



TRIUMPH-VS

GNSS Receiver

Operator's Manual

Version 1.1

Last Revised July 29, 2014

**All contents in this manual are copyrighted by JAVAD GNSS.
All rights reserved. The information contained herein may not be used, accessed, copied,
stored, displayed, sold, modified, published, or distributed, or otherwise reproduced without express written
consent from JAVAD GNSS**

TABLE OF CONTENTS

Preface	5
Terms and Conditions	5
Regulatory Information	6
Manual Conventions	8
Screen Captures	8
Technical Assistance	8
Chapter 1. Description and Operation	9
1. Principles of Operation	9
2. Getting Acquainted	10
2.1. GNSS Antenna	11
2.2. Controller	11
2.3. Quick Access Buttons and LEDs	12
2.4. SD card and SIM Card Slots	13
2.5. Data and Power Ports	14
2.6. Two Cameras	14
2.7. Mounting	15
2.8. Cables	15
2.9. Accessories	16
3. Operation	17
3.1. Software installation	17
3.2. Installing Optional SIM Cards	17
3.3. Charging the Batteries	18
3.4. Turning On/Off the Receiver	20
3.5. Mounting Method	21
3.6. Connecting to Internet	23
3.7. Checking OAF and Software Version	25
3.8. TRIUMPH-VS Configuration	27
4. Base and Rover Setup	28
4.1. Base Station Configuration	28
4.2. Rover Configuration	47
5. Operation in RTK Mode	57
5.1. Type of Survey	57
5.2. Action Screen	58

5.3. Command screen	64
5.4. Point survey	66
5.5. Parcel Survey	67
5.6. Trajectory survey	68
5.7. Stake out	68
6. Stop and Go Survey for Post-processing	74
7. Monitor Structure	76
Chapter 2. Troubleshooting	77
2.1. Check This First!	77
Appendix A. Specifications	81
Appendix B. UHF Radio Usage	89
Appendix C. Safety Warnings	91
General Warnings	91
Battery Pack Warnings	92
Power Supply	92
Usage Warnings	93
Appendix D. Warranty Terms	95

PREFACE

Thank you for purchasing this product. The materials available in this Manual (the “Manual”) have been prepared by JAVAD GNSS, Inc. (“JAVAD GNSS”) for owners of JAVAD GNSS products. It is designed to assist owners with the use of TRIUMPH -VS and its use is subject to these terms and conditions (the “Terms and Conditions”).

Note: Please read these Terms and Conditions carefully.

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.

COPYRIGHT – All information contained in this Manual is the intellectual property of, and copyrighted material of JAVAD GNSS. All rights are reserved. You may not use, access, copy, store, display, create derivative works of, sell, modify, publish, distribute, or allow any third party access to, any graphics, content, information or data in this Manual without JAVAD GNSS’ express written consent and may only use such information for the care and operation of your TRIUMPH -VS. The information and data in this Manual are a valuable asset of JAVAD GNSS and are developed by the expenditure of considerable work, time and money, and are the result of original selection, coordination and arrangement by JAVAD GNSS.

TRADEMARKS – TRIUMPH-VS™, JAVAD GNSS® are trademarks or registered trademarks of JAVAD GNSS. Windows® is a registered trademark of Microsoft Corporation; Bluetooth® word mark is owned by the Bluetooth SIG, Inc. Product and company names mentioned herein may be trademarks of their respective owners.

DISCLAIMER OF WARRANTY – EXCEPT FOR ANY WARRANTIES IN THIS MANUAL OR A WARRANTY CARD ACCOMPANYING THE PRODUCT, THIS MANUAL AND THE TRIUMPH -VS RECEIVER ARE PROVIDED “AS-IS.” THERE ARE NO OTHER WARRANTIES. JAVAD GNSS DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE OR PURPOSE. JAVAD GNSS AND ITS DISTRIBUTORS SHALL NOT BE LIABLE FOR TECHNICAL OR EDITORIAL ERRORS OR OMISSIONS CONTAINED HEREIN; NOR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE FURNISHING, PERFORMANCE OR USE OF THIS MATERIAL OR THE TRIUMPH -VS RECEIVER. SUCH DISCLAIMED DAMAGES INCLUDE BUT ARE NOT LIMITED TO LOSS OF TIME, LOSS OR DESTRUCTION OF DATA, LOSS OF PROFIT, SAVINGS OR REVENUE, OR LOSS OF THE PRODUCT'S USE. IN ADDITION, JAVAD GNSS IS NOT RESPONSIBLE OR LIABLE FOR DAMAGES OR COSTS INCURRED IN CONNECTION WITH OBTAINING SUBSTITUTE PRODUCTS OR SOFTWARE, CLAIMS BY OTHERS, INCONVENIENCE, OR ANY OTHER COSTS. IN ANY EVENT, JAVAD GNSS SHALL HAVE NO LIABILITY FOR DAMAGES OR OTHERWISE TO YOU OR ANY OTHER PERSON OR ENTITY IN EXCESS OF THE PURCHASE PRICE FOR TRIUMPH -VS.

Preface

Regulatory Information
FCC Class B Compliance

LICENSE AGREEMENT – Use of any computer programs or software supplied by JAVAD GNSS or downloaded from a JAVAD GNSS website (the “Software”) in connection with TRIUMPH -VS constitutes acceptance of these Terms and Conditions in this Manual and an agreement to abide by these Terms and Conditions. The user is granted a personal, non-exclusive, non-transferable license to use such Software under the terms stated herein and in any case only with a single TRIUMPH -VS or single computer. You may not assign or transfer the Software or this license without the express written consent of JAVAD GNSS. This license is effective until terminated. You may terminate the license at any time by destroying the Software and Manual. JAVAD GNSS may terminate the license if you fail to comply with any of the Terms or Conditions. You agree to destroy the Software and manual upon termination of your use of TRIUMPH -VS. TRIUMPH -VS All ownership, copyright and other intellectual property rights in and to the Software belong to JAVAD GNSS. If these license terms are not acceptable, return any unused software and manual.

CONFIDENTIALITY – This Manual, its contents and the Software (collectively, the “Confidential Information”) are the confidential and proprietary information of JAVAD GNSS. You agree to treat JAVAD GNSS' Confidential Information with a degree of care no less stringent than the degree of care you would use in safeguarding your own most valuable trade secrets. Nothing in this paragraph shall restrict you from disclosing Confidential Information to your employees as may be necessary or appropriate to operate or care for TRIUMPH -VS. Such employees must also keep the Confidentiality Information confidential. In the event you become legally compelled to disclose any of the Confidential Information, you shall give JAVAD GNSS immediate notice so that it may seek a protective order or other appropriate remedy.

WEBSITE; OTHER STATEMENTS – No statement contained at the JAVAD GNSS website (or any other website) or in any other advertisements or JAVAD GNSS literature or made by an employee or independent contractor of JAVAD GNSS modifies these Terms and Conditions (including the Software license, warranty and limitation of liability).

SAFETY – Improper use of TRIUMPH -VS can lead to injury to persons or property and/or malfunction of the product. The TRIUMPH -VS receiver should only be repaired by authorized JAVAD GNSS warranty service centers. Users should review and heed the safety warnings in Appendix C.

MISCELLANEOUS – The above Terms and Conditions may be amended, modified, superseded, or canceled, at any time by JAVAD GNSS. The above Terms and Conditions will be governed by, and construed in accordance with, the laws of the State of California, without reference to conflict of laws.

Regulatory Information

The following sections provide information on this product’s compliance with government regulations.

FCC Class B Compliance

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Move the equipment away from the receiver.
- Plug the equipment into an outlet on a circuit different from that to which the receiver is powered.
- Consult the dealer or an experienced radio/television technician for additional suggestions.

Note: Any changes or modifications to the equipment not expressly approved by the party responsible for compliance could void your authority to operate such equipment.

Canadian Emissions Labeling Requirements

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

WEEE Directive

The following information is for EU-member states only:

The use of the symbol indicates that this product may not be treated as household waste. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about the take-back and recycling of this product, please contact your supplier where you purchased the product or consult.



Preface

Manual Conventions

WEEE Directive

Manual Conventions

This manual uses the following conventions:

Example	Description
<i>File ▶ Exit</i>	Click the <i>File</i> menu and click <i>Exit</i>
<i>Communications</i>	This format represents titles of dialog windows/boxes, names of menu options, identifies program interface objects, such as checkboxes, edit boxes, radio buttons, etc.
Temp	This format is used to enter various string information (e.g., file and directory names) as well as operator commands.

Note: Supplementary information that can have an affect on system operation, system performance, measurements, or personal safety.

CAUTION: Notification that an action has the potential to adversely affect system operation, system performance, data integrity, or personal health.

Warning: Notification that an action will result in system damage, loss of data, loss of warranty, or personal injury.

DANGER: UNDER NO CIRCUMSTANCES SHOULD THIS ACTION BE PERFORMED.

Screen Captures

This manual includes sample screen captures. Your actual screen can look slightly different from the sample screen due to the receiver you have connected, operating system used and settings you have specified. This is normal and not a cause for concern.

Technical Assistance

If you have a problem and cannot find the information you need in the product documentation, contact your local dealer. Alternatively, request technical support using the JAVAD GNSS World Wide Web site at: www.javad.com. To contact JAVAD GNSS Customer Support use the QUESTIONS button available on the www.javad.com.



DESCRIPTION AND OPERATION

1. Principles of Operation

TRIUMPH -VS is a revolutionary new GNSS complex that combines high performance 216-channel GNSS receiver, all-frequency GNSS antenna, and a modern featured handheld. All-in one TRIUMPH-VS is a new word in survey. Compact, lightweight, reliable TRIUMPH-VS changes the idea of surveying, opens new horizons in this industry.

In the perfect designed compact case (178 mm x 109 mm x 110) there is enough place for the replaceable battery pack, removable memory card, two built-in cameras, two SIM cards, GSM/GPRS, WiFi, and UHF antennas, Bluetooth module.

All GNSS, UHF, GSM, Bluetooth®, and WiFi antennas are conveniently hidden and protected. An external antenna can also be connected to bypass the internal GNSS antenna. There are two SIM cards inside the box, they can be easily reached and changed.

TRIUMPH-VS can receive and processes multiple signal types GPS C/A, P1, P2, L2C (L+M), L5 (I+Q); Galileo E1 (B+C), E5A (I+Q), E5B (I+Q), AltBoc; GLONASS C/A, L2C, P1, P2, L3 (I+Q); QZSS C/A, L1C(I+Q), L2C (L+M), L5 (I+Q), SAIF; BeiDou B1, B2; SBAS L1, L5 improving the accuracy and reliability of your survey points and positions, especially under difficult jobsite conditions.

The GNSS component of TRIUMPH-VS receivers means you can access the GPS (Global Positioning System) satellites of the United States, the Galileo (an upcoming global positioning system maintained and operated by Galileo Industries), the GLONASS (Global Navigation Satellite System) satellites of the Russian Federation, the QZSS (is a proposed three-satellite regional time transfer system and Satellite Based Augmentation System for the Global Positioning System, that would be receivable within Japan), and the BeiDou (Chinese Global Navigation Satellite System), increasing the number of satellites your receiver can detect, thus improving the accuracy of your measuring points, increasing productivity, and reducing cost.

Several other features, including multipath mitigation and common tracking, provide under-canopy and low signal strength reception. The TRIUMPH -VS receiver provides the functionality, accuracy, availability, and integrity needed for fast and easy data collection.

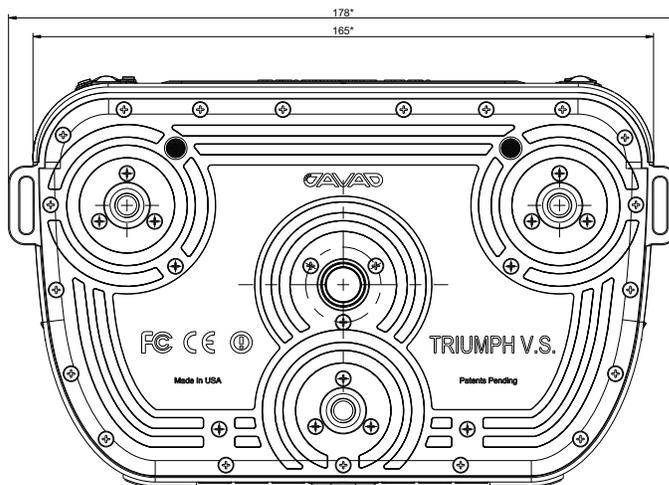
2. Getting Acquainted

The TRIUMPH-VS receiver boasts a 216-channel triple-frequency GNSS board capable of tracking any and all current GNSS signals including GPS, GLONASS and Galileo, as well as any foreseeable ones. Packed in with the core GNSS board is a wide variety of communication options: GSM/GPRS, UHF (transmit and receive), Bluetooth, Ethernet, even WiFi.



Figure 1. TRIUMPH -VS Receiver

Firmware updates for receivers are fairly common and for most of us it means getting all the receivers together and hitching them up to a PC one at a time for updating. With the TRIUMPH-VS receiver there is a better way. Firmware and software updates are performed via the Internet (over GSM, WiFi or Ethernet) on the unit itself with a couple of clicks. No PC required.



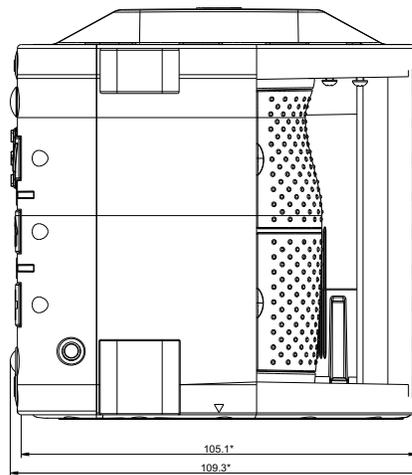


Figure 2. TRIUMPH-VS dimensions in mm

TRIUMPH-VS contains two 3-megapixel cameras—one downward facing and one forward facing—a digital compass, a multi-axis inclinometer (to sense and measure the unit’s angle from level) and expandable MicroSD slot (4GB card included with the unit, supports up to 32GB) to hold all the GNSS data, images, sound recordings you will need to store.

The TRIUMPH-VS receiver’s advanced design reduces the number of cable required for operation, allowing you to survey more reliably and efficiently. The casing allocates space for GNSS antenna, rechargeable battery pack, two SIM card slots, SD card slot, a Bluetooth® wireless technology module, a multi-system receiver board, and a radio modem.

2.1. GNSS Antenna

The Triumph-VS GNSS antenna is a stacked microstrip multipatch model that supports GPS, GLONASS and Galileo (L1 GPS/GLONASS/Galileo; L2 GPS/GLONASS; L3 GLONASS; L5 GPS; E5 Galileo). Unless you plan on using the TRIUMPH-VS as a CORS station, you simply won’t need another antenna.

2.2. Controller

TRIUMPH-VS boasts a “wide” 800x480 pixel touchscreen that is easily readable in direct sunlight. It is also physically larger than the average controller screen. With its colorful icons and single-screen main menu the TRIUMPH-VS user interface looks much like an iPhone or Android home screen, however the operating system running behind the JAVAD software is Microsoft Windows CE.

Description and Operation

Getting Acquainted

Quick Access Buttons and LEDs

2.3. Quick Access Buttons and LEDs

The buttons allows the quick access to *Home* screen, choosing and opening the applications. LEDs show the battery level, charging status and sleep mode.



Figure 3. Buttons

- *Navigation* - Four-direction button for easy page navigation without touching the screen.
- *Action screen* - Quick access to *Action* screen.
- *Cancel (Zoom -)* - Decline the action or scale down for example map.
- *Enter (OK)* - Accept the changes in parameter's configuration.
- *Home* - Quick return to the *Home* screen.
- *Accept (Zoom +)* - Accept the action or enlarge for example map or image.



Figure 4. User programmable buttons and On/Off button

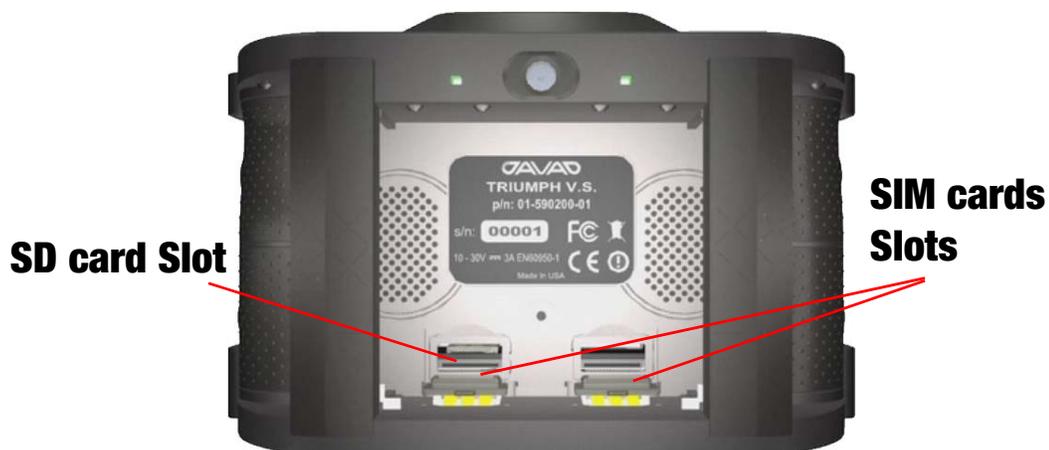
- The *On/Off (power) button* turns the receiver on and off.
- Five user programmable buttons are used for quick access to the saved receiver configurations for different tasks.

**Figure 5. LEDs**

- *Battery Level* - Battery status indicator:
 - Green – full.
 - Yellow – half.
 - Red – almost empty.
- *Charge Status* - Charge status indicator, the color is similar to Battery level status:
 - Green – batteries are fully charged.
 - Yellow – batteries are half charged.
 - Red – batteries are almost empty.
- *Sleep Mode* - Sleep Mode indicator.

2.4. SD card and SIM Card Slots

The SIM card slot allows a standard SIM cards to be installed in the receiver. Once installed, the SIM cards provide a unique identification for the receiver's GSM module and enable the receiver's GSM functionality based on the subscribed services (the receiver board accesses the GSM module which accesses the SIM card). The SIM cards usually remains inside the receiver. A SIM card can be purchased from your local cellular provider. How to insert the SIM cards see “Installing Optional SIM Cards” on page 17.

**Figure 6. Slots**

Description and Operation

Getting Acquainted
Data and Power Ports

2.5. Data and Power Ports

The TRIUMPH-VS receiver has the following ports (Figure 7):

- *Power* – used to connect the receiver to an external power source. This port can also be used to charge the batteries.
- *Ethernet* – used to connect the receiver to local network.
- *USB WIN* – used for high-speed data transfer and communication between the receiver and an external device by synchronizing with Justin Link.
- *USB INT* – USB port for connecting NetView software to the GNSS board.
- *Ant* – used for external GNSS antenna connection.
- *UHF* – used for external UHF antenna connection.
- *Ext. Frq/1PPS/Event* – used for external devices connection for input/output special signals.



Figure 7. TRIUMPH-VS Ports

2.6. Two Cameras

Two integrated 3 megapixel cameras (on the front and on the bottom) are used for taking pictures of surveyed objects or survey sites (front) and for centering the receiver on the point (bottom).

2.7. Mounting

Three connectors for mounting TRIUMPH-VS on tripods, monopods, poles and machines.

