ProFlex™ 800

powered by ashtech

Reference Manual

Copyright Notice

P/N 631670-B, April 2013

Trademarks

FCC Notice

ProFlex 800 Receiver complies with the limits for a Class B digital device, pursuant to the Part 15 of the FCC rules when it is used in Portable Mode. See Note below related to Class B device.

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

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

When ProFlex 800 is used with an external power supply or connected to an external device using the USB port, it complies with the limits for a Class A digital device, pursuant to the Part 15 of the FCC rules. See Note below related to Class A device.

Class A digital devices NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Remark: Any changes or modifications not expressly approved by Ashtech, could void the right for user to operate the equipment.

RF Safety Exposure To Radio Frequency Energy (SAR)

Radio transmitting devices radiate Radio Frequency (RF) energy during its operation. RF energy can be absorbed into the human body and potentially can cause adverse health effects if excessive levels are absorbed. The unit of measurement for human exposure to RF energy is "Specific Absorption Rate" (SAR).

The Federal Communications Commission (FCC), Industrie Canada (IC), and other agencies around the world have established limits that incorporate a substantial safety margin designed to assure the safety of all persons using this equipment. In order to certify this unit for sale in the US, Canada and Europe this unit has been tested for RF exposure compliance at a qualified test laboratory and found to comply with the regulations regarding exposure to RF Energy. SAR was measured with the unit (GSM Module) transmitting at its maximum certified RF power. Often, however, during normal operation the unit (GSM Module) will transmit much less than maximum power. Transmit power is controlled automatically and, in general is reduced as you get closer to a cellular base station. This reduction in transmit power will result in a lower RF energy exposure and resulting SAR value.

FCC and CE UHF Safety Statement

The different versions of the UHF Transmitters are FCC and CE compliant.

In order to comply with FCC and CE RF exposure safety guidelines as body-worn, normal use of unit, the following must be followed:

A distance of AT LEAST 10 feet (3 m) of separation between the users body and the unit (UHF Transmitter). This distance has been defined taken into account the FCC and CE Requirements and the worst output power configuration.

Do NOT use the device in a manner such that it is in direct contact with the body (e.g. on the lap). Such use will likely exceed FCC RF safety exposure limits. See www.fcc.gov/oet/rfsafety/ for more information on RF exposure safety.

To comply with CE and FCC electrical safety regulations, ProFlex 800 should only be powered from a 9 to 28 V DC external source, with 20 W power limitation, or the recommended battery (P/N 111374). The battery should be charged only with the supplied battery charger (P/N 802064).

CAUTION

RISK OF EXPLOSION IF BATTERY REPLACED
BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES
ACCORDING TO THE INSTRUCTIONS.

NOTICE:

The FCC (Federal Communications Commission) requests that equipment manufacturers take every step to increase user awareness about the responsibilities inherent in being an FCC licensee on shared channels.

Users are indeed requested to obtain a FCC license before operating their RTK equipment on the US territory. Once a license has been granted, users should observe all the FCC regulations (see http://wireless.fcc.gov/). Licensees are encouraged to avoid any use of voice frequencies in the 450-470 MHz band.

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For ambient temperatures over 40°C, touching the unit may be hazardous as the unit temperature may exceed 55°C in this case (re. EN60950 standard from R&TTE directive).

Limited Warranty Terms and Conditions

Product Limited Warranty. Subject to the terms and conditions set forth herein, Trimble Navigation Limited ("Trimble") warrants that for a period of (1) year from date of purchase this Spectra Precision product (the "Product") will substantially conform to our publicly available specifications for the Product and that the hardware and any storage media components of the Product will be substantially free from defects in materials and workmanship.

Product Software. Product software, whether built into hardware circuitry as firmware, provided as a standalone computer software product, embedded in flash memory, or stored on magnetic or other media, is licensed solely for use with or as an integral part of the Product and is not sold. The terms of the end user license agreement govern the use of the Product Software, including any differing limited warranty terms, exclusions and limitations, which shall control over the terms and conditions set forth in the limited Product warranty.

Warranty Remedies. If the Product fails during the warranty period for reasons covered by this limited warranty and you notify us of such failure during the warranty period, we will repair OR replace the nonconforming Product with new, equivalent to new, or reconditioned parts or Product, OR refund the Product purchase price paid by you, at our option, upon your return of the Product in accordance with our product return procedures then in effect.

How To Use this Documentation

Please read this section to understand the organization of this manual. This will help you navigate more easily through the pages and find more quickly the information you are looking for.

The manual is divided into six volumes:

- **Receiver Description** (Chapter 1)
- **Web Server** (Chapters 2-3)
- **Backpack Land Surveying** (Chapter 4)
- **CORS station** (Chapter 5)
- **The Integrator's Corner** (Chapters 6-11)
- **Appendix** (Chapters 12-13)

Note that these six volumes only appear in the PDF version of the manual as bookmarks created at the highest level in the PDF file. On the other hand, the table of contents only shows a succession of numbered chapters without any reference to these volumes. Therefore, the different chapters come as follows.

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Chapter 1 provides a full description of the ProFlex 800 (front panel display screens, connectors, accessories, batteries, etc.). Additional sections cover the following topics: Specifications, Firmware Options, U-Link radios, Port Pinouts, 1PPS Output and Event Marker Input.

***

Chapters 2 and 3 are about the ProFlex 800 Web Server, an embedded web application allowing users to control and monitor the receiver over the Internet. Chapter 2 provides step-by-step instructions for several typical applications. Chapter 3 is an illustrated collection of the ProFlex 800 Web Server on-line help files.

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Chapter 4 focuses on how to set up a base and a rover, including radio setups and network connections, for RTK operation. This chapter also addresses the following topics: Direct IP Connection To Your Own Base Through RTDS Software and Using an External CDMA Cell Phone for Network Connections.

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Chapter 5 deals exclusively with the ProFlex 800 CORS extension. The content is virtually the same as the corresponding Getting Started Guide, except for the list of items and hardware description which here are addressed in Chapter 1.

***

Chapters 6 to 11 give in-depth information on the receiver. They are more particularly intended for integrators and technical experts. This is the biggest part in this manual.

Chapter 6 explains how to install the ProFlex 800 when used on board a machine or a vessel and provides typical scripts (based on $PASH commands) to configure the receiver as a base or a rover.

Chapters 7 lists the connection facilities offered by the Ethernet port.

Chapter 8 is about the $PASH proprietary commands, introducing the two categories of commands, and telling you how to apply them. Chapter 8 also describes the conventions used in their description and provides an alphabetical list, combining set and query commands in a single table.

Chapters 9 to 11 provide a full description of respectively the set commands, the query commands and the data output formats.

***

Chapters 12 and 13 are grouped together to constitute the Appendix of the manual.

Chapter 12 is a collection of first-level maintenance instructions you may have to refer to, should you encounter any problems with your equipment. This chapter also includes the list of alarms the receiver may generate.

Chapter 13 is designed as a memo gathering various typical procedures you may sometimes have to run.

Table of Contents

Chapter 1. Receiver Description

What is ProFlex 800?

Congratulations! You have just acquired a ProFlex 800 GNSS receiver from Spectra Precision!

GNSS have revolutionized control surveys, topographic data collection, construction surveying, marine surveying and machine guidance and control. Purchasing the right tools for a professional job is essential in today's competitive business environment. Learning to put these tools to work quickly and efficiently will be the focus of this manual.

ProFlex 800 is a flexible, rugged and high-performance GNSS receiver integrating the best of today's technologies, including the exclusive Z-Blade™ algorithms and multi-constellation (GPS+GLONASS+GALILEO+SBAS+QZSS) capabilities.

ProFlex 800 can be used in numerous applications where real-time precise positioning is required:

- Used in conjunction with the Backpack Kit, ProFlex 800 is an interesting alternative to the Spectra Precision ProMark 800 for those land surveyors who prefer to carry their GNSS antennas and field terminals on a pole while holding their receivers separately on their backs.

  Also usable with Survey Pro and FAST Survey, ProFlex 800 in this configuration offers the same functionality as the Spectra Precision ProMark 800.
- Used in conjunction with a UHF Accessory Kit, ProFlex 800 can also be used aboard ships for precise marine surveying applications. Like the ProMark 800, ProFlex 800 comes with a choice of UHF radio transmitter and receiver kits allowing autonomous operation of base/rover systems, which is a valuable asset for numerous applications, including maritime applications.
- Associated to an external GNSS receiver that uses its own GNSS antenna, ProFlex 800 can in addition be used for heading determination. Through an appropriate setup of

the two GNSS antennas that maintains an ever fixed distance between them, ProFlex 800 will accurately determine the direction (i.e. the heading) of the vector connecting the two antennas. Plus, depending on the orientation of the antenna setup with respect to the structure, ProFlex 800 will also determine the pitch or roll angle.

In this application:

- ProFlex 800 can simultaneously deliver RTK position solutions for its own antenna.
- The external receiver provides the ProFlex 800 with appropriate data either through a local serial connection (if the two receivers are close to each other) or through a wireless connection (radio, GSM).
- The GNSS antenna connected to the external receiver always represents the origin of the measured vector.

- The use of ProFlex 800 can also be extended to those terrestrial applications, like machine guidance or machine control, where real-time precise positioning, or long-range decimetric accuracy (using the Flying RTK solution) is also required. Being compact, rugged and flexible, the new Ashtech ProFlex 800 is proving to be the best system available today for this kind of requirement.
- As an extension of the ProFlex 800, ProFlex 800 CORS is an advanced CORS reference station for use in the most demanding applications. This extension is the subject of a separate chapter in this Reference Manual.
- With its many communication devices (UHF, GSM, RS232/422, Bluetooth, USB and Ethernet), ProFlex 800 is a flexible and versatile receiver, suitable for a wide range of applications.

System Components Overview

The tables below provide an overview of the different key items composing the ProFlex 800.

Depending on your purchase and based on the type of survey you wish to perform, you may only have some of the listed items. Please refer to the packing list for an accurate description of the equipment that has been delivered to you.

Spectra Precision reserves the right to make changes to the items listed below without prior notice.

ProFlex 800 Basic Supply

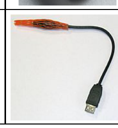
Item	Part Number	Picture
ProFlex 800 Basic: ProFlex 800 L1/L2 GPS Receiver with standard accessories: • 1 x Li-Ion rechargeable battery pack • AC/DC power supply kit • USB cable, host to device, 20 cm • Serial interface cable • Ethernet cable • Bluetooth antenna • Cellular antenna • 2-Hz update rate • Transport bag • Dual-frequency tracking [P] • Limited RTK [L] – No limitation in base mode – Baseline limited to 3 km in rover mode – All protocols available: RTCM-2.3, RTCM3, CMR/CMR+, ATOM (+ DBEN and LRK in rover mode)	990658-ASH	
ProFlex 800 Basic (above) + ADL Foundation radio (internal transceiver TRx 430-470 MHz) NOTE: UHF antenna not included in this part number but available as a separate item.	990658-30-ASH	

ProFlex 800 CORS Basic Supply

Item	Part Number	Picture
ProFlex 800 CORS: L1/L2 ProFlex 800 GNSS Receiver with standard accessories: • 1x Li-Ion rechargeable battery pack • AC/DC power supply kit • USB cable, host to device, 20 cm • Serial interface cable • Ethernet cable • Bluetooth antenna • Cellular antenna • Transport bag • Base Mode [N] • Dual-frequency tracking [P] • 2-Hz update rate Includes the hardware features below: • 8-GByte internal memory extension • DC power kit for port A (12 V DC@0.5 A - 1 A peak) • External reference clock input kit (internal coaxial cable fitted with TNC female connector mounted on rear panel(second GNSS input) + protective cap for this connector). • Universal cable (RS+PPS+Ext. Event+Power) • Y-shaped power cable • External power cable	990660-ASH	

Standard Accessories

(Can also be ordered separately as spare parts using part numbers mentioned below.)

