JS-X6S

Product Specification Data Sheet

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Version update instructions

revision	Modification date	Content changes and modifications	Modifier
V1.0	2022-04-27	first edition	Wang Wei
V1.1	2022-05-13	Firmware V4.9.1 upgraded to V4.12.1, supports B3I	Wang Wei
V1.2	2022-10-29	Add network functions	Wang Wei
V1.3	2023-06-19	Software V4.12.1 upgraded to V4.14.0	Wang Wei

Documentation applies to the following products:

product type	Product number	product status
Board	JS-X6S1	mass production
Board	JS-X6S2	mass production
Board	JS-X6SO1	mass production
Board	JS-X6SO2	mass production

1 Product introduction

1.1 Overview

JS-X6S is a new multi-band, multi-constellation satellite receiver with multiple data interfaces. It is suitable for drones, fully automatic robots, precision control, driverless driving, and other application fields. It can track all global satellite navigation system (GNSS) constellations, supports all current and future signals, and has unique AIM+ anti-interference Anti-spoofing mitigation technology; LOCK+ enables robust tracking during high vibration and shock; APME+ multipath mitigation to separate direct signals and signals reflected from nearby buildings; IONO+ provides advanced protection against ionospheric interference, in complex environments The effect is particularly outstanding, providing a performance benchmark for mass market GNSS positioning, and is currently being widely used in the GNSS mass market.

1.2 Product characteristics

- Use high-performance chips
- Full-view satellite tracking, multi-constellation, multi-frequency
- 448 hardware channels that can track all visible satellite signals simultaneously
- Up to 100Hz navigation update rate
- Ultra-low latency of less than 10 milliseconds
- Satellite signals can be tracked smoothly during high-frequency vibrations and rapid movements
- Supports GPS, GLONASS, BDS, Galileo, QZSS, Navic, SBAS satellites
- Integrated TCXO, LNA, and a TF card slot up to 32G
- Small size (66.6*38.5*9.9mm±0.3mm), suitable for relatively compact spaces
- Supports standard NMEA 0183, SBF, RINEX, RTCM, CMR/CMR+
- AIM+ interference monitoring and suppression
- IONO+ ionospheric scintillation suppression
- Lock+ superior tracking robustness
- APME+ multipath suppression technology
- RAIM+ receiver autonomous integrity monitoring
- Features interference indicator, interference mitigation and spectrum measurement capabilities
- Supports high-precision positioning and heading output, with an error of 0.2 degrees
- Support GNSS navigation

• Support OSNMA

• Support network functions

1.3 Performance indicators

Parameter	Elaborate
Satellites (Mosaic-x5 single antenna)	■GPS: L1C/A, L1C, L1PY, L2C, L2P, L5 ■BDS: B1I, B1C, B2a, B2I, B2b,B3I ■GLONASS:L1CA, L2CA, L2P, L3 CDMA ■Navic:L5 ■Galileo:E1, E5a, E5b, E5 AltBoc,E6 ■QZSS:L1C/A, L1C/B, L2C, L5 ■SBAS:EGNOS, WAAS, GAGAN, MSAS, SDCM (L1, L5)
Satellites (Mosaic-H dual antenna)[1]	■GPS: L1C/A, L2P(Y), L2C ■BDS: B1, B2I, B3I ■GLONASS:L1C/A, L2C/A ■Galileo:E1, E5b ■QZSS:L1C/A, L1C/B, L2C ■SBAS:EGNOS, WAAS, GAGAN, MSAS, SDCM (L1)
Tracking performance (C/N0 threshold)	Tracking and navigation sensitivity 20 dB-Hz Capture sensitivity 33 dB-Hz
Positioning time[2]	Cold start < 45s Warm start < 20s Recapture 1s
RTK status[3]	Horizontal position accuracy 0.6cm+0.5ppm4 Height accuracy 1cm+1ppm4 Initialization time 7s
Other positioning status[3]	Horizontal vertical Standalone 1.2m 1.9m SBAS 0.6m 0.8m DGNSS 0.4m 0.7m
Timing accuracy	xPPS output 5ns Event accuracy <20ns
Delay	99% <10ms
Speed accuracy	0.03m/s
Directional accuracy (dual antenna)	Heading Pitch/Roll 1m antenna spacing 0.15° 0.25° 5m antenna spacing 0.03° 0.05°
limitation factor	Power limit ≤ 4 g Height limit 18000m Speed limit 515m/s
Baud rate	115200- 4M bps (default 115200bps)

Data update frequency	Positioning 100 Hz Observed value 100Hz Positioning and directional (dual antenna) Standalone, SBAS, DGPS 50Hz RTK 20Hz

1.4 Protocol Description

Protocol	Type
NMEA 0183 v2.3,v3.03,v4.0	Input/output, ASCII
Septentrio Binary Format(SBF)	Input/output
RTCM v2.x, v3.x (including MSM)	Input/output
RINEX v2.x,v3.x	Logging
CMR v2.0	Input/output
CMR+	Input

1.5 antenna

project	parameter	
Antenna preamplification range	Mosaic-x5 single antenna 15-50dB	Mosaic-H dual antenna 15-35dB
Antenna bias voltage	3.0-5.5V (built-in current limit: 150mA)	

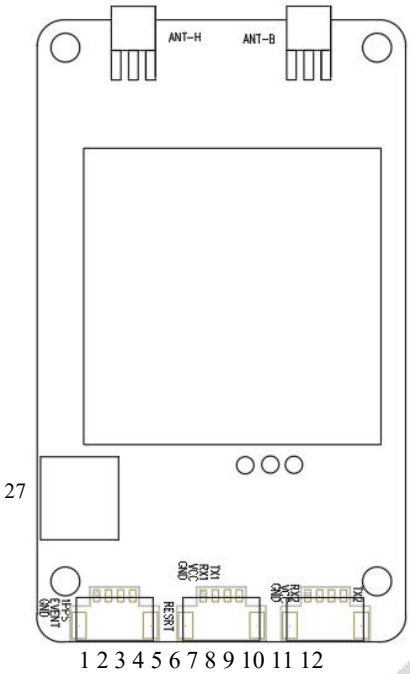
JS-X6S will come in two types, a single-antenna version (X6S1) and a dual-antenna version (X6S2). When using a single antenna, only connect ANT-B. When using dual antennas, you need to connect ANT-B and ANT-H. It supports dual antenna directional function.

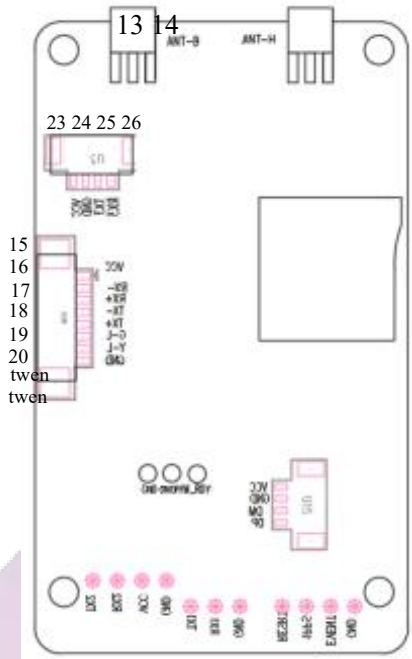
1.6 Product Application

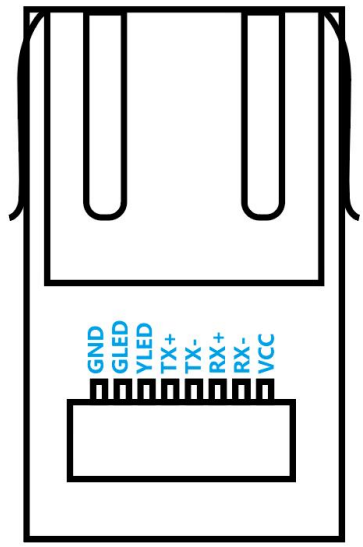
- Drone applications • Mapping and surveying
- Intelligent logistics dispatch
- Smart robot
- Geometry
- Precision agriculture and positioning services
- Geological hazard monitoring
- Heading output (X6S2 only)
- Vehicle equipment applications
- Precise control

2 pin definition

2.1 Pin assignment







Network

SN.	Name	Input Output	Description
1	GND	-	Ground
2	EVENT	Input	Triggered by external events
3	1PPS	output	second pulse output
4	RESET	Input	reset
5	GND	-	Ground
6	NC	-	NC
7	RX1	Input	Serial port 1 GNSS receives data
8	TX1	output	Serial port 1 GNSS sends data
9	GND	-	Ground
10	VCC	Input	GNSS power supply 4.5-12.0V (USB power supply 5V)
11	RX2	Input	Serial port 2 GNSS receiving data
12	TX2	output	Serial port 2 GNSS sends data
13	ANT-B	Input	GNSS positioning antenna interface, supply voltage is 5V
14	ANT-H	Input	GNSS directional antenna interface, supply voltage is 5V
15	VCC	Network port VCC output	3.3V
16	RX-	Input	Network port receives data RX-
17	RX+	Input	Network port receives data RX+
18	TX-	output	Network port sends data TX-

19	Tx+	output	Network port sends data TX+
20	GLED	Network port LED	Network port LED green
21	YLED	Network port LED	Network port LED yellow
22	GND	Network port GND	Ground
23	VCC	output	4G power supply 4-12V
24	GND	-	Ground
25	TX3	output	Serial port 3 GNSS sends data
26	RX3	Input	Serial port 3 GNSS receiving data
27	USB	Input Output	TYPE-C power supply + data transmission

