



DELTA-DI

(Option A, B, C)
GNSS RECEIVER

User Manual
Version 1.0
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TERMS AND CONDITIONS

USE – JAVAD GNSS receivers are designed to be used by a professional. The user is expected to have a good knowledge and understanding of the user and safety instructions before operating, inspecting or adjusting. Always wear the required protectors (safety shoes, helmet, etc.) when operating the receiver.

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1. INTRODUCTION

Welcome to Your DELTA-DI User Manual. This manual has been developed by JAVAD GNSS, Inc. to support users of JAVAD GNSS products. It provides helpful guidance for getting started with your DELTA-DI receiver and using it effectively.

1.1. User Notices

1.1.1. CE Notices



The DELTA-DI receiver complies with all applicable EU directives, including the Low Voltage Directive (2014/35/EU), EMC Directive (2014/30/EU), and RoHS Directive (2011/65/EU).

1.1.2. Environmental Compliance



DELTA-DI receivers are fully compliant with the latest directives:

- WEEE (Waste Electrical and Electronic Equipment)
- RoHS (Restriction of Hazardous Substances)
- REACH (Registration, Evaluation, Authorization & Restriction of Chemicals).

These standards ensure that DELTA-DI products are manufactured and disposed of in an environmentally responsible manner.

1.1.3. Storage Precautions

- Always clean the instrument after use. Wipe off dust with a cleaning brush, then wipe off dirt with a soft cloth.
- Store in a location with a temperature of -40°C $+85^{\circ}\text{C}$ and no exposure to direct sunlight.
- Use a clean cloth, moistened with a neutral detergent or water, to clean the receiver. Never use an abrasive cleaner, ether, thinner benzene, or other solvents.
- Always make sure the instrument is completely dry before storing. Dry the receiver with a soft, clean cloth.

1.1.4. Safety Information

1. The final disposal of this product must be carried out in full compliance with all applicable national and local laws, regulations, and environmental directives.
2. The power supply unit provided by JAVAD GNSS for the DELTA-DI receiver (if supplied) must not be substituted with any third-party power source. If an alternative power supply is used, it must feature double insulation and fully conform to the electrical and safety specifications of the original JAVAD GNSS-supplied unit.
3. The equipment, along with all supplied accessories, shall be operated solely in accordance with the specifications and usage conditions outlined in the accompanying release notes, user manual, and any other official documentation provided with the receiver.
4. To ensure the safe operation of the receiver, a lightning arrestor must be installed between the receiver and the GNSS antenna.

A lightning arrestor meeting the following specifications is recommended for proper protection:

Minimum Frequency: DC

Maximum Frequency: 3000 MHz

Minimum input power: > 2W

Directional Impedance: 50 Ohm (inferred as standard for GNSS/RF systems with Type N connectors)

1.1.5. Support

For initial support inquiries, please contact your authorized JAVAD dealer.

If you experience unexpected behavior from your DELTA-DI receiver and require technical assistance, please contact JAVAD GNSS Technical Support. To expedite the support process, include a short log file with support data and a Diagnostic Report from the receiver.

Website: <https://www.javad.com>

Technical Support: support@javad.com

Sales: sales@javad.com

Phone: 1 (408) 770-1770 Main
+1 (408) 770-1703 Support 1
+1 (408) 770-1714 Support 2

Address: JAVAD GNSS
900 Rock Avenue
San Jose, CA 95131
USA



2. DELTA-DI OVERVIEW

DELTA-DI is a mountable, rugged GNSS enclosure dual antennas, MEMS IMU, and standard interfaces. DELTA-DI is designed for any application that uses RTK, Heading, Roll, & Pitch.

Built on the custom ASIC engineered by JAVAD, DELTA-DI tracks all GNSS constellations with patented anti-jamming, anti-spoofing, and multipath reduction technologies for reliability and signal quality.

2.1. Hardware Specifications

2.1.1. Power Consumption

Power Input: 1 ports, 5-pin ODU, 4.5-40 VDC

Typical Consumption: 4.5 W (Typical)

2.1.2. Key Features

Use the simple web interface to configure a Continuously Operating Reference Station (CORS) or Portable Base Station, with integrated NTRIP Caster and Server functions to transmit RTCM corrections via TCP or NTRIP.

Key Features

- All GNSS Constellations
- CORS Receiver
- Portable Base Station
- NTRIP Server / Caster
- Web User Interface
- Event Marker, 1PPS
- External Frequency I/O

2.1.3. Physical and Environmental

Dimensions	136 x 39 x 158
Weight	0.5 kg
Temperature Range	-40°C to +70°C (Operating) -40°C to +85°C (Storage)
Humidity	95%
Ingress protection	IP66
Shock	MIL-STD-810H Method 516.8
Vibration	MIL-STD-810H Method 514.8
Compliance	CE, RoHS, REACH, WEEE

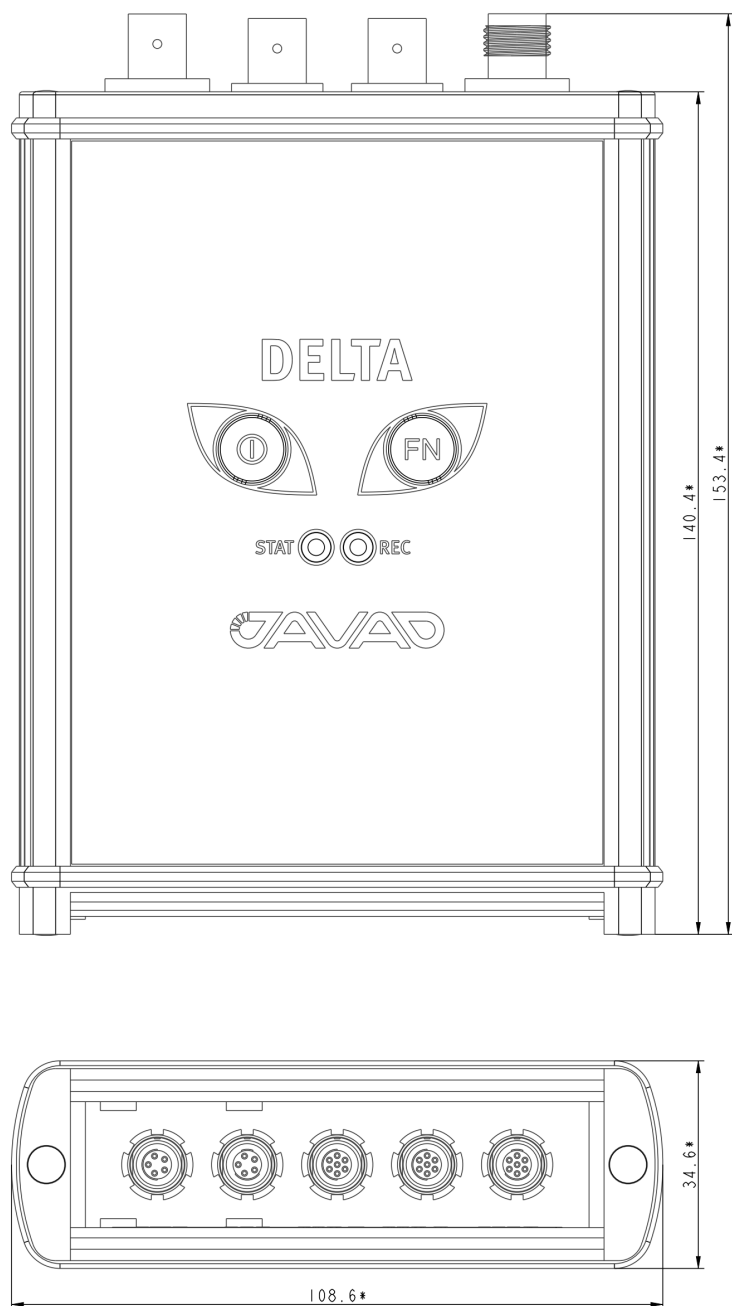
2.1.4. Performance

Operation Time	18 hours
-----------------------	----------

Time to First Fix	
Cold Start	< 35 s
Warm Start	< 5 s
Reacquisition	< 1 s
RTK Initialization	2 - 6 s

2.1.5. Output Rate

Position/Measurements	Up to 100 Hz
Attitude	Up to 100 Hz



*All dimensions are given in millimeters.

2.2. DELTA-DI design

The DELTA-DI receiver has three main panels used for data collection and user interface, and to provide connections for external devices. The DELTA-DI casing includes a user interface, a power port, and ports for configuration.

2.2.1. Front panel

The DELTA-DI Front Panel layout is illustrated in Figure 1.

DELTA-DI Front Panel	
PWR1 (power)	Connection to an external power source
Port A & Port C	Communication between the receiver & external device
USB	For high-speed data transfer and communication
ETHR (Ethernet)	Port to connect the receiver to local network



Figure 1: DELTA-DI Front Panel

2.2.2. Back panel (Options A, B, C)

The back panel configuration varies depending on the selected option. There are three available options: A, B, and C.

OPTION A	
OPTION B	
OPTION C	

Back Panel OPTION A

Figure 2.1 illustrates the layout of the back-panel **Option A** connectors on the DELTA receiver.

Back Panel Option A	
ANT1 & ANT2	Connection to an external GNSS antenna



Figure 2.1: DELTA-DI Back Panel Option A

Back Panel OPTION B

Figure 2.2 illustrates the layout of the back-panel **Option B** connectors on the DELTA receiver.

Back Panel Option B	
ANT1 & ANT2	Connection to an external GNSS antenna
1PPS A	Output connector for 1PPS
Event Marker (EVENT A)	External Event Input



Figure 2.2: DELTA-DI Back Panel Option B

Back Panel OPTION C

Figure 2.3 illustrates the layout of the back-panel **Option C** connectors on the DELTA receiver.

Back Panel Option C	
ANT1 & ANT2	Connection to an external GNSS antenna
1PPS A	Output connector for 1PPS
RS/CAN	Connector for serial communication (RS) with external devices and data exchange over Controller Area Network (CAN)*



Figure 2.3: DELTA-DI Back Panel Option C

2.2.3. Top panel

The DELTA-DI Top Panel is shown in Figure 3.

Status LEDs	STAT (Status)	Indicates system status, including power and operational state.
	REC (Recording)	Indicates whether the receiver is actively logging data.
Control Buttons	Power Button	Used to power the receiver on or off.
	Function Button (FN)	Used for user-defined actions, such as starting/stopping logging.

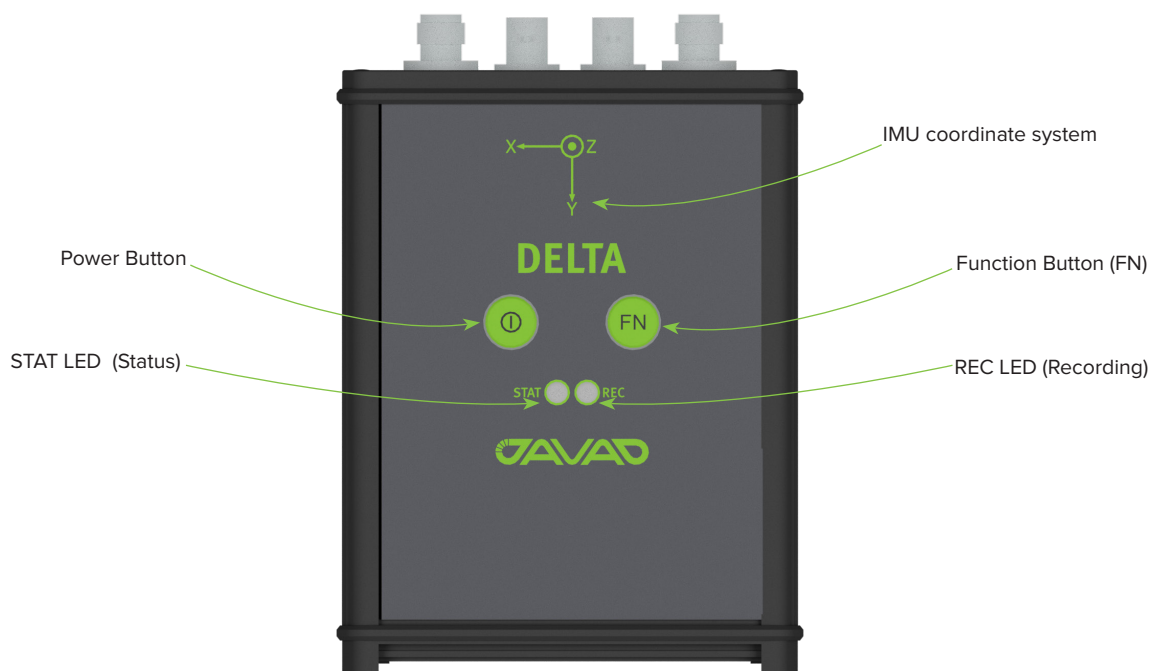


Figure 3: DELTA-DI Top Panel

2.2.4. Bottom Panel

The DELTA-DI bottom panel displays the serial number label.