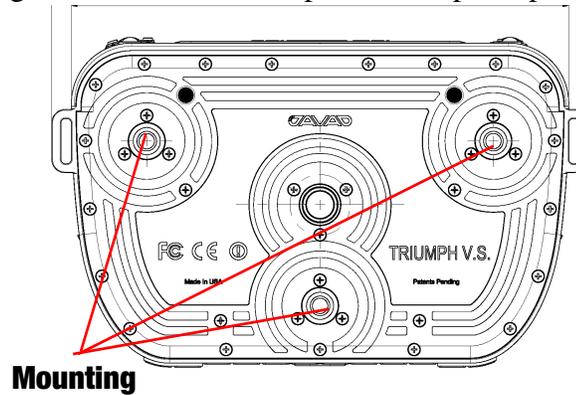


Figure 8. TRIUMPH-VS Mounting

2.8. Cables

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

Power cable 14-578101-01	
Power supply with SAE connector 22-570101-01	
Power cable 14-508053-01	
USB cable 14-578104-01	
Ethernet cable 14-578105-01	

Description and Operation

Getting Acquainted

Accessories

2.9. Accessories

The TRIUMPH-VS receiver package includes the following accessories:

4GB Micro SD card 30-590212-01	
TRIUMPH-VS pole 30-590210-01	
TRIUMPH-VS soft carrying case 20-590204-01	
Triumph-VS Support Legs 21-590299-11	
TRIUMPH-VS Shoulder Strap 30-590209-01	
TRIUMPH-VS 3 Mount Survey Tripod Adaptor 02-590290-01	
TRIUMPH-VS 1/4-20 to 5/8-11 adapter 10-590293-01	
Mouse pad 21-590282-01	
Tweezers Straight Spade Tip, Smooth, 4-1/2inch, SS 34-000004-01	
Stereo Headset 30-590213-01	
TRIUMPH-VS / Victor VS Headset Bung 21-590301-01	
TRIUMPH-VS Sun Visor 04-590276-05	

3. Operation

3.1. Software installation

The data exchange with TRIUMPH-VS can be performed using Justin Link software. It allows running Triumph-VS media files and editing objects attributes and styles. Although RTK is the main mode for field positioning, Justin Link is able to improve the position by recalculating base coordinates and GNSS data post processing.

To connect to Justin Link are needed:

- *Active Sync* (for Windows XP) - Microsoft software for connecting the receiver to the PC as mobile device.
- *Windows Mobile Device Center* (for Windows Vista and Windows XP) - Microsoft software for connecting the receiver to the PC as mobile device.

3.2. Installing Optional SIM Cards

TRIUMPH-VS is equipped with two SIM card slots, to allow using two SIM cards and switching between two different cell providers. The SIM card can be purchased at your local cellular phone supply store.

The SIM card must have GPRS support to provide an Internet connectivity in the field, where WiFi is not available. The SIM card must support Circuit Switched Data to establish the direct communication between GSM-capable receivers.

Note: Before SIM card installing in TRIUMPH-VS, it is recommended to remove PIN code using your cell phone.

1. Ensure the receiver is turned off.
2. Using both hands, gently push the battery pack upward, to remove it. Rest your thumbs against the receiver case, with other fingers push the battery up.



Figure 9. TRIUMPH-VS battery removing

Description and Operation

Operation

Charging the Batteries

3. Open the SIM1 or SIM2 card cover.

Note: If you intend to insert only one SIM card, always insert it to the SIM1 slot.

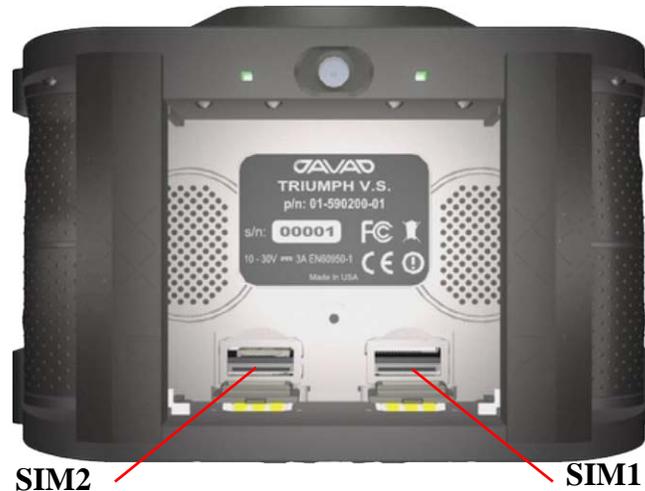


Figure 10. SIM card slots

4. Gently insert the SIM card contacts facing up into SIM card holder until it clicks.
5. Close the cover.
6. Place the battery pack back into the receiver, make sure it is firmly established.

3.3. Charging the Batteries

CAUTION: Risk of explosion if battery is replaced by an incorrect type. Dispose of used battery according to the instructions.

Before beginning to work, fully charge the batteries for maximum operating time. An approximately 6-hour charge cycle will fully charge the batteries; the batteries will charge simultaneously. The batteries can not be overcharged.

Note: The batteries are shipped from the factory with 40% of power. Fully charge the batteries before surveying. The Li-Ion batteries used in the battery packs should run at no less than 80% capacity after 500 charging cycles. These batteries do not need to be drained before recharging.

DANGER: NEVER ATTEMPT TO OPEN THE CASING OF THE DETACHABLE BATTERIES! LITHIUM-ION BATTERIES CAN BE DANGEROUS IF MISHANDLED!

DANGER: DO NOT INCINERATE OR HEAT BATTERY PACK ABOVE 212 DEGREES FAHRENHEIT (100 DEGREES CELSIUS). EXCESSIVE HEAT CAN CAUSE SERIOUS DAMAGE AND POSSIBLE EXPLOSION.

DANGER: THE BATTERIES (OR BATTERIES INSTALLED) SHALL NOT BE EXPOSED TO EXCESSIVE HEAT SUCH AS SUNSHINE, FIRE OR THE LIKE.

Warning: *Do not attempt to open the battery pack.*

Warning: *Do not disassemble the battery pack.*

Warning: *Do not charge in conditions different than specified.*

Warning: *Do not use other than the specified battery charger.*

Warning: *Do not short circuit the battery pack.*

Warning: *Do not crush or modify the battery pack*

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 TRIUMPH-VS. 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 rated for Outdoor Use and have an output rated for 10...30 V DC, 5A. This may not be the same range as other JAVAD GNSS products with which you are familiar.

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.*

Powering receiver

To charge the receiver internal batteries without removing, take the following steps:

- Plug the Receiver-to-SAE cable's 5-pin connector into the power port of the receiver (14-578101-01).
- Connect the opposite end of this cable with the battery charger's SAE connector (22-570101-01).

Description and Operation

Operation

Turning On/Off the Receiver

- Plug the other end of this cable into an AC outlet with cable (14-508053-01).
- Leave overnight.

To charge the battery pack, use the TRIUMPH-VS charger (99-590400-01). Remove the battery as shown in Figure 9 on page 17. Place the battery pack to charger and leave overnight.



Figure 11. Charger

3.4. Turning On/Off the Receiver

To turn ON the receiver, press and hold the power button on the top of TRIUMPH-VS.

To turn OFF the receiver, press and hold the power button for more than one seconds (until the special *Power Off* screen appears). This delay (about 1 second) will prevent the receiver from being turned off by mistake. Select the desired action.



Figure 12. Power Off

- *Turn off* - tap to turn the receiver off;
- *Restart* - tap to restart;
- *Exit Program* - tap to exit to Windows
- *Cancel* - return to main window.

3.5. Mounting Method

The pole mounting options for the TRIUMPH-VS are many. You can use a conventional 5/8" rover rod, tripod (with 5/8" coarse thread), or a 1/4"-20 threaded monopod (included with the TRIUMPH-VS as a standard accessory).



Figure 13. TRIUMPH-VS on monopod

Mounting can be performed either eccentrically or in any of the three offset attachment points. If you use an offset attachment point, you simply set the options in the TRIUMPH-VS so that it will adjust the position to eccentric using the compass and clinometers. You also have the option of using the bottom camera to center the TRIUMPH-VS over a point visually (and of course snap an image at the same time as you collect the point). This use of a graduated monopod is a new idea from JAVAD GNSS. Because you don't need a level bubble (the TRIUMPH-VS clinometers take care of that), monopod use is a convenient and simple option.



Figure 14. TRIUMPH-VS on tripod

Description and Operation

Operation

Mounting Method



Figure 15. TRIUMPH-VS on hands

To select the mounting method, follow the steps:

1. Tap *Settings* ▶ *Mounting Method*.
2. Select the desired mounting method (Figure 16 on page 22)

Note: The mounting method is effective only when the internal antenna is used.

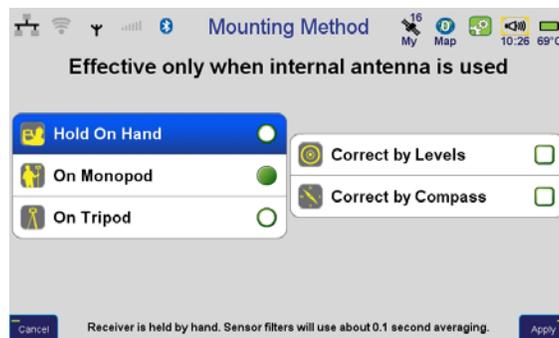


Figure 16. Mounting Method

To use inclinometers and compass corrections select the appropriate check marks.

To center the receiver when *Hold on Hand* mounting method is selected, double tap on the screen center to activate the bottom camera.

3.6. Connecting to Internet

Establishing WiFi Connection

1. On the main screen tap the *Settings* icon:



Figure 17. Home screen

2. Tap *Communication* ▶ *WiFi*.

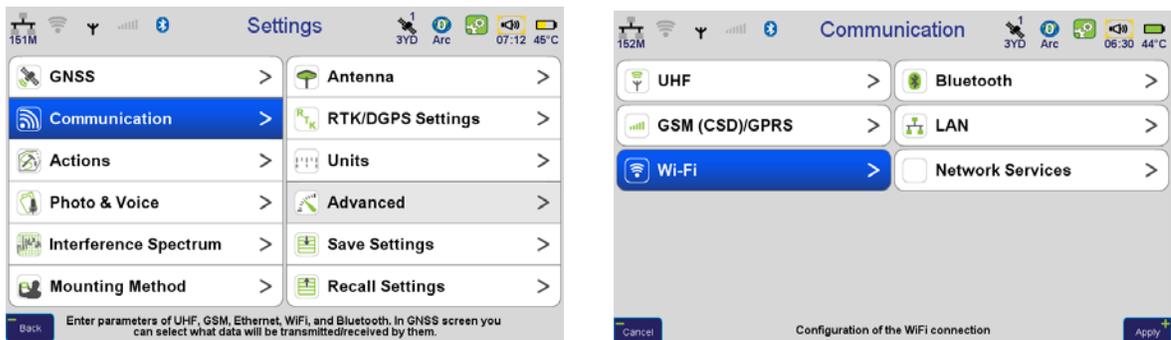


Figure 18. Communication ▶ Wi-Fi

3. Select the desired/available WiFi access point and tap *Connect*.



Figure 19. WiFi

Description and Operation

Operation

Connecting to Internet

- The connection will be established and the WiFi status icon will be active in the left top corner indicating the signal strength.

Establishing LAN Connection

- On the main screen tap the *Settings* icon.



Figure 20. Home screen

- Tap *Communication* ▶ *LAN*.

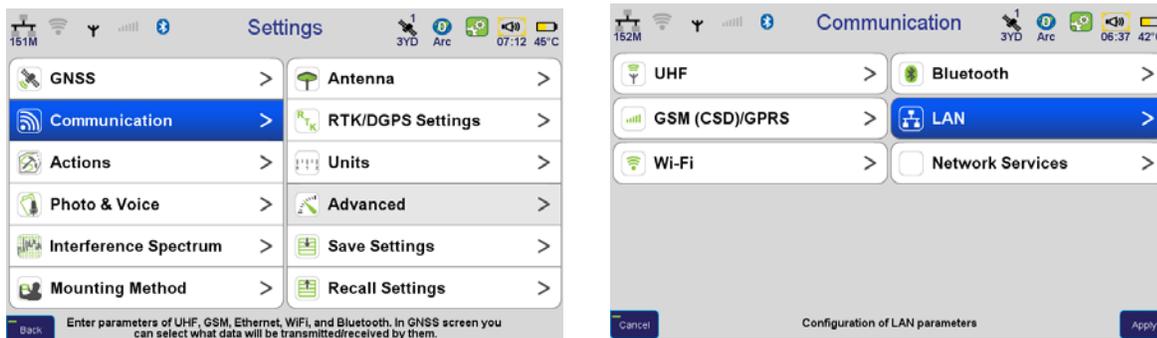


Figure 21. Communication ▶ LAN

- Enter the network parameters, such as IP, Net Mask, Gateway, DNS, then tap *Apply*.

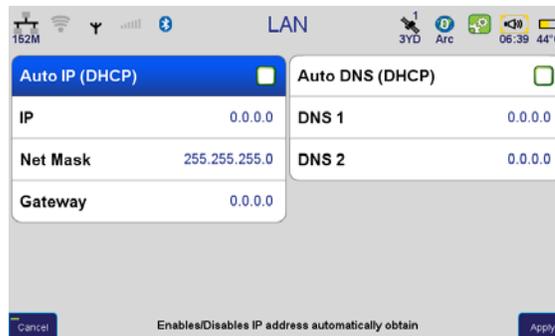


Figure 22. LAN parameters

Note: Contact your system administrator to obtain the required LAN parameters.

- The connection will be established and the LAN status icon will be active in the left top corner.

3.7. Checking OAF and Software Version

Checking 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 TRIUMPH-VS receiver according to particular needs, thus only purchasing those options needed.

Typically, all TRIUMPH-VS 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.

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

1. To check OAF and/or update options, tap *Support* on the *Main* screen:

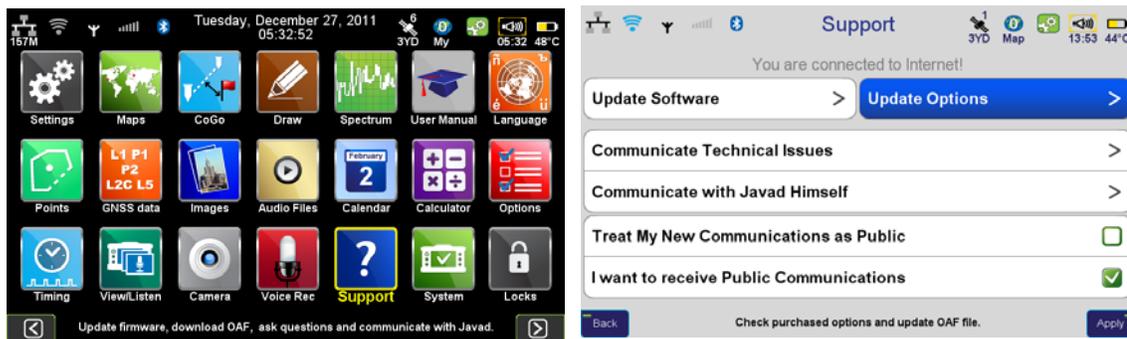


Figure 23. Support

Note: Base and Rover receivers must be loaded with the same software version. Use the latest version, available for download from the JAVAD GNSS website, to ensure your receiver has the most recent updates.

2. You can check the status of your receiver's options, and load any new OAFs tapping *Support* ▶ *Update options*.

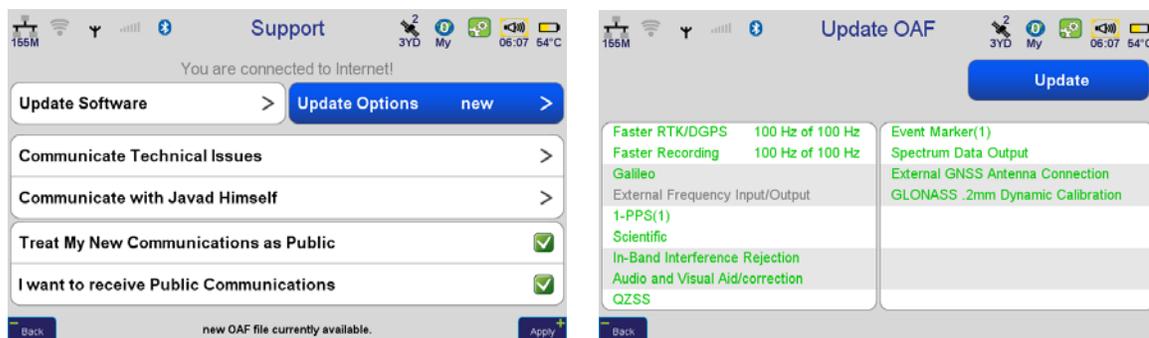


Figure 24. Support ▶ Update OAF

Description and Operation

Operation

Checking OAF and Software Version

Checking version and software updating

1. To update software version, tap *Support* on the *Main* screen, the *Update Software*:

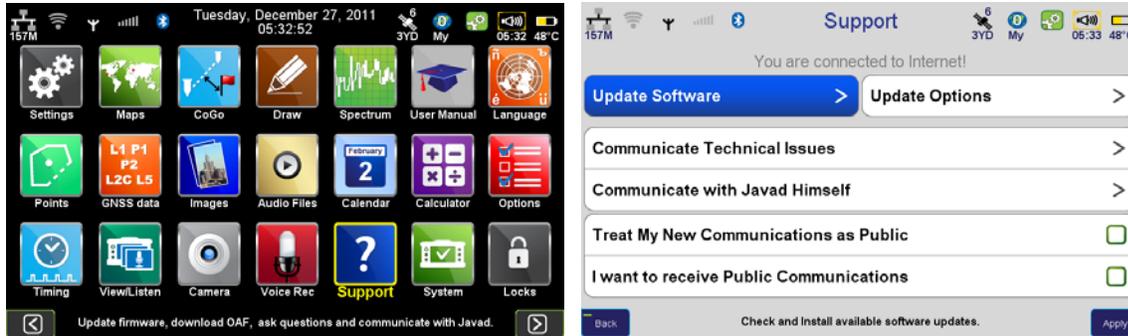


Figure 25. Support ► Update Software

2. The list of current software versions will be displayed and in red will be shown available updates. Tap *Update*.

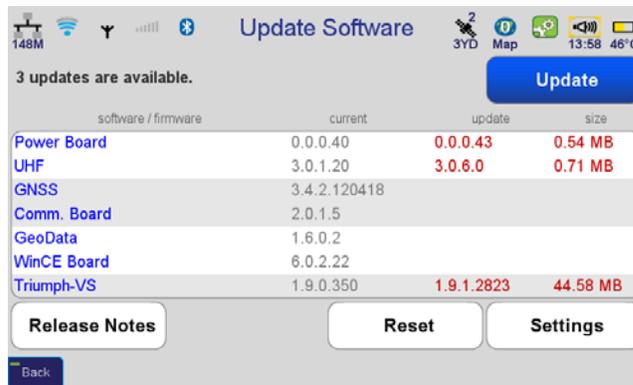


Figure 26. Update software

3.8. TRIUMPH-VS Configuration

To configure the receiver use *Settings* menu item



Figure 27. Settings

One by one configuring receiver's parameters, save them at once, tapping *Save Settings*. Here can be saved a lot of different configuration types for different jobs, all of them can be recalled at any time with *Recall Settings* item.



Figure 28. Save settings and Recall Settings items

All parameters and receiver configuration for different applications, will be described below.

Description and Operation

Base and Rover Setup

Base Station Configuration

4. Base and Rover Setup

Both Base and Rover receivers must be configured according to the desired survey method.

- In applications where real-time positioning results are required, the Base receiver provides the correction information needed to properly calculate the location of the Rover receiver. A Base station is normally set up over a known point and collects GPS/GLONASS data from satellites. As the receiver picks up satellite data, it measures the carrier and code phases to accurately compute and verify its location. Then, the receiver transmits this information via radio (UHF or GSM) to the Rover receiver.
- The Rover receiver applies correction information from the Base station to its current location to accurately calculate one or more points. Rovers are mobile GNSS receivers on a survey pole or bipod that compares the information from the Base station to the data it logs from satellites and applies correction algorithms to accurately calculate a new point.
- In applications intended for post-processing, the receivers typically log code phase and/or carrier phase measurements separately from common satellites and during the same time interval. This data is then processed using post-processing software (for example, Justin).

4.1. Base Station Configuration

Base via UHF modem

Note: To return to *Main* screen, press the *Home* button  on the front panel of TRIUMPH-VS.