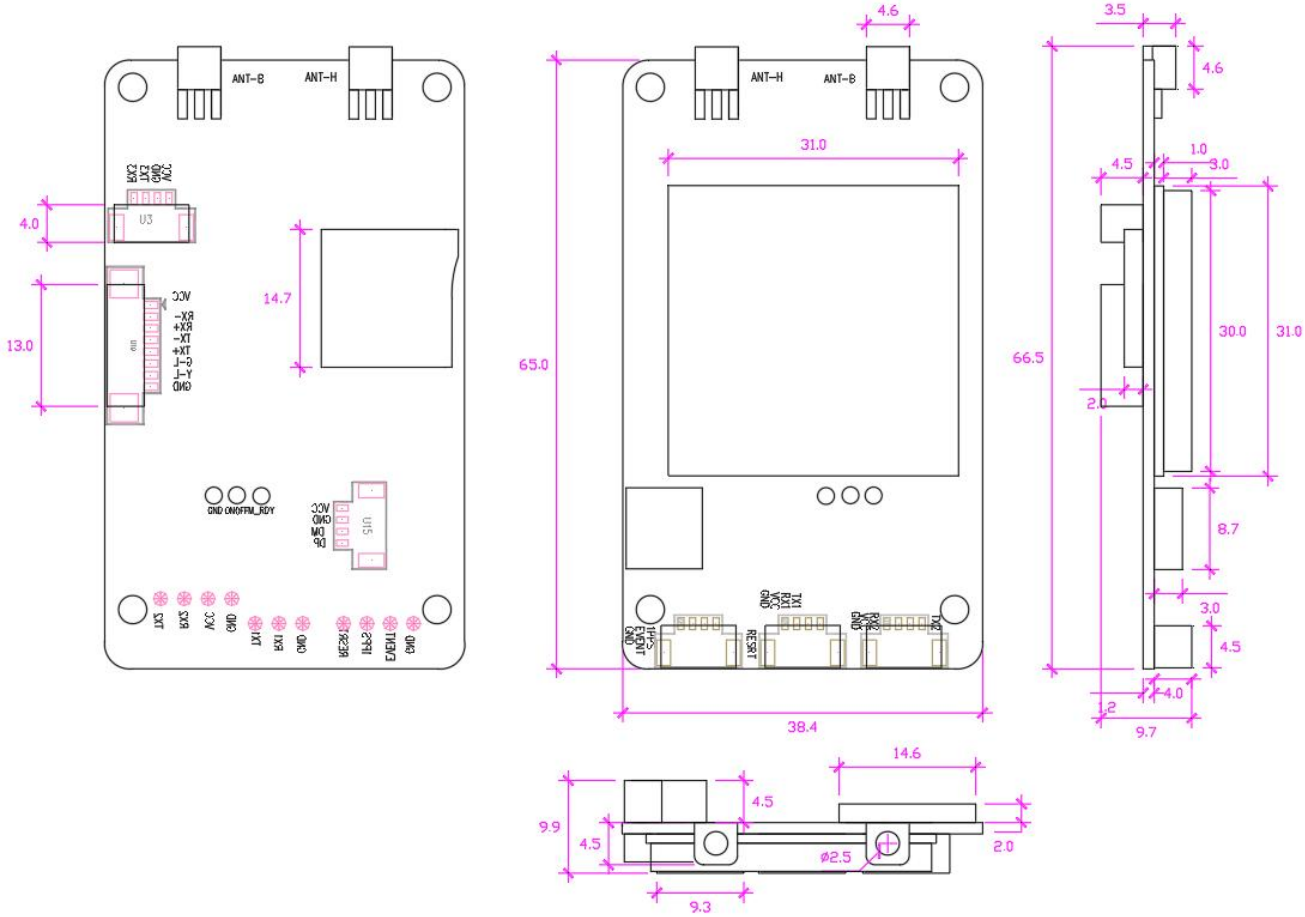
3 Electrical Characteristics

Parameter	Symbol	Minimum	Conventional	Maximum	Unit
Supply voltage range	VCC	4.5	5.0	12.0	V
Average current*	capture current	160@5.0V	185@5.0V	330@5.0V	mA
	tracking current	160@5.0V	185@5.0V	280@5.0V	mA
Antenna power supply current 1	RF_VCC	-	-	70mA@5.0V	mA
Maximum ripple at VCC port	vrpp	0	50	50	mV
	Vin	-0.5	Vcc +0.2	-	mV
Electrostatic protection	VESD(HBM)	--	2000	2000	V
Storage temperature	Txt	-55	-	85	°C
Operating temperature	Txt	-40	-	85	°C
Humidity				95	%

* Passive antenna test

[1]Maximum current value supported by a single antenna

4 Mechanical dimensions



Unit: mm. Dimensional error: ±0.3 mm.

5 Interface configuration selection

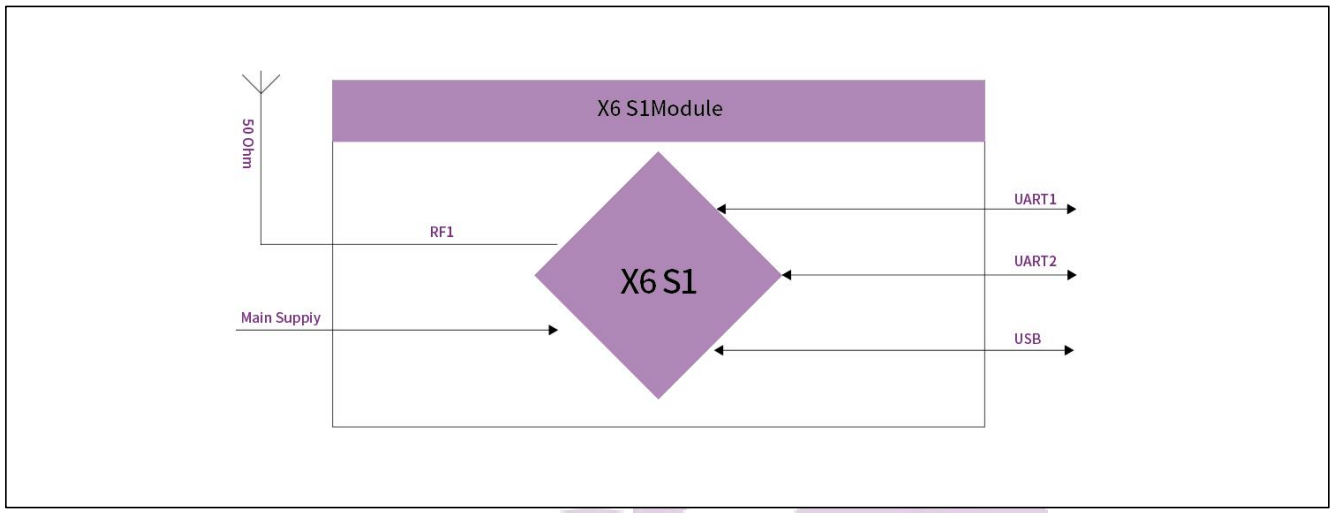
The JS-X6S module includes 2 UART ports and a USB interface, which can be used to communicate with the host. Different interfaces can be selected through the connection of different hardware interfaces. 1 PPS output time pulse and 1EVENTTriggered by external events.

You can choose according to the needs of the corresponding interface output and additional functions. There are mainly the following choices.

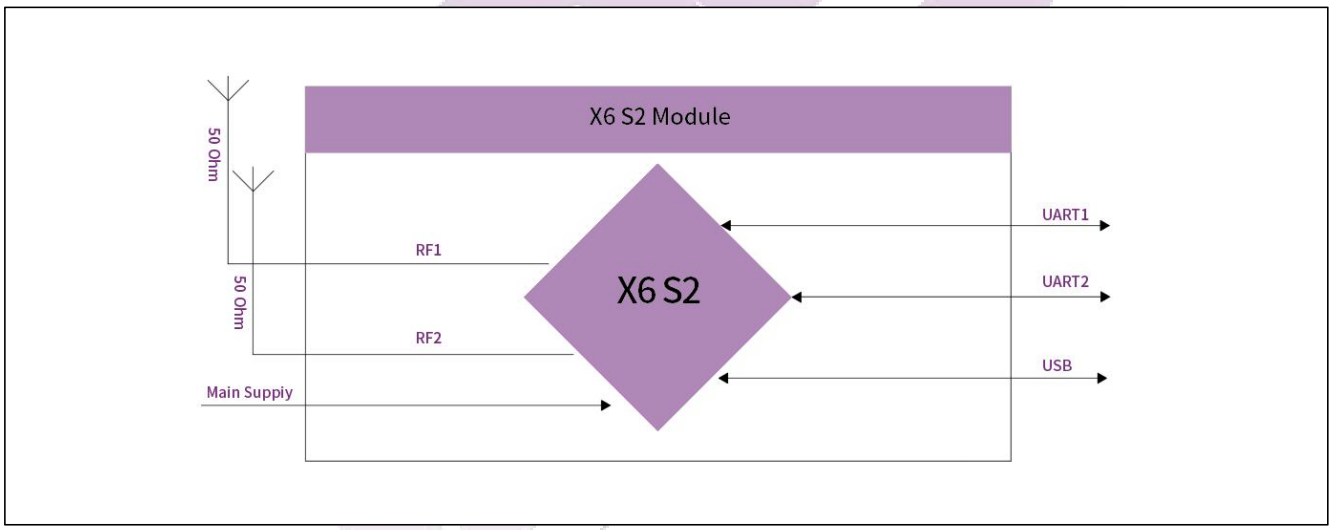
NAME	position	Orientation	network
JS-X6S1	√	NC	NC
JS-X6S2	√	√	NC
JS-X6SO1	√	NC	√
JS-X6SO2	√	√	√