2.2.5. Power Button

To turn the DELTA-DI On, push and release the PWR button.

To turn the DELTA-DI Off, press the PWR button for between 1 and 4 seconds. During this period, the STAT LED (status) remains off.

If the PWR button is pressed for more than 8 seconds, the command is ignored to protect against stuck keys.

2.2.6. FN Button and <REC> LED

The FN button enables a few functions directly.

- Pressing the FN button during the first second turns the REC LED YELLOW.
- Pressing the FN button between 1 and 5 seconds will Start / Stop raw data recording. Each time data recording is turned on, a new file opens or data is appended to an existing file.
- Pressing the FN button between 5 to 8 seconds will turn Serial Port A to Command Mode at 9,600 baud for an external connection.
- Pressing the FN button for more than 8 seconds has no impact.

The REC LED has 3 color indications:

- REC LED is GREEN or YELLOW during data recording.
 - It blinks each time data is written to internal memory.
- REC LED is RED
 - when memory is full
 - when there is a hardware problem
 - when there is an improper OAF.
- REC LED flashes YELLOW
 - to indicate “not ready” during bootup
 - checking memory availability
 - may take a few minutes depending on the amount of internal memory.

Action	REC LED	Description
Press for < 1 s	YELLOW (for 1 sec)	No action. Button press detected
Press for 1 – 5 s	YELLOW	Starts or Stops Logging
	GREEN or YELLOW (recording)	Blinks Green / Yellow during writes
	RED	Memory Full, HW Failure, Invalid OAF
Press for 5-8 s	YELLOW	Serial Port A to CMD Mode at 9600
Press for > 8 s	NONE	None
Receiver Booting	YELLOW (flashing)	File system initializing, not ready
		< 1 s to several minutes due to memory size & conditions

2.2.7. STAT LED

The STAT LED alternates between two indications for satellite tracking <SAT> and position mode <POS> every 0.5 seconds. The display logic is repeated every 1 second.

- <SAT> Mode = Number of Space Vehicles (SVs) tracked
- <POS> Mode = position status

GREEN: In the normal state, when receiver tracks enough SVs to compute position, the STAT LED is a steady green followed by short OFF period to indicate receiver is active.

RED or YELLOW: The STAT LED indicates less than optimal conditions with red or yellow colors. When no SVs are tracked (and thus no position is computed), the STAT LED is OFF most of the time and produces short red blinks of every second.

<SAT> Mode Description		
LED Appearance	Usable SVs, Nu	Description
OFF	0	No satellites tracked
RED	1–4	Low number of satellites
YELLOW	5–7	Moderate number of satellites
GREEN	> 7	Good number of satellites

$N_u = \# \text{ satellites used}$, $N_t = \# \text{ satellites tracked}$, $N_s = \# \text{ GNSS with tracked satellites}$

$N_u = N_t - N_s + 1 = \text{Number of usable satellites}$

<POS> Mode Description		
Indicator	Condition	Description
Short RED Blink (100ms)	No position fix	No position computed
YELLOW	Position fix	Required position mode is not met
GREEN	Position fix match	Required position mode is met

2.3. Internal memory

The receiver features up to 64 GB of non-removable internal memory for data logging. Logging can be performed in JPS, RINEX, BINEX, NMEA, or RTCM-MSM formats.

2.4. External memory

The receiver supports data logging to an external memory device.



3. Getting started with the DELTA-DI

This section provides step-by-step instructions on how to power on the DELTA-DI receiver, establish physical and wireless connections, and communicate with it using available interfaces such as USB or serial port.

3.1. Powering the Receiver

The receiver can be powered through the following input:

PWR connector: 1 port, 5-pin ODU, 4.5 to 40 VDC

The receiver can be powered by connecting the standard power adapter to the front-panel power socket.

3.1.1. Power supply requirements

The socket-outlet shall be installed near the equipment and shall be easily accessible. A single external power supply with 5 pin ODU connector or SAE connector is necessary to operate DELTA-DI. If external power supply has only SAE connector, Receiver-to-SAE power cable shall be used. The external power supply needs to be Listed for US and Certified for EU countries, it needs also to be a Limited Power Source and have an output rated for 14.5 – 35 V DC, 2A. This may not be the same range as other JAVAD GNSS products with which you are familiar. To avoid the introduction of hazards when operating and installing, before connecting of the equipment to the supply, make sure that the supply meets local and national safety ordinances and matches the equipment's voltage and current requirements.

Warning: Never attempt any maintenance or cleaning of the supply while plugged in. Always remove supply from AC power before attempting service or cleaning.

If the voltage supplied is below the minimum specification, the receiver will suspend operation. If the voltage supplied is above the maximum specification, the receiver may be permanently damaged, voiding your warranty.

Make sure cords are located so that they will not be stepped on, tripped over, or otherwise subjected to damage or stress. Do not operate equipment with a damaged cord or plug – replace immediately.

To reduce the risk of damage to the equipment, pull by the plug body rather than the output cord when disconnecting the equipment.

Warning: Do not operate the supply if it has received a sharp blow, been dropped, or otherwise damaged. Do not disassemble the supply.

Before connecting the external power source and the receiver, make sure that the power source matches the receiver's voltage and current requirements.

3.1.2. Powering from a Solar Station

The DELTA-3S receiver supports operation from an external solar power source. It can be charged directly from a solar-powered station, ensuring autonomous and continuous operation in remote or off-grid installations.

For detailed information on compatible components, wiring schematics, power specifications, and installation guidelines, refer to the documentation provided with the Solar-Powered GNSS Station Kit.

3.2. Managing and operating receiver using NetView

Use the NetView software program for configuring and maintaining the receiver. This software is available on the JAVAD GNSS website. NetView™ is a comprehensive Windows® software product designed for controlling GNSS receivers developed by JAVAD GNSS.

1. Refer to the NetView Software Manual for full details on installing and using NetView Software.
2. If downloading the program from the website, extract the program files into a folder on your hard drive.
3. Navigate to the location of the NetView program and double-click the Setup.exe icon.
4. Follow the on-screen installation instructions. Click Install to continue. Keep the default installation location or select a new location.
5. If desired, create a shortcut on the computer's desktop for quick access to NetView.

3.2.1. Establishing a USB connection

Once you have established a connection between the receiver and the computer/controller, you will be able to configure the receiver and its components, send commands to the receiver, download files from the receiver's memory; as well as, upload new firmware, upload an OAF, and upload configuration files to a receiver, using NetView.

Make sure the computer has JAVAD GNSS's USB driver installed (available from www.javad.com) before continuing.

Using the USB cable, connect the USB port on the receiver to a USB port on the computer. Press the power buttons on the receiver and computer to turn them on. Start NetView and select USB as the type of connection mode and select USB port ID from the list.

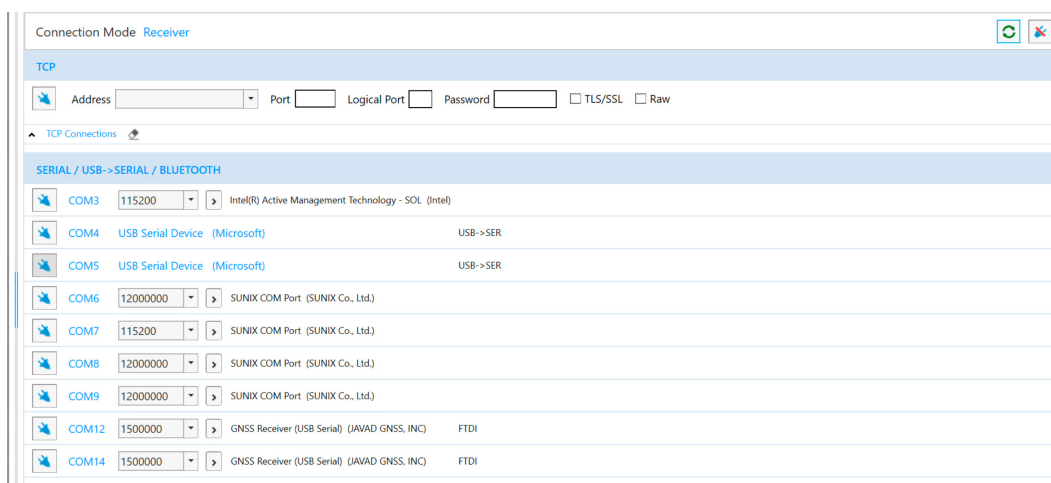


Figure 4: NetView: USB connection



3.3. Computer Connection

JAVAD GNSS NetView software provides an interface for various configuration, monitoring, and management functions for the receiver.

To configure, manage files, or maintain the receiver, connect the receiver and a computer using one of the following methods and start NetView:

- an RS232 cable and a computer/controller
- a USB cable and a computer/controller with the JAVAD GNSS USB driver installed

Once you have established a connection between the receiver and the computer/controller, you will be able to configure the receiver and its components, send commands to the receiver, download files from the receiver's memory; as well as, upload new firmware, upload an OAF, and upload configuration files to a receiver, using NetView.

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3.3.1. Option Authorization File (OAF)

JAVAD GNSS issues an Option Authorization File (OAF) to enable the specific options that customers purchase. An Option Authorization File allows customers to customize and configure the DELTA-DI receiver according to particular needs, thus only purchasing those options needed.

Typically, all DELTA-DI receivers ship with a temporary OAF that allows the receiver to be used for a predetermined period of time. When the receiver is purchased, a new OAF activates desired, purchased options permanently. Receiver options remain intact when clearing the NVRAM or resetting the receiver.

The OAF enables the following kinds of functions.

For a complete list of available options and details, visit the JAVAD GNSS website (<http://www.javad.com>) or consult your dealer.

3.4. Connecting an Antenna

The DELTA-DI receiver can be used with an external antenna. Follow the steps below to connect an external antenna to DELTA-DI and measure its offset.

1. Attach the antenna to a tripod or bipod and center it over the point at which data will be collected.
2. Measure the antenna height as described below.
3. Record the antenna height, point name, and start time in the field notes.
4. Attach the flexible RF cable from the external antenna to the antenna connector on the bottom panel of the receiver.

3.5. Ethernet Interface

The receiver features a built-in Ethernet port for network connectivity and data transfer.

Specifications

- Interface Type: Full-duplex 10BASE-T / 100BASE-TX
- Connector: 7-pin ODU

The Ethernet interface enables high-speed communication with external devices such as computers, data collectors, and network routers. It can be used for configuration, data streaming, firmware updates, and integration into IP-based systems.

3.6. Cables

The DELTA-DI receiver package includes standard communication and power cables for configuring the receiver and providing a power source to the receiver.

USB Cable to ODU-5 (1.8m) (14-578104-01)	
Extension Cable SAE/SAE (1.8m) (14-578102-01)	
Power Cable, ODU-5/SAE (0.3m) (14-578101-01)	

4. Connector Specifications

4.1 Power Connector

Rimmed in red, the power connector (Figure 4) is a sealed receptacle, 5 pin, ODU p/n G80F1C-T05QF00-0000.

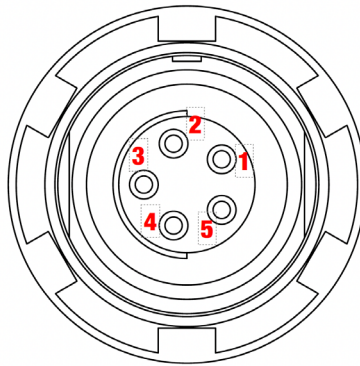


Figure 4: Power Connector

Table 1 gives the power connector specifications.

Number	Signal Name	Dir	Details
1	Power_INP	P	10 to 30 volts DC input
2	Power_INP	P	10 to 30 volts DC input
3	Power_GND	P	Ground, power return
4	Power_GND	P	Ground, power return
5			Not used

Table 1: Power Connector Specifications

4.2. Serial RS-232C Connector

The RS232 connectors (Figure 5) are sealed receptacle, 7 pin, ODU p/n G80F1C-T07QC00-0000.

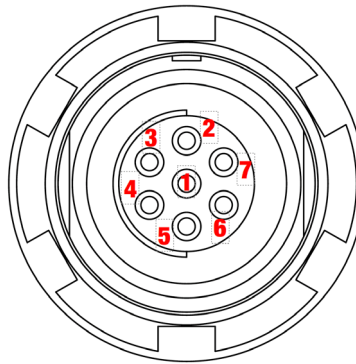


Figure 5: RS-232C Connector

Table 2 gives the RS-232C cable connector specifications.