Note: Always tap *Apply* or press the *Apply* button , to save the settings and parameters into receiver's memory.

1. To set up the base station, tap *Settings* on the *Main* screen:



Figure 29. Settings

2. Then *Communication* ▶ *UHF*:



Figure 30. Communications ▶ UHF

3. Set the UHF modem parameters:

- Frequency
- Protocol and its parameters
- Output power
- Specify the antenna (external or internal)



Figure 31. UHF parameters

Description and Operation

Base and Rover Setup
Base Station Configuration

- To setup the frequency, select the value from the list, by tapping on the *Frequency*. If there is no needed frequency value, tap *Add* or *Edit* and insert/edit the frequency:

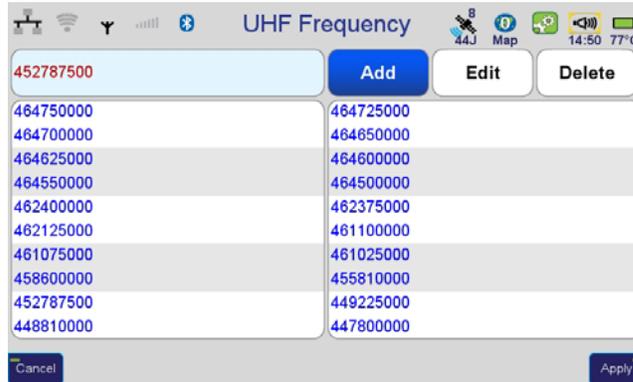


Figure 32. UHF Frequency

- The protocol parameters can be reviewed/ changed by tapping on the *Protocol* button. Use JAVAD protocol type if base and rover are the JAVAD GNSS receivers .



Figure 33. Protocol parameters

- Modem is configured now. Return to *Main* screen and tap *Settings* ▶ *GNSS*.



Figure 34. GNSS

- Tap *Receive Data (Rover)* and ensure the reception from all channels is turned off.

- Then tap *Transmit Data (Base)* and set up the parameters of the transmit data: RTK-JPS full and period 1 Hz.



Figure 35. Transmit data parameters

- Click on the UHF icon, check the *Sent* parameter. Ensure this parameter value is on the increase.

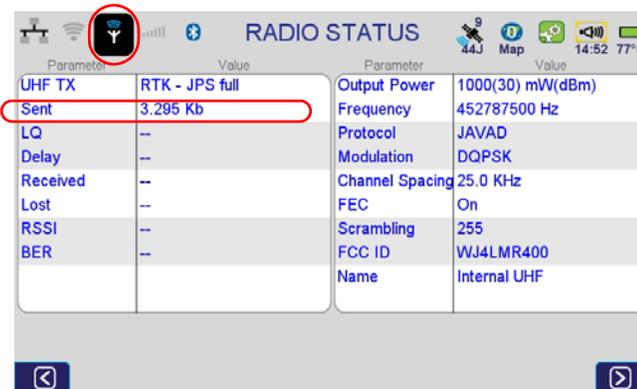


Figure 36. Status of the radio

- Specify antenna parameters and antenna height. Tap *Settings* ▶ *Antenna*:

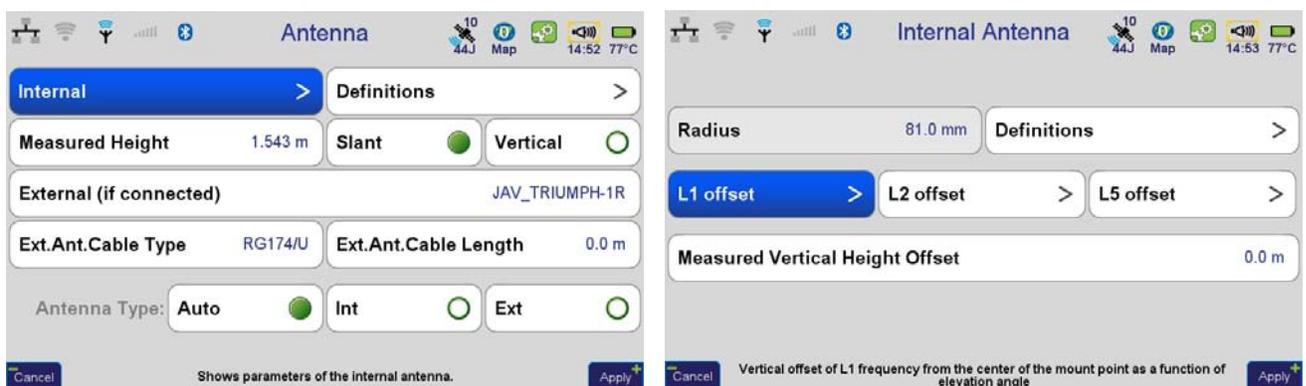


Figure 37. Antenna parameters

Select antenna type (internal/external) and enter the antenna height. If the internal antenna is selected, specify the vertical height offset for Triumph-VS (0.04 m).

Description and Operation

Base and Rover Setup

Base Station Configuration

11. Specify the mounting method (*Settings ▶ Mounting Method*) - *On Tripod*. Disable *Correct by Compass*, *Correct by Level*, and *Lift&Tilt*.

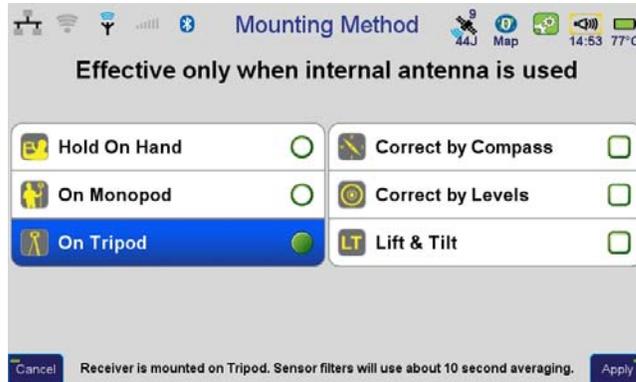


Figure 38. Mounting Method

12. Ensure the receipt of the satellite signals is turned on, tap *Settings ▶ GNSS*:



Figure 39. GNSS

13. If the data recording for base station is needed, activate the data recording in *Record Data*, specify what data will be recorded to internal memory and/or SD card:

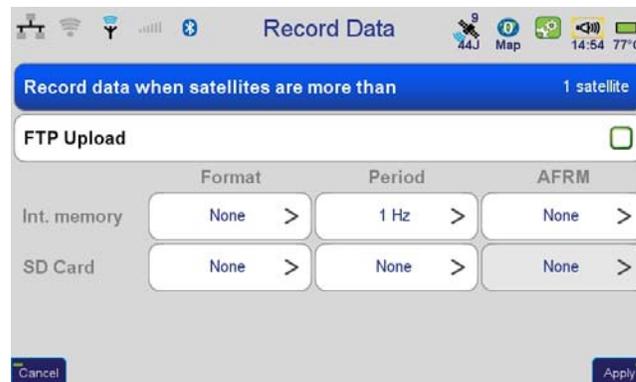


Figure 40. Record data

14. Set up the duration: stop record manually or specify the time. Disable *Delay* and *Auto repeat*:

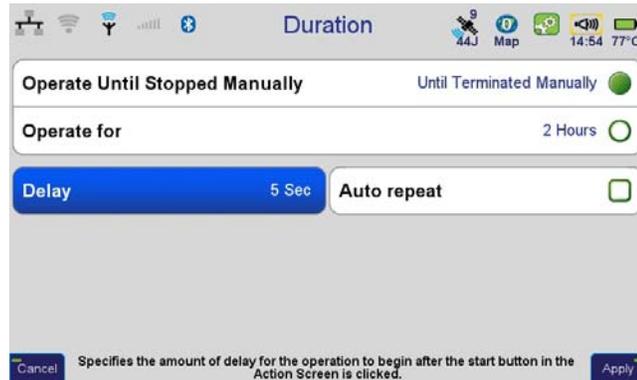


Figure 41. Duration parameters

15. Tap *Settings* ▶ *Actions*, and select *Fixed Base Station*

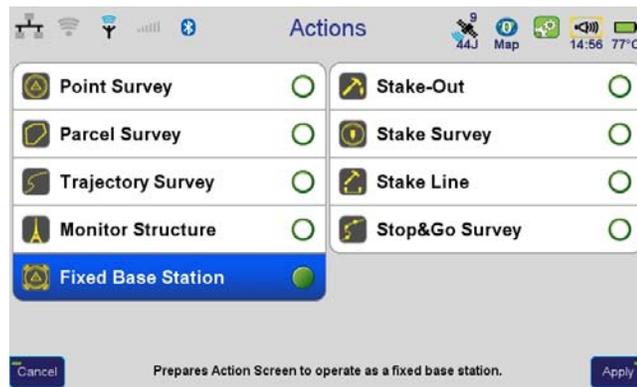


Figure 42. Actions ▶ Fixed Base Station

16. Press *Action* button  on the front of TRIUMPH-VS to switch to *Action* screen. Tap on the Fixed Base Station name and set the base parameters :



Figure 43. Base station parameters

Description and Operation

Base and Rover Setup

Base Station Configuration

17. Enter Base station coordinates: *Base Station Coordinates* ▶ *Enter Position*:



Figure 44. Base station position

18. Tap *Apply* on all screens, then return to *Action* screen (by pressing *Action* button).



Figure 45. Action screen

19. To disable Base station, after finishing the work, tap *Settings* ▶ *GNSS* ▶ *Transmit Data (Base)*, and set UHF modem format to None. Otherwise the base station operation will continue.

Base via GSM modem

The base can transmit corrections via internal GSM modem.

1. Tap *Settings* ▶ *Communication* ▶ *GSM (CSD)/GPRS*.

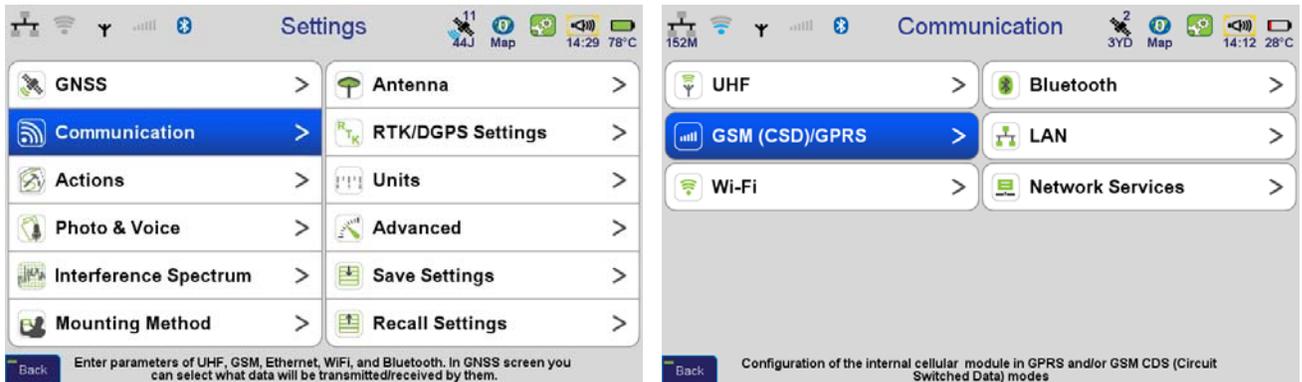


Figure 46. Communication ▶ GSM (CSD)/GPRS

2. Tap *Settings* and specify what SIM card will be used for data transfer, enter PIN code and additional settings.



Figure 47. SIM card settings

3. The modem is configured. The receiver should be configured now for transmit corrections to rover(s).
4. Repeat the steps described on page 32 (apply all settings to GSM modem, not UHF). Enter antenna parameters, mounting method, duration, base station position, etc.).

Description and Operation

Base and Rover Setup

Base Station Configuration

5. Tap *Apply* on all screens, then return to *Action* screen (by pressing *Action* button).



Figure 48. Action screen

6. To disable Base station, after finishing the work, tap *Settings* ▶ *GNSS* ▶ *Transmit Data (Base)*, and set GSM modem format to *None*. Otherwise the base station operation will continue.

Base via GPRS/EDGE modem

The corrections can be transmitted from the base station via GPRS/EDGE modem. However, SIM card should have static IP-address. Otherwise, after each connect to the network IP-address of the base receiver will be a new one. Also the access to this address should be enabled. Check with your mobile operator that such opportunities are available to your SIM-card.

1. Tap *Settings* ▶ *Communication* ▶ *GSM (CSD)/GPRS*.

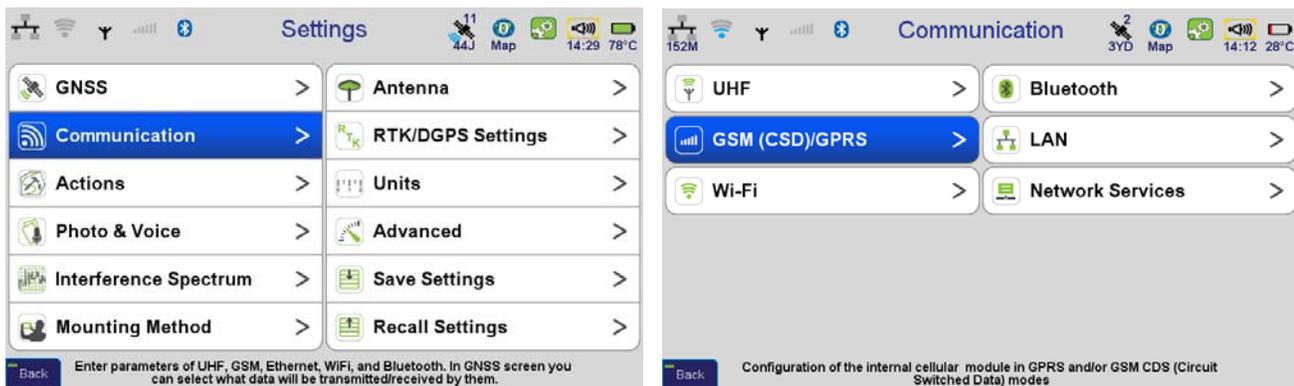


Figure 49. Communication ▶ GSM (CSD)/GPRS

2. Tap *Settings* and specify what SIM card will be used for data transfer, enter PIN code and additional settings.

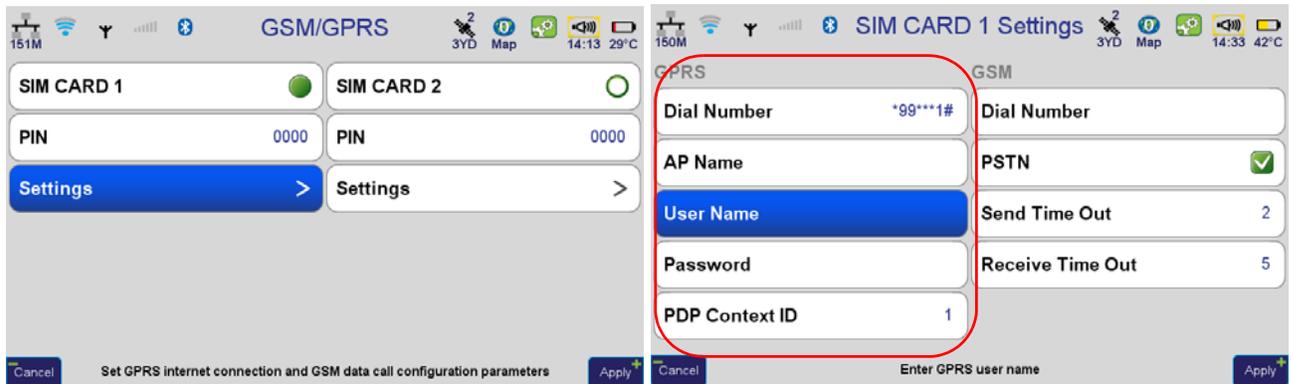


Figure 50. SIM card settings

3. Now the password to access to the base should be specified. Tap *Communication* ▶ *Network Services* ▶ *TCP server*.

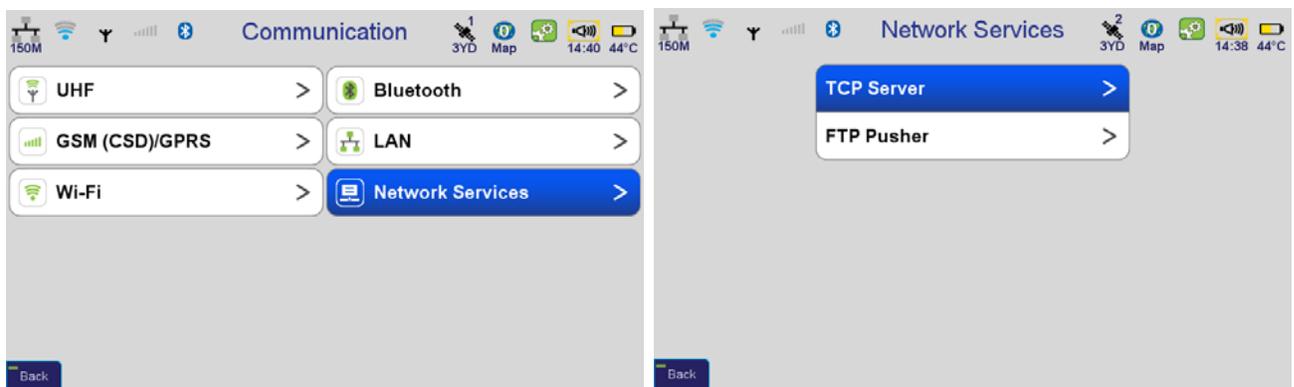


Figure 51. Network Services ▶ TCP server

4. Set server parameters, port and password, tap *Apply*:

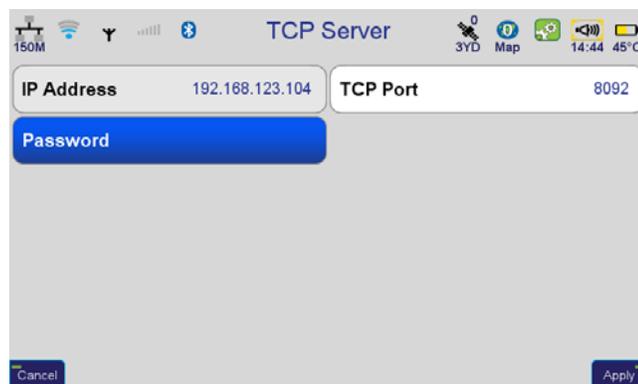


Figure 52. TCP server parameters

5. The modem is configured. The receiver should be configured now for transmit corrections to rover(s).

Description and Operation

Base and Rover Setup

Base Station Configuration

- Repeat the steps described on page 32 (apply all settings to TCP server). Enter antenna parameters, mounting method, duration, base station position, etc.).
- Ensure the SIM card is registered in network and has IP-address. Tap GSM status icon on the screen's top, wait until SIM card will be registered in network. It should be: SIM card READY; Network REGISTERD.
- Tap again *Communication* ▶ *Network Services* ▶ *TCP server* and check IP address. Write it down to use on in the rover side.



Figure 53. IP address

- Tap *Apply* on all screens, then return to *Action* screen (by pressing *Action* button).



Figure 54. Action screen

- To disable Base station, after finishing the work, tap *Settings* ▶ *GNSS* ▶ *Transmit Data (Base)*, and set GSM modem format to *None*. Otherwise the base station operation will continue.

Triumph-1 as a Base (configured through Triumph-VS)

This configuration example describes how to configure TRIUMPH-1 as a base station using TRIUMPH-VS as a controller connected to TRIUMPH-1 using Bluetooth.

Note: Please do not forget to attach the UHF/GSM antenna to TRIUMPH-1.

Attaching Optional UHF/GSM Antenna to TRIUMPH-1

A broadband, rugged, in-building or outdoor antenna designed to service the whole 406-470 MHz UHF band and GSM quad band. With modest dimensions of 25 mm (OD) x 182 mm (height), this antenna radiates with a typical peak omnidirectional gain of +1 dBi. Internally, the radiating element is DC shunted to help protect the transceiver from nearby, but not direct ElectroStatic Discharge (ESD).