Block diagram

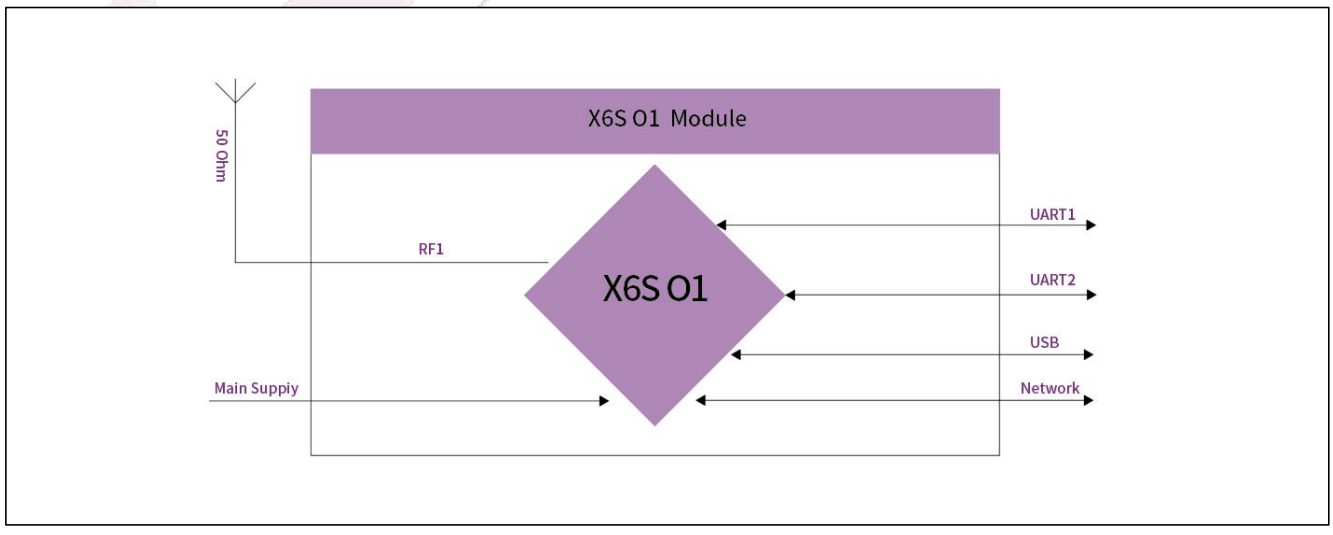
1. JS-X6S1



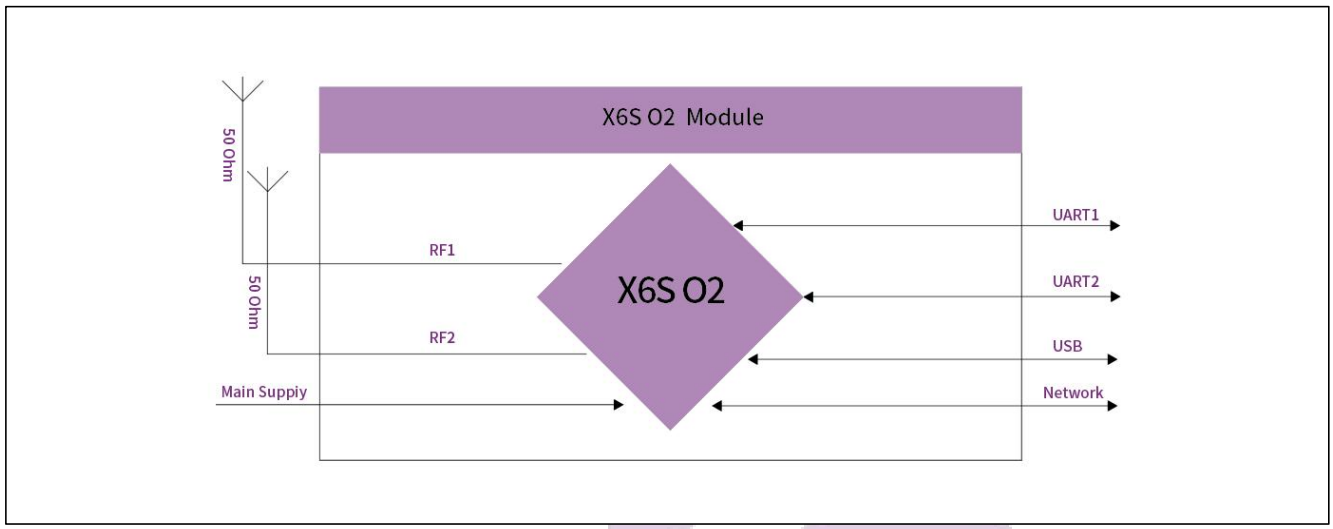
2. JS-X6S2



3. JS-X6SO1



4. JS-X6SO2



6 Basic operating instructions

6.1 Download and install RxTools software

The RxTools software installation program and user manual can be downloaded through the following link:

Septentrio official website download:

https://www.septentrio.com/en/support/software/rxtools

Install directly after downloading to avoid Chinese characters in the installation directory. After the software is installed successfully, there will be the following assembly:

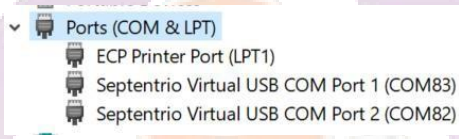
6.2 Hardware connection

1. Use after converting the MMCX connector to TNC or SMA interface, connect the satellite antenna

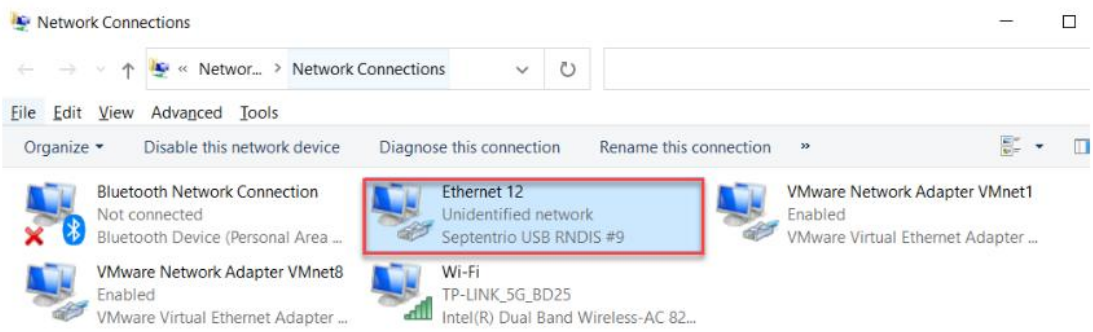
2. Connect via a serial port, you can directly use a standard serial port to USB cable to connect to the computer USB interface, and then use Septentrio PC software RxTools software or serial port assistant and other tools to communicate with the receiver. The default baud rate of the serial port is 115200.

3. Use Connect device to computer with USB cable

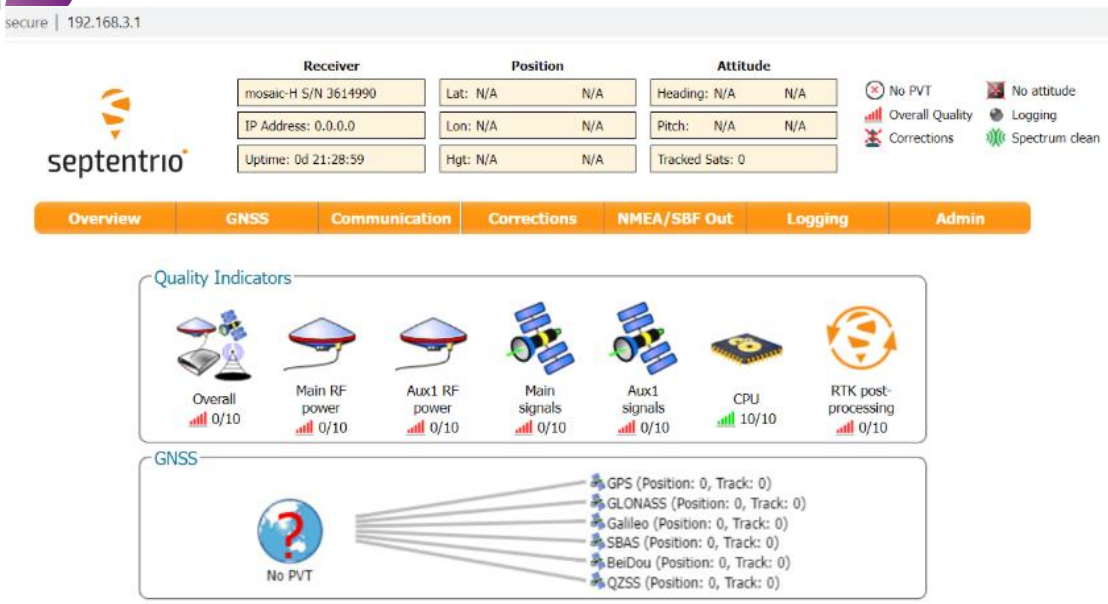
3.1 The board will be connected virtually on the computer2-way serial port, the serial port number can be viewed through the device manager interface:



3.2 At the same time, the USB connection will also virtualize a network port. Under the network connection interface, you can see the virtual network card marked with "Septentrio USB RNDIS" and the IP address is fixed 192.168.3.1.



At this time, enter 192.168.3.1 in the browser to access the receiver's web interface.



1. useRJ45 network port connection

4.1 You need to enable the Ethernet network function of the receiver first. You can choose to enable it in the following two ways:

4.1.1. By sending command: setEthernetMode, on

4.1.2. In the RxControl program, set the Power option to on in Communication/Network Settings/General/Ethernet Interface Mode

The receiver network cable is directly connected to the computer

When connecting directly to the computer through the RJ45 network port, you also need to set the receiver and computer to have static IP addresses in the same network segment (take the receiver IP: 192.168.5.2 and the gateway as 192.168.5.1 as an example). You can use:

1. Send the command setIPSettings,Static,192.168.5.2,,192.168.5.1

2. In the RxControl program, set under the Communication/Network Settings/General/TCP/IP Settings option:

(1) Mode: Static

(2) IP address: 192.168.5.2

(3) Gateway: 192.168.5.1

Set the computer's local connection to a static IP: 192.168.5.3, and the gateway to 192.168.5.1.

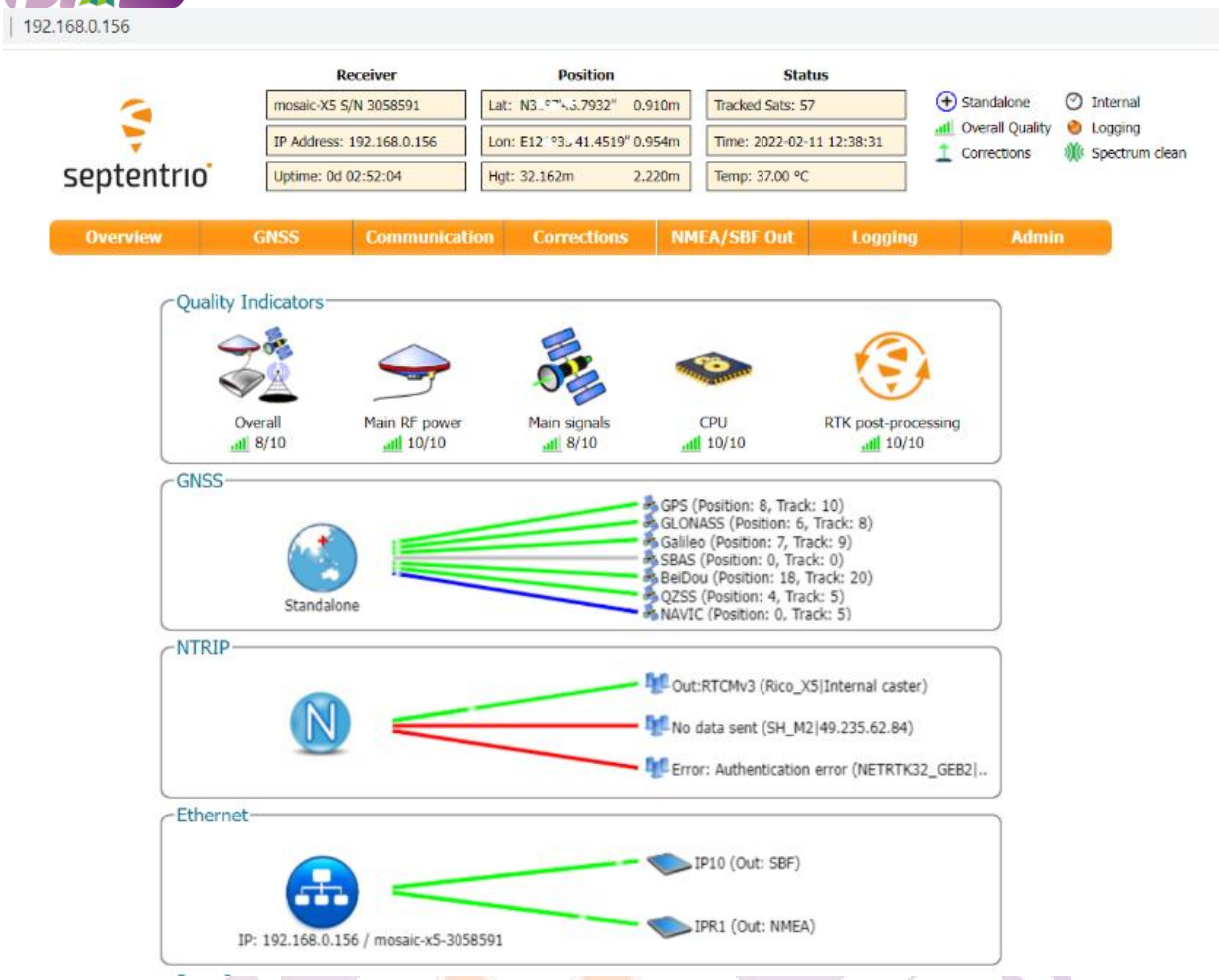
After the above steps are set, you can enter the receiver IP: 192.168.5.2 through the browser to access the receiver web interface.