Number	Signal Name	Dir	Details
1	-	-	-
2	GND	-	Signal ground
3	CTS	I	Clear to send
4	RTS	O	Request to send
5	RXD	I	Receive data
6	TXD	O	Transmit data
7			Not used

Table 2: RS-232C Connector Specifications

4.3. USB Connector

The USB connector is a sealed receptacle, 5 pin, ODU p/n G80F2C-P05QF00-0000 (Figure 6).

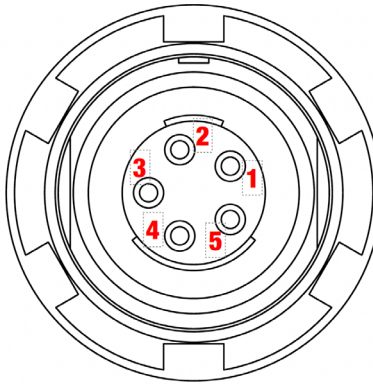


Figure 6: USB Connector

Table 3 gives the USB connector specifications.

Number	Signal Name	Dir	Details
1			
2	USB_PWR	P	Bus power
3	GND	-	Ground
4	USB D+	I/O	Data plus
5	USB D-	I/O	Data minus

Table 3: USB Connector Specifications

4.4. Ethernet Connector

Rimmed in gray the Ethernet connector is a sealed receptacle, 7 pin, ODU p/n G80F2C- P07QC00-0000 (Figure 7)

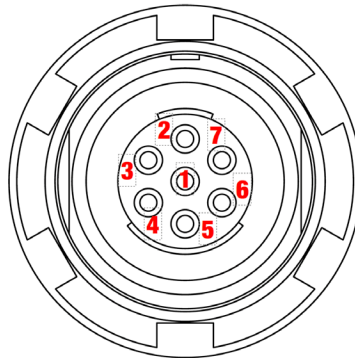


Figure 7: Ethernet Connector

Table 4 gives the Ethernet connector specifications.

Number	Signal Name	Dir	Details
1			Not used
2	Power_GND		Signal ground
3	TXD+	O	Transmit data plus
4	TXD-	O	Transmit data minus
5	RXD+	I	Receive data plus
6	RXD-	I	Receive data minus
7	LAN LED		External LAN LED anode

Table 4: Ethernet Connector Specifications

4.5. RS422 and CAN Connector

The RS422/CAN connector is a sealed receptacle, M12, 8 pin Male receptacle, FM, M16x1.5, flying lead connector Binder-USA p/n 09-3481-700-08 (Figure 8)

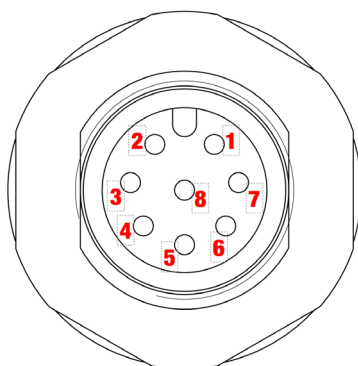


Figure 8: RS422 and CAN Connector

Table 5 gives the RS422/CAN connector specifications.

Number	Signal Name	Dir	Details
1	PWR OUT	P	Bus power
2	GND	-	Signal ground
3	422_TX+	O	Port TX+ line
4	422_TX-	O	Port TX- line
5	422_RX+	I	Port RX+ line
6	422_RX-	I	Port RX- line
7	CAN_H	I/O	CAN_H bus line (dominant high)
8	CAN_L	I/O	CAN_H bus line (dominant low)

Table 5: RS422/CAN Connector Specifications

4.6. GNSS External Antenna RF Connector

The external antenna connector type (Table 6) is a TNC RF connector with an Applied Engineering Product p/n 6001-7051-003.

Type	Signal Name	Dir	Details
TNC	ANT_IN	I	RF input from LNA, 100 mA at 5.0 volts DC output

Table 6: GNSS External Antenna RF Connector

4.7. EVENT and 1PPS Connectors

The EVENT and 1PPS connectors are coaxial female receptacles of BNC series, Kings Electronics part number KC-79-108. These connectors are optional.

5. Technical Specifications

5.1. GNSS Constellations

Number of Channels	874
GPS	L1 C/A, L1C, P1, P2, L2C, L5
GLONASS	L1 C/A, P1, P2, L2 C/A, L3
GALILEO	E1, E5, E5A, E5B, E6
BeiDou	B1, B1C, B2B, B2, B2A, B3
QZSS	L1C C/A, L1C, L2C, L5, L6, L1S, L1Sb, L5S
SBAS	L1, L5
NavIC	L1, L5, S
L-Band	1525-1560 MHz

5.2. GNSS Accuracy (RMS)

	Horizontal (m)	Vertical (m)
Autonomous (Stand alone)	1.000	1.500
SBAS	0.500	0.850
DGPS	0.250	0.500
JStar (PPP)	0.025	0.050
RTK	0.008 + 1 ppm	0.015 + 1 ppm
Network RTK	0.008 + 0.5 ppm	0.015 + 0.5 ppm
Static/Fast Static	0.003 + 0.1 ppm	0.004 + 0.4 ppm
Heading	DUO: < 0.09 deg (2m baseline)	

5.3. GNSS+INS Accuracy (RMS)

Outage (s)	Position Mode
0	Stand Alone RTK
10	Stand Alone RTK

Position Accuracy	
Horizontal (m)	Vertical (m)
<1	<1.5
0.008	0.015
<1.5	<1.8
0.2	0.3

Attitude Accuracy	
Heading (deg)	Pitch/Roll (deg)
<0.09 2m baseline	0.04
<0.20	0.07

6. Base/Rover

This chapter describes the example of configuration of Base/Rover modes.

6.1. Base configuration

Turn on the receiver and wait for a stand-alone solution. After that:

1. Go to the **Parameters** tab (1) and then to the **Base** section (2);
2. Click on the button “**Get from Receiver**” (3);
3. After the position of the antenna phase center appears, press the button “**APC->ARP**” (4);
4. Then save the changes by clicking on the **green check mark** (5) at the bottom of the window;

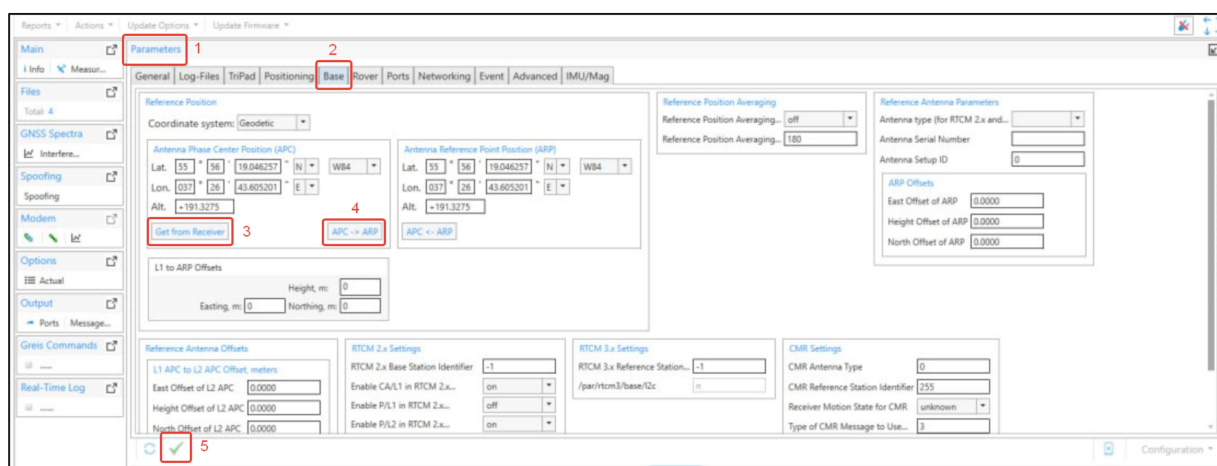


Figure 9: Explanations for steps 1-4

5. After that, go to the **Ports** (6) section and then to the **Serial** tab (7);
6. For the port that will transmit corrections, for example port A, **select the corrections** (8) required to be issued, for example “RTK RTCM3 MSM GPS+GLO+BDS+GAL”;
7. Then save the changes by clicking on the **green check mark** (9) at the bottom of the window.

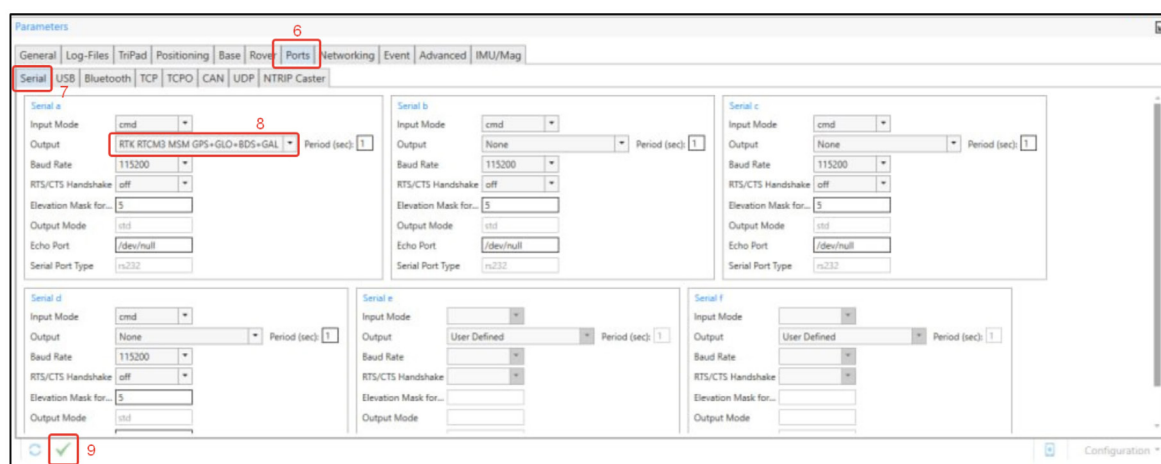


Figure 10: Explanations for steps 5-7

6.2. Rover configuration

Turn on the receiver. After that:

1. Go to the **Parameters** tab (1), then to the **Ports** section (2) and to the **Serial** tab (3);
2. For the port to which the Base is connected, in the Input setting, select “**rtcm3**” (4);
3. Then save the changes by clicking on the **green check mark** (5) at the bottom of the window;

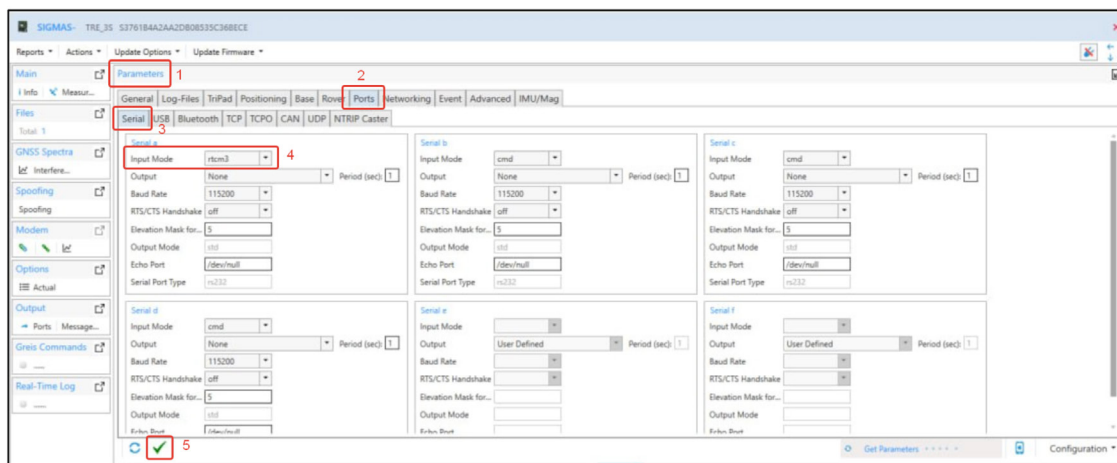


Figure 11: Explanations for steps 1-3

4. Next, go to the **Positioning** tab (6), and then the **Main** section (7);
5. In the *Enable solutions* section, in the *Position Calculation Mode* tab, select **pd** mode (8);
6. Then save the changes by clicking on the **green check mark** (9) at the bottom of the window.