The TRIUMPH-1 modem antenna can be mounted on standard poles (5/8-11 inches thread). Attached to the TRIUMPH-1 receiver this antenna gets a part of survey pole, making handling with receiver easy and simple.



Figure 55. TRIUMPH-1 External UHF/GSM Antenna

TRIUMPH-1 Placement Recommendations

- TRIUMPH-1 should be placed on a stable surface, and antenna should be positioned horizontally.
- Ensure TRIUMPH-1 is placed on a place with maximum satellites visibility (open sky) and minimum multipath.
- Lift TRIUMPH-1 to the maximum height (to provide maximum transmission range of the corrections using UHF radio).

Note: If the radio range is insufficient, it is recommended to use an external radio HPT404BT or HPT435BT.

TRIUMPH-1 as a Base Setup

1. To configure TRIUMPH-1 via TRIUMPH-VS, place TRIUMPH-VS at a distance of no more than 8 meters from the TRIUMPH-1 (to ensure a reliable connection between the Bluetooth devices).
2. Turn on both receivers.

Note: To return to TRIUMPH-VS's *Main* screen, press the *Home* button  on the front panel of TRIUMPH-VS.

Note: Always tap *Apply* or press the *Apply* button , to save the settings and parameters into receiver's memory.

Description and Operation

Base and Rover Setup

Base Station Configuration

3. On the TRIUMPH-VS *Main* screen tap *System* ▶ *Connection Mode* and then *External Receiver*:

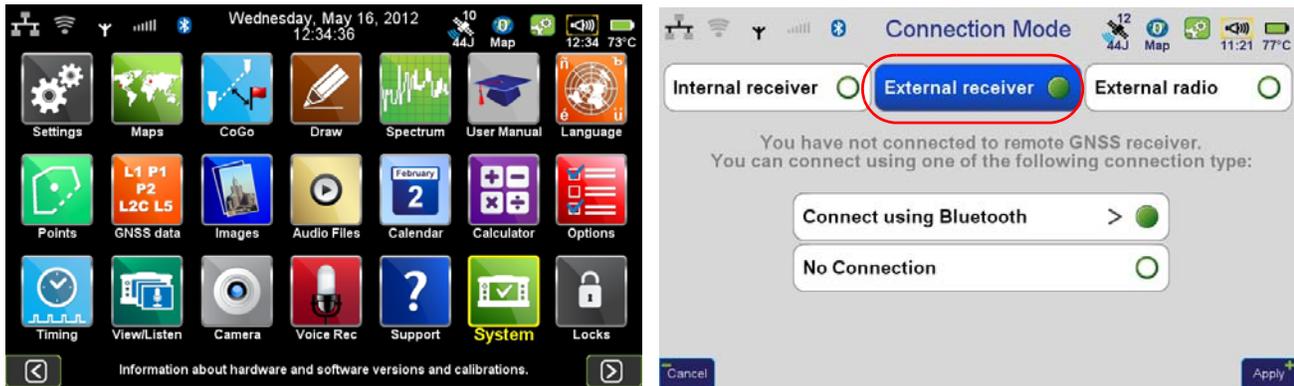


Figure 56. System ▶ Connection Mode ▶ External Receiver

4. Tap *Connect using Bluetooth*, the Bluetooth connection window will appear:



Figure 57. Bluetooth connection window

Note: Red color of the satellites icon means TRIUMPH-1 is not connected yet and cannot track satellites

5. Tap *Discovery* and after the Bluetooth devices are discovered select your TRIUMPH-1 from the list and tap *Connect*. When the connection will be established the Bluetooth icon will become green and satellites icon will show the number of tracked satellites.



Figure 58. TRIUMPH-1 is connected to TRIUMPH-VS

6. To set up the Base station, tap *Settings* on the *Main* screen:



Figure 59. Settings

7. Then *Communication* ▶ *UHF*:



Figure 60. Communications ▶ UHF

8. Set the UHF modem parameters:

- Frequency
- Protocol and its parameters
- Output power
- Specify the antenna (external or internal)



Figure 61. UHF parameters

Description and Operation

Base and Rover Setup

Base Station Configuration

- To setup the frequency, select the value from the list, by tapping on the *Frequency*. If there is no needed frequency value, tap *Add* or *Edit* and insert/edit the frequency:

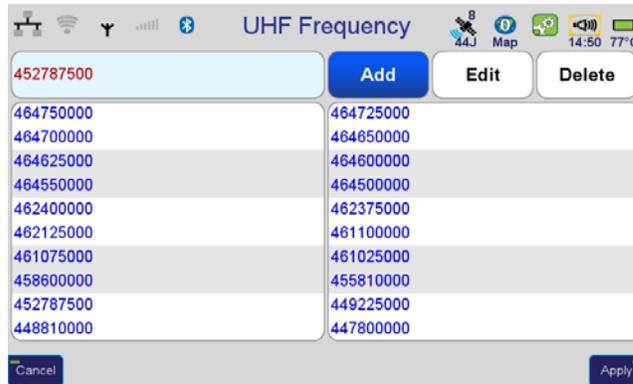


Figure 62. UHF Frequency

- The protocol parameters can be reviewed/ changed by tapping on the *Protocol* button. Use JAVAD protocol type if base and rover are the JAVAD GNSS receivers .



Figure 63. Protocol parameters

- Modem is configured now. Return to *Main* screen and tap *Settings* ▶ *GNSS*.



Figure 64. GNSS

- Tap *Receive Data (Rover)* and ensure the reception from all channels is turned off.

13. Then tap *Transmit Data (Base)* and set up the parameters of the transmit data: RTK-JPS full and period 1 Hz.

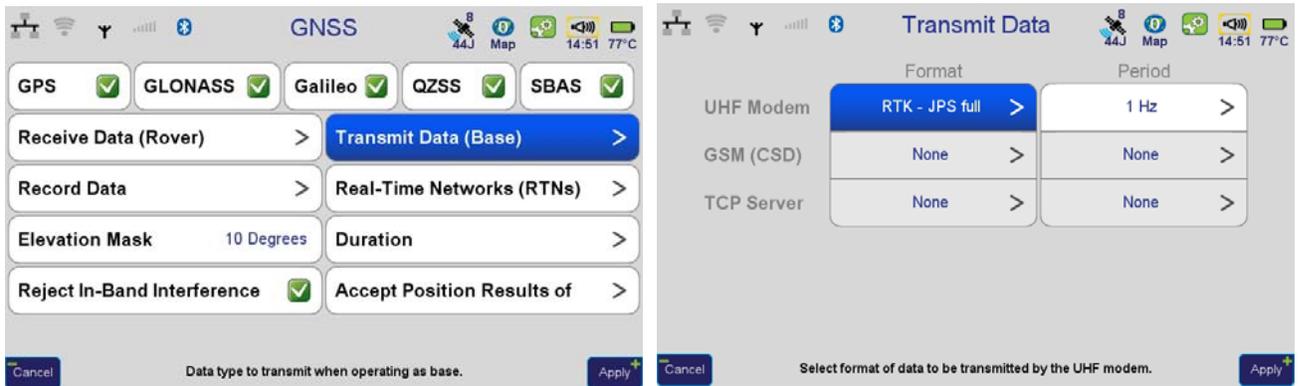


Figure 65. Transmit data parameters

14. Specify antenna parameters and antenna height. Tap *Settings* ▶ *Antenna*:

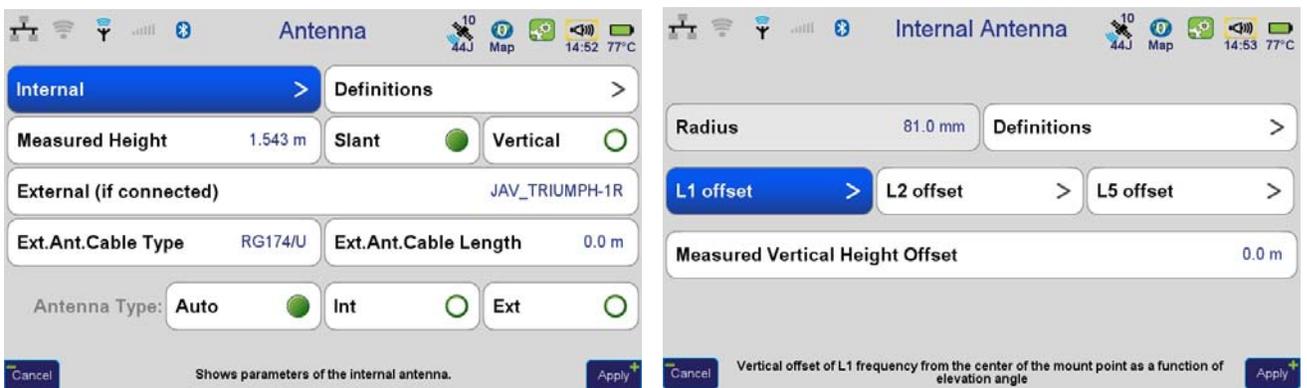


Figure 66. Antenna parameters

Select antenna type (internal/external) and enter the antenna height.

15. Specify the mounting method (*Settings* ▶ *Mounting Method*) - on tripod. Disable *Correct by Compass*, *Correct by Level*, and *Lift&Tilt*.

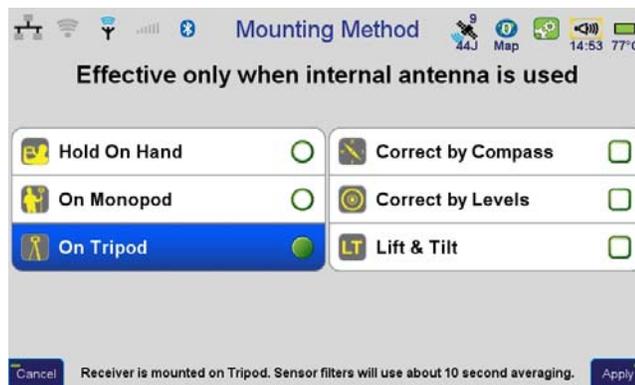


Figure 67. Mounting Method

Description and Operation

Base and Rover Setup

Base Station Configuration

16. Ensure the receipt of the satellite signals is turned on, tap *Settings* ▶ *GNSS*:



Figure 68. GNSS

17. If the data recording for base station is needed, activate the data recording in *Record Data*, specify what data will be recorded to internal memory and/or SD card:

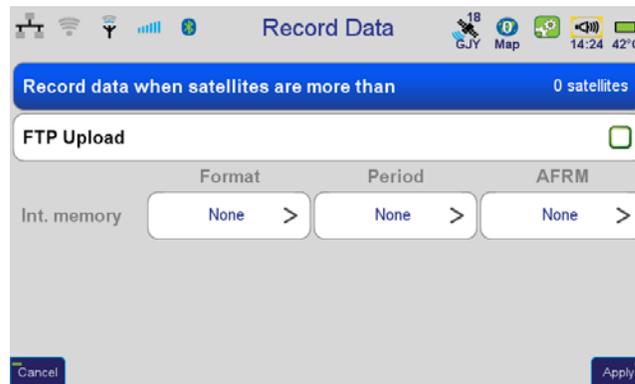


Figure 69. Record data

18. Set up the duration: stop record manually or specify the time. Disable *Delay* and *Auto repeat*:

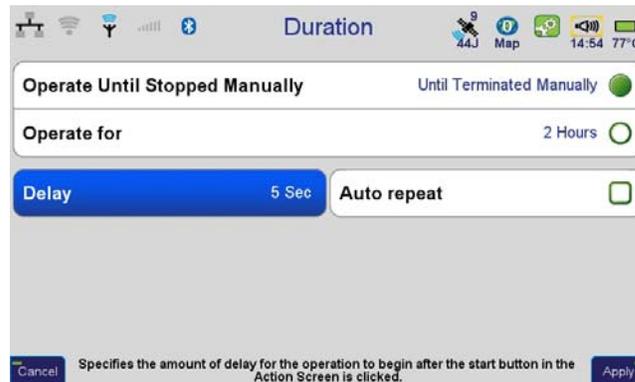


Figure 70. Duration parameters

19. Tap *Settings* ▶ *Actions*, and select *Fixed Base Station*

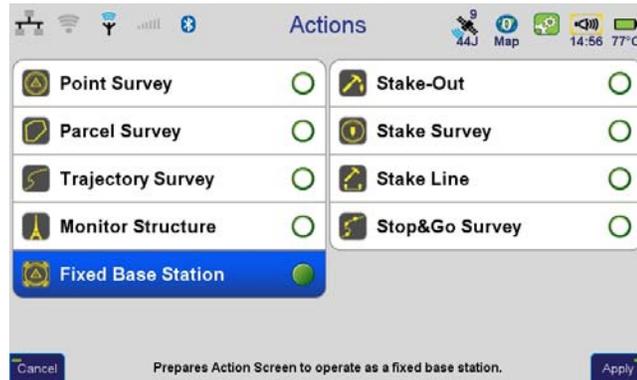


Figure 71. Actions ▶ Fixed Base Station

20. Press *Action* button on the front of TRIUMPH-VS to switch to *Action* screen. Tap on the Fixed Base Station name and set the base parameters :

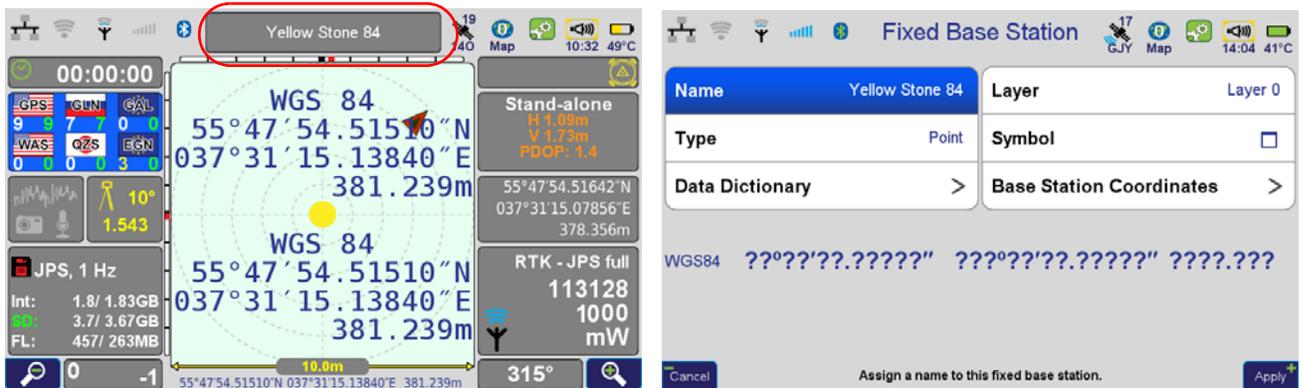


Figure 72. Base station parameters

21. Enter Base station coordinates: *Base Station Coordinates* ▶ *Enter Position*:



Figure 73. Base station position

22. Tap *Apply* on all screens, then return to *Action* screen (by pressing *Action* button).

Description and Operation

Base and Rover Setup

Base Station Configuration

23. Press *Action* button  , to switch to *Command* screen and tap *Start*. To stop the base operation tap *Stop*.

	Yellow Stone 84	Start
0.746m 1.21m	0	Stop
	--	Clear

Figure 74. Command screen

24. Now base station is configured. Please do not move it!
25. In the *Action* screen ensure the base station is transmitting corrections:



Figure 75. Base station is transmitting corrections

26. To disable Base station, after finishing the work, tap *Settings* ▶ *GNSS* ▶ *Transmit Data (Base)*, and set UHF modem format to None. Otherwise the base station operation will continue.

27. On the Main screen tap *System* ▶ *Connection Mode*, then *Internal receiver*. Tap *Apply*. Satellites icon will show the number of tracked satellites.



Figure 76. Disconnect from external receiver

28. Tap *Settings* ▶ *Communication* ▶ *Bluetooth* and tap *Disconnect*, to disconnect TRIUMPH-VS from TRIUMPH-1. The Bluetooth icon will become white and the satellites icon red, this means TRIUMPH-VS is disconnected.

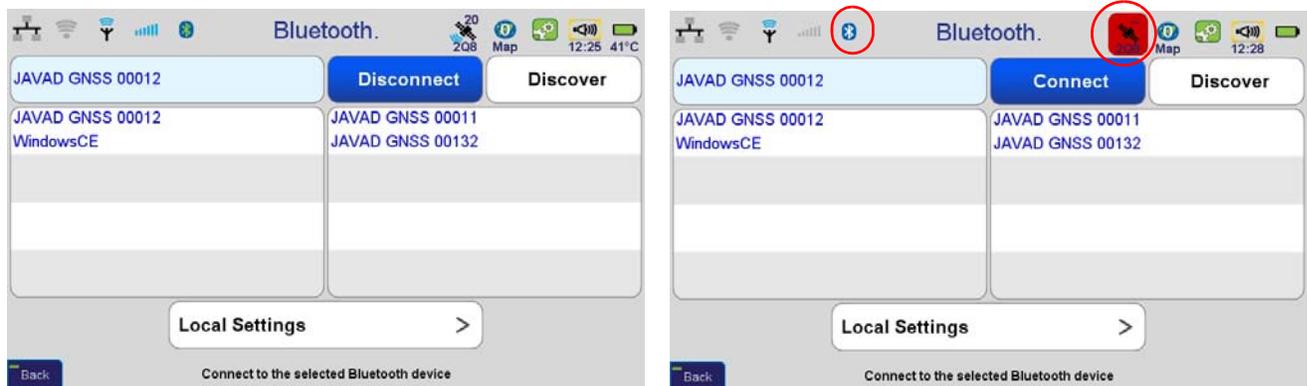


Figure 77. TRIUMPH-VS is disconnected from TRIUMPH-1

4.2. Rover Configuration

To obtain precise position, a radio communication link is maintained between the base receiver and the rover, and the base receiver supplies the corrections to the rover which computes its position and display the coordinates. Corrections from the base station or RTN can be received using the following:

- UHF modem
- GSM modem
- GPRS/EDGE modem via Internet

Hereby the first step in rover configuration is configuration the modem to receive the corrections.

Description and Operation

Base and Rover Setup

Rover Configuration

Configuring Rover to receive corrections

Rover via UHF modem

Note: To return to *Main* screen, press the *Home* button  on the front panel of TRIUMPH-VS.

Note: Always tap *Apply* or press the *Apply* button , to save the settings and parameters into receiver's memory.

1. To set up the rover, tap *Settings* on the *Main* screen:



Figure 78. Settings

2. Then *Communication* ▶ *UHF*:



Figure 79. Communications ▶ UHF

3. Set the UHF modem parameters:
 - Frequency
 - Protocol and its parameters

- Specify the antenna (external or internal)



Figure 80. UHF parameters

Note: All UHF parameters for rover, such as frequency, protocol parameters should be identical with the same base parameters.

4. To setup the frequency, select the value from the list, by tapping on the *Frequency*. If there is no needed frequency value, tap *Add* or *Edit* and insert/edit the frequency:

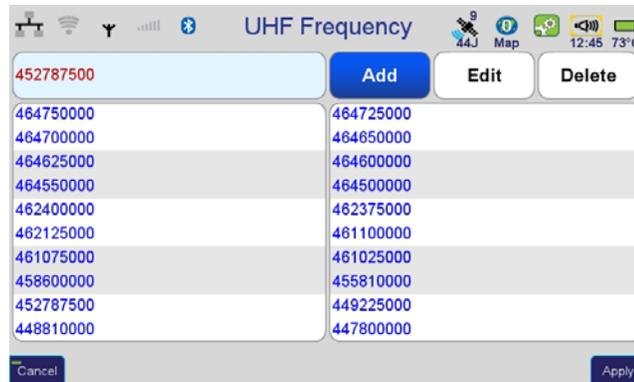


Figure 81. UHF Frequency

5. The protocol parameters can be reviewed/ changed by tapping on the *Protocol* button. Use JAVAD protocol type if base and rover are the JAVAD GNSS receivers .



