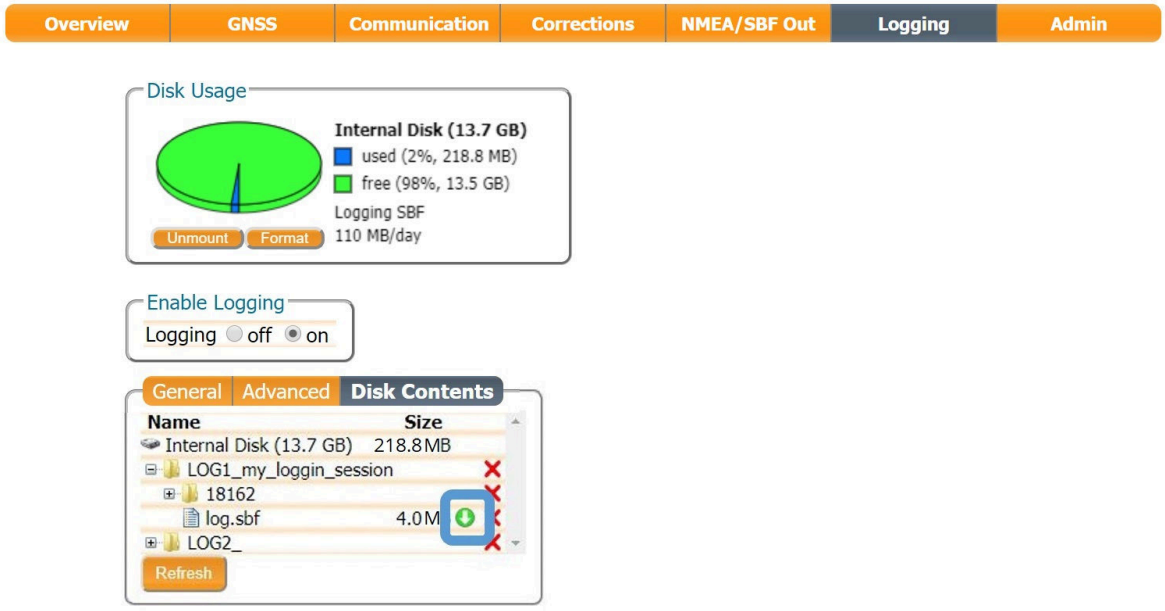

Figure 4-16: Downloading logged files

A Rear-panel port descriptions

A.1 PWR-COM2&3/USB

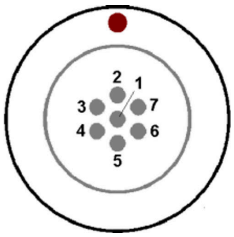

Figure A-1: Solder view of the 7-pin female PWR-COM2&3/USB socket on the rear panel of the AsteRx SB3

The 7-pin connector type is an ODU MINI-SNAP F Circular Connector Series S40F1C-P07MCD0-500S.

PIN #	Colour	COM mode	USB mode	Comment
1	Red	PWR	Not connected	5-36 VDC input (1.3A) Pink wire with Red heat-shrink tube
2	Black	GND	GND	Ground Brown wire with Black heat-shrink tube
3	Green	RxD3	USB D-	**EITHER** Serial COM3 receive line **OR** Negative USB 2.0 FS device node. Selection is done via pin 7.
4	Yellow	TxD3	Not connected	Serial COM3 transmit line
5	Grey	RxD2	USB D+	**EITHER** Serial COM2 receive line **OR** Positive USB 2.0 FS device node. Selection is done via pin 7.
6	White	TxD2	Not connected	Serial COM2 transmit line
7	Blue	Not connected	VBus	4.4-5.25 V input. **If present**, USB-mode is selected. **If not present**, UART Serial COM mode is selected.

A.2 COM1-GPIO

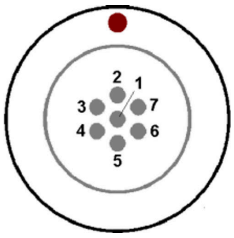

Figure A-2: Solder view of the 7-pin female COM1-GPIO socket on the rear panel of the AsteRx SB3

The 7-pin connector type is an ODU MINI-SNAP F Circular Connector Series S40F1C-P07MCD0-500S.

PIN #	Colour	Name	Comment
1	Pink	EVENTA	First EVENT input (Max. V_{IL} = 1V, Min. V_{IH} = 2V, Max. V_{IH} = 24V, Internal delay to detection < 1 μs, 15 KΩ pull-down)
2	Black	GND	Ground Brown wire with Black heat-shrink tube
3	Green	COM1 CTS/ EVENTB	COM1 Clear to Send. This also connects to the second event EVENTB input. It has the same electrical specifications as EVENTA (see pin 1).
4	Yellow	COM1 RTS/ PPS_OUT	COM1 Request To Send or PPS_OUT (PPS_OUT low = 0V, PPS_OUT high = 5V). PPS_OUT polarity is consistent with command line reference of OEM module.
5	Grey	RxD1	Serial COM1 receive line
6	White	TxD1	Serial COM1 transmit line
7	Red	5V OUT	5V +/- 5%, 300 mA DC output Blue wire with Red heat-shrink tube

A.3 ETH

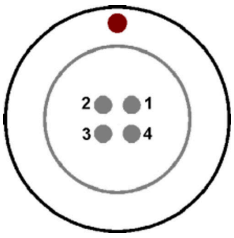

Figure A-3: Solder view of the 4-pin female ETH socket on the rear panel of the AsteRx SB3

The 4-pin connector type is an ODU MINI-SNAP F Circular Connector Series S40F1C-P04MFG0-50OO.

PIN #	Name	Description
1	TXP	Ethernet TX+
2	TXN	Ethernet TX-
3	RXP	Ethernet RX+
4	RXN	Ethernet RX-

A.4 MAIN ANT / AUX ANT (TNC)

Connect an active GNSS antenna to these connectors. The gain at the connectors (antenna gain minus cable losses) must be in the range 15 to 50dB.
Note: AsteRx SB3 ProBase model has only one antenna connector.

The receiver provides a 5V DC supply on both the MAIN and AUX connectors to feed the antennas. The maximum supported current is 150mA.

Never inject a DC voltage into the MAIN or AUX connectors as it may damage the receiver. When using a splitter to distribute the antenna signal to several receivers, make sure that no more than one output of the splitter passes DC. Use DC-blocks otherwise.