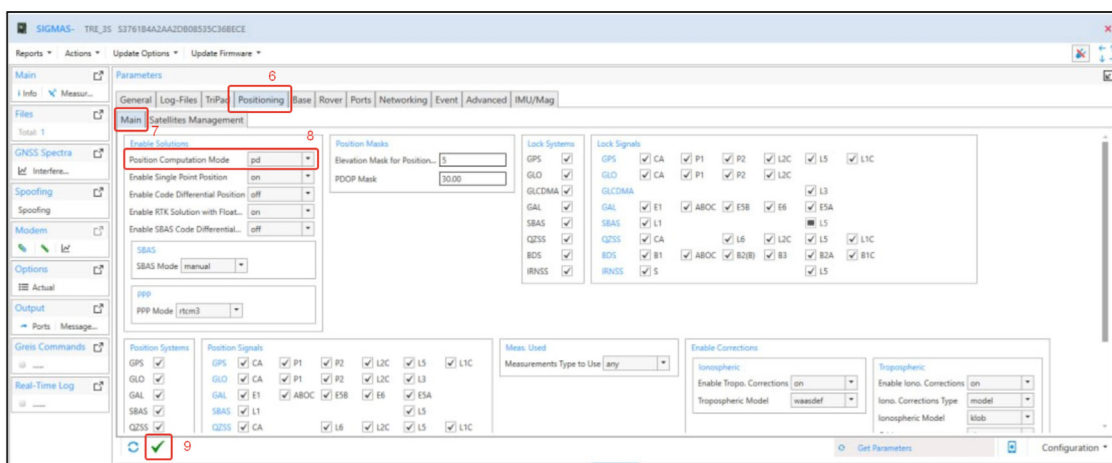


Figure 12: Explanations for steps 4-6

At the end of these stages, the receiver will switch to RTK mode and will issue a high-precision solution.



7.Data Logging

This chapter describes how log navigation data using GREIS commands or NetView.

7.1. Data Logging By GREIS Commands

1. Remove previous log-file with the same name
%%remove,data_log
2. Create a new file with the desired name
%%create,data_log
3. Enable the desired set of messages.
 - a. If required It can be like a default set: **%%em,/cur/file/a,def:0.1**

Note: “:0.1” - the period of message output in seconds. If not specified, there will be a default output with a period of 1 second.

- b. And/or messages that are also required for output:
%%em,/cur/file/a,/msg/jps/{<Required messages separated by commas>}:0.1
Example: %%em,/cur/file/a,/msg/jps/{RT,PG,VG,ET}:0.1

The messages are given as an example:

- [RT] – Receiver Time - binary GREIS message;
- [PG] – Geodetic Position - binary GREIS message;
- [VG] – Geodetic Velocity - binary GREIS message;
- [ET] – Epoch Time - binary GREIS message.

After these commands, the recording of the log file will begin

4. To stop recording a file, use the command
%%dm,/cur/file/a

After that, the resulting file can be downloaded to your computer for further processing.

7.2. NMEA Logging By GREIS Commands

1. Remove previous log-file with the same name

%%remove,nmea_log

2. Create a new file with the desired name

%%create,nmea_log

3. Enable the desired set of messages.

%%em,/cur/file/a,/msg/nmea/{<Required messages separated by commas>}:0.1

Example: %%em,/cur/file/a,/msg/nmea/{GGA,RMC}:0.1

Note: “:0.1” - the period of message output in seconds. If not specified, there will be a default output with a period of 1 second

The messages are given as an example:

- [GGA] – Receiver Time: This message comprises time, position and other fix related data for JAVAD GNSS receiver. (GREIS manual p.163)
- [RMC] – Recommended Minimum Specific: GNSS Data Time, date, position, course and speed data provided by a GNSS navigation receiver. (GREIS manual p.170)

After these commands, the recording of the log file will begin.

4. To stop recording a file, use the command

%%dm,/cur/file/a

After that, the resulting file can be downloaded to your computer for further processing.

7.3. Data logging with NetView

In this case, start the DELTA-DI and connect to NetView.

1. In the NetView open **Output Tile** (1), then open the **Message Sets** tab (2) and click on the **pencil icon** (3) next to the desired set of messages to edit or create a new one;

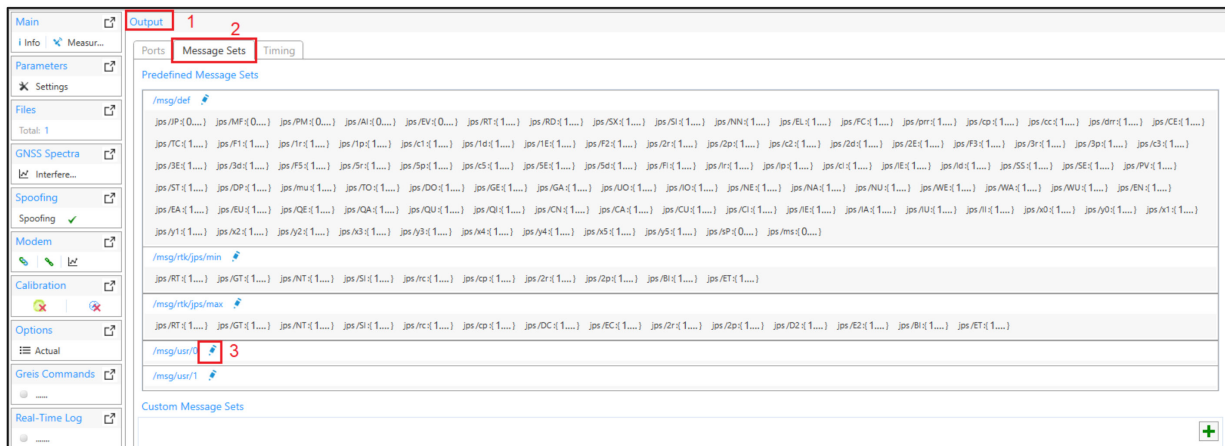


Figure 14: Explanation for Step 1

2. In the **messages tab** (4) that opens, select the required ones (NMEA messages are shown as an example) and then click on the **green check mark** to confirm (5);

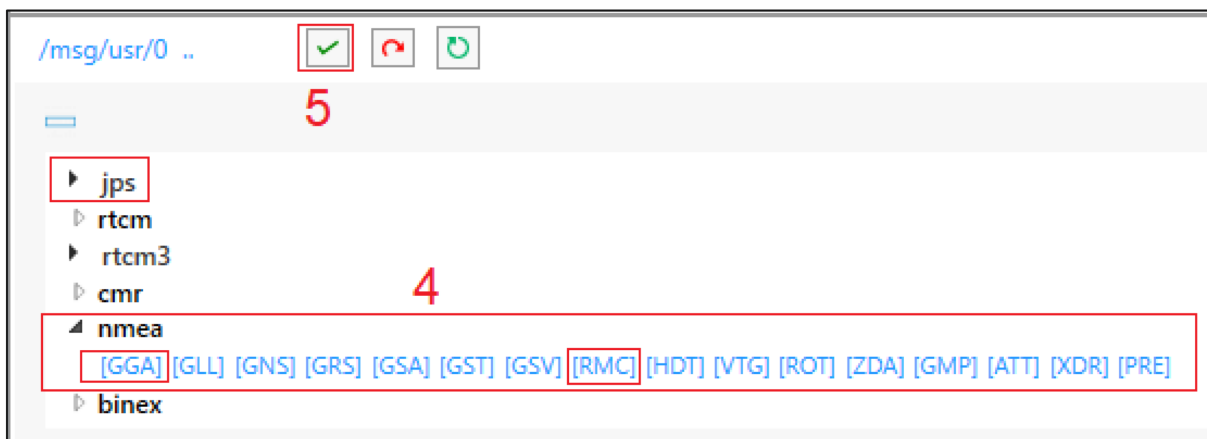


Figure 15: Explanation for Step 2

3. Next, go to the **Files tab** (6), select the previously choose **message set** (7) (in the example, this is usr/0), set the **recording interval** (8) (in seconds), set the **file name** (9) and press the **start button** (10) to record the file;

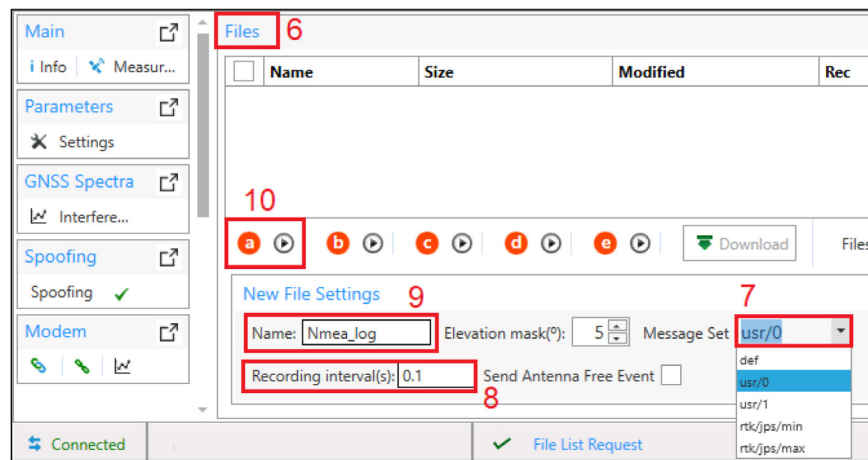


Figure 16: Explanation for Step 3

After these commands, the recording of the log file will begin.

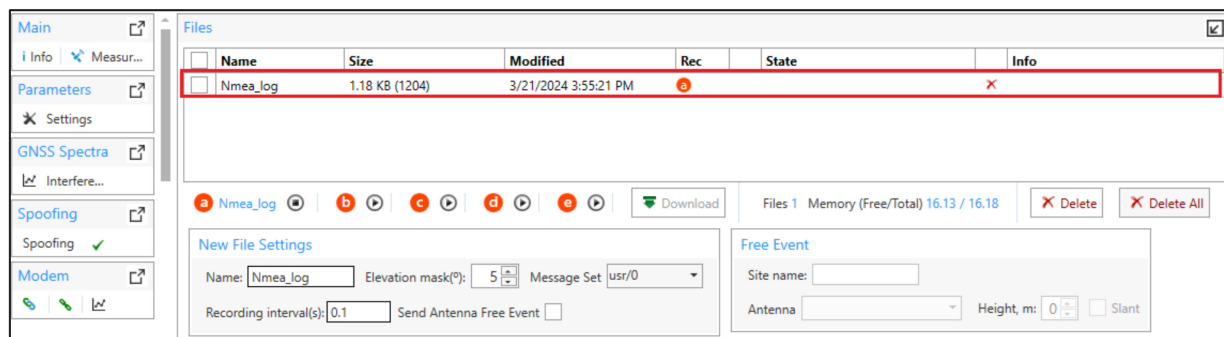


Figure 17: Example of a recording file

To stop recording, click on the Stop File Recording button.

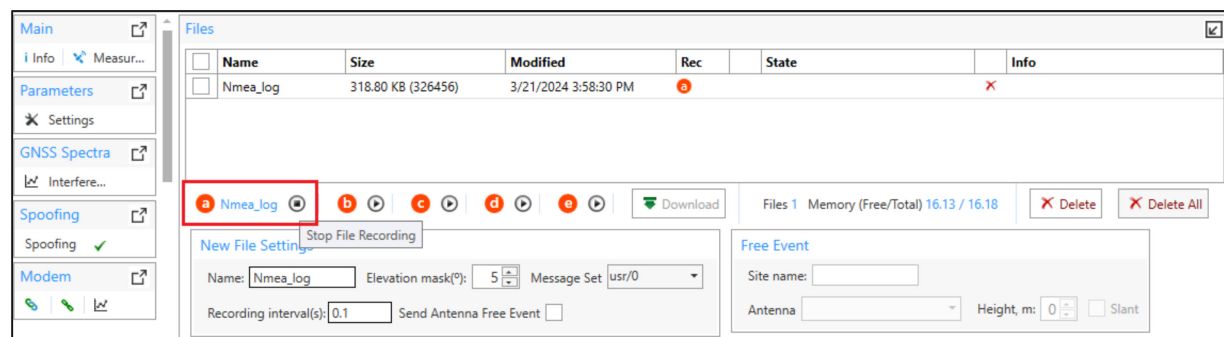


Figure 18: Example of stopping file recording

After that, the resulting file can be downloaded to your computer for further processing.