Figure 82. Protocol parameters

Description and Operation

Base and Rover Setup

Rover Configuration

6. Modem is configured now.
7. Tap *Settings* ▶ *GNSS*. Ensure there is no specified data for transmitting (All *Transmit Data (Base)* formats should be set to None).
8. Tap *Receive Data (Rover)* ▶ *UHF* and select the same corrections type which was selected on the base:

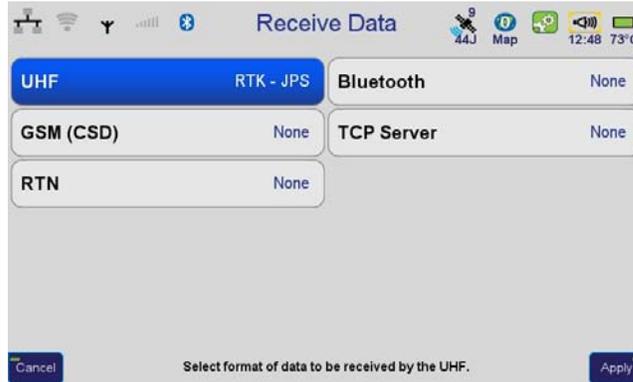


Figure 83. Receive Data

9. To ensure the rover receives the corrections via UHF, tap on the UHF status icon and check the *LQ* and *Received* parameter. Ensure *LQ* is 100%, and *Received* value is on the increase.

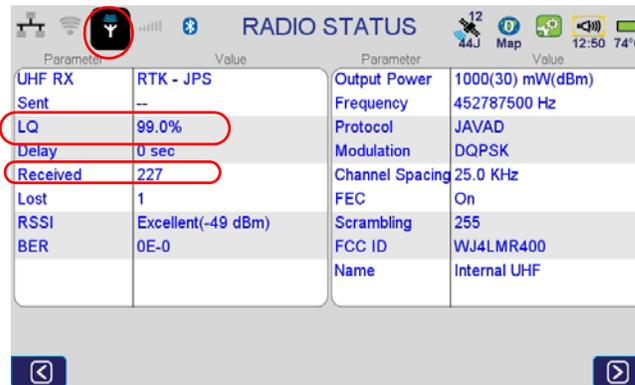


Figure 84. Status of the radio

10. Now rover is ready to receive the corrections from the base.



Figure 85. Rover is receiving corrections

Rover via GSM modem

1. Tap *Settings* ▶ *Communication* ▶ *GSM (CSD)/GPRS*.

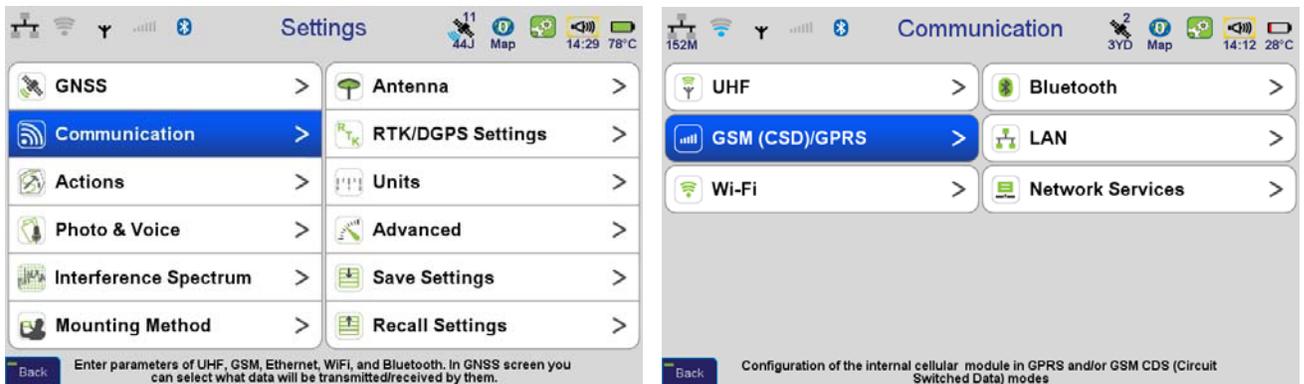


Figure 86. Communication ▶ GSM (CSD)/GPRS

2. Tap *Settings* and specify what SIM card will be used for data transfer, enter PIN code and enter the dial number of the base which GSM modem will dial for call:

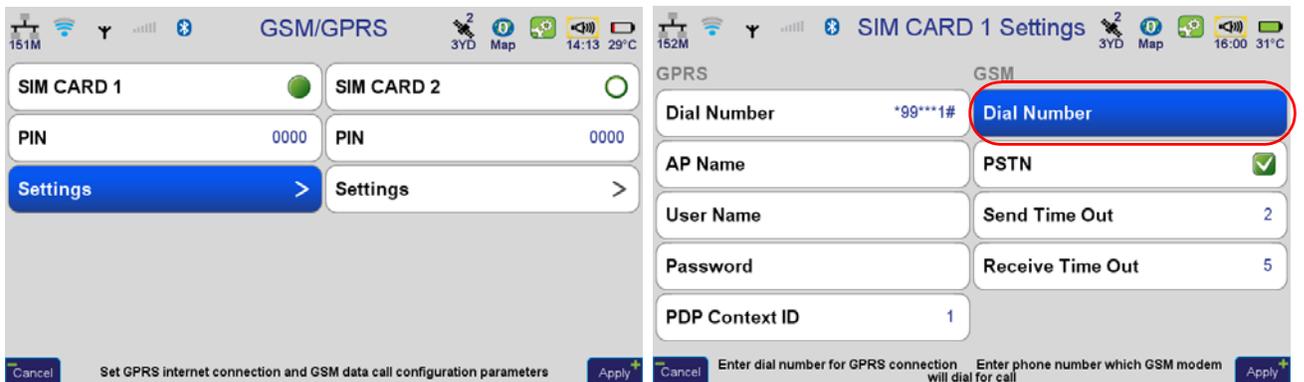


Figure 87. SIM card settings

Description and Operation

Base and Rover Setup

Rover Configuration

3. Tap *Settings* ▶ *GNSS*. Ensure there is no specified data for transmitting (*All Transmit Data (Base)* formats should be set to *None*).
4. Tap *Receive Data (Rover)* ▶ *GSM (CSD)* and select the same corrections type which was selected on the base:

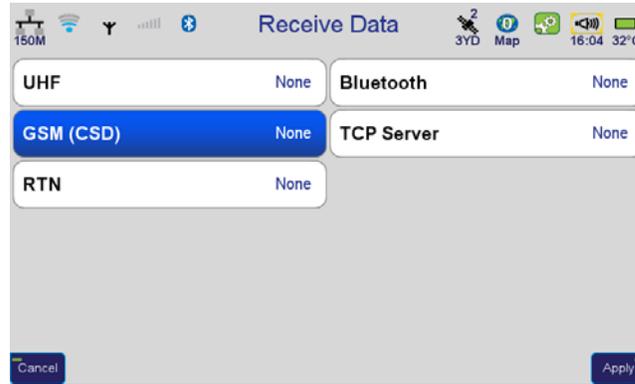


Figure 88. Receive Data

5. To ensure the rover receives the corrections via GSM, tap on the GSM status icon and check the *LQ* and *Received* parameter. Ensure *LQ* is 100%, and *Received* value is on the increase.

Rover via GPRS connection (RCV or NTRIP)

1. Tap *Settings* ▶ *Communication* ▶ *GSM (CSD)/GPRS*.

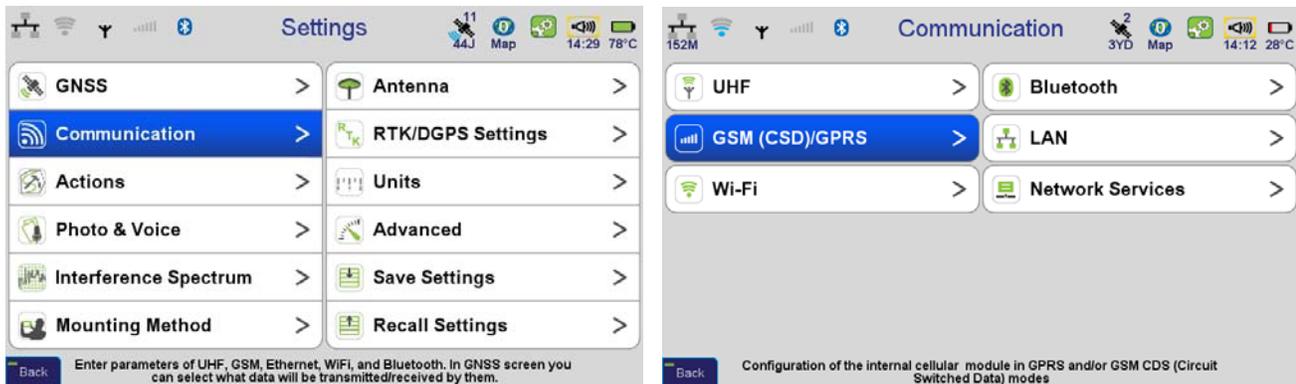


Figure 89. Communication ▶ GSM (CSD)/GPRS

2. Tap *Settings* and specify what SIM card will be used for data transfer, enter PIN code and enter the dial number of the base which GSM modem will dial for call:

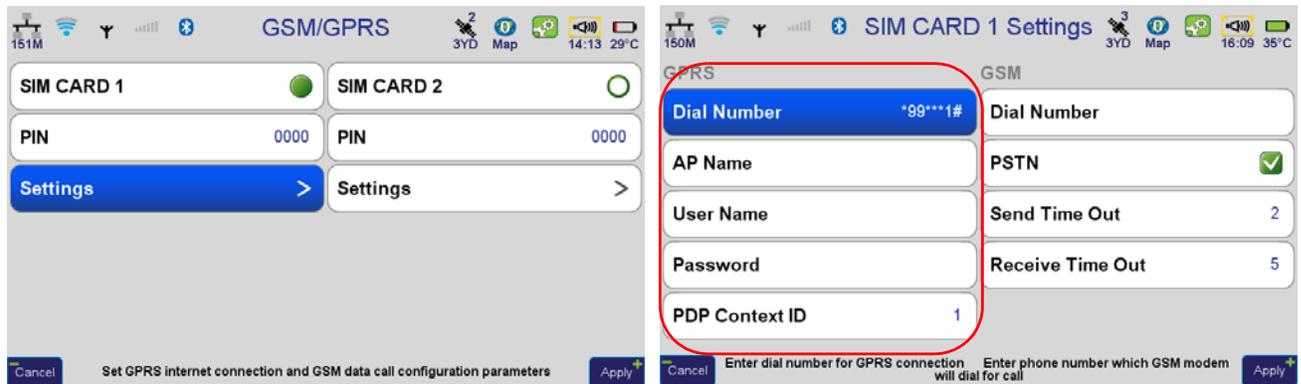


Figure 90. GPRS settings

3. Tap *Settings* ▶ *Real-Time Networks (RTNs)*, add the connection description by tapping *Add*. Select NTRIP or RCV.
 - To connect to NTRIP caster, enter server’s IP-address, TCP port, username, and password.



Figure 91. RTN NTRIP Client parameters

- To connect to RCV (TCP), enter appropriate parameters:

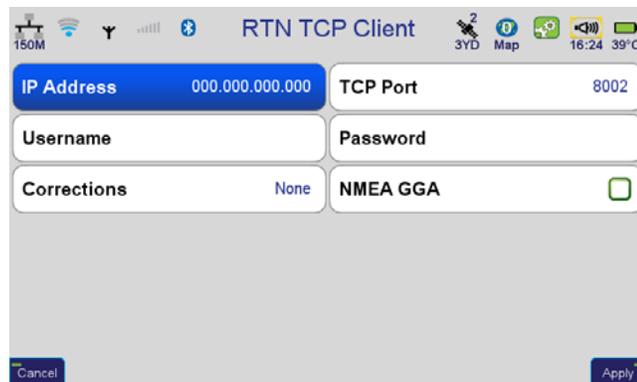


Figure 92. RTN TCP client parameters

Description and Operation

Base and Rover Setup

Rover Configuration

To start operation, connect to the specified service:

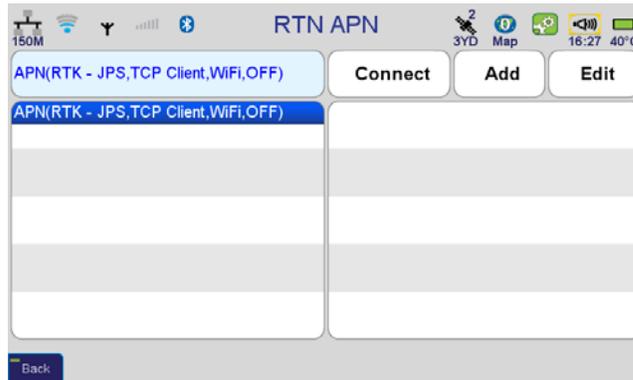


Figure 93. RTN APN

4. Tap GSM status and check the status: SIM card should be installed and registered in network, GPRS connection should be available.

Antenna height setup

Set the rover for correct work with heights.

1. Tap *Settings* ▶ *Mounting Method* and select *On Tripod*.
2. If TRIUMPH-VS is used as rover select *Correct by Compass* as well.
3. Activate *Lift & Tilt* mode if needed.
4. Return to Home screen, tap *Settings* ▶ *Antenna*. Set the antenna type (internal or external) and height of the tripod (*Measured Height*). If there are offsets (mounting for TRIUMPH-VS or UHF/GSM antenna for TRIUMPH-1), tap Internal and add these offsets.

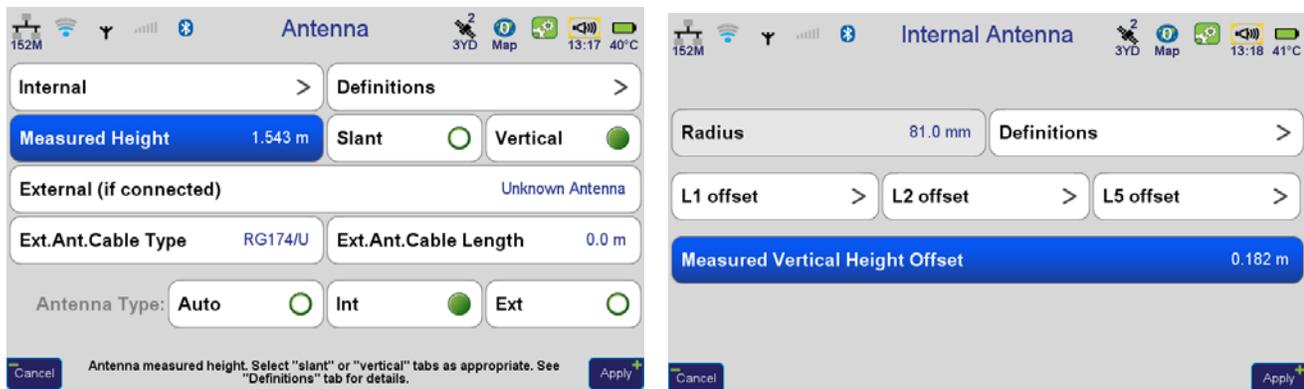


Figure 94. Antenna parameters

Other settings

Check other settings and ensure all parameters are set to the needed parameters according your tasks.

- In the GNSS set the Elevation Mask, activate In-band interference rejection. Set what data should be recorded and specify the destination (Internal memory or SD-card):

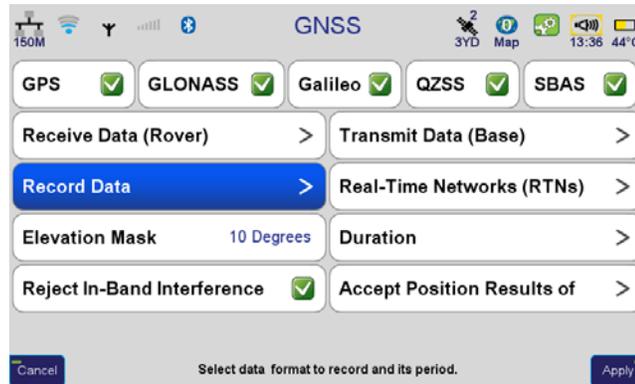


Figure 95. GNSS Parameters

- Tap *Duration* to set the survey duration. Keep *Auto repeat* disabled.

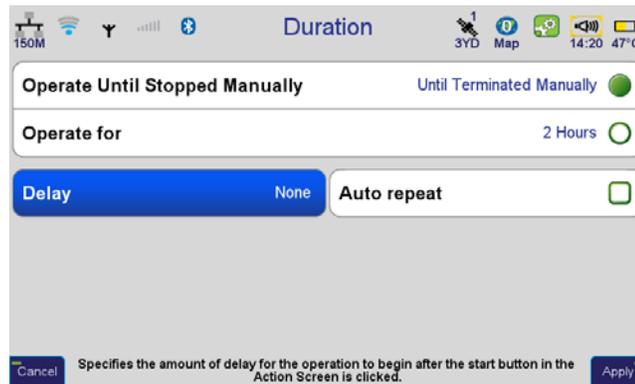


Figure 96. Duration

- Tap *Accept Position Results of* and specify what type of solution will be accepted: usually it is *RTK Fixed*:

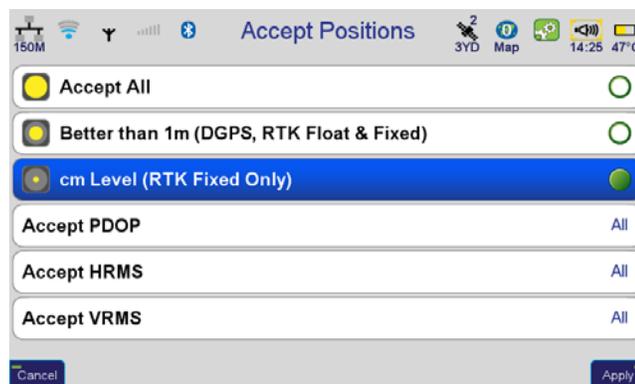


Figure 97. Solution type

Description and Operation

Base and Rover Setup

Rover Configuration

- Tap *Settings* ▶ *Photo&Voice*, to setup the parameters of picture capturing and voice recording or disable all these parameters:

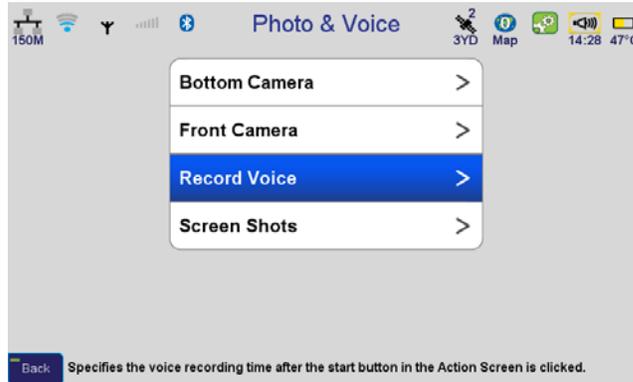


Figure 98. Audio- and video parameters

- Tap *Settings* ▶ *Interference Spectrum* and setup the parameters of spectrum recording (if needed):

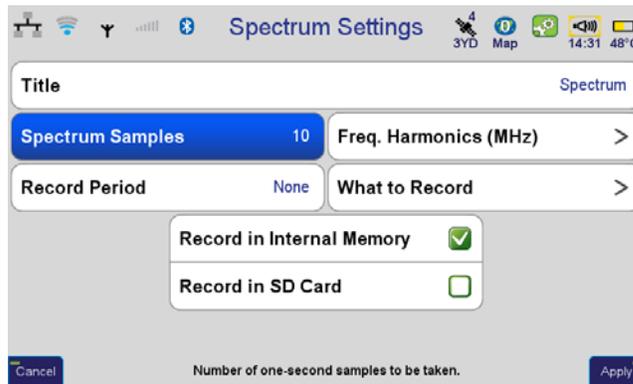


Figure 99. Spectrum settings

Tap *Save Settings*, to save made configurations, then it can be recalled with *Recall Settings* item.