Item	Part Number	Picture
Cellular antenna (quad-band)	111397	
Bluetooth antenna	111403	
7.4 V-4.6 Ah Li-ion Battery Pack (rechargeable)	111374	
USB Host-to-Device Cable, 0.2 m Makes ProFlex 800 a USB device.	702104	

Item	Part Number	Picture
Ethernet adaptor cable	702426	
Serial data cable	700461	
AC/DC Power Supply Kit (includes external AC adapter, battery charger and cable extension for powering ProFlex 800 directly from the AC adapter)	802064	
Transport bag	206490	

Optional Accessories

GNSS Antennas

Item	Part Number	Picture
ASH-661 L1/L2/L5 GNSS antenna, gain: 38 dB	802135	
ASH-660 L1 GNSS antenna, gain: 38 dB	802133	

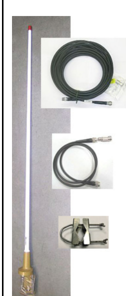
UHF Antennas

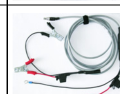
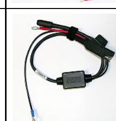
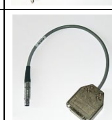
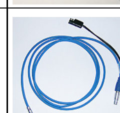
Item	Part Number	Picture
Whip antenna, TNC adapter, 410-430 MHz	C3310190	
Whip antenna, TNC adapter, 430-450 MHz	C3310196	
Whip antenna, TNC adapter, 450-470 MHz	C3310188	

Transmitter Kits

Item	Part Number	Picture
ADL Vantage	87330-00: ADL Vantage Kit, 430-470 MHz, 4 W 87330-20: Accessory kit, 430-450 MHz 87330-10: Accessory kit, 450-470 MHz Each accessory kit includes a unity-gain antenna, a range pole mount, a tripod mount system, a battery accessory kit (without the battery) and a Vantage/Vantage Pro programming cable.	 Transmitter alone
ADL Vantage Pro	87400-00: ADL Vantage Pro Kit, 430-470 MHz, 35 W 87400-20: Accessory kit, 430-450 MHz 87400-10: Accessory kit, 450-470 MHz Each accessory kit includes a unity-gain antenna, a range pole mount, a tripod mount system, a 35-W radio battery bag with 2 x 6’ cables (without the battery) and a Vantage/Vantage Pro programming cable.	 Transmitter alone

Other Accessories

Item	Part Number	Picture
Survey Backpack Kit, includes: • Backpack • 7.4 V-4.6 Ah Li-ion Battery Pack (rechargeable) • GNSS cable with push-pull system consisting of PP-m/TNC-m 50-Ohm coaxial cable, 1.50 m, and PP/TNC-m 50-Ohm coaxial cable, 0.75 m. • Range pole for UHF antenna (includes 0.50-meter pole with 5/8” female adaptor, TNC receptacle and TNC-female/TNC-female cable extension, 0.80 meter long) • HI measurement tool	890309	
Machine Installation and Connectivity Kit, consists of: • GNSS coaxial cable, 10 meters • UHF coaxial cable, 6 meters + pole • 3-pin power cable for battery, 3 meters • Serial interface cable (Fischer to DB9) • Universal cable, RS+PPS+Ext Event+Power Out, Fischer to DB15 • Antenna mounting bracket	802089	
UHF Marine 10-meter Aerial Kit, consists of: • KX15 coaxial cable, interfacing, 1 meter • Low-loss KX13 coaxial cable, 10 meters • UHF antenna, 420-450 MHz - CXL70-3dB + mounting parts	P0101391	

Item	Part Number	Picture
GNSS Marine 30-meter Cable Kit, consists of: • Low-loss LMR-240 GNSS cable, TNC-m/ TNC-m • Antenna mounting bracket	P076464A	
GNSS Marine 10-meter Cable Kit, consists of: • Low-loss RG223 GNSS cable, 10 meters, TNC-m/TNC-m • Antenna mounting bracket	P0101393	
Vertical antenna extension	103717	
TNC/TNC antenna cable, 10 meters	700439	
External power cable for GNSS receiver	802143	
Y-shaped power cable	702501	
Universal cable	702443	
USB cable, device to PC	702103	
ADL Vantage (Pro) to ProFlex 800 cable (Pac-Crest ref. A00630)	105659	

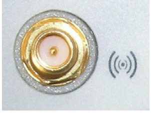
Firmware Upgrades

Item	Part Number
GLONASS	680500
GALILEO	680655
GPS L5	680656
Unlimited RTK	680502
Fast Output	680527
Flying RTK	680635
Embedded NTRIP caster	680636
GSM	680528

Equipment Description & Basic Functions

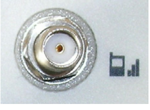
Front View

From left to right:



Bluetooth Antenna

A coaxial female connector (reverse SMA type) allowing you to connect a Bluetooth antenna for wireless communication with a field terminal or other device.



Cellular Antenna

A coaxial female connector (SMA type) allowing you to connect a cellular antenna. A cellular antenna is required when the ProFlex 800 sends or receives RTK or differential corrections data via its internal cellular modem (GSM).

Take care not to swap the Bluetooth antenna and the cellular antenna. The picture below shows where the shorter and longer antennas should be connected.

USB Host & Device

A nine-contact female connector (Fischer type). Depending on how it is configured, the USB port can be used in two different ways:

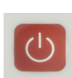
1. For a USB host, such as a mass storage device using optional device cable P/N 702104.
2. For a USB device allowing ProFlex 800 to be seen as a disk from the computer connected to this port. In this configuration, files can be transferred between the ProFlex 800's internal memory and the computer using the USB cable provided (P/N 702103).

Display Screen

The display consists of a 128 x 64-pixel, 1.5-inch monochrome yellow screen using organic LED technology (OLED).

Used in conjunction with the Scroll button, the display screen allows you to view different pages of information. See *Display Screens on page 15* for a detailed description of the information available from this screen.

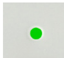
After a few seconds of inactivity (i.e. Scroll button idle), screen luminosity turns from high to low level.



Power button

To turn on the ProFlex 800, hold the Power button pressed until the power LED lights up.

To turn off the ProFlex 800, hold the Power button pressed until the "Ashtech" screen is displayed. Then release the button and wait until the ProFlex 800 shuts down.



Power LED

- This indicator light is off when the ProFlex 800 is off and no external power source is connected to the DC power input.
- It is on and red when an external power source is present at the DC power input and the ProFlex 800 is off.
- It is on and green when the ProFlex 800 is on, regardless of whether it is powered from the internal battery or an external power source.
- It is blinking red when the sleep mode has been enabled and the receiver is currently running a session. With the sleep mode enabled, the receiver is idle between any two sessions, as if it were virtually turned off, and the power LED is also turned off during this time.

Log Button

Press this button briefly to start recording raw data on the selected storage medium.

Another short press on this button will immediately stop raw data recording.

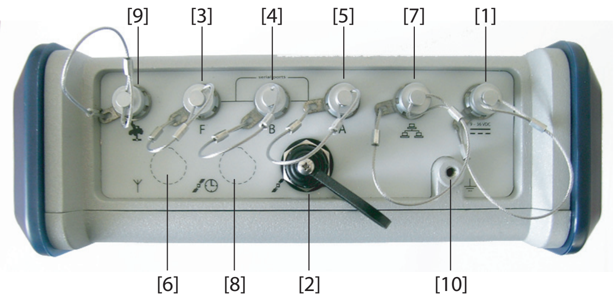
Scroll button

Press this button briefly to scroll through the different pages of information viewed on the screen.

If an alarm is reported on the display screen, a short press on the Scroll button will acknowledge the alarm. The Scroll button will recover its display scrolling function only after all the alarms have been acknowledged this way.

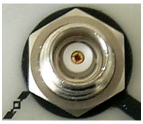
Another function of the Scroll button is to re-activate the screen backlight after the latter has automatically been turned off. The Scroll button is also used in the firmware update procedure.

Rear View



DC Power Input

A Fischer, three-contact, female connector **[1]** allowing the ProFlex 800 to be powered from either the provided AC adapter (connect the cable extension between ProFlex 800 and the end of the AC adapter output cable), or an external 9- to 36-V DC power source through cable P/N 730477 (cf. base setup using an external radio transmitter).



GNSS Input #1

A TNC coaxial female connector **[2]** allowing you to connect a GNSS antenna to the receiver via a coaxial cable.

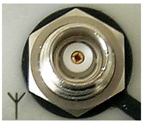
Serial Data Ports

These are all Fischer, seven-contact, female connectors, each allowing a serial connection to an external device..

- Ports F **[3]** and B **[4]** are both RS232-only ports
- RS232/422 Port A **[5]** is a switchable RS232/RS422 port (Default is RS232).

  As an option (installed at the factory), port A also delivers a regulated DC power voltage between pin 1 (+12 V DC) and pin 2 (GND) that can be used to power a connected device. The DC current available is 0.5 A steady state, and 1.0 A peak.

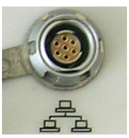
UHF Input



A TNC coaxial female connector **[6]** allowing you to connect a radio whip antenna. This connector is available only if the ProFlex 800 has been fitted with a radio module. (Connector **[6]** is missing from the rear view above.)

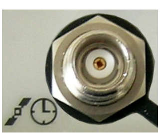
Warning! Do not confuse this coaxial input with the GNSS input **[2]** below. Connecting a GNSS antenna to the UHF input might damage it if the embedded UHF transmitter is used (although the transmitter is not supposed to transmit until there are enough GNSS satellites received).

Ethernet Port



A Fischer, seven-contact female connector **[7]** allowing you to connect the ProFlex 800 to a local network (LAN). Through this connector, you may remotely control and monitor the ProFlex 800 from any computer connected to the Internet. Data may also flow through this port, in the same way as through a serial port.

GNSS Input #2



A TNC coaxial female connector **[8]** for applying an external reference clock. (Connector **[8]** is missing on the rear view above.)

CAN 2.0 Bus

A Fischer, five-contact, female connector **[9]** allowing you to connect the ProFlex 800 to external, NMEA2000-compatible equipment via CAN bus. (For future use.)

Earth Terminal

A screw terminal **[10]** for connecting the receiver chassis to Earth.

Electric Isolation

All signals available on the following connectors are optically isolated from the receiver's internal circuitry and chassis ground, as well as from each other:

- Serial ports A, B and F (including DC power output voltage on port A)
- Ethernet port
- CAN bus

Buzzer

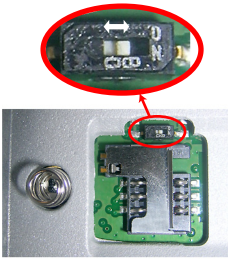
The internal buzzer will sound whenever an error is detected. The buzzer will sound six times and then stop. The error icon will however continue to blink. To acknowledge the error notification, first press the Scroll key to view the error and associated code and then press the same button again. The buzzer can be deactivated permanently using the $PASHS,BEEP command. See *BEEP: Beeper Setup on page 328*.

Battery Model & Battery Compartment

The battery used is a 7.4-V DC - 4600 mAh rechargeable battery. It is a standard model used in many camcorders.

The battery is housed in a battery compartment accessible from above the ProFlex 800. The compartment door can be opened by lifting and then turning the quarter-turn finger screw counter-clockwise.

The battery will automatically operate as a backup power source for the receiver if for some reason the external DC source used is removed from the DC power input.



A slide switch is available at the bottom of the battery compartment to set the behavior of the receiver after removal or failure of the DC power source while the receiver is on:

- Slide switch pushed **to the right**: Automatic re-start. The receiver will automatically be switched on when DC power is restored. This is the typically the setting that should be used with ProFlex 800 CORS.
- Slide switch pushed **to the left**: Manual re-start. After power is restored, the receiver will stay off. Operator intervention is needed to switch the receiver back on.

Use for example the tip of a pen to slide the switch to the left or right.

Special Button Combinations

- With the ProFlex 800 OFF, pressing the Power, Log and Scroll buttons simultaneously for a few seconds will restore all the factory settings.
- With the ProFlex 800 OFF and a USB key connected, pressing the Power and Scroll buttons simultaneously for a few seconds will cause the ProFlex 800 to start a firmware upload process. If there is no USB key connected or the key does not contain a firmware upgrade, then the process will abort after a few seconds.

  Because data has to be decompressed on the USB key during upgrades, the USB key must be unlocked, with at least 100 MBytes of free memory, before starting the upgrade.

These button combinations are summarized in the table below:

Button Combination	ProFlex 800 State	Function
Power+Log+Scroll	OFF	Restores Factory Settings.
Power+Scroll	OFF	Initiates firmware update from USB key.

Display Screens

If you press the Scroll button several times, you will see the following displays successively.

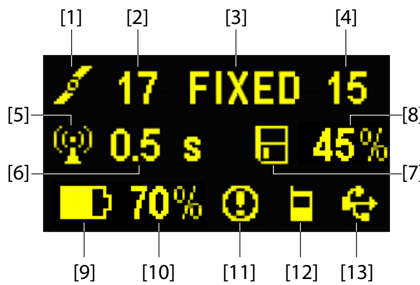
Power-On Screen

When you power on the receiver, the Ashtech logo appears on the screen. It is displayed until the receiver has completed its auto-test (this takes about 30 seconds).

Then the General Status screen is displayed.

General Status Screen

An example of General Status screen is shown below.



This screen displays the following information:

- : Satellite icon **[1]** (always displayed).
- Number of satellites tracked **[2]**.
- Position solution status **[3]**:
  - NONE: Position not available
  - AUTO: Autonomous GPS position
  - DGPS: Differential GPS position
  - S DGPS: SBAS Differential GPS position
  - FLOAT: Float solution
  - FIXED: Fixed solution (RTK is operational)
  - BASE: Receiver configured as a base.
- Number of satellites used **[4]**: Number of satellites used in the position processing, regardless of the current position solution status.
- : Data link icon **[5]**. This icon is displayed only when corrections are received.
- Age of corrections **[6]**, in seconds. This value is displayed when corrections are received and only after base station information has been received (Position status is at least "DGPS").

- Raw data logging icon **[7]**:

	Data recording through front panel Log button: – Blinking: Raw data logging in progress – Fixed: No raw data logging in progress.
	Data recording through sessions: – Blinking: Raw data logging in progress – Fixed: No raw data logging in progress.
	ATL data recording for advanced diagnosis.

- Percentage of free memory in the storage medium used **[8]**.
- : Battery icon **[9]** with visual indication of remaining charge. If an external power source is used (AC adapter or external battery), the battery icon will be animated to indicate battery charging in progress.

  is displayed when there is no battery in the compartment and the receiver is operated from an external power source.
- Power status **[10]**.

Icon	Definition
Percent value	Percentage of remaining battery. This indication will flash when the remaining energy drops below 5%. When an internal battery is used with external power applied, this icon alternates between the plug and the percentage of charge on the battery.
	Replaces percentage when an external power source is used.

- Alarm status **[11]**.

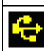
Icon	Definition
	Alarm detected. Press the Scroll button to view the alarm type. Press it again to acknowledge the alarm, which then disappears from the list. Unless there is another alarm in the queue, in which case you will have to resume the acknowledge sequence, the screen then displays the memory screen.
None	No alarm detected

- GSM module (modem) status **[12]**. This may be one of the following icons:

Icon	Definition
Blank	Modem turned off.

Icon	Definition
 	Blinking icon: Modem turned on but not initialized yet. Indicates signal strength at modem antenna input. Fixed icon: Modem turned on and initialized (ready for a connection). Indicates signal strength received at modem antenna input. The higher the number of bars, the better the signal. This icon will show four dots at the bottom when the input signal is zero. The symbol shown in the upper left corner stands for “2G”. When the modem detects a 3G network, “3G” is displayed instead.
	Modem on line.