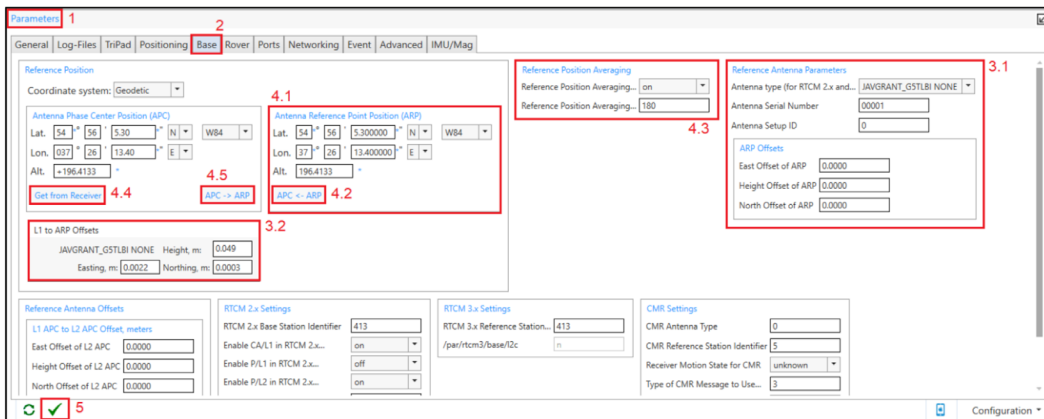
8. NTRIP Caster

This chapter describes the configuration of the NTRIP Caster on applicable JAVAD products using NetView. Turn the receiver on, then start NetView and make a connection to the receiver.

8.1. Base Configuration

Ensure the receiver is operating in standalone mode on the Main tile. After that:

1. Go to the **Parameters** tile (1) and select the **Base** tab (2);
2. Go to the Reference Antenna Parameters pane and select the Antenna Type (3.1) from the drop-down menu which displays the L1 to ARP Offsets (offsets appear after apply), or set the **L1 to ARP Offsets** manually (3.2);
3. Enter Base coordinates from known or measured positions:
 - 3.1. Known Position: Enter the known coordinates in the **Antenna Reference Point Position (ARP)** pane (4.1) section and then press the button **“APC->ARP”** (4.2);
 - 3.2. Measured Position: Set **Reference Position Averaging** (4.3) option to “on” then measure averaged position by pressing **“Get from Receiver”** (4.4). Then press the button **“APC->ARP”** (4.5);
4. Click the **green check mark** (5) at the bottom of the window to save changes;



The screenshot shows the 'Parameters' window with the 'Base' tab selected. The window is divided into several panes. Red boxes and numbers indicate the steps for configuration:

- 1:** Points to the 'Parameters' tile at the top left.
- 2:** Points to the 'Base' tab in the top navigation bar.
- 3.1:** Points to the 'Antenna type (for RTCM 2.x and...)' dropdown menu in the 'Reference Antenna Parameters' pane.
- 3.2:** Points to the 'L1 to ARP Offsets' section in the 'Reference Antenna Parameters' pane.
- 4.1:** Points to the 'Antenna Reference Point Position (ARP)' section, specifically the coordinate input fields.
- 4.2:** Points to the 'APC -> ARP' button in the 'Antenna Reference Point Position (ARP)' section.
- 4.3:** Points to the 'Reference Position Averaging' dropdown menu in the 'Reference Position Averaging' section.
- 4.4:** Points to the 'Get from Receiver' button in the 'Reference Position Averaging' section.
- 4.5:** Points to the 'APC -> ARP' button in the 'Reference Position Averaging' section.
- 5:** Points to the green checkmark button at the bottom left of the window.

Figure 19: Explanations For Steps 1 - 4

5. Select the **Ports** (6) tab and then to the **NTRIP Caster** tab (7). In this section, you can set up to five different outputs for corrections;
6. On the **NTRIP a** pane, select the corrections **Output** type (8) required, for example “RTK RTCM3 MSM GPS+GLO+BDS+GAL”,
In this example, only the “NTRIP a” output is configured;
7. Click the **green check mark** (9) at the bottom of the window to save changes;

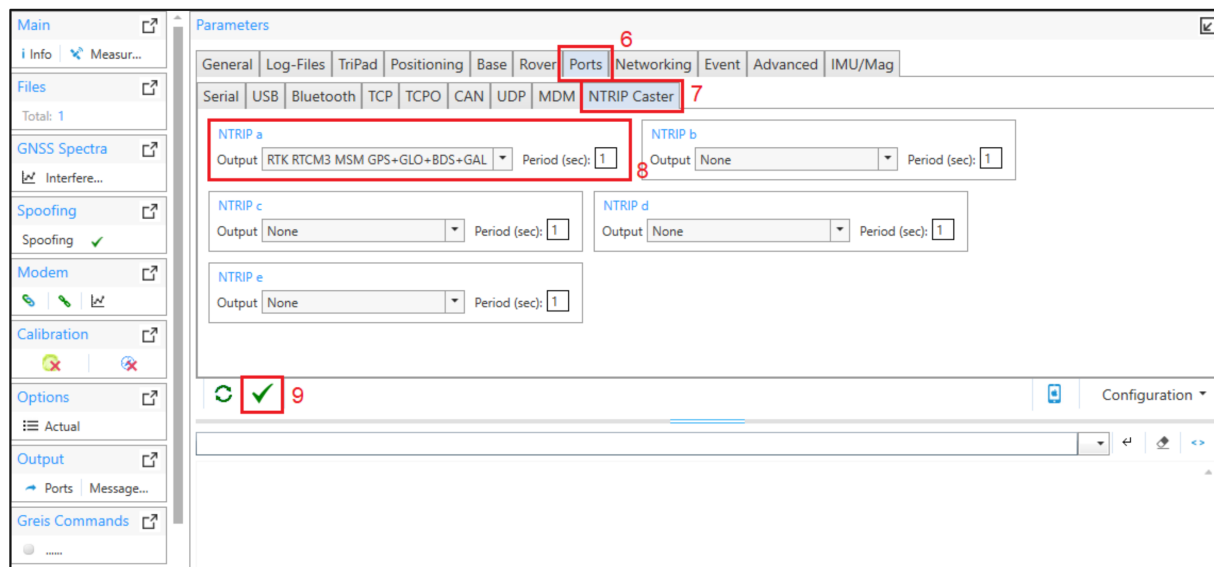


Figure 20: Explanations For Steps 5-7

8. Select the **Networking** (10) tab and then the **NTRIP Caster** tab (11). In this section, you can configure up to **five Mount Points**, each configurable to transmit individual corrections;
9. In the **Settings** (12) pane, set the **NTRIP Caster IP Port**, **Connection Timeout**, **Login**, **Password** to connect to this Mount Point and set the **Protocol version** “1” or “2”;

Note: You can also leave the default settings by setting only the username and password.

10. In the next pane, select the desired *Mount Point* tab, in the example it is **Mount Point A** (13), and set the parameters for it. **Format-details**, **latitude** and **longitude** can be added automatically by clicking on the appropriate buttons, get from the receiver;
11. Set the **NTRIP Caster Mode** (14) “on” from the drop-down menu;
12. Click the **green check mark** (15) at the bottom of the window to save changes.

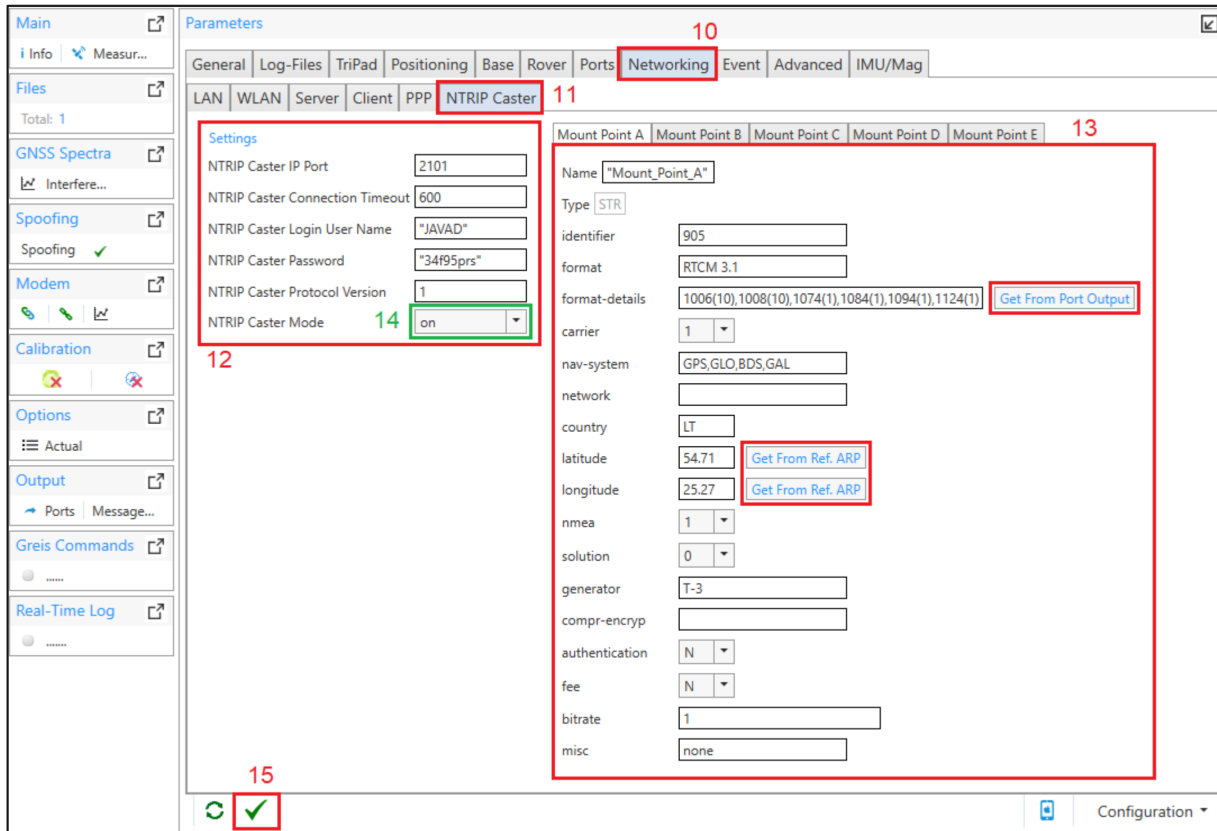


Figure 21: Explanations For Steps 8-12

Important: It is also necessary that the receiver has an Internet connection with:

- Static IP address;
- Port forwarding of the receiver from the local network;
- Configured Dynamic DNS service (Setup Dynamic DNS: <https://help.dyn.com/setup-remote-access-video/>).

After that, the Base setup is completed.

8.2. Rover Configuration

Turn on the receiver and connect it to the Internet. After that:

1. Go to the **Parameters** tile (1), then to the **Networking** tab (2), to the **Client** (3) tab and to **A** (4) tab;
2. In the **NTRIP Client** (5) pane, enter the NTRIP Caster parameters: **Host Name of NTRIP Caster/ IP address**, **IP port** (external, which, for example, through port forwarding lead to the base with NTRIP Caster). You also need to enter the **NTRIP Username**, **NTRIP Password** assigned in the NTRIP Caster settings on the base, the name of **Mount Point**, **NMEA GGA Period of NTRIP** and **NTRIP Protocol Version**;
3. In the **Mode** (6) pane, set **TCP Client mode** (7) as “ntrip”;
4. Click the **green check mark** (8) at the bottom of the window to save changes;