Figure 100. Save settings and Recall Settings

Now the receiver is ready for surveying. We recommend to go to the opened place, receive the fixed solution, and then go to the field and start survey.

5. Operation in RTK Mode

5.1. Type of Survey

To setup the survey type, tap *Settings* ▶ *Actions* or press F2 button on the top of the receiver.

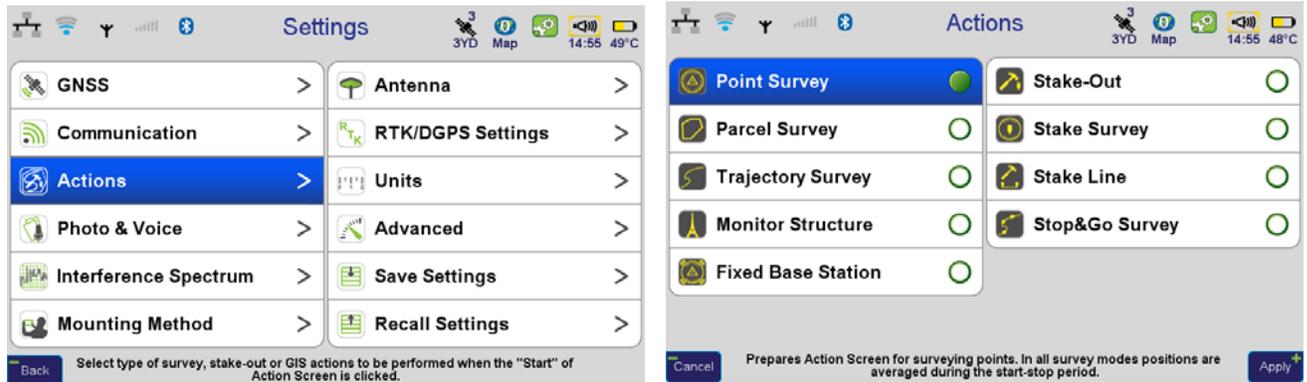


Figure 101. Actions

All operations is performed using *Action* screen and *Command* screen, if the survey buttons are disabled on the *Action* screen. To enable these buttons tap *System* ▶ *Application Setup*:

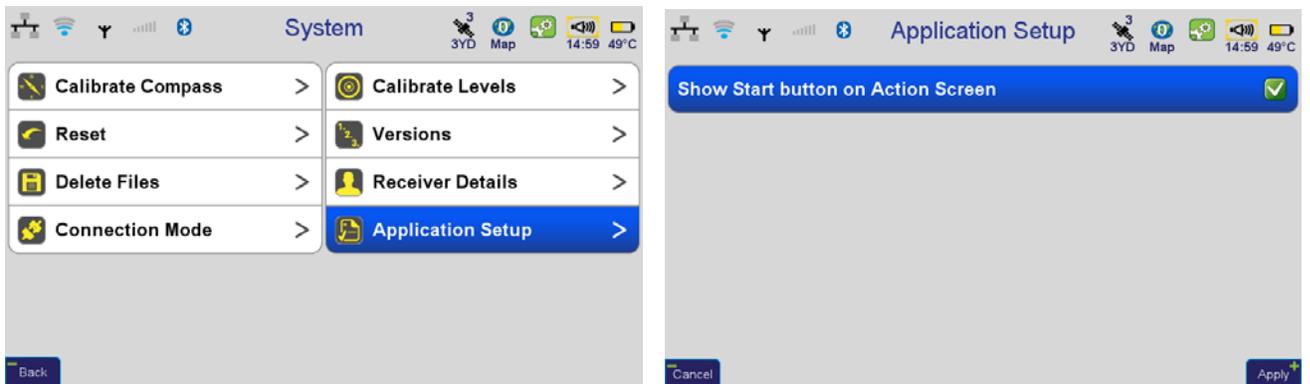


Figure 102. Application Setup

Enable *Show Start button on Action Screen*. Without survey buttons it is necessary to switch to Lite view and tap there Start and Stop to start and finish survey.

Description and Operation

Operation in RTK Mode

Action Screen

To open *Action* screen, press Action button (middle button on the left on the front of the receiver). Double pressing switches to *Command* screen and back.

	Yellow Stone 84	Start
0.010m 0.010m	0	Stop
	--	Clear

5.2. Action Screen

This screen shows current settings and surveying progress. It is divided on some panels which show the information depending on survey type.

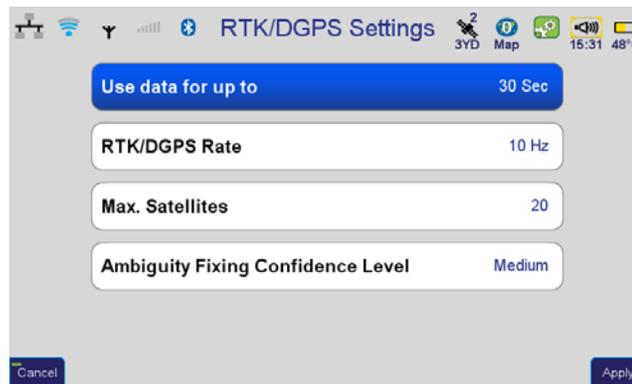
Figure 103. Action screen

All fields are active and tapping on each appropriate parameters can be changed.

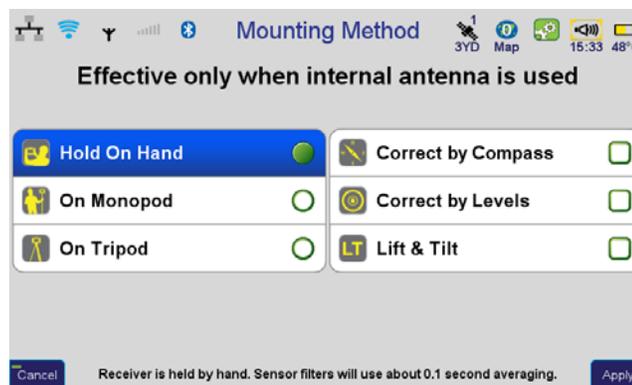
1. This panel shows coordinates and received epochs. By tapping 9 buttons appear:



- *Camera* - enables the picture from bottom camera, double tapping enables front camera).
- *RTK Settings* - opens RTK settings window:



- *Mounting Method* - quick access to *Mounting Method* window.

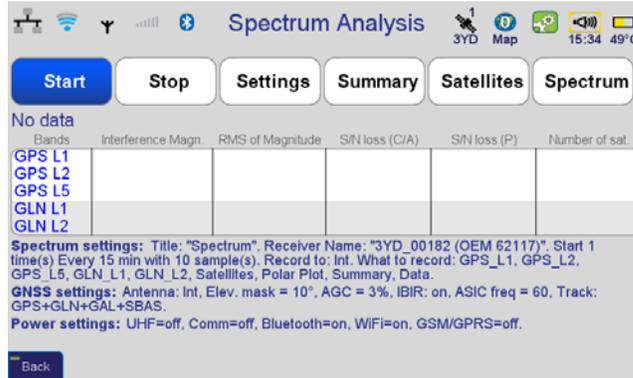


Description and Operation

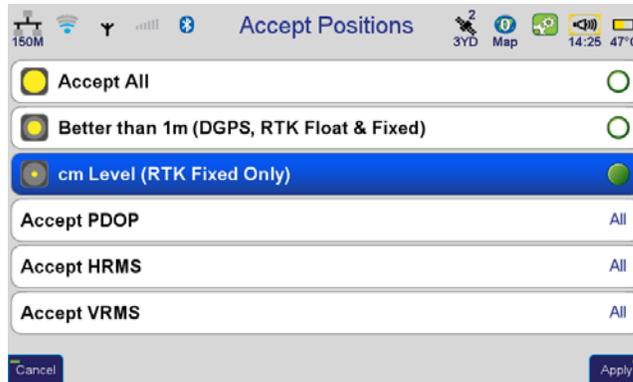
Operation in RTK Mode

Action Screen

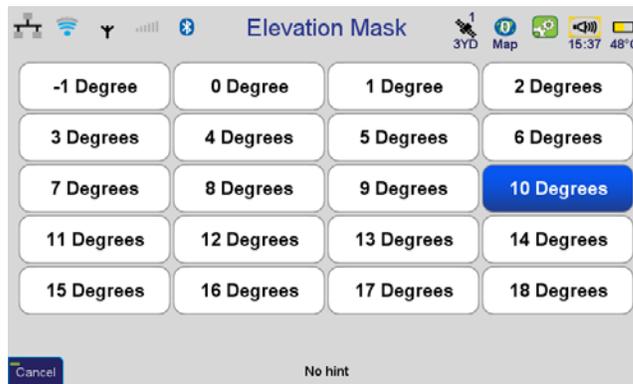
- *Spectrum* - opens *Spectrum Analysis* window.



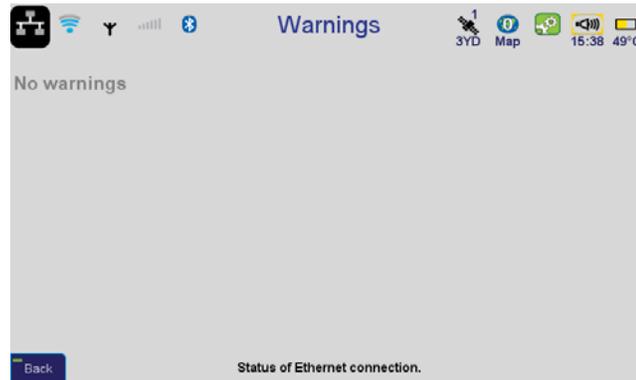
- *Accuracy* - quick access to *Accept Positions* window.



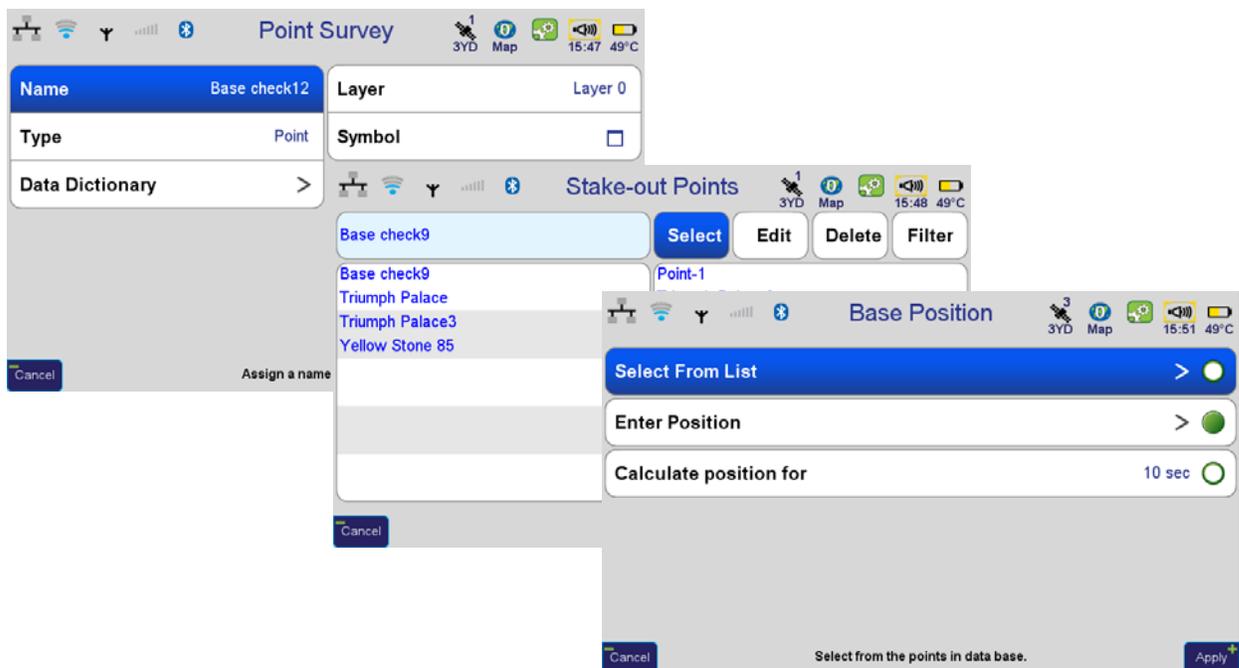
- *Elevation Mask* - allows the quick access to Elevation mask settings:



- *Warnings* - shows warnings.



- *CLR Screen* - Clear screen
 - *Back* - Return to *Action* screen
2. This panel displays the name of the current point. tapping on this panel, appears the window with the parameters of the object (name, attribute, layer, etc.) for survey, either select a point for the stake out, or setup coordinates of the base station.

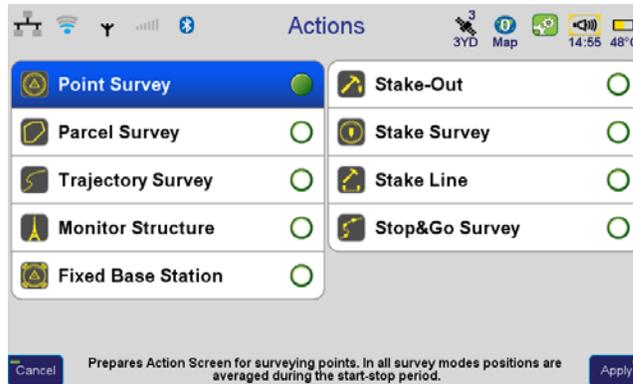


Description and Operation

Operation in RTK Mode

Action Screen

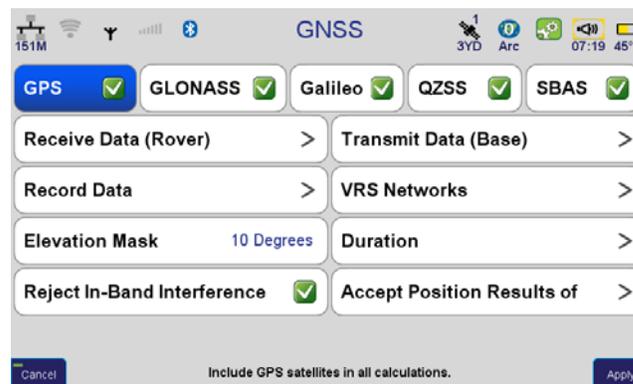
3. Current action screen. During survey it displays the number of received epochs. By tapping opens the *Action* screen with list of actions.



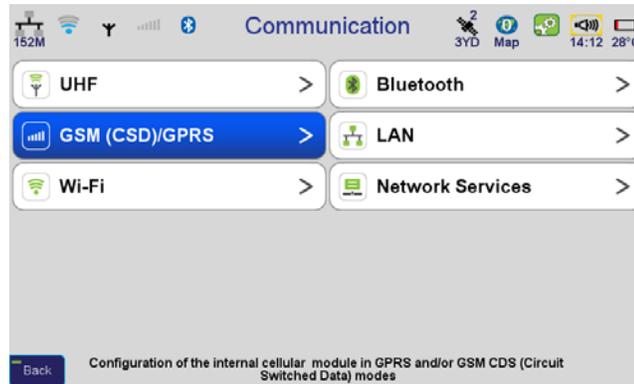
4. The survey time panel. By tapping opens the screen with the duration settings.
5. The achieved accuracy. It also displays the current type of solution and PDOP. After surveying, the values are not lost. To check current epoch accuracy, tap *Clear*. By tapping displays RTK V6 screen.



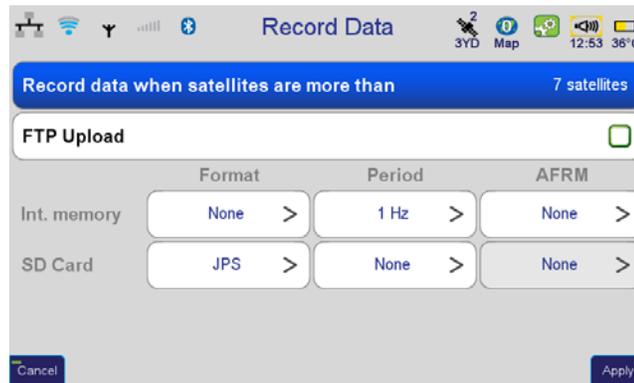
6. Tracking satellites. By tapping opens the GNSS screen with the main GNSS settings.



7. Corrections. For base station it shows the transmitted corrections, and for the rover received.. By tapping opens *Communication* screen.



8. The panel displays the status of recording “raw” measurements. By tapping it opens the screen *Record Data*.



9. Displays for the TRIUMPH-VS the status of inclinometer. By tapping it opens the screen *Calibrating Levels*.



Description and Operation

Operation in RTK Mode

Command screen

10. Displays the date from the internal compass. By tapping it opens the screen *Calibrating Compass*.



Also in the *Action* screen the buttons + and - change the scale of the central window, which helps during the stake out o by displaying the epochs during surveying.

5.3. Command screen

While all the information is displayed on the *Action* screen, the surveying management can be performed on the Command screen. To switch to it, press the FN button once again.

	Yellow Stone 84	Start
0.010m 0.010m	0	Stop
	--	Clear

Figure 104. Command screen

This screen is divided into 9 parts with text. On the right there are three buttons associated with the physical buttons on the right side (Start, Stop, Reset).

By the different modes the screen content will be different. Below are examples of screen commands in different modes.

7	Yellow Stone 86	Start	N	-8.55 m	Start
0.012m 0.012m	4	Stop	E	18.40 m	Stop
	--	Clear	U	-13.16 m	Clear
		Yellow Stone 84		Start	
0.010m 0.010m		0		Stop	
		--		Clear	

Description and Operation

Operation in RTK Mode

Point survey

5.4. Point survey

This mode allows the surveyor to collect pickets or points. If you're surveying with a pole, put it at the desired point. At the top of the screen is displayed the name of the object. If you tap on this field, you can change/enter a name for the point and the layer in which it will be stored.

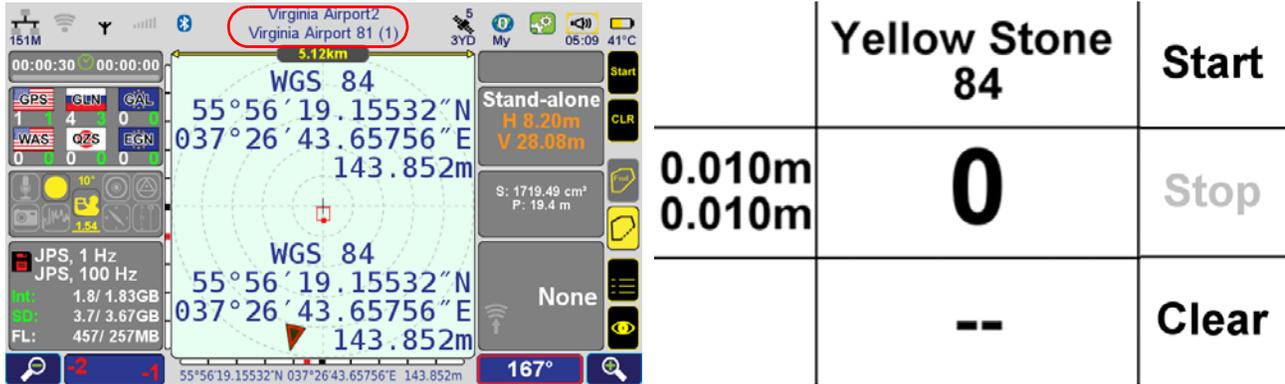


Figure 105. Point survey

Press the *Action (FN)* button, the *Command* screen will be opened. Tap *Start* to begin the surveying, then either wait for complete survey, or tap *Stop* at the end.

The point name will be incremented after the surveying, so is it possible to survey the points in the command screen only, without switching to other. If you want to change the point name, return to the *Action* screen and change the name there.

During the point survey, it is possible to enable the cameras to take pictures or record a voice note. Using the Justin Link software these voice notes can be converted into codes for objects or other values??, such as the height of the antenna, comments, etc.