- [**13**]: USB status and/or Bluetooth status and/or Ethernet port status.

Icon	Definition
	USB port connected to active device
	Bluetooth active
	Ethernet port active
 /  / 	These three icons will appear successively when the USB port, the Ethernet port and Bluetooth are all active.
Blank	USB port unconnected, Bluetooth and Ethernet inactive.

Memory Screens

From the General Status screen, press the Scroll button to access the Memory screens. Memory screens appear successively (see examples) at a display rate of about five seconds:

Left screen:

- First line: Percentage of free space in the internal memory.
- Second line: Number of files currently stored in the internal memory.
- Third line: Percentage of free space on the USB mass storage device.

- Fourth line: Number of files currently stored on the USB mass storage device.

Right screen:

- First line: Total space occupied by the files currently stored in the internal memory.
- Second line: Nominal size of the internal memory.
- Third line: Total space occupied by the files currently stored on the USB mass storage device.
- Fourth line: Nominal size of the USB mass storage device.

About the "*" symbol:

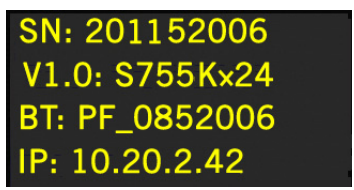
- It can only appear at the end of the first or third line.
- Where placed, it indicates that this storage medium is used for data logging.

What if there is no USB mass storage device connected to the receiver?

- Parameters relevant to the USB key size and space used and available are void (three dots displayed instead).
- Number of files is forced to "0".

Receiver Identification Screen

From any of the two Memory screens, press the Scroll button to access the Receiver Identification screen. See example below.



- Receiver Serial Number
- Firmware Version
- Receiver Bluetooth Identifier
- IP Address

Position Computation Screen

From the Receiver Identification screen, press the Scroll button to access the Position Computation screen. This screen displays the receiver position. The displayed coordinates will be:

- either WGS84 coordinates ("W84" displayed at the beginning of the last line; coordinates are latitude, longitude and ellipsoidal elevation)

- or local coordinates (“LOC” displayed at the beginning of the last line; coordinates may be either Easting, Northing, Height or Latitude, Longitude, Ellipsoidal Elevation, depending on whether or not a projection is defined in the local coordinate system used),

If the receiver is a rover, the displayed position will be the last computed position. The coordinates will be local (“LOC”) only if the rover receives specific RTCM messages from the base describing the local system used by the base.

If the receiver is a base, the displayed coordinates are set ones (not computed ones) representing the WGS84 or local reference position assigned to the base. See screen example below for a rover delivering WGS84 coordinates.

The upper line contains the same information as in the upper line of the General Status screen.

A new press on the Scroll button will take you to the ATL Recording screen (see below). If however the receiver is fitted with a radio receiver or is connected to an external radio transmitter, an additional display screen will show up before pressing the Scroll button takes you back to the ATL Recording screen.

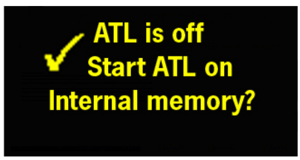
The possible two screens show the current radio settings:

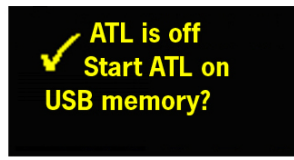
- First line: Serial port used, “Rx” for radio receiver or “Tx” for radio transmitter, radio type (ADL). Extra-parameter for “Rx”: Power status
- Second line: Channel number, carrier frequency
- Third line: Protocol used (Transparent, Trimtalk, DSNP, etc.), airlink speed

- Fourth line: Squelch setting (medium, low, high). Extra-parameters for Rx if a Pacific Crest: “FEC” if forward error correction enabled, “SCR” if scrambling enabled. Modulation type (GMSK, 4FSK). The fourth line will be slowly scrolled to the right if four parameters have to be displayed in the line.

ATL Recording Screen

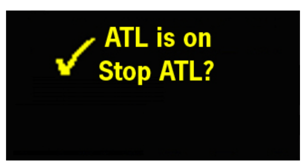
Pressing the Scroll button from the Position Computation screen –or from the Radio Settings screen if there is a radio used– will take you to the ATL Recording screen, which looks like one of the following, depending on whether a USB key is connected to the receiver (below, right) or not (below, left).





You don’t normally have to record ATL data, but if for troubleshooting purposes, the Technical Support asks you to do so, then proceed as follows:

- Press the Log button (left-hand button). This will cause the receiver to start recording ATL data on the specified storage medium. The screen will then look like this:



  You can then freely use the Scroll button to access other receiver screens without affecting the ATL data collection in progress (pressing the Scroll button from this screen will take you back to the General Status screen).

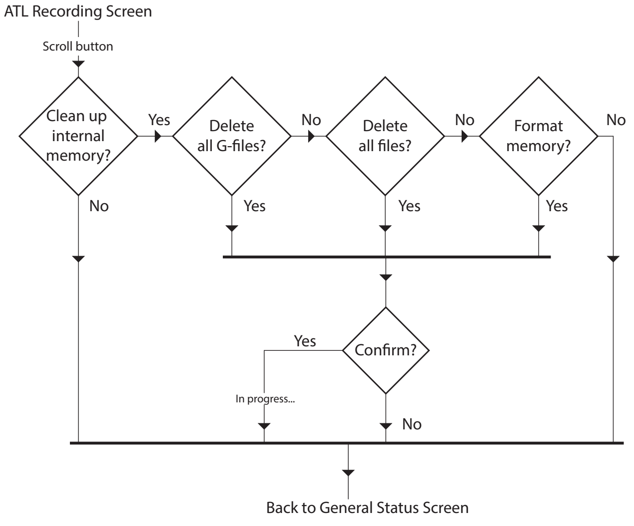
- When enough ATL data have been recorded (Tech Support will usually indicate the duration of ATL data collection needed for troubleshooting), then come back to the ATL Recording screen and simply press on the Log button again to stop the recording.

NOTE 1: ATL data recording is totally independent of raw data recording: controlling ATL recording is done exclusively from the ATL recording screen, and raw data recording from any other screen.

NOTE 2: Before connecting a USB key to record ATL data, make sure there is no *.par files saved on the key as the presence of this type of file would initiate some other functions in the receiver.

Memory Management Screen

From the ATL Recording screen, press the Scroll button to access the Memory Management screen. The flowchart below summarizes the different tasks you can perform at this point in the management of the receiver memory.



Screen Backlight

The screen backlight is automatically turned off if no key is pressed for 1 minute. When the backlight is off, a short press on the Scroll button will turn it back on. The Scroll button will then recover its usual functions.

Data Transfer Screen

For more information on the screen displayed when downloading files, refer to *Downloading Raw Data on page 715*.

External Heading

When the receiver is used in external heading mode:

- The area showing the Position Solution Status on the General Status screen also shows the status of the heading process.

  For example, if the Position Solution Status is "FIXED" and the heading process has reached its operational status, then the Position Solution status will show successively "FIXED" and "H-FIX" (at regular intervals of 1 second).

- An additional screen, called the Heading screen, is inserted between the General Status screen and the Memory screens. It provides the status and results of the heading process.

  In the example below, the heading process is fully operational ("FIXED" status), the receiver returns the heading measurement, as well as the roll measurement (baseline oriented perpendicular to the vehicle centerline). There is no pitch value returned because this angle is not measured in this case.

The table below gives the correspondence between the heading status displayed on the General Status screen and the one shown on the Heading screen and explains the meaning of each status.

General Status Screen	Heading Screen	Meaning
H-NON	NONE	Your receiver is con figured to operate in external heading mode, but there's no data received from the external receiver.
H-CAL	CALIB	Calibration of the heading process is in progress.
H-FLO	FLOAT	Heading process has reached the FLOAT status
H-FIX	FIXED	Heading process has reached the FIXED status and is now fully operational.

Charging Batteries Before Use

Make sure the battery is fully charged for each ProFlex 800 you will be using in the field.

For a ProFlex 800 CORS, inserting a fully charged battery into the receiver will guarantee that the station can keep operating for several hours after a power shutdown, giving you the time to take the necessary maintenance steps.

Follow the instructions below to charge a battery.

Removing the Battery from the ProFlex 800

Unless the battery has already been taken out, do the following:

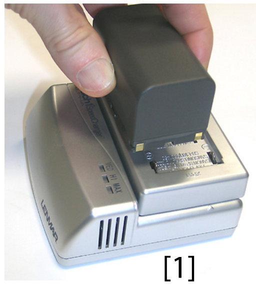
- Open the battery trapdoor, accessible from above the ProFlex 800, by lifting and then turning the quarter-turn finger screw anticlockwise. This releases the two springs located under the battery, pushing the battery slightly upward (see picture).

- Grab the battery and take it out of the compartment.

Charging the Battery

The battery charger comes with a separate universal AC adapter fitted with a 1.5-m output cable. The AC adapter includes a choice of four different, detachable plug types. Follow the instructions below to operate the charger.

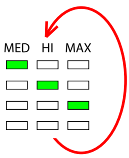
- Choose the plug type that is suitable for your country.
- Secure that plug on the AC adapter.
- Connect the cable from the AC adapter to the battery charger.
- Give the battery the right orientation with respect to the charger **[1]** (the battery terminals should come into contact with the two sets of connectors on the charger), then push the battery against the plate and slide it forward **[2]** until it locks into place.



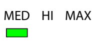
[1]

[2]

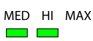
[3]



[4]



[5]



[6]

- Plug the adapter into an AC outlet. Battery charging starts immediately.

  For a low battery that's being charged, you will first see the three LEDs switch on and off, one after the other, followed by a short period of time when none of the LEDs is on (see **[3]**).

  After about two hours of charging, the MED LED will stay on **[4]**. A few minutes later, the HI LED **[5]**, and then the MAX LED **[6]** will also stay on.
- When the three LEDs are on, this means the battery is fully charged and can be disconnected from the charger.

Inserting the Battery in the ProFlex 800

- Insert the battery into the compartment making sure the battery has the right orientation (the battery terminals should come into contact with the two sets of connectors located at the bottom of the compartment).
- Close the trapdoor, push the finger screw in tight, and turn it fully clockwise.

  Note that once it is properly secured, the trapdoor pushes the battery against the bottom of the compartment to ensure electrical connection of the battery to the ProFlex 800.

Mounting Options

Backpack Mount

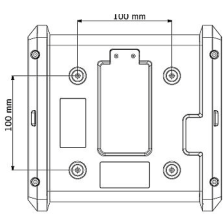
The ProFlex 800 is secured in a backpack when used as a rover for land surveying applications.

Tripod Mount

In land surveying applications, when used as a roaming base mounted on a tripod, the ProFlex 800 can be secured on one of the legs of the tripod using the lug located on its bottom side.

The lug may be secured onto the chassis in two different ways allowing the receiver to be installed either with its front panel upwards or sideways (recommended).

Bottom Mount

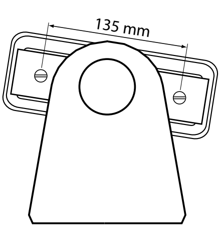


This type of installation is suitable for machine guidance or marine applications. The ProFlex 800 is secured from underneath the receiver case, using four screws M4.

Preparing the support (a flat plane) on which the receiver will be mounted only consists of drilling four holes, forming a simple, 100-mm square.

Note that this is a VESA[1]-compliant mounting scheme.

Cradle Mount



This type of installation is also suitable for machine guidance or marine applications. The ProFlex 800 can be secured on a cradle of your choice, possibly designed to allow adjustable orientation of the receiver front panel.

On both sides of the receiver case are two M4 screws, 135 mm apart, that can be used for mounting the receiver on the chosen cradle.

In this mounting case, the two plates located on either side of the receiver case can either be kept in position or simply removed.

1.VESA= Video Electronics Standards Association.

Specifications

GNSS Characteristics

- 120 channels:
  - GPS L1 C/A L1/L2 P-code, L2C, L5, L1/L2/L5 full wavelength carrier
  - GLONASS L1 C/A and L2 C/A, L1/L2
  - GALILEO E1 and E5
  - QZSS
  - SBAS: code and carrier (WAAS/EGNOS/MSAS)
- New Z-Blade™ technology for optimal GNSS performance
  - New Ashtech GNSS centric algorithm: Fully independent GNSS signal tracking and processing
  - Fully independent code and phase measurements
  - Quick signal detection engines for fast acquisition and re-acquisition of GNSS signals.
  - Advanced multipath mitigation
- Up to 20 Hz real-time raw data (code and carrier) and position output
- RTK base and rover modes, post-processing

RTK Base

- RTCM 2.3, RTCM 3.1 & RTCM 3.2
- CMR & CMR+
- ATOM™ and DBEN (proprietary formats)

RTK Rover

- Up to 20 Hz Fast RTK position output
- RTCM 2.3 & RTCM 3.1, including message types 1021, 1022, 1023 and 1025 for coordinate systems
- CMR & CMR+
- ATOM, DBEN & LRK (proprietary formats)
- Networks: VRS, FKP, MAC
- NTRIP protocol
- NMEA0183 messages output
- “Hot Standby RTK” (second RTK position available in the background as backup solution)

Accuracy

All mentioned values are RMS. See note [1]

SBAS

1.Accuracy and TTFF specifications may be affected by atmospheric conditions, signal multipath, and satellite geometry. Position accuracy specifications are for horizontal positioning. Vertical error is typically less than twice the horizontal error.

- Horizontal < 50 cm

DGPS

- Horizontal < 25 cm+1ppm in typical conditions [1]

Flying RTK™

- 5 cm + 1 ppm (steady state) horizontal for baselines up to 1000 km (3).