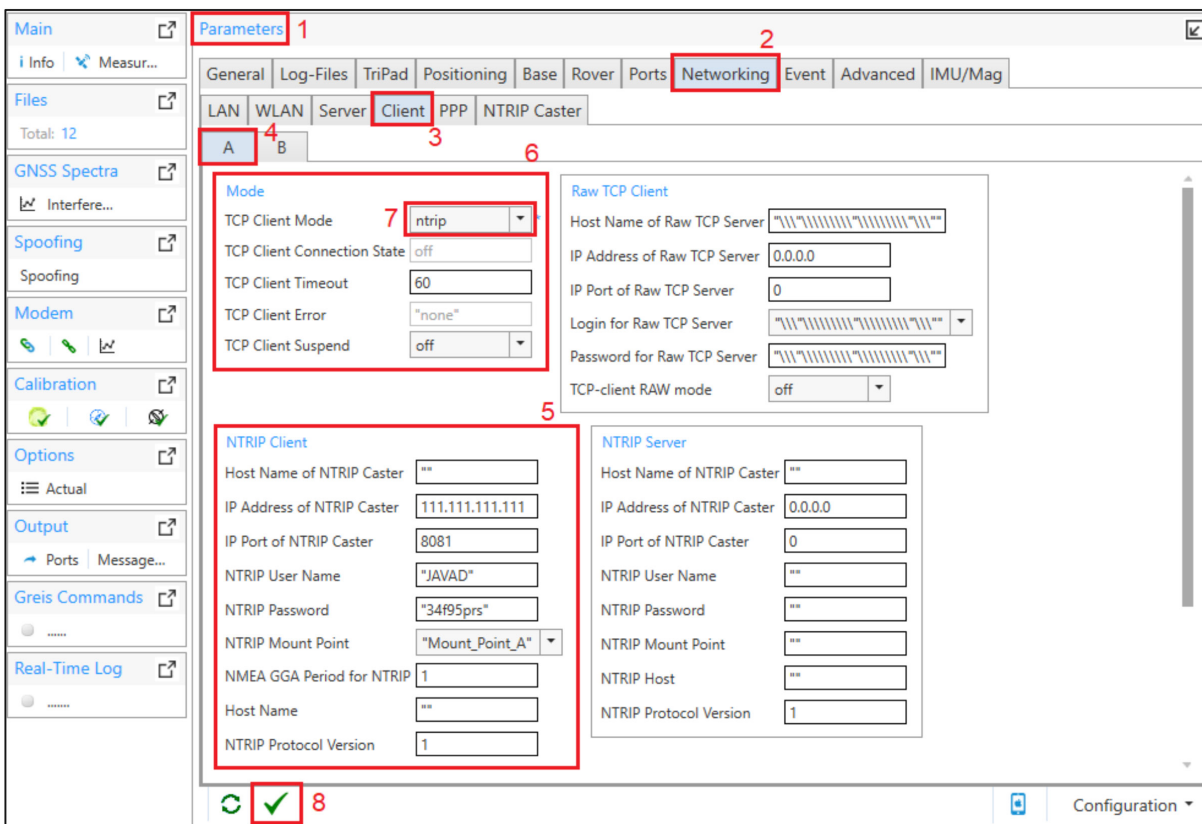


Figure 22: Explanations For Steps 1-4

5. If everything is done correctly, the **TCP Client Connection Status** will change to “connected” after a few seconds;

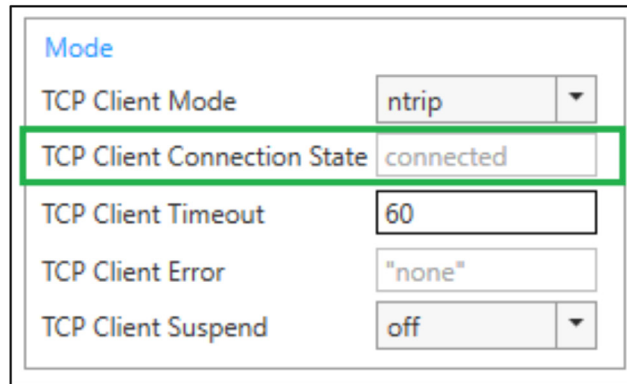


Figure 23: Connection Status

6. Go to **Ports** tab (8) and to the **TCP** tab (9);
7. On the **TCP Client** a pane, select Input Mode as “**rtcm3**” (10) from the drop-down menu;
8. Click the **green check mark** (11) at the bottom of the window to save changes;

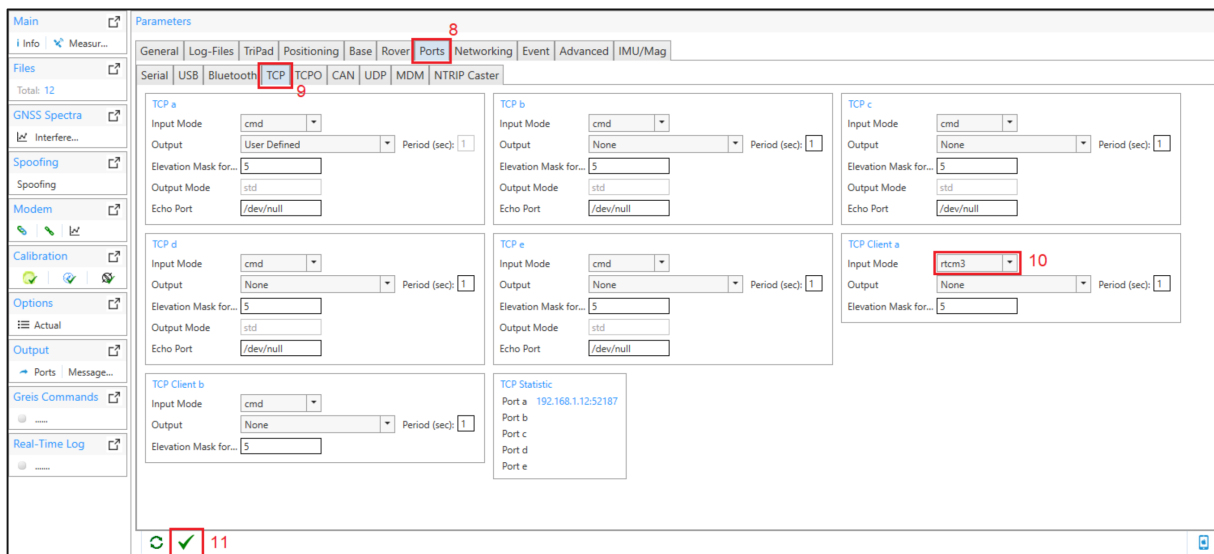


Figure 24: Explanations For Steps 6-8

9. Go to the **Positioning** tab (12), and then the **Main** tab (13);
10. In the **Enable Solutions** pane, select the **Position Computation Mode** as “**pd**” (14) from the drop-down menu;
11. Click on the **green check mark** (15) at the bottom of the window to save changes.

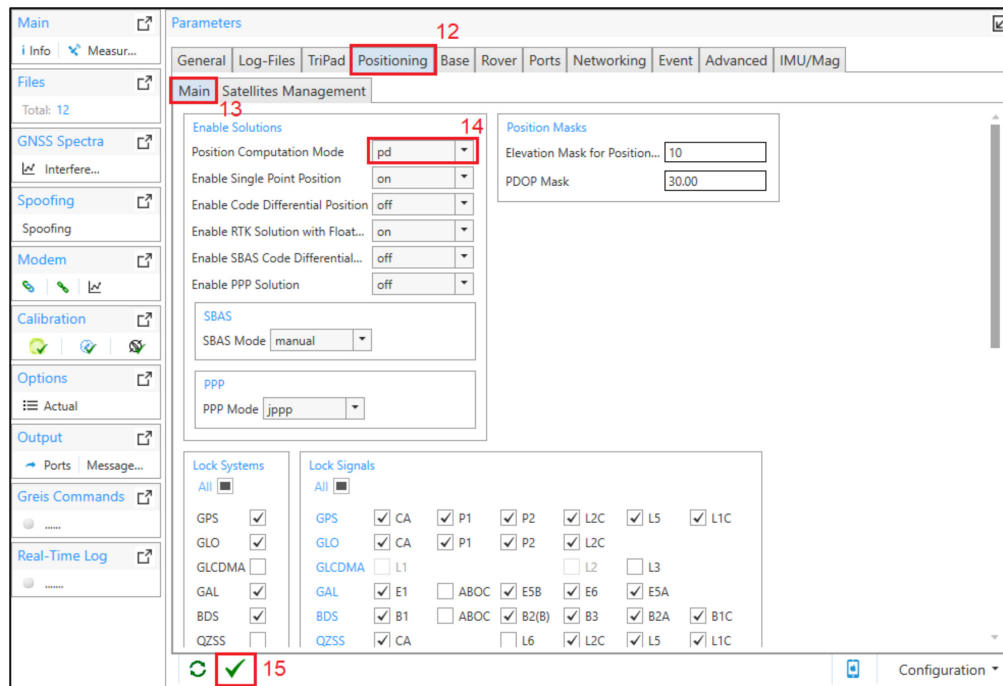


Figure 25: Explanations For Steps 9-11

The receiver will switch to RTK mode and compute a high-precision solution.

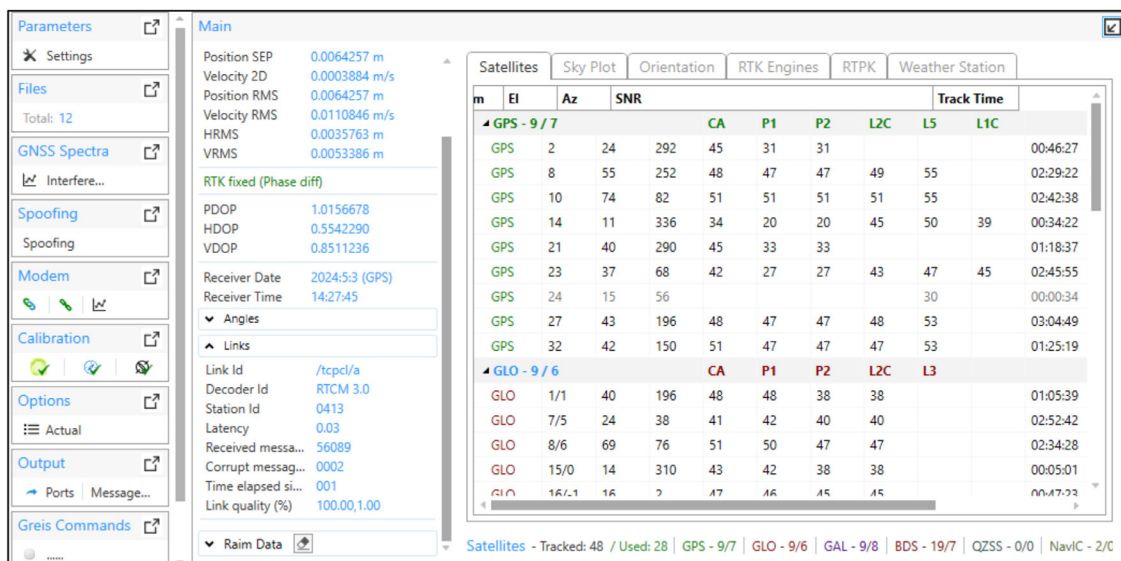


Figure 26: Receiver in RTK mode

9. Event Markers

This chapter describes how to enable and use Event markers in JAVAD receivers.

Before starting work, check whether the **Event Markers** (EVNT) option is activated on the receiver with NetView.

The option **EVNT** must be activated for configure and using Event Markers. You can check the availability of the desired option in the **Options** tab in the **EVNT** line. If the option is active, its flag in column “**Current**” will be positive integer.

Options					
Option	Current	Purchased	Leased	Date	
GPS (_GPS)	1	511	511	4/3/2024	
GLONASS (_GLO)	1	511	511	4/3/2024	
L1 (_L1_)	1	511	511	4/3/2024	
L2 (_L2_)	1	511	511	4/3/2024	
Position update rate(Hz) (_I	200	511	511	4/3/2024	
Raw data update rate(Hz) (_	200	511	511	4/3/2024	
Memory (Mb) (_MEM)	511	511	511	4/3/2024	
Common Tracking (COOP)	-1	511	511	4/3/2024	
1-PPS Timing Signal (_PPS)	2	511	511	4/3/2024	
Event Markers (EVNT)	2	511	511	4/3/2024	
In-Band Int. Rejection (_AJM)	2	511	511	4/3/2024	
Multipath Reduction (_MPF)	1	511	511	4/3/2024	
Frequency Input (_FRI)	1	511	511	4/3/2024	
Freq. Lock and Output (_FR)	1	511	511	4/3/2024	
Serial Port A (Kbps) (RS_A)	460	511	511	4/3/2024	
Serial Port B (Kbps) (RS_B)	460	511	511	4/3/2024	
Serial Port C (Kbps) (RS_C)	460	511	511	4/3/2024	
Serial Port D (Kbps) (RS_D)	460	511	511	4/3/2024	
Infrared Port (INFR)	-1	511	511	4/3/2024	
Parallel Port (_PAR)	-1	511	511	4/3/2024	
GSM (_GSM)	511	511	511	4/3/2024	

Figure 27: Example of an activated option

If you do not have the required option or if you have any other possible problem, please contact support@javad.com.

9.1. Enable Event Marker By GREIS

This chapter describes how to enable and configure an Event using the GREIS commands.

1. Enable Event Acquisition (The example uses events A)

%%set,/par/dev/event/a/in,on

2. Set the Event Reference Edge, by rise or fall (The example uses fall registration)

%%set,/par/dev/event/a/edge,fall

Default: rise

Note: rise – the time of the rising edge of the event signal will be measured;
fall – the time of the falling edge of the event signal will be measured.

3. Set the desired reference time system (GPS time is used in the example)

%%set,/par/dev/event/a/time,gps

Default: utc

Note: utc – select the best from all available UTC time scales.

[ZA] and [ZB] messages will contain identifier of the actual reference time selected for each particular Event. After that, the Event is ready for use.

Note: If some parameters do not need to be configured and default values are suitable, you do not need to enter commands.

9.2. Enable Event Marker By NetView

This section describes how to enable and configure an Event Marker using NetView.