The results of the survey are the files with "raw" measurements, saved into receiver's memory and a map with surveyed points. To transfer all data to the PC use free JAVAD GNSS software Justin Link. THE receiver should be connected to PC through Center of the connected mobile devices (for Windows 7) or Active Sync (for Windows XP).

Now you can either create a new Justin Link project, or add new data to an existing one.

To download raw files from receiver's memory, click the  button, to download the files from the controller and for RTK measurements from the map click  button on the Justin Link menu.

The list of available maps appears, select the maps to import them to PC and click *Import*. After import is complete, all surveyed points appear in the Justin Link with their attributes.

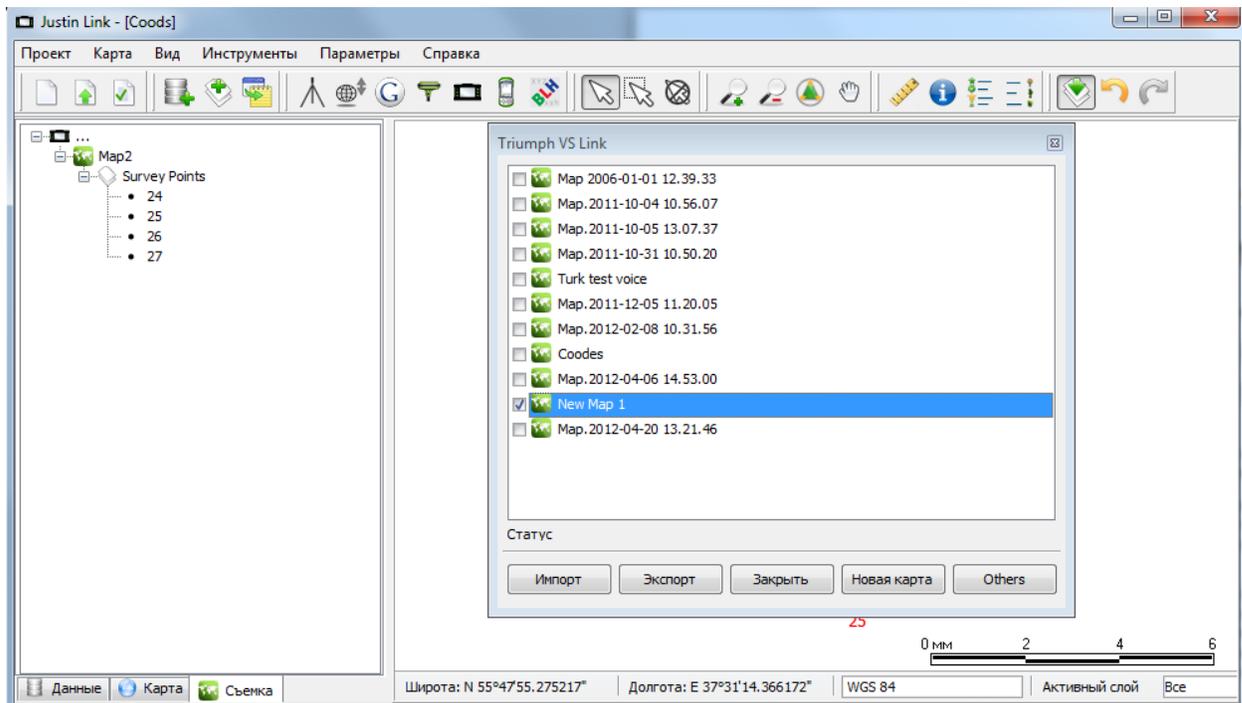


Figure 106. Justin Link

If the localization was performed in the field, it will be transferred to Justin Link as coordinate system and its localization parameters will be transferred as well.

5.5. Parcel Survey

If you want to combine several points to the object (parcel), select the parcel survey mode. Set the name of the polygon, and point name.

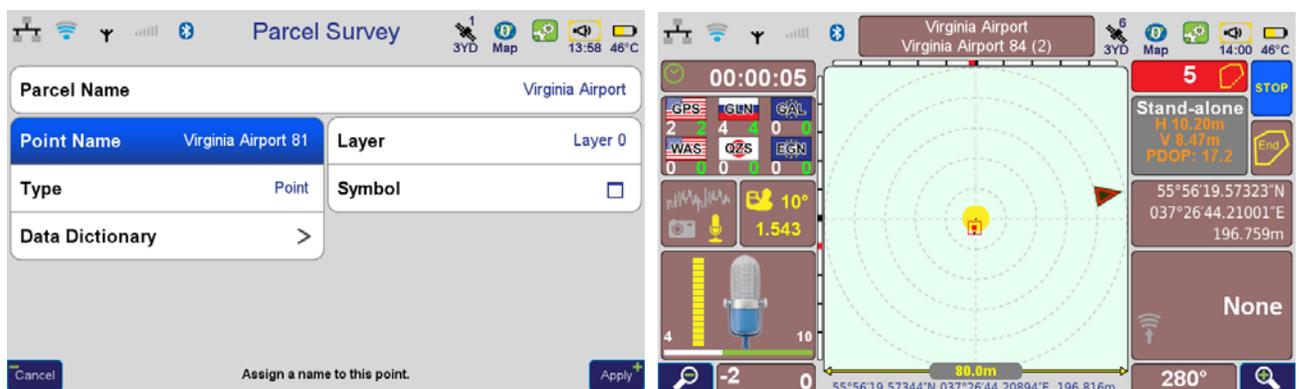


Figure 107. Parcel survey settings and Action screen

Description and Operation

Operation in RTK Mode

Trajectory survey

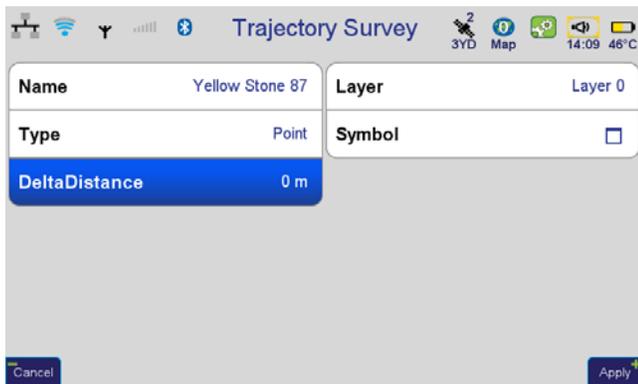
Start the survey with the *Action* screen buttons. Go from point to point and survey all of them (use *Start* and *Stop*). After last point is surveyed, tap *End*, to finish the surveying. Confirm the end of parcel:



Figure 108. End parcel confirmation

5.6. Trajectory survey

In this mode kinematic survey is performed, the epochs are not averaged and are saved as points of polyline. Set the trajectory name and minimal distance between points (in the *DeltaDistance*).



	Yellow Stone 96	Start
7.7 cm 0.12 km/h	11	Stop
	--	Clear

Figure 109. Trajectory survey

Start the survey with the *Action* screen buttons. Tap *Start* and *Stop* buttons to start and finish trajectory survey.

5.7. Stake out

here is three modes of stake out survey:

- Point stake out
- Stake survey
- Stake line

Points for stake out

At first the points for stake out should be saved in the receiver. This can be done with Justin Link.

1. Create a new project and import the points for stake out using *Import* (for text files, DXF-files, KML-files), or use *Add Layer* (for MapInfo TAB-file and ESRI SHP-files).
2. Now you need to convert a new layer to the Justin Link layer. Select all the objects on the layer on the map and click *Create new layer*.
3. Select the objects for stake out, with the right button open the menu and select *Export* ▶ *Export To TVS*.

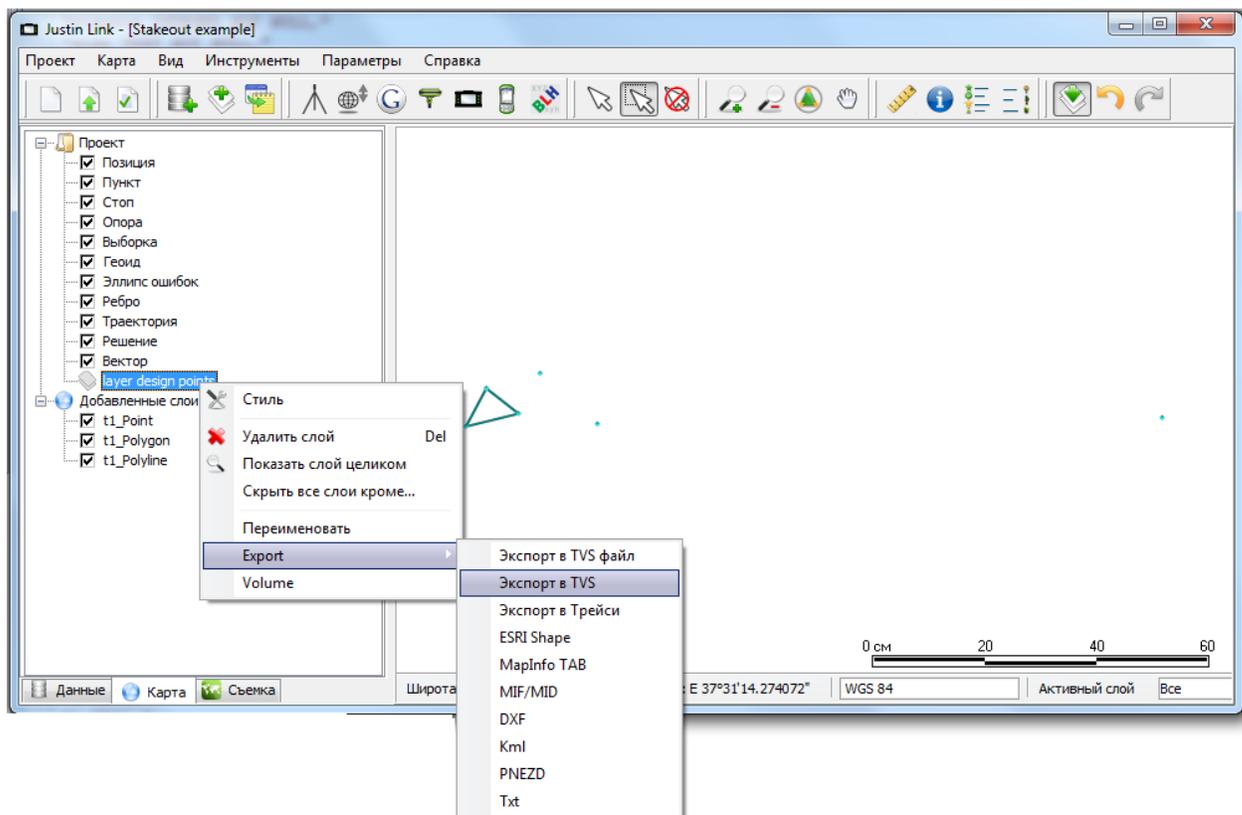


Figure 110. Export of points to TRIUMPH-VS

Description and Operation

Operation in RTK Mode

Stake out

4. A list of existing maps of the connected device will appear. You can create a new map for a new job by clicking *New map* and entering its name.

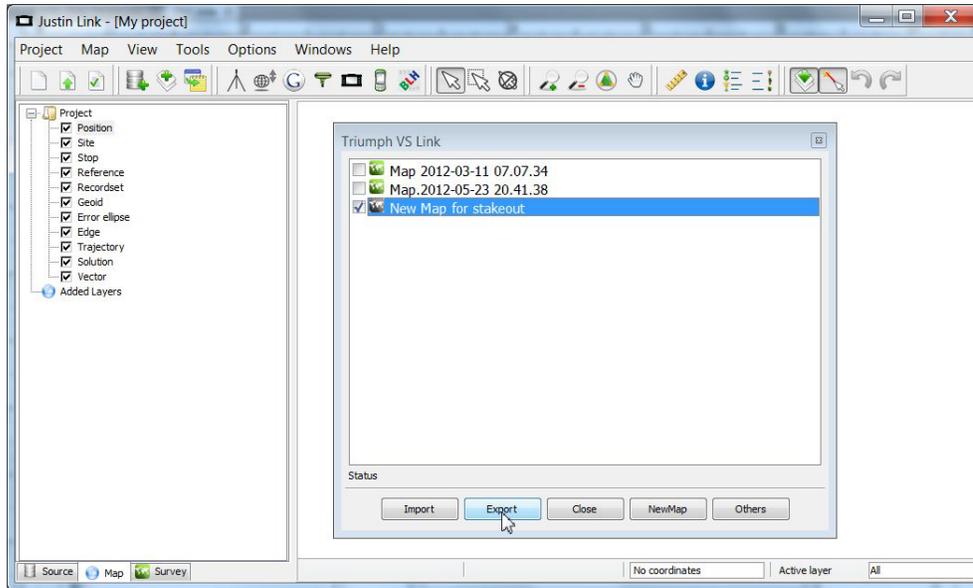


Figure 111. Export of new map

5. Click *Export* button and all the selected points of the will be transferred to device.
6. Similarly, you can send backgrounds to the device. For details, refer to the Justin Link Software Manual.

Point stake out

In this mode the points are staking out one by one. Select the points from the list (to open the list, tap on the point name at the top of *Action* screen).

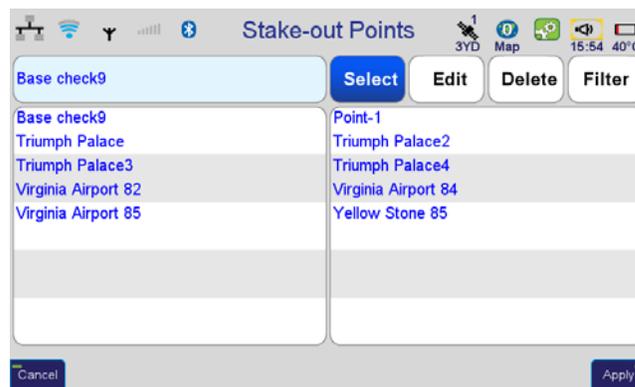


Figure 112. Stake-out points

Use *Action* or *Command* screen to perform the stake out.

On the *Action* screen a yellow circle in the center is displayed, symbolizing your position. Crossed-white or blue circle indicates the selected target point. It is white if it is on the screen and blue if outside.

The screen can zoom using the + and - buttons selecting the desired display scale. On the screen bottom the size of the screen is shown.

The main task of stake out is put the target point in the center. When it is at the top, you have to go forward; when it is on the left, turn left, on the right - turn right; when it is on the bottom, you need to turn around to go to the point. You can also focus on the difference of distances that are displayed on the right.

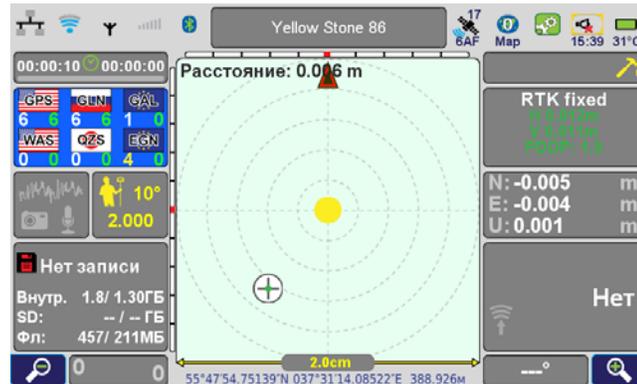


Figure 113. Point stake out

In the *Command* screen you can also focus on the difference of distances. Tapping the *Start* button starts the averaging of the coordinates, *Stop* and *Clear* continue with their instantaneous values.

N	0.000 m	Start
E	0.000 m	Stop
U	196.80 m	Clear

Figure 114. Command screen. Stake out

Description and Operation

Operation in RTK Mode

Stake out

Stake survey

Stake survey is characterizing with the following: after staking the point, this point can be surveyed to obtain new coordinates. The stake survey is identical with point stake out. After the point is staked out, you can survey it: click *Start* and *Stop* to begin and finish the surveying:



	MObject0	Start
8.34m 8.51m	0	Stop
	--	Clear

Figure 115. Command and Action screen by the Stake out survey

After survey is finished, open the directory with points (*Main ▶ Point*), select a point, click *Edit*, and then in the next screen, compare the difference between the true values of the coordinates and the coordinates obtained in the field.

Stake Line

While stake line the data is displayed relative to a line specified by two points. This is useful if you want to divide the line into several parts, to draw a parallel line and similar works. Such tasks can be performed with coordinate geometry (CoGo), and y Stake line also.

1. Select two points to specify the line (to open the list of the points, tap on the point name at the top of *Action* screen).

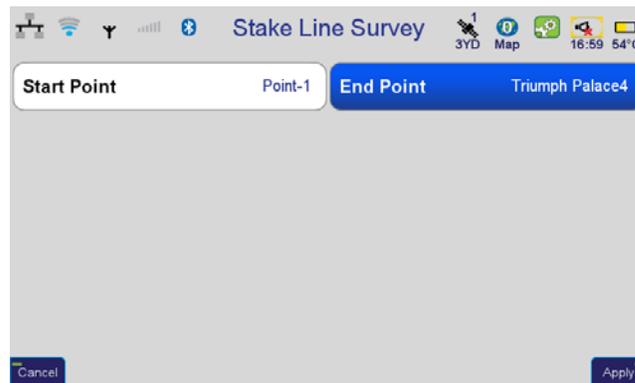


Figure 116. Start and End points for Stake line

2. *Action* screen displays two points connected by a line and from your central position held another line which is perpendicular to a given line. And in the panel instead of the distance to the north

and east of the distance across the line output (DTL-distance to line) and along the line (DAL - distance along line).



DTL	24.90 m	Start
DAL	141 m	Stop
U		Clear

Figure 117. Action and Command screens during stake line

3. You can now move along this line.

Audio Guidance

In addition to the distance orientation there is audio guidance provided. To activate it, tap on the volume icon on the top of the screen, *Display/Audio* screen appear. Here this option can be disabled as well.

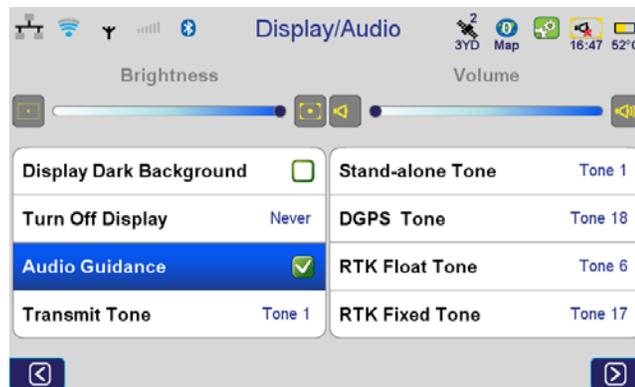


Figure 118. Audio guidance is activated

Description and Operation

Stop and Go Survey for Post-processing

Stake out

6. Stop and Go Survey for Post-processing

In this mode two or more receivers are used. These receivers should work simultaneously (!) at a known point and an unknown point. The receiver continually tracks satellites and logs raw data into its memory. Place the receiver on monopod and set it at an unknown point and collect data for 2 to 10 minutes. For Stop And Go survey use pole.

Set the record data interval (*Settings* ▶ *GNSS* ▶ *Record Data*), it can be, e.g. 1 sec for Stop and Go mode and 5 sec for static)

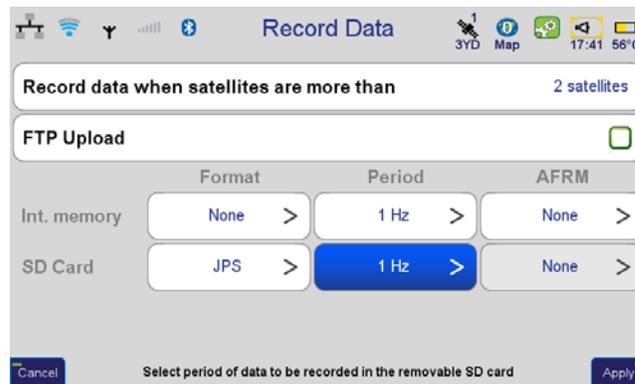


Figure 119. Record data

and the duration of the point survey (*Settings* ▶ *GNSS* ▶ *Duration*): up to 1-2 minutes for the Stop and Go, 8-30 minutes for fast static and 30 minutes or more for the static, depending on the distance between the receivers and the required accuracy.