Connect the receiver network cable to the router

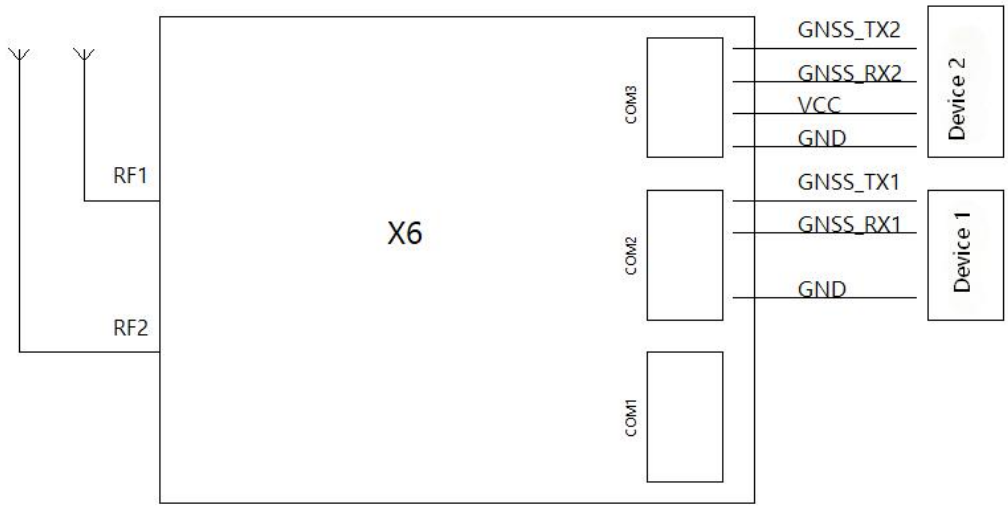
When connected to a switch or router through the RJ45 network port, you only need to set the receiver to DHCP mode through the command setIPSettings, DHCP. The router dynamically assigns an IP address to the receiver. You can query the receiver through the command: lif, ipparameters. The assigned IP address is as shown in the figure below. 192.168.0.156 is the current IP address of the receiver.

```
< lif,ipparameters
 > $R; lif,ipparameters
 > <?xml version="1.0" encoding="ISO-8859-1" ?>
 > <ipparameters>
 >     <interface name="eth0"  type="Ethernet" hostname="mosaic-x5-3058591">
 >         <hardware addr="8C:1C:DA:50:6C:C1"/>
 >         <inet addr="192.168.0.156" mask="255.255.255.0" gateway="192.168.0.1" mode="dhcp"/>
 >     </interface>
 >     <resolv>
 >         <nameserver addr="192.168.0.1"/>
 >     </resolv>
 > </ipparameters>
```

Using a computer connected to the same router or switch, you can now access the receiver's web interface using 192.168.0.156:



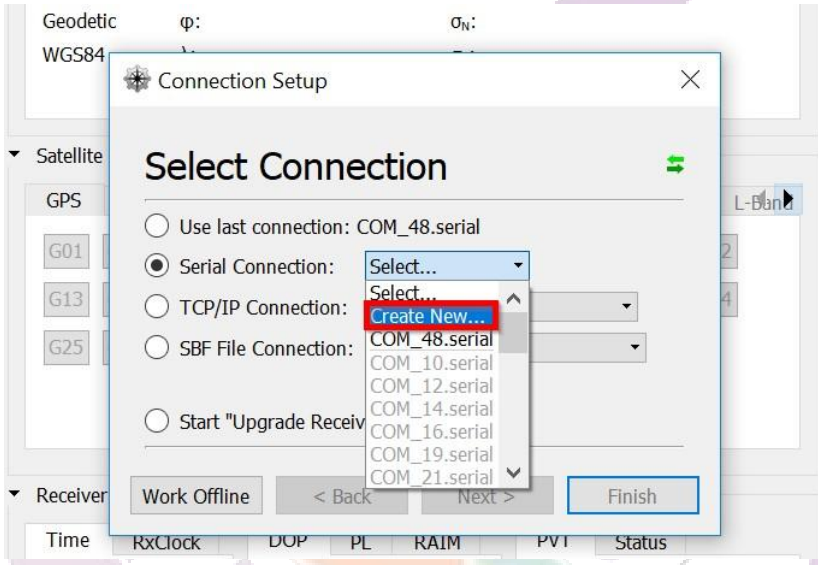
Note: ① When the device is directly connected to the computer, the X6S1 single antenna can be powered via USB connection and does not require an external power supply. The X6S2 dual antenna uses USB to connect the power supply device to a power supply of not less than 400mA before it can be started.



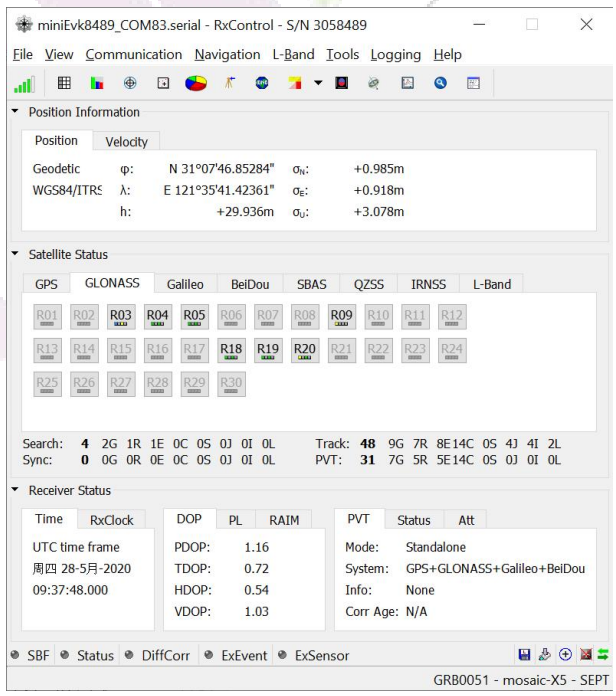
6.3 RxControl software connection board

1.StartRxControl software, the Connection Setup dialog box will pop up, select Serial Connection/Create New...

1.1 To connect for the first time, you need to create a new one; to connect again, just select the created serial port connection.



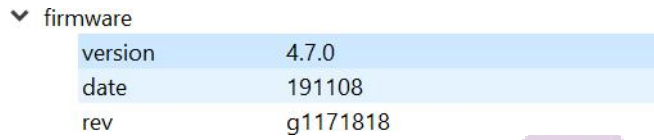
2. After the connection is successful, you can seeThe interface of RxControl is as follows:



6.4 Check firmware and upgrade

1. Confirm the board firmware version

1.1 PassedRxControl software Help/Receiver Identification View firmware version



1.2The current latest firmware version of mosaic is 4.14.4 (June 2023). You can also download the latest firmware through the following link:

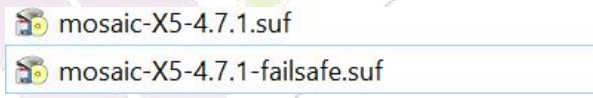
https://www.septentrio.com/en/products/gps/gnss-receiver-modules

2. Firmware upgrade

If it is found in the previous step that the firmware is not the latest version, perform the following steps to upgrade the firmware, taking version 4.7.1 as an example:

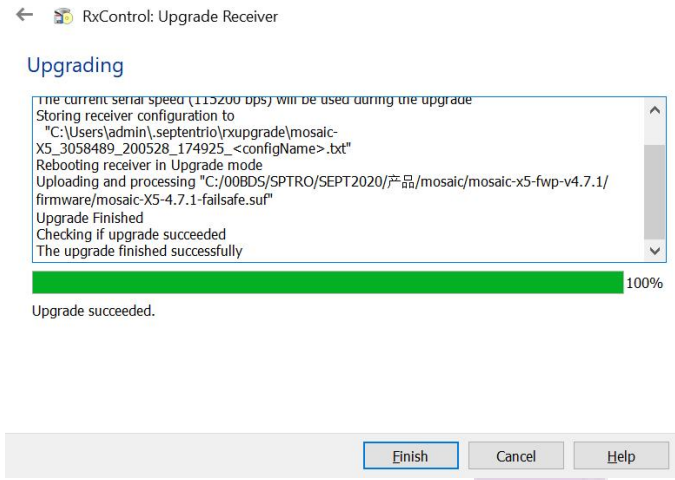
2.1 RxControl software File/Upgrade Receiver using Current Connection...

2.2 Select the latest firmware file, there2 firmware files, first upgrade the failsafe.suf firmware



file, and then upgrade the 4.7.1.suf firmware file

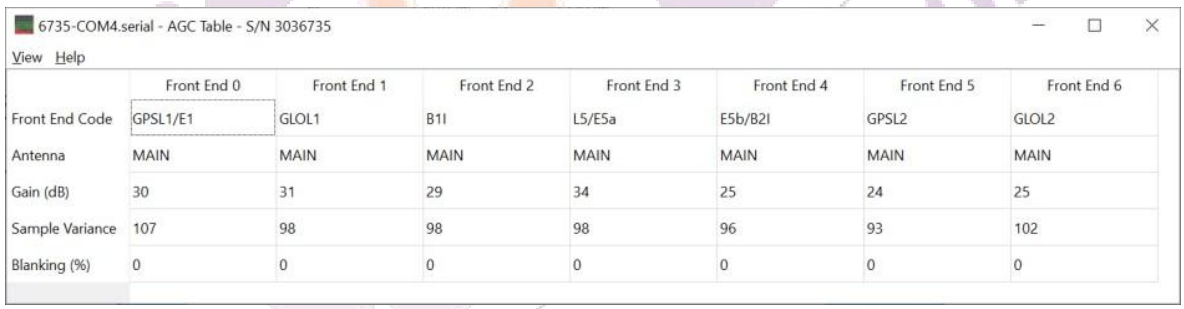
2.3 Upgrade successful



2.4 RxControl reconnects and confirms that the firmware version information has been updated through Help/Receiver Identification

6.5 Check board status

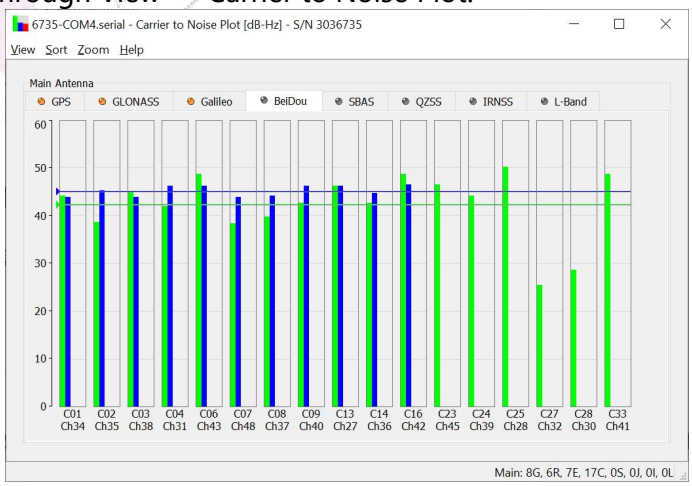
The antenna gain that the board can work normally is between 15-50dB. If the gain is too high, it means the antenna connection is poor or the cable loss is too large. The antenna gain value can be determined through RxControl->View->AGC Table.