RTK

- Horizontal: 1 cm + 1 ppm (3)
- Vertical: 2 cm + 1 ppm (3)

Real-Time Performance

Instant-RTK® Initialization:

- Typically 2-second initialization for baselines < 20 km
- Up to 99.9% reliability

RTK initialization range:

- > 40 km

Post-Processing Accuracy

All mentioned values are RMS. See also notes (2) and (3).

Static, Rapid Static:

- Horizontal: 5 mm (0.016 ft) + 0.5 ppm
- Vertical: 10 mm (0.033 ft) + 0.5 ppm

Long Static [2]:

- Horizontal: 3 mm (0.009 ft) + 0.5 ppm
- Vertical: 6 mm (0.019 ft) + 0.5 ppm

Post-Processed Kinematic:

- Horizontal: 10 mm (0.033 ft) + 1.0 ppm
- Vertical: 20 mm (0.065 ft) + 1.0 ppm

Data Logging Characteristics

Recording Interval

- 0.05 to 999 seconds

Memory

- 128-MByte internal memory (expandable through USB sticks or external hard drives), 96 Mbytes usable.
- Built-in additional 8-GByte memory extension (for CORS configuration)

1.Performance values assume minimum of five satellites, following the procedures recommended in this manual. High multipath areas, high PDOP values and periods of severe atmospheric conditions may degrade performance.

2.Long baselines, long occupations, precise ephemeris used.

- Ring File Memory offering unlimited use of the storage medium

Sessions

- Up to 96 sessions per day
- Embedded Rinex Converter (RINEX 2.11 and 3.01 supported)
- Enhanced automatic FTP Push function

Embedded Web Server

- Password-protected Web Server for administrator and users
- Full receiver monitoring and configuration
- FTP push function (to external primary FTP server or/and external backup FTP server)
- Embedded FTP server
- Embedded NTRIP caster
- NTRIP server and instant real-time multi-data streaming over Ethernet
- Email alerts for automatic notifications of receiver status
- DHCP or manual (static IP) configuration
- DynDNS technology support

Full MET/TILT Sensor Integration

- Both sensor types can be connected simultaneously
- Met and tilt data can be:
  - Logged and downloaded together with the GNSS data (legacy D-file supported)
  - Streamed in real time

I/O Interface

Rugged and waterproof Fischer connectors:

- 1 x RS232/RS422, up to 921.6 kbits/sec
- 2 x RS232, up to 115.2 kbits/sec
- 1 x USB 2.0, host and device
- Bluetooth 2.0 + EDR Class 2, SPP profile
- Ethernet (Full-Duplex, auto-negotiate 10 Base-TX / 100 Base - TX)
- 1PPS output
- Event marker input
- Earth terminal
- 12V DC/0.5 A (1 A peak) output available on serial port A
- All signals available are optically isolated from the receiver's internal circuitry (except for USB)

- Ready for CAN bus (NMEA200 compatible)

Physical & Environmental Characteristics

Characteristic	
Size	21.5 x 20.0 x 7.6 cm (8.46 x 7.87 x 2.99 inches)
Weight	From 2.1 kg (4.6 lb)
Operating temperature	-30° to +65°C (-22° to +149°F)
Storage temperature	-40° to +70°C (-40° to +158°F)
Humidity	100% condensing
Sealing	IP67 (waterproof and dustproof). Salt mist in compliance with EN60945.
Shock	MIL-STD 810F, Fig. 516.5-10 (40 g, 11 ms, saw-tooth)
Vibration	MIL-STD 810F, Fig. 514.5C-17

Power Requirements

Characteristic	
Internal, removable battery	Li-ion battery, 32.5 Wh (7.4 V x4.6 Ah). Ensures UPS (Uninterrupted power supply) in case of power outage (Back-up battery)
Internal battery life time	> 6.5 hrs (UHF rover at 20°C) with UHF rover configuration
External power input	Isolated, 9-36 V DC input, protected from polarity reversal
Power requirement	< 5 W typical (with GNSS antenna)
Sleep mode	Programmable

Complementary System Components

- Internal UHF Kits (radios)
  - Pacific Crest Tx/Rx (base, rover)
- External UHF Transceiver Kits
  - Pacific Crest Tx/Rx
  - U-Link Tx/Rx
- Built-in 3.5 G Modem
  - UMTS/HxDPA: 2100,1900, 850MHz; Tri-Band
  - GSM/GPRS/EDGE: 850,900,1800,1900,2100 MHz; Quad-Band
  - GPRS/EDGE multislot class 12
  - 2G/3G automatic detection
  - GCF and PTCRB approved
- Antennas
  - Geodetic GNSS Survey antenna, gain: 38 dB
  - Choke ring GNSS antenna, gain: 39 dB

- Field Software
  - FAST Survey
  - Survey Pro
  - RTDS
- Office Software
  - GNSS Solutions
  - Survey Office

Certifications

- R&TTE directive compliant (CE)
- FCC/IC

Firmware Options

The available firmware options are summarized in the table below. Some are pre-installed, some others need to be purchased.

ID	Designation	Description	P/N
S	GLONASS	Enables the use of signals from the GLONASS constellation	680500
O	GALILEO	Enables the reception of GALILEO satellites	680655
Q	GNSSL5	Enables the reception of the L5 frequency	680656
K	RTK	Allows a base to generate and send RTK corrections. Allows a rover to compute RTK position solutions using corrections received from a base (unlimited RTK).	680502
F	FASTOUTPUT	Allows position output at a rate of up to 20 Hz	680527
R	FLYING RTK	RTK computation (Flying RTK mode only)	680635
C	CASTER	Embedded NTRIP caster	680636
Z	MODEM	Enables the use of the internal GSM/GPRS modem	680528

L	RTK3	For a rover, limits the RTK range to 3 km. (Not available for ProFlex 800 CORS)	Pre-installed
M	RTK2	Allows a rover to deliver RTK positions using corrections in DBEN, ATOM or LRK format. Allows a base to generate ATOM corrections.	Pre-installed
N	STA	Enables a base receiver to generate RTCM, CMR or ATOM corrections data	Pre-installed
P	GNSSL2	Enables the reception of the L2 frequency	Pre-installed

Enabling a firmware option purchased separately from the system relies on the use of the $PASHS,OPTION serial command. For more information on how to enable an option, refer to *OPTION: Receiver Firmware Options on page 414*.

Understanding RTK, RTK3, RTK2 and STA firmware options. Because these options have some intertwined properties, you usually don't need to have them all activated in your receiver:

- To get a full-featured RTK base, you just have to choose one of the following options:
  - RTK [K],
  - STA [N],
  - or RTK3 [L], the notion of limited RTK applying only to a rover, not to a base.

  You'll get the same level of base operation whatever the option you choose.
- To operate an RTK rover, you just need to choose one of the following options:
  - RTK [K], full RTK range (unlimited),
  - or RTK3 [L], RTK operation limited to baselines up to 3 km (pre-installed option).

  Your choice will depend on the baseline length you wish to cover in RTK. Note that option [K] "includes" option [L] in the sense that option [K] also allows the rover to operate in RTK for baselines less than 3 km.
- RTK2 (pre-installed) is equivalent to RTK except that it does not support RTCM and CMR/CMR+.

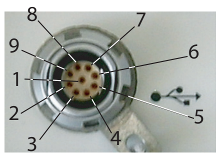
Port Pinouts

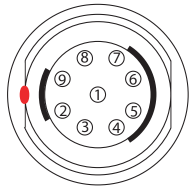
NOTE: All illustrations below show connectors seen from outside the receiver case.

USB Port

On front panel, USB 2.0, full speed.

9-C Connector, Type: Fischer DPUC 102 A059-230, fitted with sealing cap.



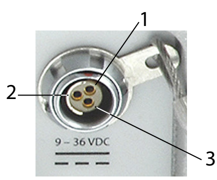


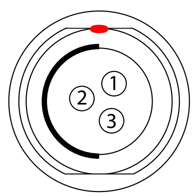
Pin	Signal Name
1	NC
2	GND
3	Device (D+)
4	Device (D-)
5	Host (VBus)
6	Host (D+)
7	Host (D-)
8	Device Detection
9	NC

Power In

On rear panel.

3-C Connector, Type: Fischer DPUC 102 A052-130, fitted with sealing cap.



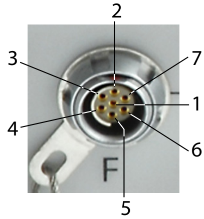


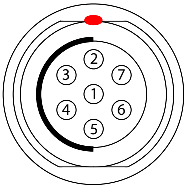
Pin	Signal Name	Description
1	GND	External Power Ground
2	PWR	External Power Input (9-36 V DC)
3	-	NC

Serial Data Ports

Ports A, B and F on rear panel.

Three 7-C connectors, Type: Fischer DPUC 102 A056-130, each fitted with a sealing cap. (Port F shown on the picture below. Ports A, B and F are similar.)





RS232 Configuration (all ports):

Pin	Signal Name	Description
1	+12 V DC or NC	12-V DC Output (port A only, and as an option). For all other ports: NC
2	GND	Ground
3	CTS	Clear To Send
4	RTS	Ready To Send
5	RXD	Receive Data
6	TXD	Transmit Data
7	PPS or EVENT	1PPS output (port A only) Event Marker input (port B only)

RS422 Configuration (port A only):

Pin	Signal Name	Description
1	+12 V DC	12-V DC Output
2	GND	Ground
3	RXD-	Receive Data-
4	TXD+	Transmit Data+
5	RXD+	Receive Data+
6	TXD-	Transmit Data-
7	PPS	1PPS output

Port A can be switched to RS232 or RS422 using the $PASHS,MDP command. RS232 inputs/outputs are typically ± 10 Volt asymmetrical signals with respect to ground. RS422 inputs/outputs are 0/+5 Volt symmetrical signals (differential lines).

Important! Pin 1 on port A delivering 12 V DC with an average DC current of 0.5 A and a peak DC current of 1 A, is a hardware option. Do not forget to mention this option in your Purchase Order if you want port A to be fitted with this feature. With the hardware option duly installed, remember that the 12 V DC will be available only when the receiver is powered from and external source, and not solely from its internal battery.

On port A, the 1PPS output is similar to a standard TTL output (0/+5 V):

- VOH Min= 4.5 V at IOL = - 4 mA
- VOH Max= 0.4 V at IOL= - 4 mA

Port B consists of the following:

- 1 x RS232 output, electrically similar to that on port A
- 1 x Event input with the following characteristics:
  - VIH Min = 3.7 V
  - VIL Max = 1.6 V

Port F provides an RS232 interface, electrically similar to that on port A.

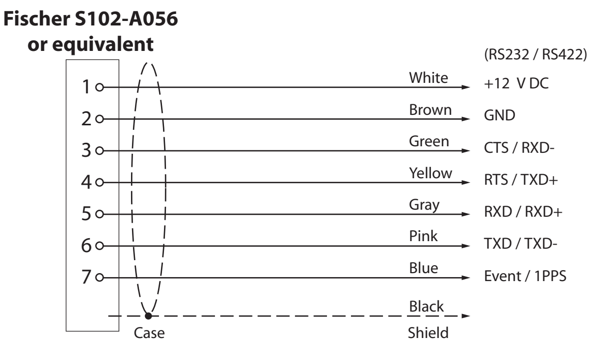
Multi-Function Serial Cable

In the basic supply of the ProFlex 800 CORS station, this cable (P/N 702450) comes with bare wires at one end.

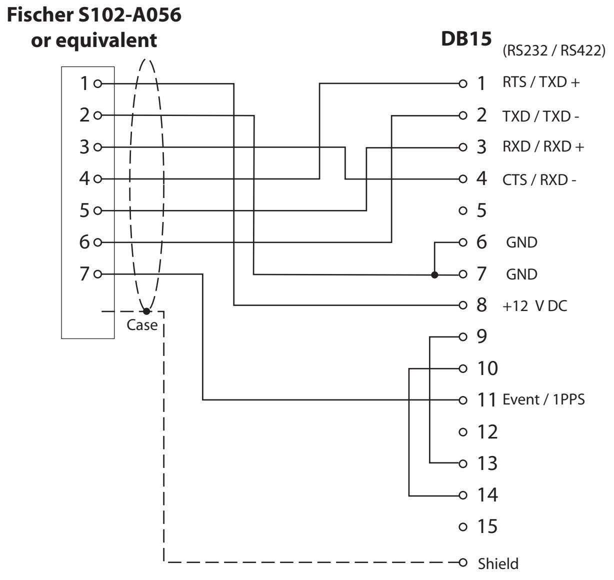
It is also available as an optional cable (P/N 702443) with a DB15 standard connector instead of bare wires.

The pinout of each of these cables is given below.

Cable P/N 702450, length: 2.90 m



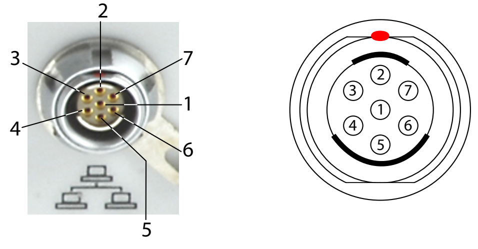
Cable P/N 702443, length: 0.25 m



Ethernet Port

On rear panel.

7-C Connector, Type: Fischer DPUC 102 A056-230, fitted with sealing cap. Although being also a 7-contact type, this receptacle uses a positioner that is different from the one used on ports A, B and F, thus making impossible the connection of the serial cable provided to this port.



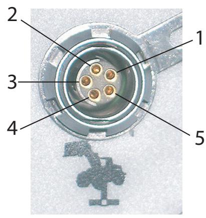
Pin	Signal Name
1	SHLD
2	RX+S
3	RX-S
4	TX-S

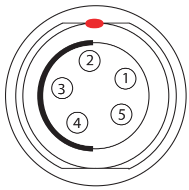
Pin	Signal Name
5	TX+S
6	L1
7	L2

CAN Bus

On rear panel. For use in a future release of the product.