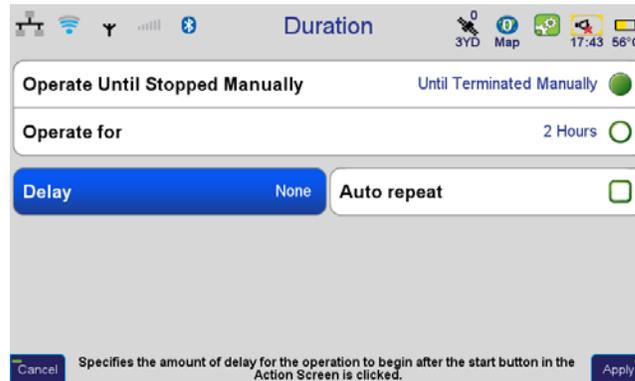


Figure 120. Duration

Tap *Settings* ▶ *Actions* and set the survey mode: point survey for static and fast static, or Stop&Go survey for such mode.

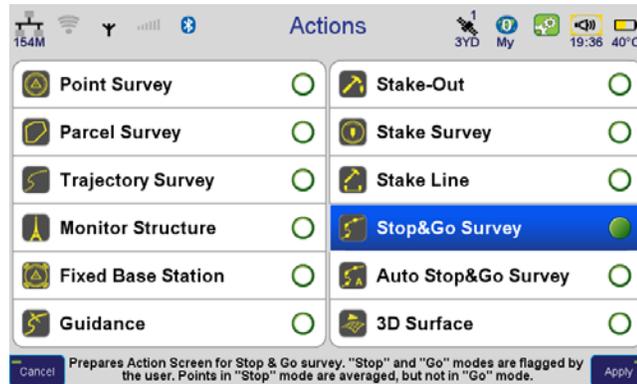


Figure 121. Actions

Specify the antenna height, point name and attributes. Set the destination (internal memory or microSD-card of the controller) the data will be recorded to.

When finished, the files should be sent to Justin software for the post-processing: for reference points their original coordinates are entered, and then network vectors are calculated.

In this survey mode *Action* and *Command* screens are as follows:

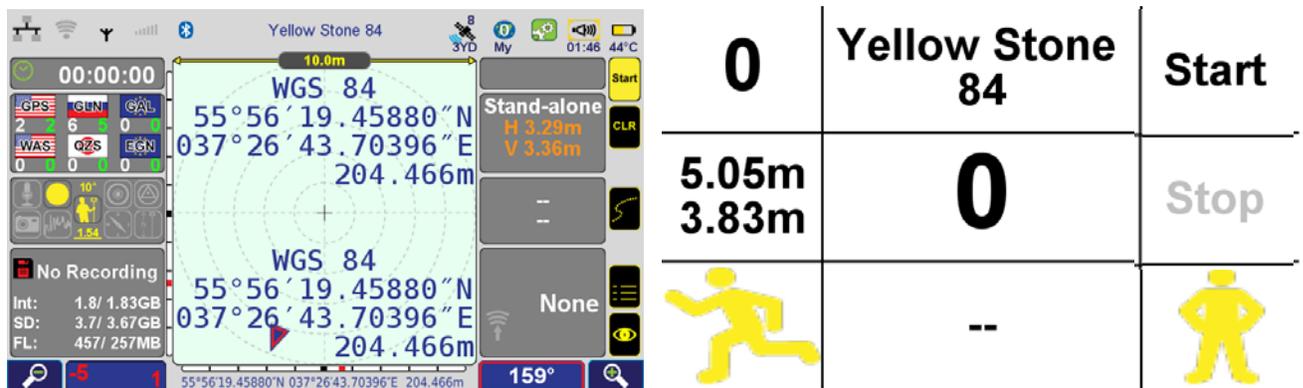


Figure 122. Action and Command screens during Stop and Go survey mode

In the *Command* screen tap *Start* to start writing the file, by tapping on *Stop* the file will be closed. The + and -, respectively, switch between the mode Stop and the mode Go.

All points and trajectories are automatically named. Point name is attributed to the prefix “t_” and the number is incremented. When point survey is finished, its number is also incremented. If you want to change the point, you can switch to the *Action* screen and change the name.

Description and Operation

Monitor Structure

Stake out

7. Monitor Structure

In this mode the receiver averages its position and records the result as a position in the trajectory. Later, the result can be used for analysis..



1	Virginia Airport (0)	Start
	0	Stop
Clear	--	End

Figure 123. Action and Command screens during monitor structure

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.*

2.1. 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 for drained batteries or incorrectly connected cables.
- 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:

- Clear the NVRAM.

If the problem persists, see the following sections for other solutions.

The receiver does not power up

- The batteries may be discharged.
- The receiver may have a defective charger.

If, after connecting an external power source, the receiver still does not power up, contact JAVAD GNSS Support for advice.

Cable specific problems

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

Generic problems

- The corresponding receiver options may be disabled or expired.

Troubleshooting

Check This First!

- 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.

The receiver tracks too few satellites

- The elevation mask value is too high (above 15 degrees).
 - Lower the elevation mask.
- The survey is conducted near obstructions (tree canopy, tall buildings, etc.).
 - Move to an area free of obstructions, if applicable.

The receiver cannot obtain Code Differential and/or RTK solutions.

- Incorrect Base coordinates entered
 - Specify the correct coordinates for the Base station
- The receiver is not configured as a Base or Rover.
 - If the receiver should function as a Base, ensure it has the proper configuration.
 - If the receiver should function as a Rover, ensure it has the proper configuration.
- The corresponding receiver options may be disabled or expired.
 - 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.
- A discrepancy exists between the differential standards used at the Base and Rover receivers.
 - Ensure the Base and Rover receivers use the same corrections input/output format:
- The transmitting and/or receiving antenna may be improperly connected.
 - Check that the radio modem's antenna is securely and properly connected to the antenna connector.
 - Check that the radio modem's antenna is undamaged. If damaged, contact your JAVAD GNSS dealer to replace the antenna.
 - The specified baud rate is incompatible with the baud rates the receiver supports.
- The baud rate is the rate at which the receiver transmits differential messages to the receiver and vice versa. Change the baud rate to that which your receiver supports.
- The Base and Rover receivers use different radio link parameters.
 - Configure the Base and Rover radio receivers according to the procedures listed in the applicable section.
- The distance between the Base and Rover is too far.
 - Close the distance between the Base and Rover.
 - Use repeaters to increase radio coverage.
- There may be a source of radio interference that disrupts radio communications.
 - Change the RF channel (if possible).
 - Use a spectrum analyzer to detect the radio characteristics of the interfering signal and change your system's configuration accordingly.
 - Remove the source of jamming signal or relocate your radio antennas (if possible).

The receiver does not start data logging

- The memory option is disabled or expired.
 - Check that the memory option is enabled.
- The receiver's memory has no free space.
 - Use the AFRM feature.

Troubleshooting

Check This First!

SPECIFICATIONS

Integrated GNSS Antenna

Antenna type	Microstrip (ZeroCentered)
Ground plane	Antenna on a flat ground plane
LNAGain	32±2dB

GNSS Receiver

Total 216 channels: all-in-view (GPS L1/L2/L5, Galileo E1/E5A/E5B, GLONASS L1/L2/L3, QZSS L1/L2/L5, BeiDou B1/B2, SBAS L1/L5) integrated receiver, rugged magnesium housing	
Signals Tracked	GPS C/A, P1, P2, L2C (L+M), L5 (I+Q) Galileo E1 (B+C), E5A (I+Q), E5B (I+Q), AltBoc GLONASS C/A, L2C, P1, P2, L3 (I+Q) QZSS C/A, L1 C (I+Q), L2C (L+M), L5 (I+Q), SAIF BeiDou B1, B2 SBAS L1, L5
Autonomous Accuracy	<2m
Static, Fast Static Accuracy	Horizontal: 0.3 cm + 0.5 ppm * base_line_length Vertical: 0.5 cm + 0.5 ppm * base_line_length
Kinematic Accuracy	Horizontal: 1 cm + 1 ppm * base_line_length Vertical: 1.5 cm + 1.5 ppm * base_line_length
RTK (OTF)	Horizontal: 1 cm + 1 ppm * base_line_length Vertical: 1.5 cm + 1.5 ppm * base_line_length
DGPS	<0.25m (post-processing) <0.5m (real-time)
Cold Start	<35 sec
Warm Start	<5 sec
Reacquisition	<1 sec
Internal Memory	Up to 2048MB of onboard non-removable memory for data storage
Raw Data Recording	Up to 100 times per second (100Hz)
Real-time Data Input/Output	JPS, RTCM SC 104v.2.x и 3.x, CMR
Real-time Data Output	NMEA 0183 v.2.x и 3.0, BINEX

Environmental

Enclosure	Molded magnesium alloy and plastic, IP55
Color	Black
Operating Temperature*	-35° C to +55° C

Specifications

Storage Temperature**	-40° C to +85° C
Humidity	100% condensing
Dimensions	W:178 mm x H:109 mm x D:110 mm
Weight	1700 g

* The operating temperature of Li-Ion batteries is -30 ° C to 55° C

** The storage temperature range of Li-Ion batteries is -20 ° C to +45°

Radio

GSM/GPRS/EDGE model	Internal GSM/GPRS/EDGE quad-band module, GPRS/EDGE Class 10
SIM card slots	Two SIM cards can be used; user accessible, fully sealed
UHF modem	Internal 406-470MHz radio transceiver, up to 38.4kbps
Output power	1 Watt

UHF modem Specification

Radio Transceiver	
Frequency Range	406 - 470 (EU); 406.1 - 470 MHz (USA); 406-430; 450-470 (Canada)
Channel Spacing	25/12.5/6.25 kHz (USA, Canada); 25/20/12.5 kHz (ETSI EN 300 113); 20/12.5 kHz (ETSI EN 300 220)
Carrier Frequency Stability	±1 ppm
Modulation	GMSK/DBPSK/DQPSK/D8PSK/D16QAM
Communication Mode	Half duplex, simplex
Radio Transmitter	
Transmitter Output Power	+15... +30 dBm in 1 dB step / 50 Ω
Carrier Frequency Stability	+1 dB / -2 dB
Radio Receiver	
Modem Sensitivity for DBPSK (@ BER 1x 10 ⁻⁴)	-113 dBm for 25 kHz Channel Spacing -113 dBm for 20 kHz Channel Spacing -114 dBm for 12.5 kHz Channel Spacing -114 dBm for 6.25 kHz Channel Spacing
Modem Sensitivity for DQPSK (@ BER 1x 10 ⁻⁴)	-110 dBm for 25 kHz Channel Spacing -110 dBm for 20 kHz Channel Spacing -111 dBm for 12.5 kHz Channel Spacing -111 dBm for 6.25 kHz Channel Spacing

Modem Dynamic Range	-119 to -52 dBm
Modem	
Data Speed of Serial Interface	9600 - 115200 bps
Data Rate of Radio Interface (25 kHz Channel Spacing)	9600 bps – DBPSK/GMSK 19200 bps – DQPSK 28800 bps – D8PSK 38400 bps – D16QAM
Data Rate of Radio Interface (20kHz Channel Spacing)	7500 bps – DBPSK/GMSK 15000 bps – DQPSK/4FSK 22500 bps – D8PSK 30000 bps – D16QAM
Data Rate of Radio Interface (12.5 kHz Channel Spacing)	4800 bps – DBPSK/GMSK 9600 bps – DQPSK 14400 bps – D8PSK 19200 bps – D16QAM
Data Rate of Radio Interface (6.25 kHz Channel Spacing)	2400 bps – DBPSK 4800 bps – DQPSK 7200 bps – D8PSK 9600 bps – D16QAM
Forward Error Correction (FEC)	Reed-Solomon Error Correction
Data scrambling	Yes
Compliance	
FCC	FCC Part 90
Industry Canada	RSS-210
ETSI	ETSI EN 300 113-2; ETSI EN 301 489-1; ETSI EN 301 489-5; ETSI EN 300 220-1

Specifications

GSM module Specification

Operating Systems	Quad band: 850/900/1800/1900 MHz
Tx power	850/900 MHz – Class 4 (2 Watt);1800/1900 MHz – Class 1 (1 Watt)
Typical RX sensitivity	-106dBm (4dB margin on top of spec)
GPRS	Multi-slot class 10 (4 down; 2 up; 5 Total) Max BR 85.6 Kbps Class B GSM 07.10 multiplexing protocol Coding scheme CS1-CS4
EDGE	Multi-slot class 10 (4 Down; 2 Up; 5 Total) Max BR Downlink 236.8 Kbps (Over RS232) Coding Scheme MCS1-MCS9
SIM Card	2 SIM cards support, 3.0 V, STK 3.1
Regulatory and Approvals	FCC, IC, CCC; FTA, PTCRB; R&TTE; GCF; EMC; QS9000 manufacturing; RoHS/WEEE

Input/Output

Communication Ports	Wi-Fi (IEEE 802.11b/g) Bluetooth V2.0+EDR Class 2 supporting SPP Slave and Master Profiles Full-duplex 10BASE-T/100BASE-TX Ethernet port High Speed USB 2.0 On-The-Go port High Speed USB 2.0 Device port
Other I/O	1 PPS synchronized; Event Marker; External GNSS antenna

Bluetooth®-module

Range	up to 10 m (indoor); up to 50 m (outdoor)
Type	Class 2
Service classes	Miscellaneous
Supported profiles	LM, L2CAP, SDP, SPPP
Frequency Country Code	North America and Europe

Controller

Processor	OMAP3530; 600MHz; 512 MB RAM and 512MB NAND Flash
Operating System	Microsoft Windows CE 6.0
Memory	512 MB
SD card slot	High Capacity microSD Card (microSDHC) up to 32GB can be used; user accessible, fully sealed
Display	Active viewing area: 4.3" diagonal (109 mm) High visibility TFT active matrix ; WVGA, 800 x 480 pixels

Touchscreen	Sealed resistive touchscreen, Fingerprint-resistant oleophobic coating
Buttons	Four-way directional Navigation button Standard key functions include: Home - main screen FN -action button -/+ - Cancel (Zoom -)/Accept (Zoom +) Enter (Ok) button - activates enter function Five user programmable buttons On/Off button
Enunciators	Three LEDs: battery charging status, battery status, sleep mode
Voice recording	integrated
Audio Output	integrated
Photo camera	Two. 3 Megapixels
IMU	integrated
Compass	integrated

Power

Battery	Intelligent, rechargeable, lightweight Li-Ion battery pack, 63.0 Wh (nom.). Battery easily changed in field without tools
Operation Time	Operates no less than 9 hours on one charge
External Power Input	10 to 30 V power input connector for charging or direct power input
Charging	Power management notifies user when battery needs charging and protects battery from overcharging Charges in 3 to 5 hours

Connector specifications

Power

The power connector is a sealed receptacle (Figure A-1) ODU p/n G80F1C-T05QF00-0000.

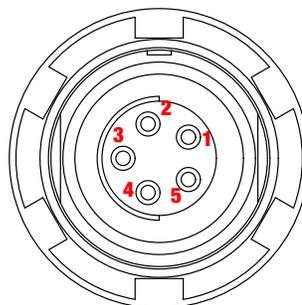


Figure A-1. Power connector

Specifications

Table A-1. 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

USB

The USB connector (Figure A-2) is a sealed receptacle ODU, p/n G80F1C-T05QF00-0000.

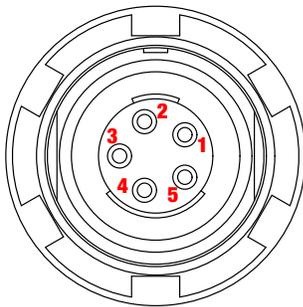


Figure A-2. USB connector

Table A-2. USB Connector Specifications

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

Ethernet

The Ethernet connector (Figure A-3) is a sealed receptacle ODU, p/n G80F2C-P07QC00-0000.

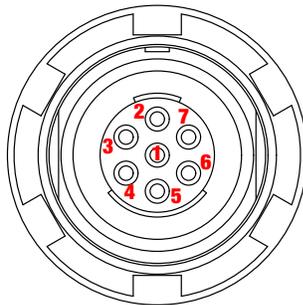


Figure A-3. Ethernet Connector

Table A-3. 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

GNSS Antenna connector (optional)

Standard SMA connector.

Table A-4. GNSS Antenna Connector Specifications

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

EVENT and 1PPS (optional)

EVENT and 1PPS connectors are standard SMA connectors.

Specifications

UHF RADIO USAGE

Many countries require a license for radio users (such as the United States). Be sure you comply with all local laws while operating a UHF radio.

Surveying in RTK mode has made UHF the most popular choice for communications between base and rover modems. Know the strengths and weaknesses of this technology to get the best use out of your modem.

The quality and strength of the UHF signals translates into range for UHF communications.

The system's range will greatly depend on the local conditions. Topography, local communications and even meteorological conditions play a major role in the possible range of RTK communications.

If needed, use a scanner to find clear channels for communication.

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.

General Warnings

JAVAD GNSS receivers are designed for survey and survey 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 survey site.
- Contrary to applicable laws, rules, and regulations.

Safety Warnings

Battery Pack Warnings

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

Warning: *To comply with RF exposure requirements, maintain at least 20 cm between the user and the GSM module/UHF radio modem.*

Battery Pack Warnings

CAUTION: *Risk of explosion if battery is replaced by an incorrect type. Dispose of used battery according to the instructions.*

DANGER: NEVER ATTEMPT TO OPEN THE CASING OF THE DETACHABLE BATTERIES! LITHIUM-ION BATTERIES CAN BE DANGEROUS IF MISHANDLED!

DANGER: DO NOT INCINERATE OR HEAT BATTERY PACK ABOVE 212 DEGREES FAHRENHEIT (100 DEGREES CELSIUS). EXCESSIVE HEAT CAN CAUSE SERIOUS DAMAGE AND POSSIBLE EXPLOSION.

DANGER: THE BATTERIES (OR BATTERIES INSTALLED) SHALL NOT BE EXPOSED TO EXCESSIVE HEAT SUCH AS SUNSHINE, FIRE OR THE LIKE.

Warning: *Do not attempt to open the battery pack.*

Warning: *Do not disassemble the battery pack.*

Warning: *Do not charge in conditions different than specified.*

Warning: *Do not use other than the specified battery charger.*

Warning: *Do not short circuit the battery pack.*

Warning: *Do not crush or modify the battery pack.*

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.*

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.

Safety Warnings

Usage Warnings

WARRANTY TERMS

JAVAD GNSS electronic equipment are guaranteed against defective material and workmanship under normal use and application consistent with this Manual. The equipment is guaranteed for the period indicated, on the warranty card accompanying the product, starting from the date that the product is sold to the original purchaser by JAVAD GNSS' Authorized Dealers¹.

During the warranty period, JAVAD GNSS will, at its option, repair or replace this product at no additional charge. Repair parts and replacement products will be furnished on an exchange basis and will be either reconditioned or new. This limited warranty does not include service to repair damage to the product resulting from an accident, disaster, misuses, abuse or modification of the product.

Warranty service may be obtained from an authorized JAVAD GNSS warranty service dealer. If this product is delivered by mail, purchaser agrees to insure the product or assume the risk of loss or damage in transit, to prepay shipping charges to the warranty service location and to use the original shipping container or equivalent. A letter should accompany the package furnishing a description of the problem and/or defect.

The purchaser's sole remedy shall be replacement as provided above. In no event shall JAVAD GNSS be liable for any damages or other claim including any claim for lost profits, lost savings or other incidental or consequential damages arising out of the use of, or inability to use, the product.

1. The warranty against defects in JAVAD GNSS battery, charger, or cable is 90 days.



900 Rock Avenue, San Jose, CA 95131 USA

Phone: +1(408)770-1770

Fax: +1(408)770-1799

www.javad.com

Copyright © JAVAD GNSS, Inc., 2014
All rights reserved. No unauthorized duplication.