	Front End 0	Front End 1	Front End 2	Front End 3	Front End 4	Front End 5	Front End 6
Front End Code	GPSL1/E1	GLOL1	B1I	L5/E5a	E5b/B2I	GPSL2	GLOL2
Antenna	MAIN	MAIN	MAIN	MAIN	MAIN	MAIN	MAIN
Gain (dB)	30	31	29	34	25	24	25
Sample Variance	107	98	98	98	96	93	102
Blanking (%)	0	0	0	0	0	0	0

6.6 Check the satellite reception and signal-to-noise ratio

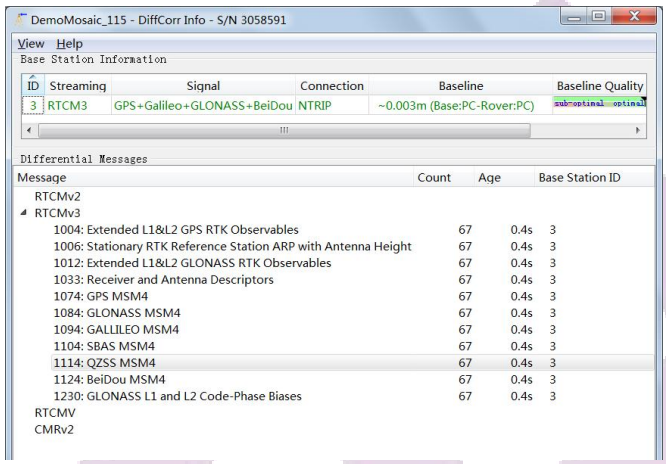
Please refer to the star search statusRxControl main interface Satellite Status, the signal-to-noise ratio can be viewed through View -> Carrier to Noise Plot.



6.7 View differential data

Enter the following interface through RxControl software View/DiffCorr Info View, and you can see the differential source signal system, baseline length, and RTCMv2 or RTCMv3 data.

6.8 Check the board positioning and orientation status



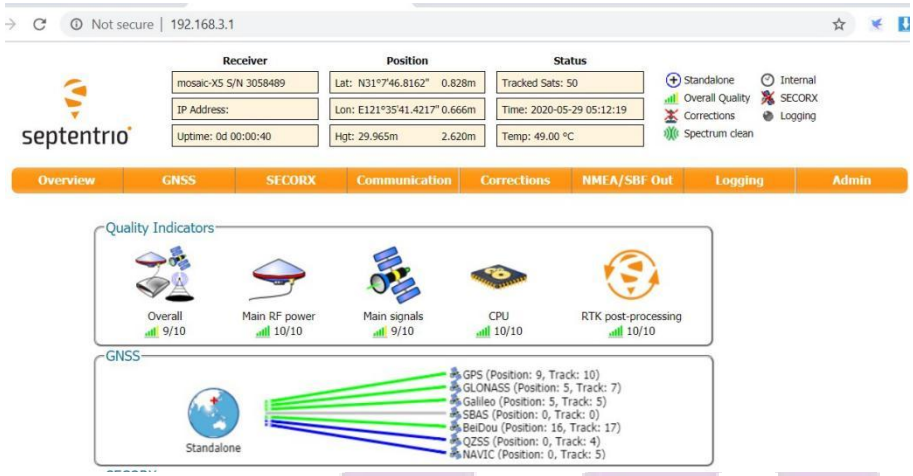
The positioning status can be viewed on the RxControl main interface. The Position Information contains the antenna position information. The PVT column in the lower right corner displays the positioning status of the board and each satellite system used for positioning.

6.9 RxControl command line window

Enter the command through the RxControl software and the Tools/Expert Console/GRB0051 window. The window will automatically prompt the command prompt information when inputting. You can also enter help to return all supported commands.

6.10 Web interface

Connect via USB. There will be a virtual network port on the computer. The IP address is fixed



192.168.3.1. Use a browser to open it. The interface is as follows:

Receiver settings can be made through the Admin/Expert Control/Control Panel.

7 Set up tracking and frequency points

7.1 Tracking satellites

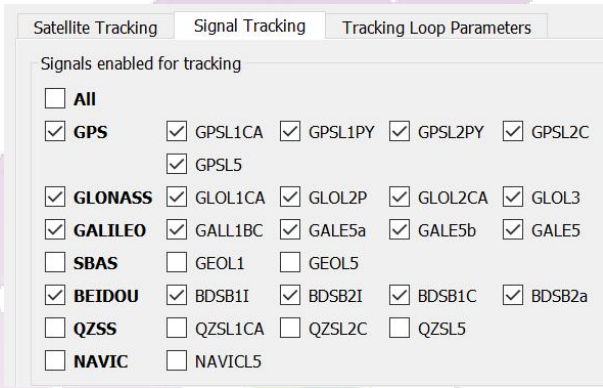
1. Set up tracking satellites,RxControl software Navigation/Advanced User Setting/Tracking/Satellites Tracking, all check GPS+Glonass+Galileo+Beidou

Command line: sst,GPS+Glonass+Galileo+Beidou

7.2 Tracking frequency points

1. Set the tracking frequency point,RxControl SoftwareNavigation/Advanced User Setting/Tracking/Signal

Tracking, check all GPS+Glonass+Galileo+Beidou all frequencies



Command line: snt,GPS+Glonass+Galileo+Beidou

7.3 PVT solution satellite

1. Set up the solution satellite,RxControl software Navigation/Advanced User Setting /PVT/Satellites Usage, check all GPS+Glonass+Galileo+Beidou

Command line: ssu,GPS+Glonass+Galileo+Beidou

7.4 PVT solution frequency point

1. Set the solution frequency point,RxControl software Navigation/Advanced User Setting/PVT/Signal Usage, check all GPS+Glonass+Galileo+Beidou all frequencies

Command line: snu,all,all

8 Performance optimization settings

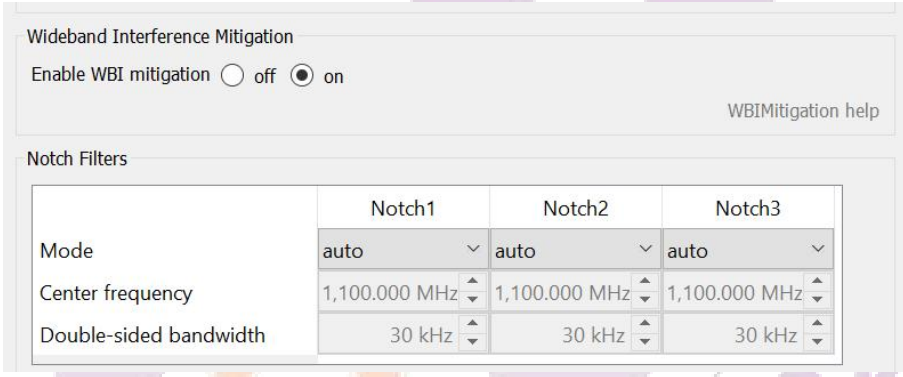
8.1 Anti-interference

Turn on the anti-interference function option through the following steps:

RxControl/Navigation/Advanced User Setting/Frontend and Interference Mitigation:

Wideband Interference Mitigation/Enable WBI mitigation: ON

Notch Filters: Notch 1 – Auto; Notch 2 – Auto; Notch 3 – Auto



Command Line:setWBIMitigation,on//Broadband interference suppression-Enable
setNotchFiltering,all,auto,,//Narrowband interference suppression-Enable

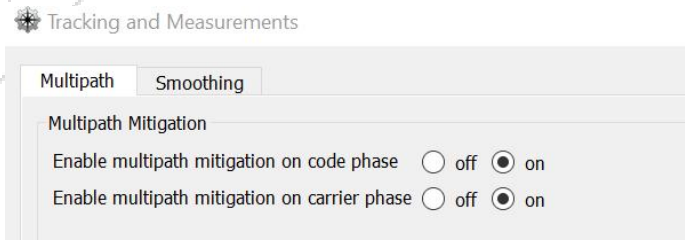
8.2 Multipath suppression

View and set multipath suppression options by following these steps:

RxControl/Navigation/Receiver Operation/Tracking and Measurements/Multipath:

Enable multipath mitigation on code phase: ON

Enable multipath mitigation on carrier phase: ON

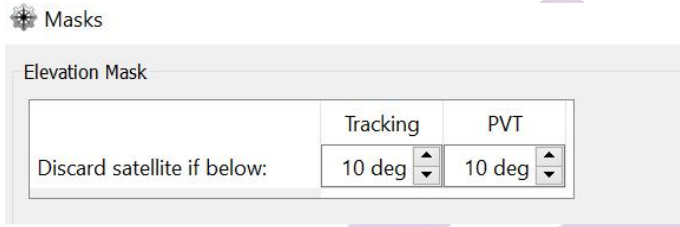


Command Line:setMultipathMitigation,on,on //multipath suppression-Enable

8.3 Cutoff altitude angle

It is recommended to set the cutoff height angle to 10°. You can view and set the cutoff height angle options through the following steps: RxControl/Navigation/Mask/Elevation Mask:

Discard satellite if below: Tracking: 10 degrees; PVT: 10 degrees;



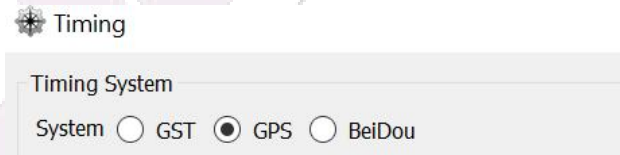
CommandLine:setElevationMask,tracking,10//Set tracking cutoff altitude angle 10°

setElevationMask,pvt,10//Set PVT cutoff altitude angle 10°

8.4 Satellite time systems

The board's default satellite time system uses GPS time. If in actual application scenarios it is found that interference with the GPS signal affects the positioning quality and the RTK Fixed state cannot be achieved, it is recommended to change the time system to Beidou satellite system time. The method is as follows:

RxControl/Navigation/Rover Operation/Timing / Timing System: Beidou

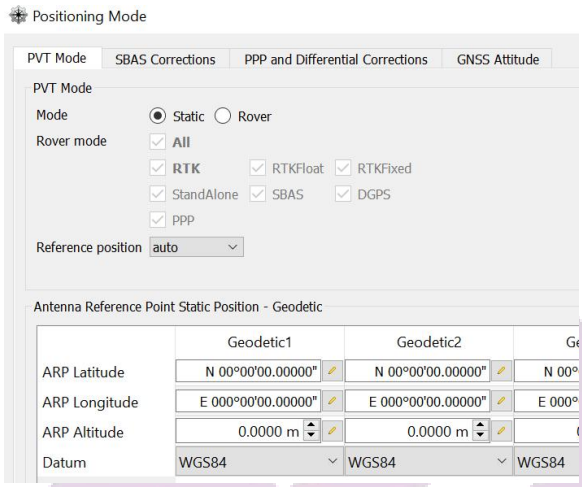


Command Line:setTimingSystem,Beidou //Set the time system to Beidou satellite system time

9 RTK mode

9.1 Base station mode

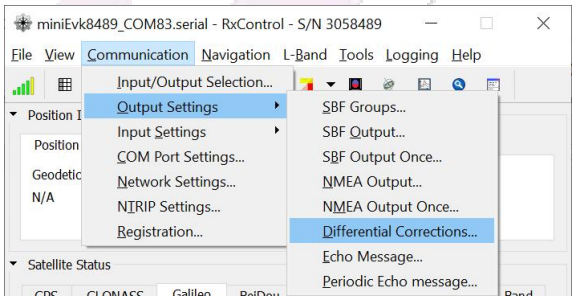
1. Configure the board asStatic mode: RxControl/Navigation/Position Mode

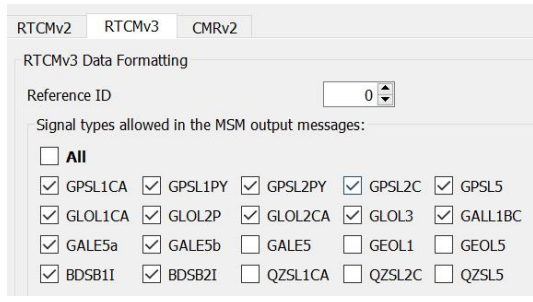


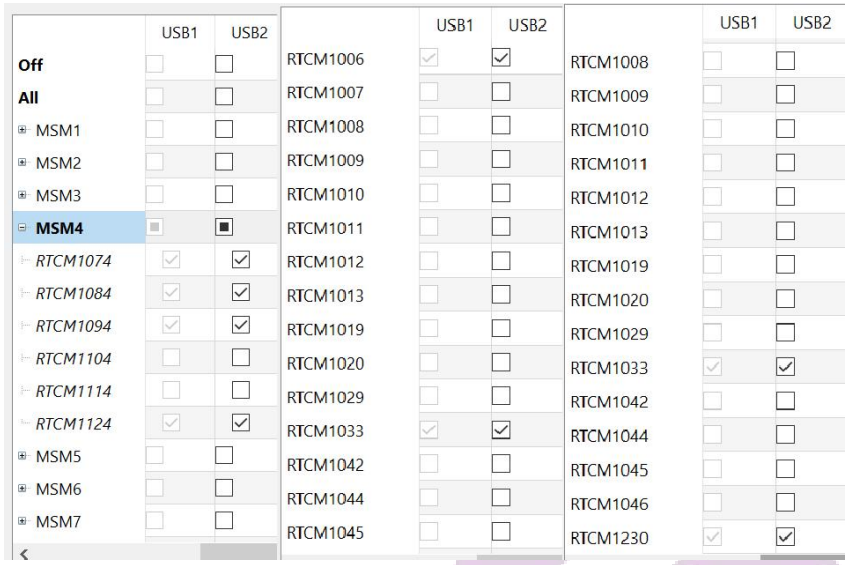
set up Reference position is Auto, or specify the latitude and longitude coordinates, for example, enter the latitude and longitude coordinates in Geodetic1, and then select Geodetic1 as Reference position.

Command Line:setpvtmode,static,,auto //Set asstaticBase station,
Command Line:
setStaticPosGeodetic,Geodetic1,11.1234,22.1234,33.123 //Set Geodetic1 latitude and longitudesetpvtmode,static,,geodetic1 //Set as base station and use the location of Geodetic1

2. setupRTCMv3 output







Follow the screenshot steps above to set RTCMv3 data output, set the satellite frequency used by RTCMv3, and output RTCMv3 data type.

Command

Line:setRTCMv3Formatting,0,GPSL1CA+GPSL1PY+GPSL2PY+GPSL2C+GPSL5+GLOL1CA+GLO

L2P+G LOL2CA+GLOL3+GALL1BC+GALE5a+GALE5b+BDSB1I+BDSB2I

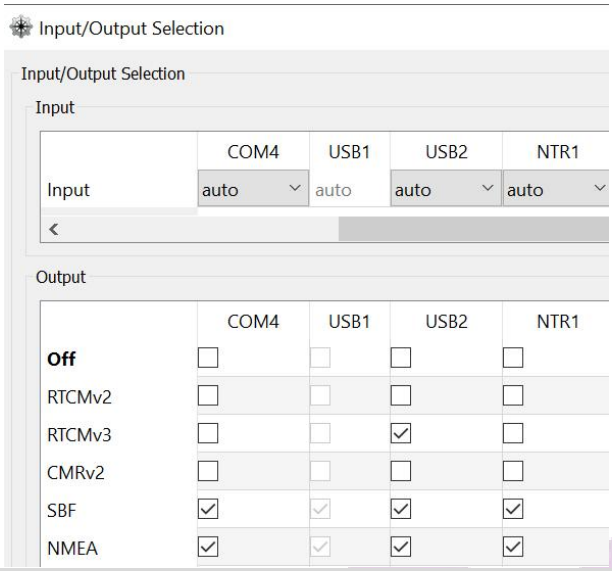
//Set the satellite frequency used by RTCMv3

outputsetRTCMv3Output,usb2,RTCM1006+RTCM1033+RTCM1074+RTCM1084+RTCM1094+

RTCM11

24+RTCM1230// setupRTCMv3 output, output through usb2 port

3. Port enable outputRTCMv3 data

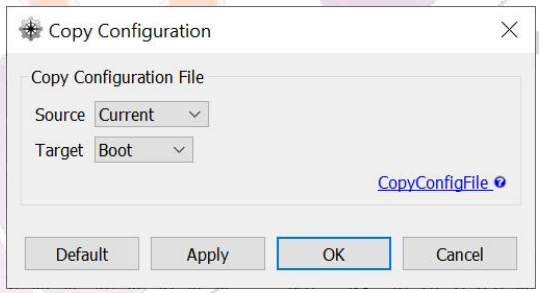


Command Line:setDataInOut,USB2,auto,RTCMv3// OpenUSB2port

4. Save Settings

Whether in RxControl, command line or web interface, after changing the settings, you need to save them so that they will not take effect until the power is turned off and restarted.

In RxControl software, you can save Current to Boot through the File/Copy Configuration interface



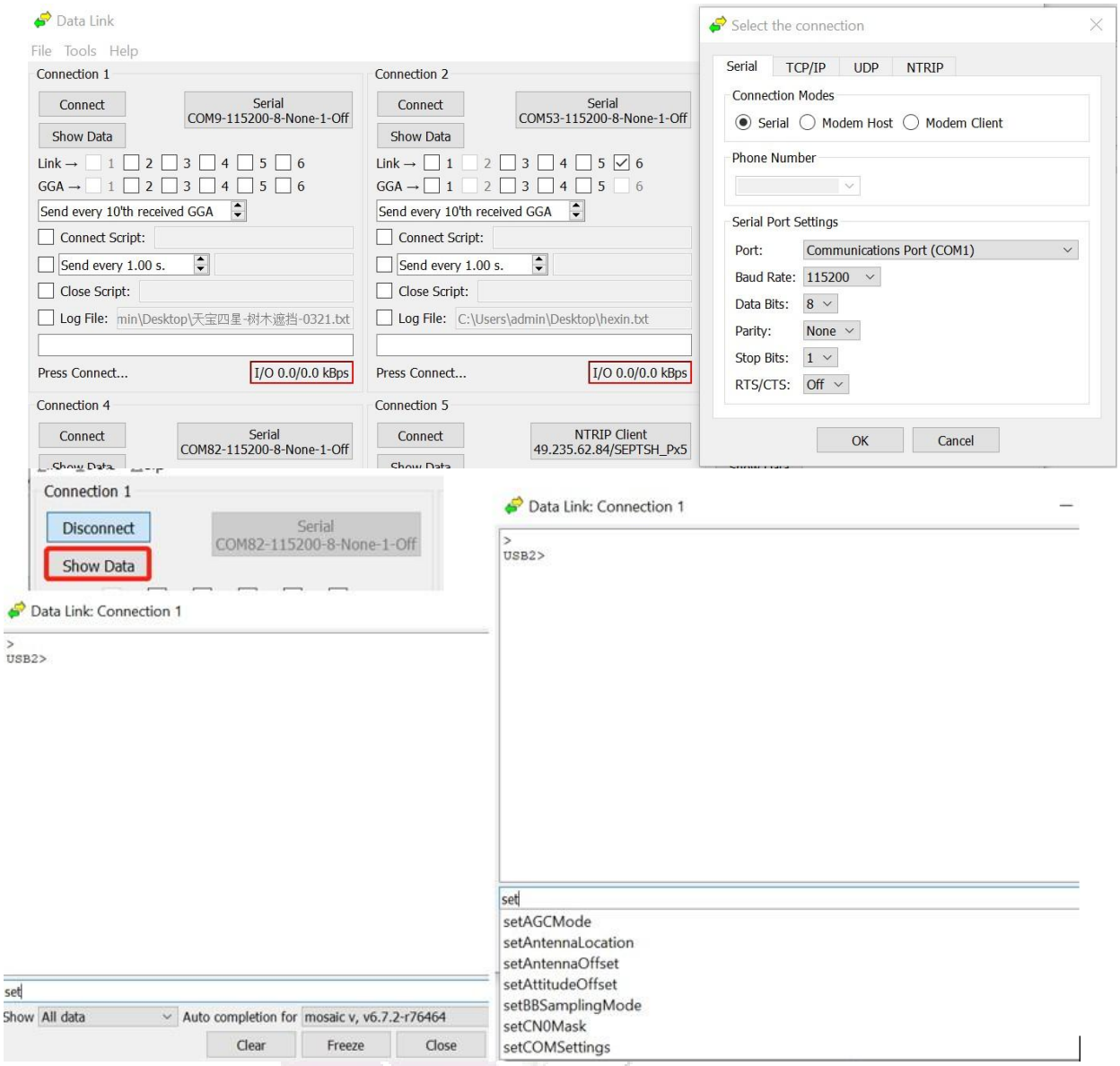
before saving it to the boot file.