5-C Connector, Type: Fischer DPUC 102 A054-130, protection cap provided.





Pin	Signal Name	Description
1	NET-SHIELD	Shield
2	NET-S	Power source (+)
3	NET-C	Power source (common)
4	NET-H	“High” signal line
5	NET-L	“Low” signal line

1PPS Output

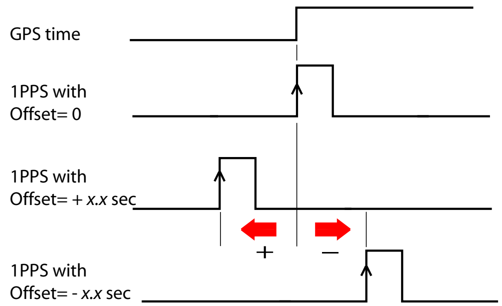
This output delivers a periodic signal that is a multiple or submultiple of 1 second of GPS time, with or without offset.

Using the 1PPS output is a standard feature of the receiver (no firmware option needed).

The 1PPS output is available on port A, pin 7, whatever the current configuration of this port (RS232 or RS422).

You can set the properties of the 1PPS signal using the $PASHS,PPS command. These properties are:

- Period: a multiple (1 to 60) or submultiple (0.1 to 1 in 0.1-second increments) of 1 second of GPS time.
- Offset: Amount of time in seconds before (+?) or after (-?) a full second of GPS time.



- Active edge, i.e. the edge (falling or rising) synchronized with GPS time. (On the diagram above, the rising edge was set to be the active edge)

You can read the current properties of the 1PPS output using the $PASHR,PPS command.

The signal specifications for the 1PPS output are the following:

- Signal level: 0-5 V
- Pulse duration: 1 ms
- Jitter: < 100 ns
- Slope transient time: < 20 ns

You can also output the exact GPS time of the active edge of the 1PPS output signal using the $PASHR,PTT command. The receiver will respond to this command right after the next 1PPS signal is issued, taking into account the chosen offset.

Event Marker Input

This input is used to time-tag external events. When an external event is detected on this input, the corresponding GPS time for this event is output as a $PASHR,TTT message on port B. The time tag provided in the message represents the exact GPS time of the event to within 1 µsecond. Obviously, a single message is output for each new event.

Using the Event Marker input is a standard feature of the receiver (no firmware option needed).

The event marker input is located on port B, pin 7.

You can choose whether it will be the rising or falling edge of the event marker signal that will trigger the time tagging of the event. This choice can be done using the $PASHS,PHE command.

The signal specifications of the marker event input are the following:

- Signal level: ± 10 V
- Permitted transient time on active edge: < 20 ns

Physical and Virtual Ports

Port ID	Port Definition
A	External serial port (RS232/RS422)
B	External serial port (RS232)
C	Bluetooth SPP
D	Internal UHF radio
E	Internal GSM/GPRS modem
F	External serial port (RS232)
I	External Ethernet (server)
I1-I9	Data streaming port on IP
M	Internal memory
P, Q	External Ethernet (client)
R	Automatic recording session
U	External USB memory

Chapter 2. Using the Web Server

Introduction

What is the ProFlex Web Server and what is it for? The ProFlex Web Server is a receiver-embedded, HTML-based firmware application designed to enable users to monitor or control the ProFlex 800 through a TCP/IP connection.

After making a TCP/IP connection physically possible between a computer and the receiver (via its Ethernet port), run a web browser on your computer (e.g. Mozilla FireFox, Microsoft Internet Explorer). Type the IP address (or host name) of the receiver in the address box, then press the Enter key. This launches the Web Server in the receiver, which in turn opens a web page in the web browser of the computer.

Who is allowed to use a receiver's Web Server application? The answer is anyone who has been given the IP address or host name of the receiver as well as a connection profile, i.e. a login and a password. These are the only parameters required to perform a remote connection through the Internet and run the Web Server.

Who gives remote access to the Web Server application? Only the owner of the receiver can as she/he knows the IP address or host name of the receiver and is allowed to create connection profiles for remote users.

How many types of connection profiles are there? There are two possible types of connection profiles:

- *Administrator* Profile: This profile is allowed to view the status of the receiver and change all the receiver settings. Only one administrator profile can be created in a receiver.
- *User* Profile: This profile is only allowed to view the status of the receiver. There can be as many different user profiles as needed, but only five users can connect simultaneously.

Note that this count of five simultaneous users does not include those users who are connected to the receiver for acquiring data through ports Ix (data streaming).

Getting the ProFlex 800 Ready for Running the Web Server

This section is more particularly intended for the receiver owner, who is also the receiver administrator.

In this section are described several possible cases of TCP/IP connection between the receiver and the computer, depending on the network environment.

Also discussed in this section are the steps to be taken jointly with the local network's IT Manager to make the TCP/IP connection successful, as well as some local settings you, as the receiver administrator, may have to do. This includes the management of the connection profiles for all the users of the ProFlex Web Server. As the receiver administrator, you should provide Web Server users with the following information:

- Receiver IP address or host name,
- Connection profile (login + password).

A TCP/IP connection with the receiver necessarily uses the receiver's Ethernet port. For this reason, you will always have to use the Ethernet adaptor cable provided (P/N 702426).

Typically, there are three possible cases of TCP/IP connection:

- TCP/IP connection within a local network.
- TCP/IP connection through the public Internet.
- ”Direct” TCP/IP connection.

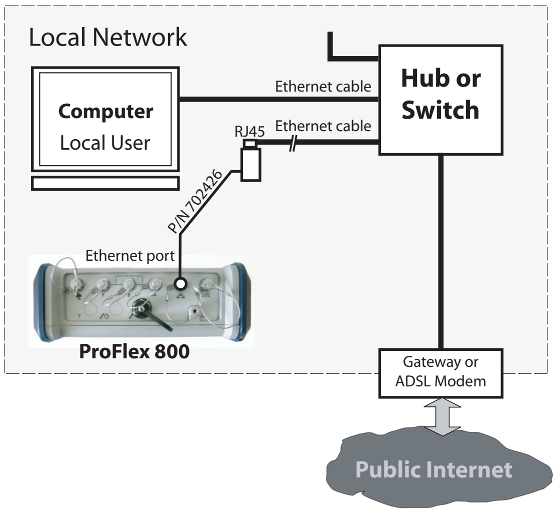
These are detailed below.

NOTE: It is assumed that the reader knows how to send $PASH commands to the receiver through a serial line or Bluetooth (see *Using Serial Commands* chapter, for more information).

TCP/IP Connection Within a Local Network

In this case of use, the receiver and the computer are connected to the same local area network (LAN) and may even be in the same room. Here the communication will NOT take place through the public Internet, but simply within the local network.

The connection diagram typically is the following.



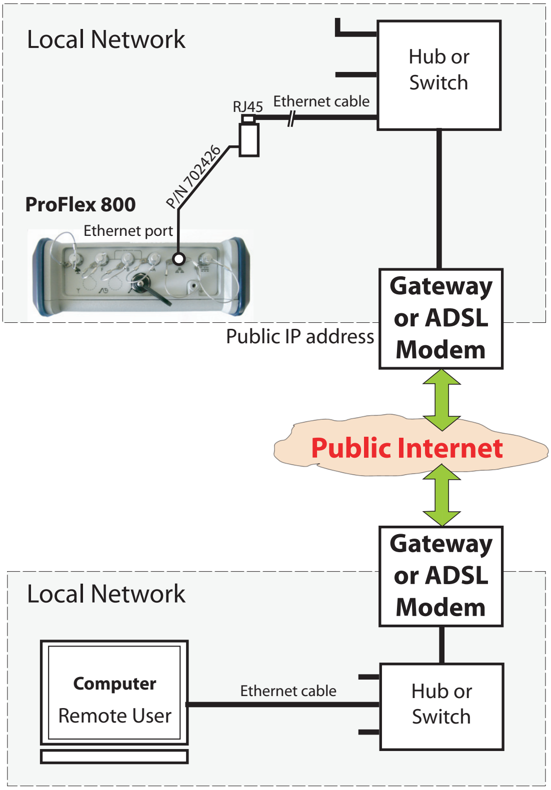
The valid receiver IP address to be sent to the users **is the one read on the receiver display screen**. To read this IP address, from the General Status screen, press the Scroll button twice to access the Receiver Identification screen. The IP address appears in the lower line. Please write it down.

The IT Manager may also create a host name for the receiver. The choice of using or not using the DHCP mode within the local network, and the consequence of this choice on which information to provide to users for the connection are also the decision and responsibility of the IT Manager.

TCP/IP Connection Through the Public Internet

In this case of use, the receiver and the computer are connected to different local networks. Here the communication will necessarily take place through the public Internet.

The connection diagram typically is the following.



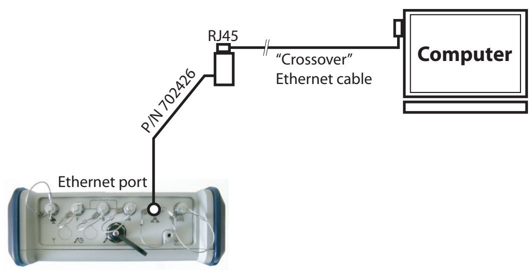
In this configuration, the IT Manager should take all the necessary steps for users to be able to access the ProFlex 800 through the public IP address of the local network. **Obviously, the IP address read on the receiver display screen is NOT the one to be provided to users**.

It will therefore be the responsibility of the IT Manager to provide the receiver administrator with the appropriate connection information (<IP address:port number> or host name).

"Direct" TCP/IP Connection

The term "Direct" used here should not be confused with the "Direct IP" connection mode, which is a special case of Internet connection to a static IP address. Here the term "Direct" is used to describe a TCP/IP connection between a receiver and a local computer through a special Ethernet connection, using a crossover cable connected directly between the receiver and the computer.

In a crossover cable, the pinout is inverted at one end of the cable. The crossover cable is not provided but is widely available from computer supply stores or online.



This type of connection is required when the receiver is not otherwise using its Ethernet port and there is no network connection available in the operating environment of the receiver (machine control, machine guidance).

In this case, make the following settings BEFORE physically connecting the computer to the receiver through the crossover cable:

- On the receiver, disable the DHCP mode and define an arbitrary static IP address and a subnetwork mask for the receiver.
- On the computer, change the network configuration for an exclusive TCP/IP connection with the receiver.

  Before changing the network configuration of the computer, it is advisable to write down all the current settings so that you can easily reverse to the previous network configuration when you are done with communicating with the receiver.

1. Send the following command to the receiver to read the current settings. Write them all down so that later you can easily reverse to these settings.

   NOTE: It is assumed that the reader knows how to send $PASH commands to the receiver through a serial line or

Bluetooth (see *ProFlex 800 Reference Manual*, *Using Serial Commands* Chapter, for more information)

$PASHQ,ETH
Example of receiver response:
$PASHR,ETH,I,ON,00:09:66:00:10:a0,10.20.2.123,DHP=1,ADD=192.168.0.1,MSK=255.255.255.0,GTW=255.255.255.255,DN1=255.255.255.255,DN2=255.255.255.255*3F

Should the Ethernet port be off (2nd parameter in the above response line is "OFF" instead of "ON"), please use the following command to turn it back on:

$PASHS,ETH,ON
Receiver response should be the following if the set command is successful:
$PASHR,ACK*3D

2. Send the following command to the receiver to disable the DHCP mode and define an arbitrary IP address for the receiver:

   $PASHS,ETH,PAR,DHP,0,ADD,10.20.2.10,MSK,255.255.255.0,GTW,10.20.2.1
   $PASHR,ACK*3D

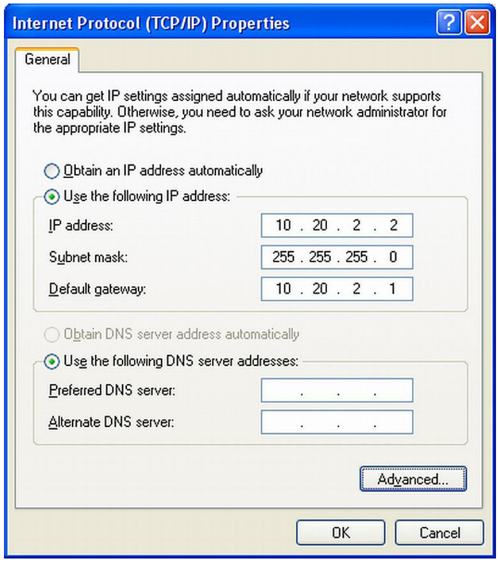
   Where:

   "10.20.2.10" is the arbitrary IP address assigned to the receiver.

   "255.255.255.0" is the arbitrary, but also mandatory, subnetwork mask.

   "10.20.2.1" is the arbitrary address for the gateway that will be assigned to the computer.
3. On the computer (running Windows XP), from the task bar, select **Start>Control Panel**.
4. Double-click **Network Configuration**.
5. Right click on **Local Area Connection** (or **Ethernet Board** if there is no local network) and select **Properties**.
6. On the **General** tab of the **Local Area Connection** properties, write down all the currently activated services so that later you can easily revert to these settings.
7. Still in this dialog box, clear all the services, except for the **Internet Protocol (TCP/IP)** service, which must stay active.
8. Still in that box, select the **Internet Protocol (TCP/IP)** option an click on the **Properties** button located nearby to open the Internet Protocol Properties window.
9. In that window, disable the DHCP mode by selecting the **Use the following IP address** option.

10.Enter a different IP address for the computer (e.g. 10.20.2.2). Enter the same subnetwork mask and gateway as those entered above in the receiver through the $PASHS,ETH,PAR command.



11.Click **OK** twice to close the windows.

12.Connect the crossover cable between the receiver and the computer.

13.Check that the new IP address displayed on the receiver screen is the expected one.