1. Go to the **Parameters** tab (1) and then to the **Event** section (2), there will be an Event Marker settings panel on this page;

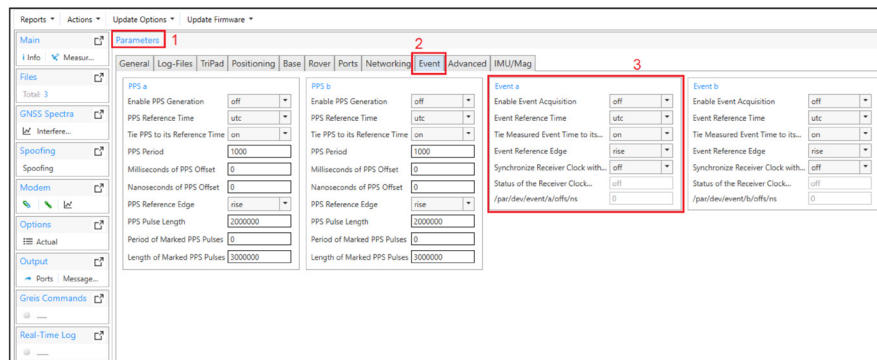


Figure 28: Explanations for step 1

2. In the Event settings panel, follow these steps:

- Enable Event Acquisition (a)
- Set the desired reference time system (b)
- Set the Event Reference Edge (c)

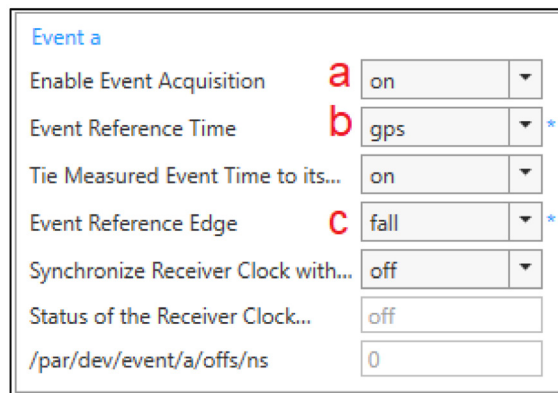


Figure 29: Explanations for step 2

After that, the Event is ready for use.

9.3. Check Event Marker Operation

- Put a button between the Event entrance and the ground;
- Go to the Greis Commands tab and click Capture;

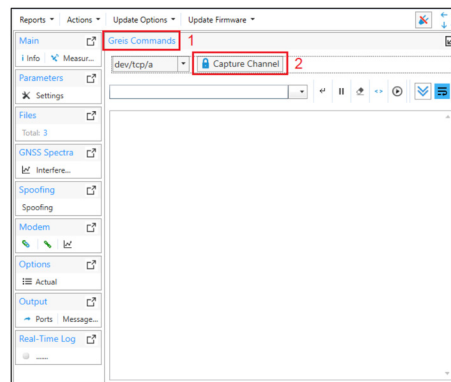


Figure 30: Explanations for step 1

3. Submit commands to check responses:

•

Response example: RE004%on%

•%em%em,/cur/term,/msg/jps/XA

Response example: RE004%em%

4. Press and release your button. For each press & release, a new message should appear on the screen as follows:

Response example: XA00A.....

5. If it works, check the actual device. For example, connect a camera shutter instead of the button and check that the XA message appears every time the shutter is released.

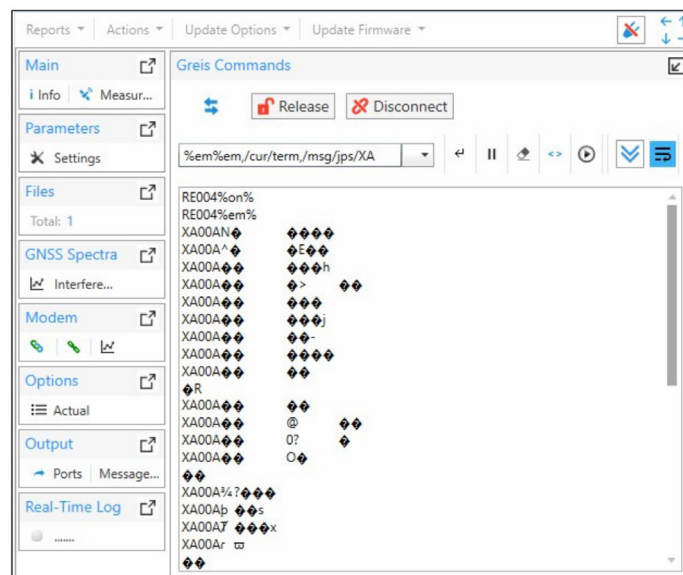


Figure 31: Example of answers of Event Markers

6. Next, you record the measurement file for verification by periodically releasing the camera shutter. And then checks the results.

Refer to the GREIS manual for a description of GREIS commands, parameters, and messages and a general description of command language which is common for any JAVAD GNSS receiver.

10. How to use SPOOFING/JAMMING detection

This chapter describes how to enable and use Spoofing/Jamming detection in DELTA-DI.

10.1. Spoofing / Jamming Detection Algorithm

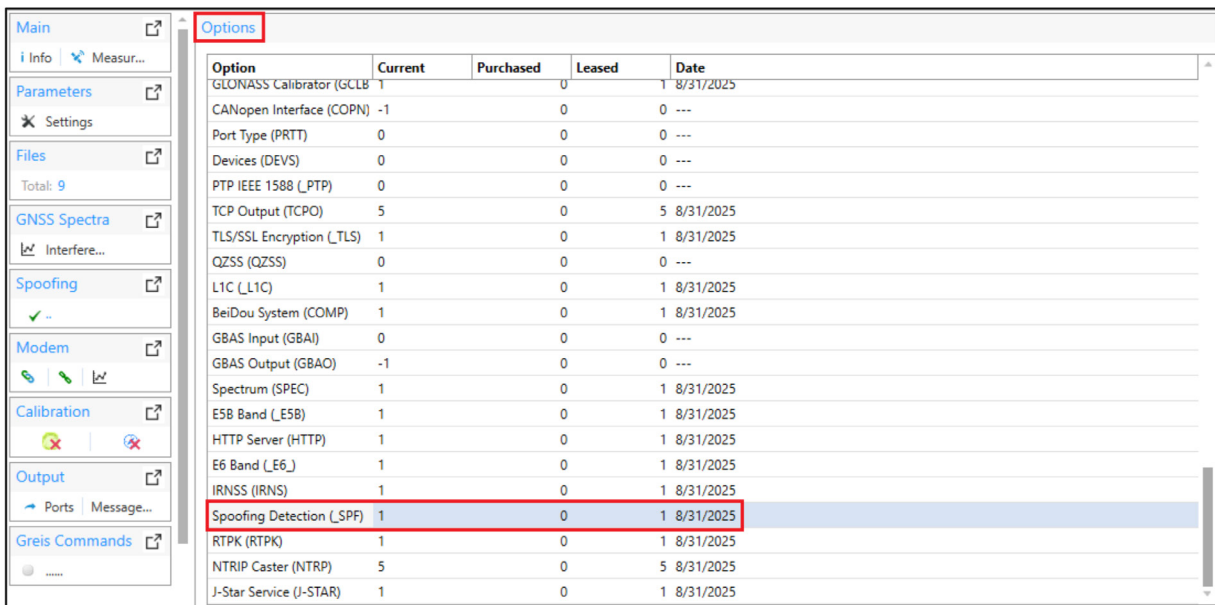
The receiver detects possible spoofing by analyzing the number of correlation peaks. In normal conditions, only one peak is present. In the case of spoofing, there should be two peaks: original and spoofed.

If the receiver detects two peaks, it marks the signal as “spoofed”. If the number of spoofed satellites appears to be more than one, that signal for all satellites is flagged as “spoofed”.

Jamming detection is based on an analysis of incoming noise characteristics. In cases of jamming, the “noise floor” increases. Also, the deviation of noise may increase. The receiver measures these parameters, and in the event that at least one is greater than the threshold, the signal for all satellites is flagged as “jammed”.

10.2. Enable Spoofing/Jamming Detection

1. Before starting work, check whether the _SPF option is activated on the receiver. The option _SPF must be activated for Spoofing/Jamming detection. You can check the availability of the desired option in the Options tab in the _SPF line. If the option is active, its flag will be «1».



Option	Current	Purchased	Leased	Date
GLONASS Calibrator (GCLB)	1	0	1	8/31/2025
CANopen Interface (COPN)	-1	0	0	---
Port Type (PRTT)	0	0	0	---
Devices (DEVS)	0	0	0	---
PTP IEEE 1588 (_PTP)	0	0	0	---
TCP Output (TCPO)	5	0	5	8/31/2025
TLS/SSL Encryption (_TLS)	1	0	1	8/31/2025
QZSS (QZSS)	0	0	0	---
L1C (_L1C)	1	0	1	8/31/2025
BeiDou System (COMP)	1	0	1	8/31/2025
GBAS Input (GBAI)	0	0	0	---
GBAS Output (GBAO)	-1	0	0	---
Spectrum (SPEC)	1	0	1	8/31/2025
E5B Band (_E5B)	1	0	1	8/31/2025
HTTP Server (HTTP)	1	0	1	8/31/2025
E6 Band (_E6_)	1	0	1	8/31/2025
IRNSS (IRNS)	1	0	1	8/31/2025
Spoofing Detection (_SPF)	1	0	1	8/31/2025
RTPK (RTPK)	1	0	1	8/31/2025
NTRIP Caster (NTRP)	5	0	5	8/31/2025
J-Star Service (J-STAR)	1	0	1	8/31/2025

Figure 32: Spoofing / Jamming Option Activated

If you do not have the required option or if you have any other possible problem, please contact support@javad.com

2. Next, open the **Spoofing** tab.

The following settings (figure 27) configure spoof detecting:

- **Mode**
 - On/off spoofing detection mode.
- **Position**
 - On/off using of signal in positioning.
- **Dependent Lock**
 - Switch tracking to dependent mode.

Note: For spoofing/jamming detection, signal should be tracked in independent (not guided) mode, so for checking of all possible signals.

Button “Enable Spoofing Details” starts collecting detail slots information (message [sj]).

Also, toolbar contains time of the last received message and button Expand All, which expand/collapse all systems in the table at once.

The table contains available signals for each satellite system. Receiver provides the following information for each available signal in every satellite system:

- Satellites
 - Count of the locked satellites in the signal.
- Spoofed
 - Count of spoofed satellites.
 - If spoofed more than 1, the entire signal is considered to be spoofed.
 - It is red and “S!” appears near the signal header.
- Noise Mean
 - It is red if greater than 100.
 - It means that signal is jammed and dark yellow “J!” appears near the signal header.
- Noise Deviation
 - It is red if greater than 100.
 - It means that signal is jammed and dark yellow “J!” appears near the signal header.

Spoofering

Disable Spoofing Details

☐ ☒ ☒ ☐

Last Message

3/12/2024 5:43:24 PM

☒ Collapse All

	C/A		P1		P2		L2C		L5		L1C					
GPS (8)	Satellites: 8	Spoofed: 0	Noise	Mean: 80	Dev: 85		Satellites: 6	Spoofed: 0	Noise	Mean: 80	Dev: 80	Satellites: 4	Spoofed: 0	Noise	Mean: 80	Dev: 80
GPS	10	151	55	215542												
GPS	15	334	64	-42228			353	72	-2781818							
GPS	16	698	50	31671												
GPS	18	557	69	-21994			740	81	1746041	1849	59	-48181				
GPS	23	747	47	4985			416	85	2422873	519	62	-202228				
GPS	26	734	69	130498			531	75	1499120	945	72	24222				
GPS	27	367	58	79472			487	83	2105571	566	64	88123				
GPS	29	564	46	-221700			399	74	-1730205							
GLONASS (7)	CA/L1		P1		P2		CA/L2		L3							
	Satellites: 7	Spoofed: 0	Noise	Mean: 79	Dev: 86		Satellites: 6	Spoofed: 0	Noise	Mean: 79	Dev: 82					
SBAS (WAAS, EGNOS)	L1								L5							
GALILEO (7)	E1		E5		E5B		E6		E5A							
	Satellites: 7	Spoofed: 0	Noise	Mean: 83	Dev: 82	Satellites: 6	Spoofed: 0	Noise	Mean: 79	Dev: 79	Satellites: 6	Spoofed: 0	Noise	Mean: 80	Dev: 80	
QZSS	C/A		SAIF		LEX		L2C		L5		L1C					
BeiDou (14)	B1-1		B1-2		B2(B)		B3		B5A		B1C					
	Satellites: 14	Spoofed: 0	Noise	Mean: 86	Dev: 88	Satellites: 11	Spoofed: 0	Noise	Mean: 80	Dev: 79	Satellites: 7	Spoofed: 0	Noise	Mean: 80	Dev: 79	
NavIC	S								L5		L1					
OMNI	L1															
GLCDMA	L1PD						L2PD		L3							

Figure 33: Filled Spoofing Table

Reports ▾ Actions ▾ Update Options ▾ Update Firmware ▾

Spoofting

Disable Spoofting Details ■
☒ Mode
 ☐ Use spoofed in position
 ☒ Dependent Lock
 Last Message: 3/19/2021 9:48:27 AM
 Collapse All

GPS	21	238	68	21363																
GPS	25	140	77	16422																
GPS	34	171	63	-48660																
GPS	28	156	66	-32225																
GPS	30	411	80	-15835																
GPS	32	117	104	-4705																

CA/L1				P1	P2	CA/L2	L3
^ GLONASS (11) Satellites: 11 Spoofed: 1 Noise: Mean: 79 Dev: 85							
GLO	-7	525	52	-46379			
GLO	-4	275	58	-71624			
GLO	-2	218	55	-8806			
GLO	-1	524	50	-88649			
GLO	0	1285	39	-25244			
GLO	1	610	64	29941			
GLO	2	481	135	-26418			
GLO	3	270	53	-126610			
GLO	4	499	41	-85166			
GLO	5	878	51	-27582			
GLO	6	259	50	-112720			

L1 / L1							L3
^ SBAS (WAAS, EGNOS) (2) Satellites: 2 Spoofed: 0 Noise: Mean: 86 Dev: 108							
WAAS	130	109	86	-32673			
WAAS	189	139	70	-24262			

SBAS (WAAS, EGNOS) (2)

Figure 34: Detail satellites info. GPS and SBAS are expanded.
GPS/CA – spoofed and jammed, SBAS/L1 – jammed

11. TROUBLESHOOTING

This chapter will help you diagnose and solve some common problems you may encounter with your receiver.