Command Line:eccf,current,boot //Save Settings

9.2 Datalink program

Function 1: Port link, data distribution

The Datalink program can establish direct data links between different connections, and can forward data from one port to other connections through Datalink. For example, there are 6 connections under the Datalink program. Connection1 can receive serial port or NTRIP differential and then distribute it to other different connections.



Function 2: Serial port assistant

Use the Serial port to connect to the board. The default baud rate is 115200. Click Connect to connect, and then click Show.

Data displays the serial port monitoring interface

Select Auto completion for mosaic v in the lower right corner of the serial port monitoring interface, so that when entering the command line, the input box will automatically prompt the command format.

Function 3: Record port output data to file

After the serial port monitoring interface picks up the port data, return to the Datalink main interface and click Log File to save the data to a file.

9.3 Rover mode

1. First set the board to switch toRover rover mode, through RxControl software Navigation/Positioning

```
Command Line:setPVTMode,rover,RTK+Standalone//  set upPVT
```

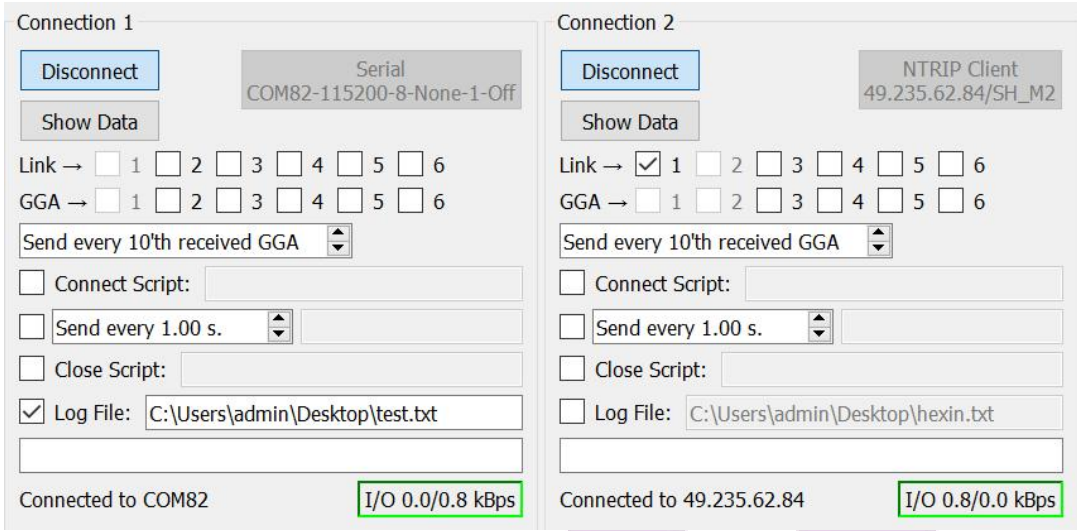
Mode interface PVT mode: Rover

2. RxControl software File/Copy Configuration/Current->Boot

```
Command Line:eccf,current,boot                    //Save
```

3. Set up differential input in Datalink software
   a. SetupConnection1 is connected to the USB2 port of Mosaic MiniEVK (the corresponding virtual serial port can be viewed through the device manager of the computer)
   b. SetupConnection2 connects to the differential source through the serial port or NTRIP, and confirms that the differential data is effectively received through Show Data.
   c. The differential data of Connection2 is linked to Connection1, so that the MiniEvk board can obtain the differential data.

Note: If you use Qianxun NTRIP or other CORS station differential data, you need to set the board to receive the differential port to output 1hz GGA data. For specific settings, seeNMEA data port real-time output

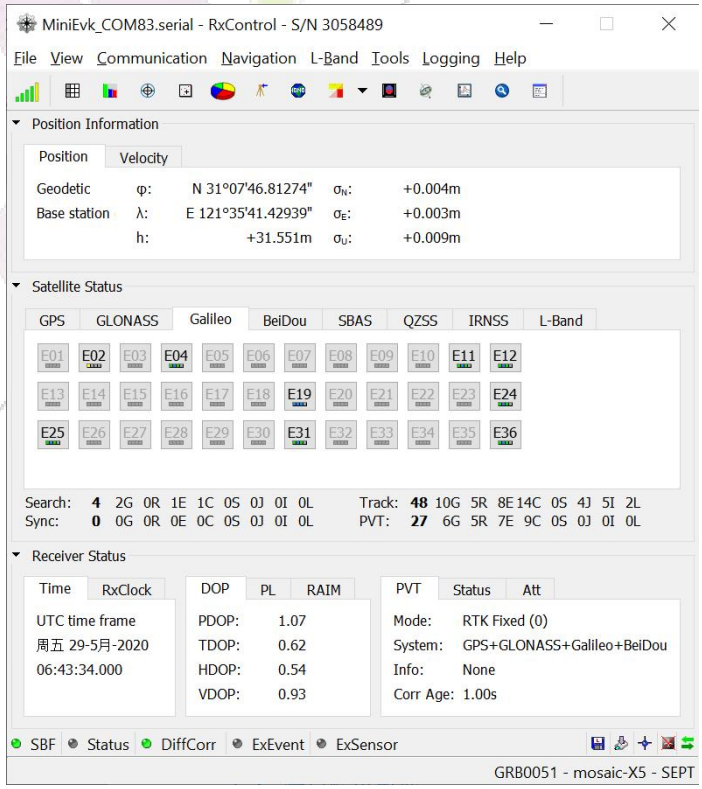


4. RTK Fixed state verification

4.1 Return to the RxControl software and you can see the positioning accuracy in the Position Information column.

4.2 In the PVT information bar in the lower right corner, you can see whether the current RTK status is RTK Fixed and the satellite system solved by PVT.

4.3 The DiffCorr light in the lower left corner flashes, indicating that differential data is being received in real time.



10 NMEA data

10.1 Real-time output via port

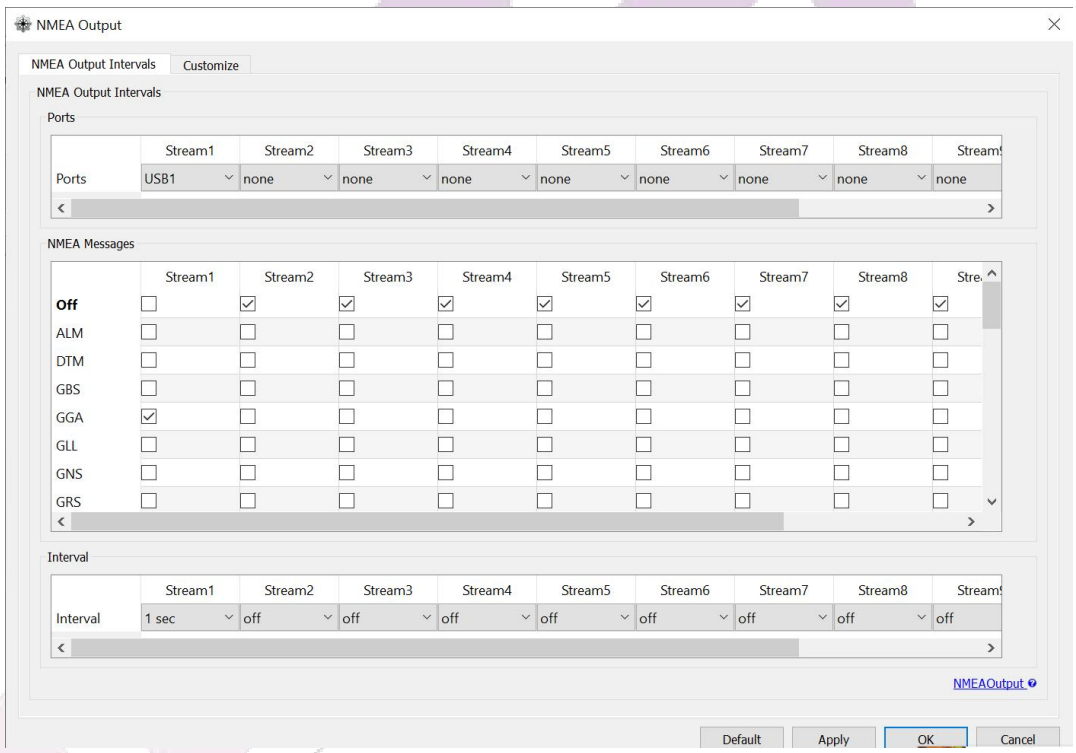
1.passRxControl software, Communication/Output Settings/NMEA Output/NMEA Output Intervals settings

d. Output port

e. NMEA data type

f. Output frequency

2. Save Settings,File/Copy Configuration/Current->Boot



Command Line:sno,stream1,ubs2,gga,sec1// set up USB2 port output 1hz GGA
Command Line:eccf,current,boot //Save Settings

10.2 Record data to memory card

Mosaic MiniEvk supports loading TF memory cards and can record data to the memory card.

1. Through RxControl software, Communication/Output Settings/NMEA Output/NMEA Output Intervals settings

1.1 The output port is DSK1

1.2 NMEA data types

```
Command Line:sno,stream1,ubs2,gga,sec1//          set upUSB2port output1hz
```

1.3 Output frequency

2. Save the settings, File/Copy Configuration/Current->Boot

```
Command Line:eccf,current,boot        //Save Settings
```

10.3 Record data computer files

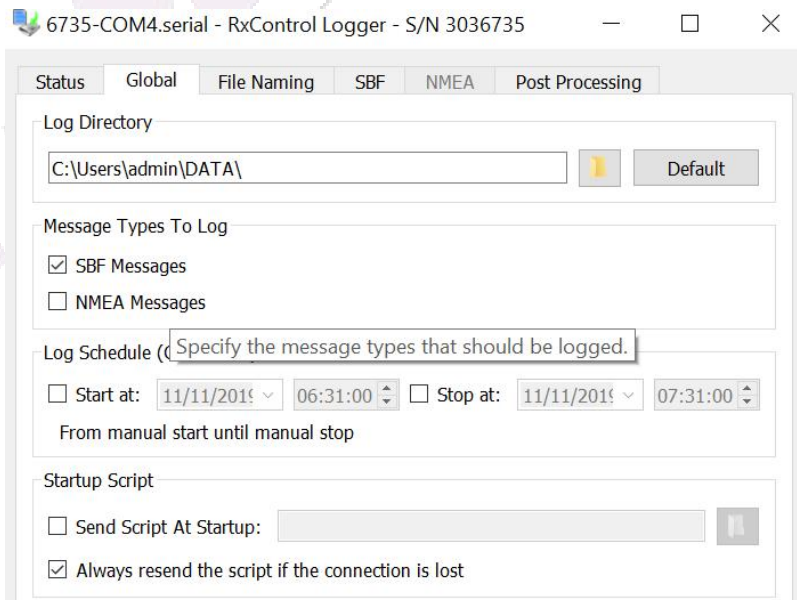
Method 1: Through Datalink

1. The Datalink program can be connected to the USB2 port of Mosaic MiniEVK, input commands through the serial port monitoring interface to set the output data, and check Log to file (for details, seeDatalink program)

Method 2: Logging through RxLogger or RxControl software

1. Logging/RxControl Logging function under RxControl software or run RxLogger program to connect to Mosaic

MiniEvk's USB port, enter the following interface



2. Under the Global menu, set Message Types To Log and check NMEA.

Note: If checked here, you need to set it and record it. If SBF is not needed, it needs to be canceled.