14.Open the web browser on the computer.

15.Type the receiver IP address in the address box. This launches the Web Server in the receiver.

NOTE: With Vista, select successively the following options to change the computer IP address: **Start>Control Panel>Network and Sharing Center**. On the left, click on **Manage Network Connections**. Right-click on **Local Area Connection** and select **Properties**. Select **Internet Protocol Version 4** and click on **Properties**. You can now change the IP address.

Managing the Connection Profiles

Managing connection profiles can be done directly from the ProFlex Web Server after you have logged in as the administrator. In this context, go to the **Configuration** tab and use the **Advanced Setup** menu (**Administrator** and **Users** submenus) to make the required changes.

The default administrator profile is defined as follows:

- Login: admin
- Password: changeme

Local Settings for the Receiver Administrator & IT Manager

You should inform your IT Manager of the following before he/she can set up the connection:

- The ProFlex 800 is not fitted –and cannot be fitted– with a firewall. If a firewall is needed in your local network, it should be installed on a device other than the ProFlex 800.
- The Ethernet port and the DHCP mode are active by default.
- TCP/IP port #80 is used by default in the receiver.

If however, the default settings have been changed in the receiver, you may have to do the following:

- Turn on the Ethernet port.

  Use the command below to power up the Ethernet port:

  $PASHS,ETH,ON

  When the port is on and connected, the Ethernet icon appears in the lower-right corner of the receiver screen. By default, the Ethernet port is on.
- Set the DHCP mode or assign a static IP address.

  Use the command below:

  $PASHS,ETH,PAR

The syntax of these two commands is fully described in the *ProFlex 800 Reference Manual*, *Set Command Library* Chapter.

Preliminary Instructions for Web Server Users

The following information should have been passed on to you:

- Receiver IP address or host name,
- Connection profile (login + password).

To make a connection with the receiver:

1. You should know for certain that the remote ProFlex 800 has properly been connected to the LAN via its Ethernet port. Otherwise no connection will be possible.

2. Make sure your computer is also ready for a TCP/IP connection.
3. Launch the web browser on your computer.
4. In the Address box of the web browser, type the IP address or host name of the receiver:

   http://<receiver_address>

   then press the Enter key.

   After the connection has successfully been established, the ProFlex Web Server **Home** tab appears in your web browser.
5. Click on the **Status** tab. You are then asked to enter the login and password of your connection profile (user or administrator). After you have successfully entered these two parameters, you can start using the Web Server. If you are the administrator, you are also allowed to access and fully use the **Configuration** tab.

Setting a Rover

How to Start

- Open the Web Server's **Configuration** tab. The first time you click on this tab, the Web Server will ask you to log in as the administrator. Only the receiver administrator is authorized to access the **Configuration** tab.

  You are allowed to change the destination of a receiver (e.g. it is currently a base and you want to change it into a rover). In this case, on opening the **Rover Setup** tab, the Web Server will retain part of the base settings that could be applied to the rover (e.g. antenna type, etc.).
- Whatever the way RTK corrections are delivered to the receiver, you will always have to define a number of general parameters pertaining to the rover function. These parameters are usually defined first. However when the internal modem is used, it is advisable to configure the modem first.
- Programming output messages in a rover is addressed separately (see *Defining Output Messages on page 64*).

General Parameters

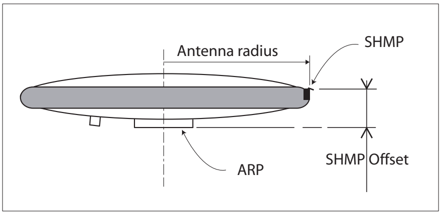
- Click on the **Rover Setup** menu.
- Set the receiver parameters:
  – **Ambiguity Fixing**: Set the confidence level (percentage) controlling the ambiguity fixing process.

Several percentages are available. Choosing a high percentage will result in a highly reliable process but is liable to reduce the availability level of “fixed” RTK positions. The default -and best- value for this parameter is 99.0%.

With no relevant firmware options installed, only the “0%” choice is available. This choice allows the receiver to operate in Flying RTK mode, which will be effective only if the FLYING RTK option ([R] option) has been installed.

– **Fast RTK**: Enable this option to get Fast RTK position output. With this option disabled, the receiver will deliver time-tagged RTK positions.
– **Moving Base**: Enable this option if corrections are received from a moving base. For all other cases where the base is static, keep this option disabled.
– **Dynamic**: Choose the type of motion that best suits the rover (static, quasi-static, walking, ship, automobile, aircraft, unlimited, adaptive or user-defined).

- Set the GNSS antenna parameters:
  – **Reference Position**: Specify the physical point on the rover system for which the receiver will accurately compute RTK positions. The three possible choices are: Antenna L1 phase center, Antenna Reference Point (ARP) or Ground Mark.
  – **Measurement Type**: Specify the method that was used when setting up the rover system to measure the height of the GNSS antenna (Vertical or Slant Height).
  – **Antenna Height**: Value of rover antenna height, expressed in the selected distance unit, as measured according to the specified measurement method.
  – **Receiver Antenna**: Specify the model of GNSS antenna used by the receiver. Select “UNKNOWN” if you don’t know which model is used.
  – **Antenna Radius**: In case of a “Slant Height” measurement, enter the antenna radius (this is a manufacturer specification), taking care to enter this parameter in the selected distance unit. See also the diagram and table below for more information.
  – **SHMP Offset**: In case of a “Slant Height” measurement, enter the SHMP offset (this is a manufacturer specification) taking care to enter this parameter in the selected distance unit. See also the diagram and table below for more information.



Antenna Model	P/N	Antenna Radius (m)	SHMP Offset (m)
ASH-661 ASH-660	802135 802133	0.0953	0.0483
MAG111406	111406	0.0921	0.0516

NOTE: The **Antenna Radius** and **SHMP Offset** fields are automatically preset to the right values when you select an antenna type in the **Receiver Antenna** field.

– **Virtual Antenna**: This option is useful when the rover is also used to log raw data. In this case, you can specify a virtual antenna model in this field to emulate a GNSS antenna other than the one really used.

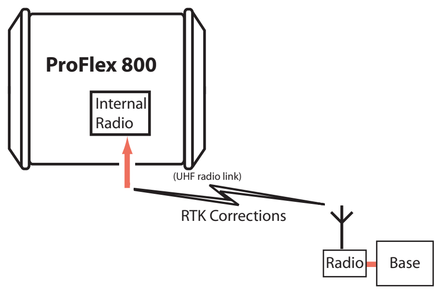
  Choosing a virtual antenna different from the one really used affects the raw data as if they had been collected by the virtual antenna, instead of the real one.

  When the rover does not have to log raw data, select "Off" in this field as there is no point using a virtual antenna in this case.

- Set the parameters relevant to the GNSS constellations used by the receiver:
  – **Position Elevation Mask**: Choose the elevation angle above the horizon creating the desired reception mask. After setting this angle, any satellite seen from the rover with an elevation angle less than the specified one will be rejected from the list of usable satellites. The default value is 5°.
  – **GPS**, **GLONASS**, **SBAS**, **QZSS**, **GALILEO**: Enable the options corresponding to the constellations you want the receiver to work from.
- You can now click on the **Configure** button to save all the changes made but remember you have to complete the content of this page depending on how the receiver will get its RTK corrections. Several typical applications are

listed below and described one after the other in the next sections:
- Internal radio
- Direct IP via modem
- Direct IP via Ethernet
- NTRIP client via Ethernet
- RTK corrections received on port A, B or F
- Rover operating in Flying RTK mode.
- Rover operating in Hot Standby RTK.

Internal Radio



- Unless already done, please follow all the steps described in section *General Parameters on page 49* before proceeding with the steps below.
- Still on the **Rover Setup** page, read the content of the **Internal Radio Port D** pane. Normally, the content of the read-only **Connection** field has been updated when opening the **Rover Setup** page to report the type of internal radio module currently used by the receiver (ADL Foundation). Just check that this field reads the name of the expected type of radio.
- Click on the **Power On** option to ask for radio power-up.
- At the bottom of the page, in the **Differential Port** pane, select the **Automatic** option to let the receiver detect the incoming differential stream automatically.

  NOTE: **Automatic** is the recommended choice for the Differential Port setting because in this case, you don't need to define the ports receiving the two possible differential streams.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver. As a result, the radio module is powered up.

Now that the radio is on, proceed with the last settings required on the radio side.

- Click on the **Connections** menu and then on the **Radio** sub-menu.
- In the **Internal Radio** pane, set the following parameters:
  - **Power**: (it is now necessarily "On" as you have turned on the radio in a previous step to make its configuration possible.)

    Choose whether the radio should be turned on automatically or manually:

    Automatic: The radio will be switched on or off automatically when the rover is respectively turned on or off.

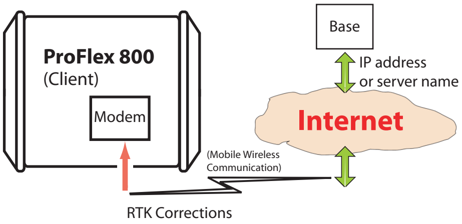
    Manual: The radio will be powered up only by going through the **Rover Setup** page, setting the internal radio to "Power On" and clicking on the **Configure** button (or using the $PASHS,RDP,ON command).
  - **Channel**: Select the channel on which you know that the base is transmitting its RTK corrections.
  - **Protocol**: Select the data protocol used in the data transmission:

    "Transparent", "Trimtalk450S", "SATEL", "TrimMark II/IIe", "TT450S", "TRIMMARK3", "Transparent FST" or "U-Link".

    This choice should be the same as the one made at the base.
  - **Airlink Speed**: Choose the data transmission speed (should be the same as the one used at the base).
  - (**Type** is just a read-only field recalling the type of radio used.)
  - **Sensitivity**: Set the radio sensitivity level ("High", "Medium" or "Low")
  - **Scrambler**: On or Off
  - **FEC**: On or Off
  - **Current Power**: 0.1, 0.5 or 1.0 W.

- Ignore the **External Radio** pane (**Type** should be set to "None").
- Click on the **Configure** button to let the Web Server load the parameters to the radio via the receiver. You just have now to define the output messages (see *Defining Output Messages on page 64*).

Direct IP Via Modem



The internal modem should be configured first:

- Click on the **Connections** menu and then on the **Bluetooth/ Modem** sub-menu.
- Set the following parameters in the **Internal Modem/Device Settings** pane:
  - **Power**: Select “On”. Then choose whether the modem should be turned on automatically or manually:

    Automatic: The modem will be switched on or off automatically when the rover is respectively turned on or off.

    Manual: The modem will be powered up only by going through the **Connections** > **Bluetooth/Modem** page, setting the modem to “Power On” and clicking on the **Configure** button (or using the $PASHS,MDM,ON command).
  - **Automatic Connection**: Check this option.
  - **Pin**: 4- to 8-character pin code of the SIM card used in the modem for GPRS operation.
  - **2G Only**: Recommended to save power.

- Set the following parameters in the **Internal Modem/GPRS Mode Settings** pane (the mobile communication provider you are using should be able to give you all this information):
  - **Internet Protocol**: Choose the Internet protocol (TCP or UDP) allowing the modem to perform an Internet connection.
  - **Access Point**: Enter the URL of the mobile communication provider.
  - **Access Point Login**: Enter the login of the mobile communication provider.
  - **Password**: Enter the password of the mobile communication provider.

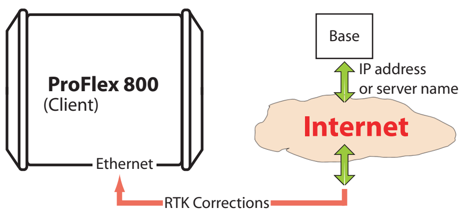
- Click on the **Configure** button.

- Now please follow all the steps described in section *General Parameters on page 49* and then proceed with the steps below.
- Still on the **Rover Setup** page, in the **Network** pane, set the following parameters:
  - **Connection**: Choose “Modem Direct IP - Port E”. As a result, new fields appear in this pane that you should set as instructed below:
  - The rover being a client, enter the information (**Connect Now**, **Address**, **Port**, **Login**, **Password**) allowing it to connect to the base (the server) from which it is supposed to receive corrections. The login and passwords are required only if the server demands authentication (e.g. SpiderNet). In that case, the message “$GPUID,<login>,<password> will be generated automatically and sent to the server when clicking on **Configure**.

    Enable **Connect Now** to allow the receiver to establish the connection right after you have clicked on **Configure**.
- At the bottom of the page, in the **Differential Port** pane, select the **Automatic** option to let the receiver detect the incoming differential stream automatically.

  NOTE: **Automatic** is the recommended choice for the Differential Port setting because in this case, you don’t need to define the ports receiving the two possible differential streams.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver. You just have now to define the output messages (see *Defining Output Messages on page 64*).

Direct IP Via Ethernet



- First, click on the **Connections**> **Ethernet** submenu.
- Set the following Ethernet parameters to allow the receiver to access the network through its Ethernet port:

– **DHCP**: Enabling this option means the local network to which the receiver is connected will automatically allocate a dynamic IP address to the receiver. If this option is disabled, you need to define the receiver's static **IP address**, and give information about the local network (**Subnetwork Mask** and **Gateway**). You may need to be assisted by a network expert -or IT Manager- to define these parameters (as well as the three parameters below).

  If you activate the **DHCP** option, then it's a good idea to define a hostname for your receiver and declare it to DynDNS (see **DynDNS** frame at the bottom of the page). DynDNS is a free service that will make sure the dynamic IP address allotted to the receiver by your ISP is always attached to your receiver's hostname. This requires that you open an account on DynDNS. For more information on this service, see *Creating an Account on Dyn.com on page 91*.
– **DNS 1 IP Address**: If DHCP is disabled, enter the IP address of the primary DNS providing the correspondence between the receiver host name and its IP address.
– **DNS 2 IP Address**: If DHCP is disabled, enter the IP address of the secondary DNS providing the correspondence between the receiver host name and its IP address
– (**MAC Address** is a read-only field showing the hardware identification of the receiver's Ethernet port.)