Warning: Do not attempt to repair equipment yourself. Doing so will void your warranty and may damage the hardware.

11.1. Check This First

Before contacting JAVAD GNSS support, check the following:

- Check all external receiver connections carefully to ensure correct and secure connections. Double check for worn or defective cables.
- Check all power sources.
- Check that the most current software is downloaded onto the computer and that the most current firmware is loaded into the receiver. Check the JAVAD GNSS website for the latest updates.

Then, try the following:

- Reset the receiver using NetView: Receiver name (on the left panel) ->Actions->Reset.
- Restore default settings using NetView: Receiver name (on the left panel)->Actions->Initial parameters.
- Clear the NVRAM.
- If the problem persists, see the following sections for other solutions.

11.2. Receiver Problems

The following are some of the most commonly encountered receiver problems.

11.2.1 Cable specific problems

1. The cable is not properly plugged in.

- Check that the cable connector is attached to the correct receiver port.
- Unplug the cable, then securely and properly reconnect it to the receiver.

2. The cable is damaged.

- Use an undamaged cable. Contact your Dealer to replace the cable.

11.2.2. Generic problems

1. The receiver port used for connection is not in Command mode.

- Connect your receiver and a computer using a free port (see chapter 3.3) and start NetView.
- Change the Input for the port used for connection to “Command”.

2. The receiver does not lock on to satellites for a long period of time.

- Order a new OAF with the desired options activated to enable or extend validity of the corresponding receiver options. Contact your dealer or visit the JAVAD GNSS website for details.
- Refer to the NetView Software Manual for a detailed description of options.

11.2.3 Too few satellites

1. The elevation mask value is too high (above 15 degrees).

- Lower the elevation mask.

2. The measuring is conducted near obstructions (tree canopy, tall buildings, etc.).

3. Check that the Multipath Reduction boxes have been enabled.

- Connect your receiver and a computer using a free port and start NetView.
- Click enable Multipath reduction and click Apply.

4. Move to an area free of obstructions, if applicable.

12. SAFETY WARNINGS

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Clean only with a damp cloth.
- Do not block any of the ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Use only with a pole, cart, stand, or tripod, specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, or has been dropped.
- Apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, shall be placed on the apparatus.

12.1. General Warnings

JAVAD GNSS receivers are designed for measuring and measuring related uses (that is, surveying coordinates, distances, angles and depths, and recording such measurements). This product should never be used:

- Without the user thoroughly understanding operator's manual.
- After disabling safety systems or altering the product.
- With unauthorized accessories.
- Without proper safeguards at the measuring site.
- Contrary to applicable laws, rules, and regulations.

DANGER: THE DELTA-DI RECEIVER SHOULD NEVER BE USED IN DANGEROUS ENVIRONMENTS. USE IN RAIN OR SNOW FOR A LIMITED PERIOD IS PERMITTED.

12.2. Power Supply

Connect the supplied adapter to the side of the unit in the slot marked “PWR”. Plug the two-prong end of the power cord to an AC100-240V outlet.

If you have difficulty inserting the plug, turn it over and reinsert it. If the unit will not be used for a long time, disconnect the plug from the outlet.

Note: Before plugging the power cord into an AC outlet, make sure that all the connections have been made.

CAUTION: To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

CAUTION: To avoid the introduction of hazards when operating and installing, before connecting of the equipment to the supply, make sure that the supply meets local and national safety ordinances and matches the equipment’s voltage and current requirements.

CAUTION: Never attempt any maintenance or cleaning of the supply while plugged in. Always remove supply from AC power before attempting service or cleaning.

Warning: If the voltage supplied is below the minimum specification, the receiver will suspend operation. If the voltage supplied is above the maximum specification, the receiver may be permanently damaged, voiding your warranty.

Make sure cords are located so that will not be stepped on, tripped over, or otherwise subjected to damage or stress. Do not operate equipment with a damaged cord or plug – replace immediately. To reduce the risk of damage to the equipment, pull by the plug body rather than the output cord when disconnecting the equipment.

Do not operate the supply if it has received a sharp blow, been dropped, or otherwise damaged. Do not disassemble the supply.

Warning: Before connecting the external power source and the receiver, make sure that the power source matches the receiver’s voltage and current requirements.

12.3. Usage Warnings

If this product has been dropped, altered, transported or shipped without proper packaging, or otherwise treated without care, erroneous measurements may occur.

Note: Do not connect or disconnect equipment with wet hands, you are at risk of electric shock if you do!

The owner should periodically test this product to ensure it provides accurate measurements. Inform JAVAD GNSS immediately if this product does not function properly.

Only allow authorized JAVAD GNSS warranty service centers to service or repair this product.



JAVAD GNSS, Inc.
900 Rock Ave, San Jose, CA 95131, USA

LIMITED WARRANTY TERMS AND CONDITION

Last updated on February 1, 2026

PRODUCT LIMITED WARRANTY

Subject to the following terms and conditions, JAVAD GNSS, Inc. ("JAVAD") warrants that the **GNSS OEM, radio, survey and geospatial equipment** purchased from JAVAD ("Covered Product") are designed and manufactured to conform to JAVAD published specifications and that all parts are free from defects in material and workmanship under normal uses for a period of time from the date of shipment directly to the buyer or if through a dealer, then the date of shipment to the dealer. The warranty periods are as follows: **one (1) year for all OEM, radio and geospatial equipment. Accessories**, such as but not limited to, batteries, chargers, SIM cards, USB devices and cables **have a ninety (90) day warranty**. This warranty extends only to the original buyer and not to any successive buyer, even if a later buyer purchases it from the original owner within the warranty period.

Within the warranty period, JAVAD will repair or replace (up to a total cost limited to the total value of the Covered Product) free of charge, any part proving to be defective in material or workmanship or issue a credit for the Covered Product, so long as the Covered Product is returned to JAVAD under an RMA and qualifies for such, under these warranty terms. All warranty repairs and services must be performed by JAVAD or a designated affiliated JAVAD entity (authorized repair).

A repaired or replaced Covered Product is warranted for 90 days from the date of return shipment to the buyer or for the balance of the original warranty period, whichever is longer. These remedies are the buyer's exclusive remedies for breach of warranty.

All expenses up to the value of the Covered Product which are related to replacing or repairing a defective part under this warranty will be assumed by JAVAD except for the following expenses, which shall be the sole responsibility of buyer:

WARRANTY EXCLUSIONS:

This warranty **does not apply** to any costs, repairs or services for the following:

1. Service calls to correct the set-up or to explain usage of the Covered Product.
2. Repairs necessary due to use that is other than normal use or as described by JAVAD.
3. Damages resulting from misuse, abuse, accidents, alterations, or improper set-up.
4. Corrective work necessary because of unauthorized repairs.
5. Operation outside environmental and other specifications of the Covered Product.

PRODUCT SOFTWARE

Covered Product software, whether built into hardware circuitry as firmware, provided as a standalone computer software product, embedded in flash memory, or stored on magnetic or other media, is licensed solely for use with or as an integral part of the Product and is not sold.

If accompanied by a separate end-user license agreement (“EULA”), use of any such software will be subject to the terms of such end-user license agreement (including any differing limited warranty terms, exclusions, and limitations), which shall control the terms and conditions set forth in this limited warranty. All capitalized terms in this paragraph are defined in the applicable EULA. During the limited warranty period, you will be entitled to receive such updates or Fixes to the Covered Product software that JAVAD releases and makes commercially available and for which it does not charge separately, subject to the procedures for delivery to purchasers of JAVAD products generally. If you have purchased the Covered Product from a JAVAD Authorized dealer rather than from JAVAD directly, JAVAD may, at its option, forward the software Fix to the JAVAD Authorized dealer for final distribution to you. Minor Updates, Major Upgrades, new products, or substantially new software releases, as identified by JAVAD, are expressly excluded from this update process and limited warranty. Receipt of software Fixes or other enhancements shall not serve to extend the limited warranty period.

HOW TO OBTAIN WARRANTY SERVICE

In the event repairs are needed, the buyer must contact JAVAD support within 10 calendar days upon discovery of defect, malfunction, or nonconformity.

If JAVAD determines the Covered Product is under warranty and qualifies for repair or replacement, then an RMA is issued for shipment to JAVAD at the buyer’s expense. A return shipment of the repaired or replaced Covered Product will be at JAVAD’s expense. If the warranty does not apply, then the return shipment of the repaired product will be at the buyer’s expense.

All returns should be insured, properly packaged and shipped in a manner that prevents further damages. JAVAD is not liable for lost or misplaced shipments. If the Covered Product is under warranty and no warranty exclusions apply, then JAVAD will loan an equivalent product, if available, free of charge, for the period of time that the repairs are being made, subject to a required signed loan agreement. Otherwise, JAVAD may offer to rent equipment, if available, for use while the product is being assessed and/or repaired.

LIMITATION OF DAMAGES:

THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND, IF APPLICABLE, IMPLIED WARRANTIES UNDER ARTICLE 35 OF THE UNITED NATIONS CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE OF GOODS. IN NO CASE SHALL THE COMPANY BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING DIRECTLY OR INDIRECTLY OUT OF THE OWNERSHIP, USE, OR OPERATION OF THE PRODUCTS, REGARDLESS OF WHETHER SUCH DAMAGES ARE PREDICATED OR BASED UPON BREACH OF WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT TORT, OR ANY OTHER LEGAL THEORY. SUCH DAMAGES INCLUDE BUT ARE NOT LIMITED TO LOSS OF PROFITS, LOSS OF SAVINGS OR REVENUE, LOSS OF USE OF THE PRODUCT OR ANY ASSOCIATED EQUIPMENT, COST OF CAPITAL, COST OF ANY SUBSTITUTE EQUIPMENT, FACILITIES, OR SERVICES, THE CLAIMS OF THIRD PARTIES, INCLUDING CUSTOMERS AND INJURY TO PROPERTY. THIS LIMITATION DOES NOT APPLY TO CLAIMS FOR PERSONAL INJURY. SOME STATES DO NOT ALLOW LIMITS ON WARRANTIES OR ON REMEDIES FOR BREACH IN CERTAIN TRANSACTIONS. IN SUCH STATES, THE LIMITS IN THIS PARAGRAPH AND THE PRECEDING PARAGRAPH MAY NOT APPLY.



LIMITATION OF DAMAGES:

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No employee of JAVAD, or any other party, is authorized to make any warranty in addition to those made in this document. This warranty allocates the risks of product failure between the Company and the buyer.

This allocation is recognized by both parties and is reflected in the price of the goods. The buyer acknowledges that it has read this warranty, understands it, and is bound by its terms. This limited warranty is governed by the laws of the State of California, without reference to its conflict of law provisions or the U.S. Convention on Contracts for the International Sale of Goods.

OFFICIAL LANGUAGE

THE OFFICIAL LANGUAGE OF THESE TERMS AND CONDITIONS IS ENGLISH. IN THE EVENT OF A CONFLICT BETWEEN ENGLISH AND OTHER LANGUAGE VERSIONS, THE ENGLISH LANGUAGE SHALL CONTROL.

THE AUSTRALIAN CONSUMER LAW

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. JAVAD's warranty (set out above) is in addition to any mandatory rights and remedies that you may have under the Australian Consumer Law



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