3. existUnder the File Naming menu, set the file path and file name, and optionally set the size and duration of a single file.

4. existUnder the NMEA menu, set the output data type and interval

5. Click**Start Logging**Start recording to computer file

11 SBF raw data

SBF - Septentrio Binary Format file is Septentrio's proprietary binary format file and records relatively complete information.

11.1 Port output raw data

RxControl software interface, Communication/Output Settings/SBF Output, and set

1. Output port

2. type of data

For the required data type, please refer to Chapter 4 SBF Reference of Mosaic Firmware Guide

3. Output interval

4. Save Settings,File/Copy Configuration/Current->Boot

```
Command Line:
sso,stream1,ubs2,PostProcess,msec200//          set upUSB2port output5hz PostProcessdata
Command Line:eccf,current,boot                  //Save
```

11.2 Record raw data to memory card

The method of recording to the memory card is basically the same as the method of serial port output. Just change the serial port number to DSK1.

11.3 Record data computer files

The setting steps are the same as Recording NMEA data to a computer file is the same, except changing the NMEA data to SBF data and confirming that the required SBF data type is checked.

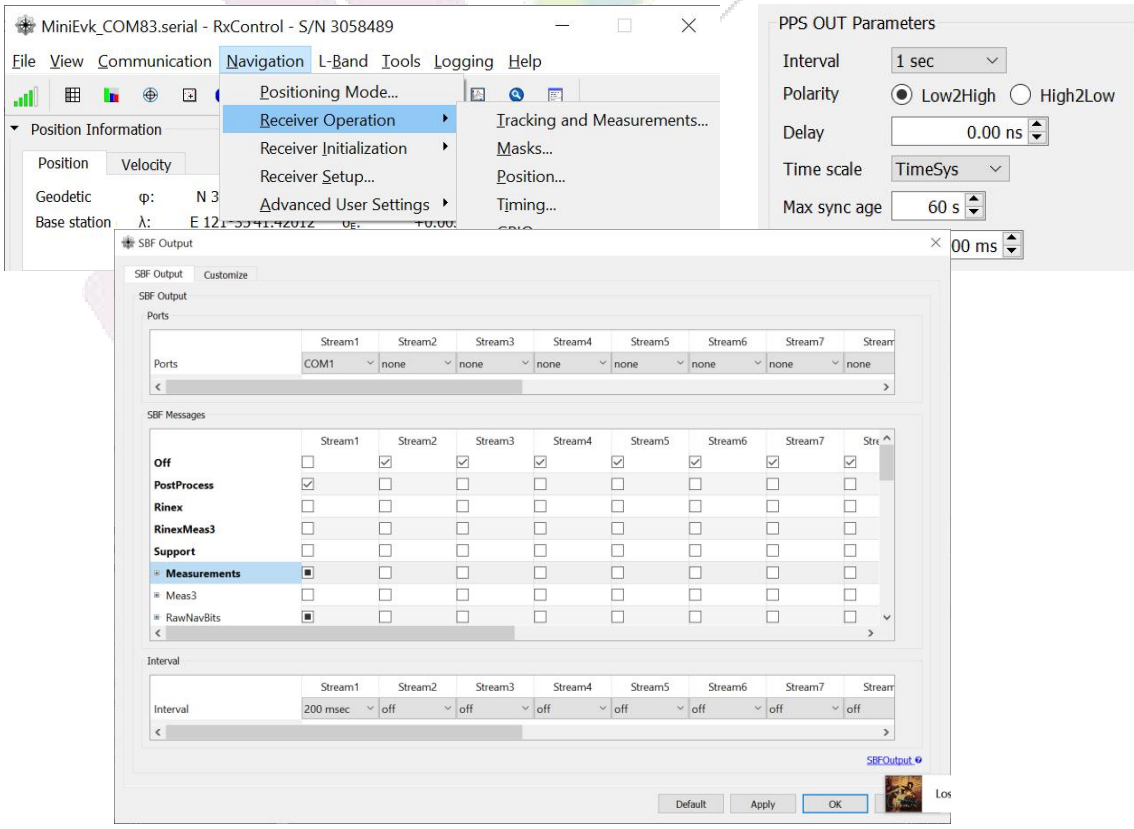
Note: SBF data is recorded to the computer. If you need to change the recording interval, you need to use the RxLogger program to record.

Record SBF under RxControl cannot be set, and the default is 1hz.

12 external events

12.1 PPS output

RxControl software interface, Navigation/Receiver Operation/Timing to set PPS output and save the settings.

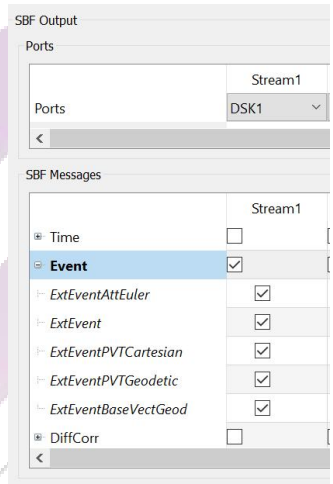


Command Line:setPPSParameters,sec1,Low2high //set up1 ppsoutput(maximum100), the pulse goes from low to high

Command Line:eccf,current,boot// Save Settings

12.2 Event

1. RxControl software interface, Navigation/Receiver Operation/Timing to set Event, and set Set recordFor SBF data recording, you need to check the Event data type so that the location information at the external trigger moment will be recorded.



Command Line:

sso,stream1,ubs2,PostProcess+Event,msec100

//set upUSB2port output10hz PostProcess+Eventdata

2. Save Settings

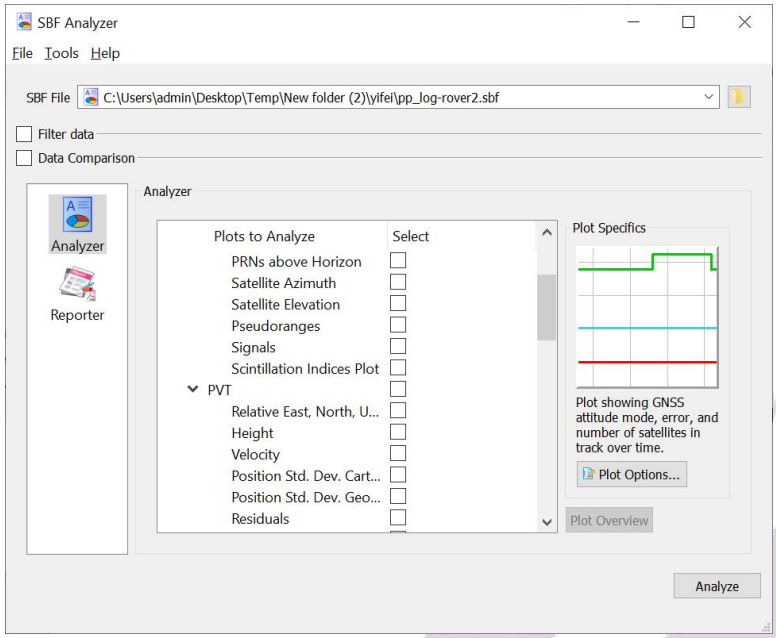
Command Line:eccf,current,boot //Save

13 SBF data analysis

13.1 SBF Analyzer

When installing the RxTools software, SBF Analyzer will be installed automatically. The following is a brief introduction to the use of the SBF Analyzer program:

1. Double click to runSBF Analyzer program, or right-click the SBF format file and select SBF Analyzer

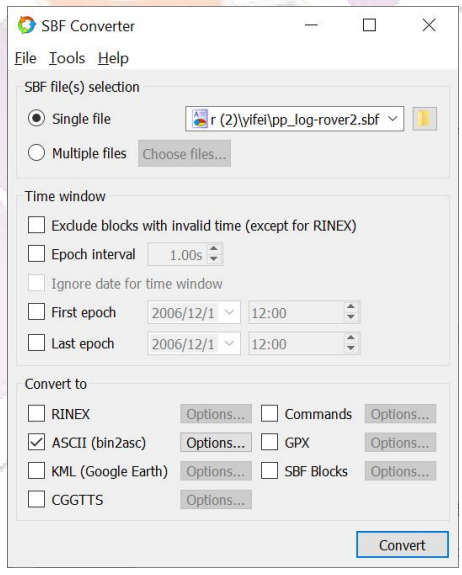


2. Check the content to be analyzed and clickAnalyze

13.2 SBF Convertor

The SBF Convertor program can convert SBF to the required common format.

1. runSBF Convertor program or SBF file right click Convert SBF



2. canConvert SBF to Rinex, ASCII files, etc.

3. in the case ofEvent application, use ExtEventPVTGeodetic1 to view the location data recorded at the time of external triggering

14Troubleshooting

14.1 Diagnostic report

1. There are several ways to obtain the diagnostic report or report content: RxControl software to connect the board, File/Display Diagnostic Report or press the shortcut key Crtl+C, and then save the report as a pdf file

2.Via web interfaceAdmin/About/Diagnostic Report, then Save As to save as text file

3. Or enter the following command through the serial port assistant, and copy the content returned by the board to the file

g. lstInternalFile, Identification
h. lstInternalFile, Permissions
i. getReceiverCapabilities
j. getReceiverInterface
k. lstConfigFile, Boot
l. lstConfigFile, Current
m. lstInternalFile, Ipparameters
n. getSbfOutput
o. getDataInOut
p. lstInternalFile, Error
q. lstInternalFile, SetupError
r. lstInternalFile, rxMessages
s. lstDiskInfo, all

14.2 Support SBF files

If you need technical support to analyze data quality and troubleshoot board abnormalities, you need to record Support SBF data. The steps for recording SBF are as follows:***SBF raw data*** introduction.

Can be set by default Support SBF data is 10hz, and the recording frequency of Support SBF can be adjusted according to whether the scene is still or moving. It is recommended to check Support+BBSamples to record to memory card or computer file.

```
Command Line:sso,stream1,dsk1,support+BBsamples,msec100// Recordsupport+BBsamples to
```

```
Command Line:eccf,current,boot                    //Save
```