- Ignore the **Port I Settings** frame.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver.
- Unless already done, please follow all the steps described in section *General Parameters on page 49* before proceeding with the steps below.
- Still on the **Rover Setup** page, in the **Network** pane, set the following parameters:
  – **Connection**: Choose "Ethernet Direct IP - Port P". As a result, new fields appear in this pane that you should set as instructed below:
  – The rover being a client, enter the information (**Connect Now**, **Address**, **Port**, **Login**, **Password**) allowing it to connect to the base (the server) from which it is supposed to receive corrections. The login and passwords are required only if the server demands

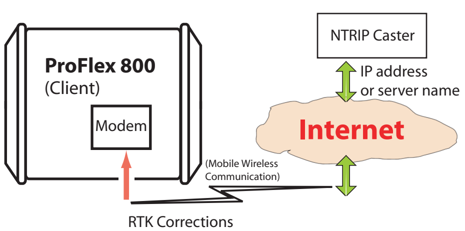
authentication (e.g. SpiderNet). In that case, the message “$GPUID,<login>,<password> will be generated automatically and sent to the server when clicking on **Configure**

Enable **Connect Now** to allow the receiver to establish the connection right after you have clicked on **Configure**.

- At the bottom of the page, in the **Differential Port** pane, select the **Automatic** option to let the receiver detect the incoming differential stream automatically.

  NOTE: **Automatic** is the recommended choice for the Differential Port setting because in this case, you don’t need to define the ports receiving the two possible differential streams.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver. You just have now to define the output messages (see *Defining Output Messages on page 64*).

NTRIP Client Via Modem



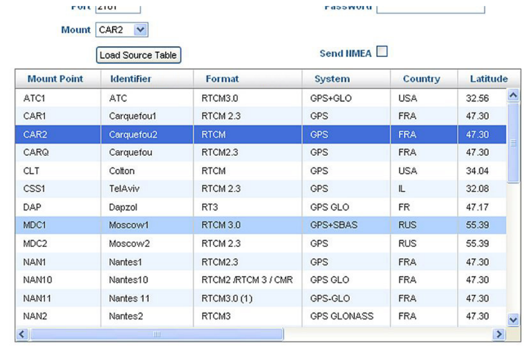
The internal modem should be configured first:

- Click on the **Connections** menu and then on the **Bluetooth/ Modem** sub-menu.
- Set the following parameters in the **Internal Modem/Device Settings** pane:
  – **Power**: Select “On”. Then choose whether the modem should be turned on automatically or manually:

    Automatic: The modem will be switched on or off automatically when the rover is respectively turned on or off.

    Manual: The modem will be powered up only by going through the **Connections** > **Bluetooth/Modem** page and setting the modem to “Power On” (or using the $PASHS,MDM,ON command).
  – **Automatic Connection**: Check this option.

  - **Pin**: 4- to 8-character pin code of the SIM card used in the modem for GPRS operation.
  - **2G Only**: Recommended to save power.
- Set the following parameters in the **Internal Modem/GPRS Mode Settings** pane (the mobile communication provider you are using should be able to give you all this information):
  - **Internet Protocol**: Choose the Internet protocol (TCP or UDP) allowing the modem to perform an Internet connection.
  - **Access Point**: Enter the URL of the mobile communication provider.
  - **Access Point Login**: Enter the login of the mobile communication provider.
  - **Password**: Enter the password of the mobile communication provider.
- Click on the **Configure** button.
- Now please follow all the steps described in section *General Parameters on page 49* and then proceed with the steps below.
- Still on the **Rover Setup** page, in the **Network** pane, set the following parameters:
  - **Connection**: Choose “Modem Ntrip Client - Port E”. As a result, new fields appear in this pane that you should set as instructed below:
  - **Connect Now**: Enable this option to allow the receiver to establish the connection right after you have clicked on **Configure**.
  - **Address**, **Port**, **Login**, **Password**: Enter the information allowing the receiver to connect to the NTRIP caster. This information should have been passed on to you earlier by the administrator of this service.
  - **Load Source Table** button: Click on this button after you have entered the information about the NTRIP caster. As a result, the list of available sources from this caster appears just underneath. (See example below.)



Mount Point	Identifier	Format	System	Country	Latitude
ATC1	ATC	RTCM3.0	GPS+GLO	USA	32.56
CAR1	Carquefou1	RTCM 2.3	GPS	FRA	47.30
CAR2	Carquefou2	RTCM	GPS	FRA	47.30
CARQ	Carquefou	RTCM2.3	GPS	FRA	47.30
CLT	Colton	RTCM	GPS	USA	34.04
CSS1	TelAviv	RTCM 2.3	GPS	IL	32.08
DAP	Dapzol	RT3	GPS GLO	FR	47.17
MDC1	Moscow1	RTCM 3.0	GPS+SBAS	RUS	55.39
MDC2	Moscow2	RTCM 2.3	GPS	RUS	55.39
NAN1	Nantes1	RTCM2.3	GPS	FRA	47.30
NAN10	Nantes10	RTCM2 /RTCM 3 / CMR	GPS GLO	FRA	47.30
NAN11	Nantes 11	RTCM3.0 (1)	GPS-GLO	FRA	47.30
NAN2	Nantes2	RTCM3	GPS GLONASS	FRA	47.30

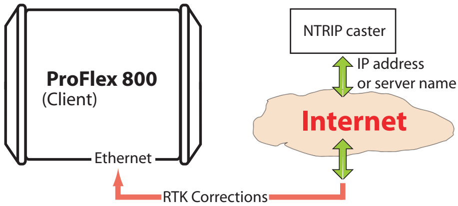
Select the desired source by simply clicking on the corresponding row. The resulting mount point then appears in the **Mount Point** field located above the **Load Source Table** button.

– **Send NMEA**: Check this button when the rover operates in a VRS network so that it can return its position to the network through an NMEA message. Keep it cleared in all other cases. (This option is automatically enabled when you select a mount point for which the NMEA message is requested.)

- At the bottom of the page, in the **Differential Port** pane, select the **Automatic** option to let the receiver detect the incoming differential stream automatically.

  NOTE: **Automatic** is the recommended choice for the Differential Port setting because in this case, you don't need to define the ports receiving the two possible differential streams.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver. You just have now to define the output messages (see *Defining Output Messages on page 64*).

NTRIP Client Via Ethernet



- First, click on the **Connections**> **Ethernet** submenu.
- Set the following Ethernet parameters to allow the receiver to access the network through its Ethernet port:
  – **DHCP**: Enabling this option means the local network to which the receiver is connected will automatically allocate a dynamic IP address to the receiver. If this option is disabled, you need to define the receiver's static **IP address**, and give information about the local network (**Subnetwork Mask** and **Gateway**). You may need to be assisted by a network expert -or IT Manager- to define these parameters (as well as the three parameters below).

    If you activate the **DHCP** option, then it's a good idea to define a hostname for your receiver and declare it to DynDNS (see **DynDNS** frame at the bottom of the page). DynDNS is a free service that will make sure the dynamic IP address allotted to the receiver by your ISP is always attached to your receiver's hostname. This requires that you open an account on DynDNS. For more information on this service, see *Creating an Account on Dyn.com on page 91*.
  – **DNS 1 IP Address**: Enter the IP address of the primary DNS providing the correspondence between the receiver server name and its IP address.
  – **DNS 2 IP Address**: Enter the IP address of the secondary DNS providing the correspondence between the receiver server name and its IP address
  – (**MAC Address** is a read-only field showing the hardware identification of the receiver's Ethernet port.)
- Ignore the **Port I settings** frame on the right.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver.

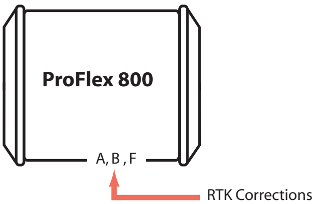
- Unless already done, please follow all the steps described in section *General Parameters on page 49* before proceeding with the steps below.
- Still on the **Rover Setup** page, in the **Network** pane, set the following parameters:
  - **Connection**: Choose “Ethernet Ntrip Client - Port P”. As a result, new fields appear in this pane that you should set as instructed below:
  - **Connect Now**: Enable this option to allow the receiver to establish the connection right after you have clicked on **Configure**.
  - **Address**, **Port**, **Login**, **Password**: Enter the information allowing the receiver to connect to the NTRIP caster. This information should have been passed on to you earlier by the administrator of this service.
  - **Load Source Table** button: Click on this button after you have entered the information about the NTRIP caster. As a result, the list of available sources from this caster appears just underneath. (See example below.)

  Select the desired source by simply clicking on the corresponding row. The resulting mount point then appears in the **Mount Point** field located above the **Load Source Table** button.
  - **Send NMEA**: Check this button when the rover operates in a VRS network so that it can return its position to the network through an NMEA message. Keep it cleared in all other cases. (This option is automatically enabled when you select a mount point for which the NMEA message is requested.)

- At the bottom of the page, in the **Differential Port** pane, select the **Automatic** option to let the receiver detect the incoming differential stream automatically.

  NOTE: **Automatic** is the recommended choice for the Differential Port setting because in this case, you don't need to define the ports receiving the two possible differential streams.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver. You just have now to define the output messages (see *Defining Output Messages on page 64*).

RTK Corrections Received on Port A, B or F

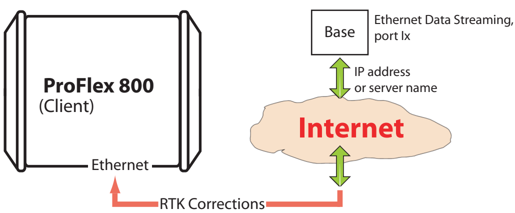


- Unless already done, please follow all the steps described in section *General Parameters on page 49* before proceeding with the steps below.
- Still on the **Rover Setup** page, in the **Serial Port x** pane corresponding to the port you want the receiver to use (A, B or F), set the following parameters:
  - **Connection**: Choose the name of the corrections receiver device connected to the port. As a general rule, choose "None/Cable" for any external corrections receiver connected to that port. But if the device used is a license-free radio, type ARF7474B EU or ARF7474A NA, choose specifically this type of radio.
  - Port settings (**Baud Rate**, **Mode**, **RTS/CTS**): Set the serial port to match the external device connected to it. Setting these fields will update the corresponding fields on the **Serial Ports** sub-menu page
- At the bottom of the page, in the **Differential Port** pane, select the **Automatic** option to let the receiver detect the incoming differential stream automatically.

  NOTE: **Automatic** is the recommended choice for the Differential Port setting because in this case, you don't need to define the ports receiving the two possible differential streams.

- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver.
- If the external radio used is a standalone, non-identified radio receiver, skip this step. But if an ARF7474x license-free radio is used, click on the **Connections**> **Radio** submenu and from the **Type** field located in the **External Radio** pane, select the type of license free radio used. Then click on the **Configure** button.
- If port A is used for the connection to the external radio, you just have now to define the output messages (see *Defining Output Messages on page 64*). But if port B or F is used, there is an additional step needed (see below) before you define the output messages.
- If port B or F is used for the connection to the external radio, click on the **Connections**> **Serial Ports** submenu, enable the **Power ON** option for serial ports B & F (bottom of the page) and click on the **Configure** button. You can switch to the output message definition.

Rover Acquiring Data Stream From a Base



The rover needs to be configured as in Direct IP mode via Ethernet (see *Direct IP Via Ethernet on page 55*).

Rover Operating in Flying RTK Mode

- Follow the steps described in section *General Parameters on page 49*. At the top of the **Rover setup** page, select Ambiguity Fixing=0 in the **Rover** pane.
- Choose the method used to let the rover acquire RTK corrections.

  With ProFlex 800, if several rovers in Flying RTK mode are assumed to use the same source of RTK corrections, the internal modem can be used individually in each rover (in GPRS mode). The source of corrections will typically be a ProFlex 800 base using the embedded NTRIP caster.

  Another possible solution is to insert the Ashtech RTDS software in the communication path so that the corrections can be distributed to all the rovers.

Rover Operating in Hot Standby RTK

Hot Standby RTK is the process of making available a second RTK position solution in the background. Should the primary RTK solution stop being delivered by the receiver for some reason, then the second RTK solution would be provided instead, until the primary RTK solution is back again and valid.

If you wish to make available this background solution, then enable the **Hot Standby RTK** option at bottom of the page. You are then asked to specify which port will route the differential corrections used to compute that solution (you should use a source of differential corrections different from the one used for the primary solution; make sure this source of corrections will be delivered on the specified port).

Defining Output Messages

Depending on your application, you will have to define different types of data output messages as well as the way they are delivered to outside equipment (typically through a serial port for a rover).

Three categories of output data are possible (NMEA, differential and raw data) but in most rover applications, only the use of NMEA messages makes sense.

However, to allow raw data to be recorded in the rover, you should make sure the appropriate messages are set on the U and M ports.

Follow the instructions below to program the desired messages:

- On the **Configuration** tab, click on the **Data Output** menu.
- Click on the **NMEA Messages** submenu. Use the page that opens as explained below:
  - All possible NMEA message types are listed below.

Message Name	Description
ALM	Almanac data for each of the tracked satellites
ATT	Computed attitude data (not supported)
CRT	Cartesian coordinates of computed position
DCR	Cartesian coordinates of computed baseline
DDS	Differential decoder status
DPO	Delta position (baseline components)
DTM	Datum Reference
GGA	Standard GNSS position message
GLL	Latitude and longitude of computed position
GMP	GNSS Map Projection Fix Data
GNS	GNSS fix data
GRS	GNSS range residuals

Message Name	Description
GSA	GNSS DOP and active satellites
GST	GNSS pseudo-range error statistics
GSV	GNSS satellites in view
HDT	Computed true heading (not supported)
LTN	Latency
POS	Computed position data
PTT	PPS signal time tag
RMC	Recommended minimum specific GNSS data
RRE	Residual error
SAT	Satellites status
SGA	GALILEO satellites status
SGL	GLONASS satellites status
SGP	GPS & SBAS satellites status
TTT	GPS time of external event
VEC	Vector & accuracy data
VTG	Course over ground and ground speed
XDR	Transducer measurements
ZDA	UTC Time & date

– To define the output of an NMEA message on a given port, you just need to select the message type from the **Message** drop-down list, the output port from the **Output** drop-down list, then enter its output rate, in seconds, in the **Rate** field, and finally click on the **Add** button. The new message definition will then appear as a new row in the table on the right. Note that for messages PTT, TTT and XDR, you don't have to define an output rate, due to the very nature of these messages.
– To change the definition of an existing message (port, rate), select the corresponding row in the table. This populates the three fields on the left with the definition of that message. Edit the port and/or rate and then click on the **Modify** button to save your changes.The table row is updated accordingly.

  Note that depending on the current selection on this page, the button located underneath the three fields on the left may be either grayed or with a different label (**Add** or **Modify**).
– Deleting a message definition can be done by simply clicking on the corresponding "trash" sign in the **Clear** column on the far right. This deletes the table row.
– There is also a **Clear All** button underneath the table that allows you to delete all the message definitions from the table in one click.

   - After all your messages have been defined, don't forget to click on **Configure** to save all the message definitions.

- Click on the **Raw Data Messages** submenu. Use the page that opens to program the type of raw data you would like the receiver to record.

  Manual raw data will later be initiated either remotely by enabling the **Data Recording** box on the **Recording** web page, or locally using the **Log** button on the receiver front panel.

  For example, to set the RNX and NAV raw data messages at 1 second, do the following:
   - In the **ATOM Messages** pane, select "RNX" from the **Message** field, select "M" or "U" from the **Output** field and type "1" in the **Rate** field. Click on the **Add** button underneath to validate your entry. The programmed message now appears in the table on the right.
   - In the **ATOM Messages** pane, select "NAV" from the **Message** field, select "M" or "U" from the **Output** field and type "1" in the **Rate** field. Click on the **Add** button underneath to validate your entry. The programmed message now appears in the table on the right.
   - Click on the **Configure** button located at the bottom of the page
- Click on the **Connections** menu, then on the **Serial Ports** submenu.
- Set each of the ports on which data output will take place. If port B or F is used, make sure the Power ON option (bottom of the page) is active.

Setting a Base

How to Start

- Open the Web Server's **Configuration** tab. The first time you click on this tab, the Web Server will ask you to log in as the administrator. Only the receiver administrator is authorized to access the **Configuration** tab.

  You are allowed to change the destination of a receiver (e.g. it is currently a rover and you want to change it into a base). In this case, on opening the **Base Setup** tab, the Web Server will retain part of the rover settings that could be applied to the base (e.g. antenna type, etc.).

- Whatever the way RTK corrections are transmitted to users (rovers), you will always have to define a number of general parameters pertaining to the base function. These parameters are usually defined first. However when the internal modem is used, it is advisable to configure the modem first.
- The ProFlex Web Server includes four submenus to configure a base:
  - **Full Setup**
  - **NTRIP Server**
  - **Data Streaming on IP**
  - **Transmitter**

  The **Full Setup** submenu is the most comprehensive one as it gives you the ability to implement any of the possible configurations.

  The other three are abridged versions of the **Full Setup** submenu, customized for three specific configurations: NTRIP server, data streaming and use of the internal radio transmitter or of an external transmitter. These submenus can advantageously be used instead of the **Full Setup** submenu to speed up the configuration phase.

  On all four submenus, the first three frames (Base, Antenna, Satellites) allow you to set the general parameters. But note that only the **Full Setup** submenu allows you to define a moving base.
- **Through network connections**, using the integrated cellular modem or Ethernet port, the ProFlex 800 can deliver two distinct sources of corrections through two different channels, designated as “Network 1” and “Network 2” on the Base Setup-Full Setup page, and “NTRIP Server 1” and “NTRIP Server 2” on the Base Setup - NTRIP server page. **Differential Streams 1 and 2** should be defined accordingly (port E, P or Q + message type), namely the Differential Stream 1 is necessarily associated with “Network 1” (or “NTRIP Server 1”) and Differential Stream 2 with “Network 2” (or “NTRIP Server 2”).

  Whereas the modem can only serve the “Network 1” or “NTRIP Server 1” connection, the Ethernet port on the other hand can serve both network connections, namely port P for “Network 1”/“NTRIP Server 1” and port Q for “Network 2”/“NTRIP Server 2”. Ports P and Q can not only route their respective corrections (data streams) to an external NTRIP caster, but also directly to the embedded

NTRIP caster, through two distinct mount points managed by the caster.

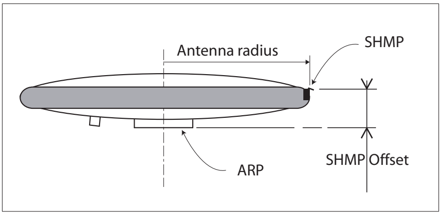
- Programming the data generated by a base is addressed separately (see *Defining the Data Generated by a Base on page 70* and *Rover Operating in Flying RTK Mode on page 63*).
- Configuring a permanently operating reference station is addressed in separate manuals (*ProFlex 800 CORS Getting Started Guide* for the short version, and also the *CORS Station* Chapter in this manualthe *ProFlex 800 Reference Manual*).

General Parameters

- Click on the **Base Setup** menu.
- Set the receiver parameters:
  - **Dynamic**: Choose the type of motion that best suits the base (static, quasi-static, walking, ship, automobile, aircraft, unlimited, adaptive or user-defined). Typically, a base is static.
  - **Moving Position**: Enable this option if the base may be moving while being operated. For all other cases where the base always stays static, keep this option disabled.
  - **Latitude, Longitude, Ellipsoid Height**: Use these three fields only when the **Moving Position** option is disabled. Use them to enter the reference position of the base (three-dimensional geographical coordinates). The coordinates shown in these fields are irrelevant and not used when the **Moving Position** option is enabled.

    Clicking on the **Get current position** button assigns the last position computed by the receiver to the base as its reference position. It makes no sense to use this button when the **Moving Position** option is enabled.
- Set the GNSS antenna parameters:
  - **Reference Position**: Specify the physical point on the base system for which the receiver will generate corrections. The three possible choices are: Antenna L1 phase center, Antenna Reference Point (ARP) or Ground Mark.
  - **Measurement Type**: Specify the method that was used when setting up the base system to measure the height of the GNSS antenna (Vertical or Slant Height).
  - **Antenna Height**: Value of base antenna height, expressed in the selected distance unit, as measured according to the specified measurement method.

– **Receiver Antenna**: Specify the model of GNSS antenna used by the receiver. Select “UNKNOWN” if you don’t know which model is used.
– **Antenna Radius**: In case of a “Slant Height” measurement, enter the antenna radius (this is a manufacturer specification), taking care to enter this parameter in the selected distance unit. See also the diagram below for more information.
– **SHMP Offset**: In case of a “Slant Height” measurement, enter the SHMP offset (this is a manufacturer specification) taking care to enter this parameter in the selected distance unit. See also the diagram below for more information.



Antenna Model	P/N	Antenna Radius (m)	SHMP Offset (m)
ASH-661 ASH-660	802135 802133	0.0953	0.0483
MAG111406	111406	0.0921	0.0516

NOTE: The **Antenna Radius** and **SHMP Offset** fields are automatically preset to the right values when you select an antenna type in the **Receiver Antenna** field.

– **Virtual Antenna**: This option is used to emulate a GNSS antenna other than the one really used.

Choosing a virtual antenna different from the one really used affects the raw and differential data as if they had been collected by the virtual antenna, instead of the real one.

A virtual antenna is needed at a base when rovers from different GNSS manufacturers cannot operate from that base because of the unknown model of GNSS antenna used by the base. In that case, defining a virtual antenna at the base will solve the problem. One of the most frequently used virtual antennas is the universal ADVNULLANTENNA antenna.

- Set the parameters relevant to the GNSS constellations used by the receiver:
  - **Recording and Output Elevation Mask**: Choose the elevation angle above the horizon creating the desired mask. After setting this angle, any satellite seen from the base with an elevation angle less than the specified one will be rejected from the list of tracked satellites. The recording elevation mask affects the measurements recorded in G-files and the differential messages generated by the receiver. The default value is 5°.
  - **GPS**, **GLONASS**, **SBAS**, **QZSS**, **GALILEO**: Enable the options corresponding to the constellations you want the receiver to work from.
- In the Internal Radio Port D, if the internal radio (ADL Foundation) is present and used, enable the **On** check box to power this radio on.
- You may now click on the **Configure** button to save all the changes made but remember you will have to complete the content of this page to tell the receiver how to make the generated data available to users.

  But before that, you need to define which data the receiver has to generate, which output rate and which port to use for each of the data messages. See *Defining the Data Generated by a Base on page 70*.

  Then use one of the typical applications described below to make the data available to users:
  - Radio transmitter
  - Direct IP via modem
  - Direct IP via Ethernet
  - NTRIP server via modem
  - NTRIP server via Ethernet
  - RTK corrections delivered on port A, B or F
  - Ethernet data streaming.

Defining the Data Generated by a Base

Depending on your application, you will have to define different types of data messages as well as the ports through which they will be delivered.

Three categories of output data are possible (NMEA, differential and raw data) but only the use of differential and raw data messages makes sense in a base.

To define differential data messages, click on **Data Output**, then on the **Differential Messages** submenu. Use the page that opens as explained below:

- All the message types pertaining to a given data format are listed vertically. These are the following:

Format	Message types
ATOM RNX	- Standard (4), Static Base - Compact (100), Static Base - Super-compact (101), Static Base - Standard (204), Moving Base - Compact (300), Moving Base
RTCM2.3	Message types: 1, 3, 9, 16, 18/19, 20/21, 22, 23, 24, 31, 32, 34, 36
RTCM 3.0 & 3.1	Message types: 1001-1013, 1019, 1020, 1029, 1033
RTCM 3.2	MSM1 to MSM7, 1230
CMR	Message types: 0, 1, 2, 3
DBEN	Ashtech legacy message

- To enable the output of a differential message, you just need to enter the desired refresh rate (in seconds) for this message in the corresponding field.
- Leaving a field blank means you don't want the message type to be output.
- For ATOM message types, you need to choose between the different formats available ("Standard", "Compact" or "Super Compact"). Basically, the difference between the three formats lies in the length (size) of the ATOM messages generated.

  Compared to the "Standard" format, "Compact" and "Super Compact" will produce shorter messages for the same message content. "Super Compact" will deliver even shorter messages than "Compact".

  Basically, data compacting is achieved by lowering the level of redundancy across messages. Through this process, some message data are sampled, which means that instead of being present in every single message generated by the base, they will in fact be provided every x occurrences of the message.

  Reconstructing full messages on rover side will however not tolerate data loss in the transmission. The successful use of the "Compact" or "Super Compact" formats therefore demands a very robust data link. In that respect, a conventional serial line using a cable is more likely to meet this requirement rather than a radio used in difficult reception conditions. But on the other hand, using a compact format seems more especially appropriate to radio links, owing to their potentially limited data throughput. So there is some sort of compromise to find here.

So What Should I Choose? In practice, Spectra precision recommends that you follow these rules:

1. As long as you are not facing any data throughput issue in your application, using the “Standard” format will always be the best choice, whatever the data link media used.
2. Data throughput issues may occur in applications requiring high output rates (e.g. 10 Hz in heading or relative positioning applications). In this case, provided a robust data link is used, you can select “Compact”, or even “Super Compact” depending on the data throughput requirement.

   Choosing one of these formats when a radio link is used implies that you have full confidence in the performance of the radio (good reception conditions, data loss very unlikely).
3. Using the “Super Compact” format should always be ruled out for a moving base.
4. Using “Compact” or “Super Compact” to solve the throughput issues of a radio used in difficult reception conditions or at range limits, is clearly a bad idea as it is likely to result in a global malfunctioning of your application. Spectra Precision recommends you reconsider the implementation of the data link.

   There is however a safe operating margin using radio links since there won’t be any throughput issue working in “Standard” ATOM format with a radio operated at 7600 bps.

The table below gives **average data throughput figures** (**in bytes/sec**) for different GNSS signals and three message types (RTCM-3 given as reference).

Protocol/ Scenario	GPS+GLONASS L1/L2	GPS+GLONASS L1 (L1CA only)	GPS L1/L2
ATOM RNX (SCN,4)	317	205	193
ATOM RNX (SCN,100)	159*	140*	98*

Protocol/ Scenario	GPS+GLONASS L1/L2	GPS+GLONASS L1 (L1CA only)	GPS L1/L2
ATOM RNX (SCN,101)	86*	75*	70*
RTCM-3	338 (MT 1004,1012)	214 (MT 1002,1010)	202 (MT 1004)

* Worst-case estimates. Real throughputs are often shorter by 4 to 8 bytes.

NOTE: For more information on the size of ATOM messages, please refer to the *ATOM Reference Manual*.

- The ports used to make the differential messages available to users are defined on the **Base Setup** page.

To define raw data messages, click on **Data Output** and then on the **Raw Data** submenu. Use the page that opens as explained below:

- All the raw data message types pertaining to a given data format are listed below:

Format	Message types
ATOM	NAV, ATR, PVT, DAT, EVT, RNX
Ashtech legacy	SNV, SNG, SNW, SAL, SAG, SAW, ION, SBD, MPC, PBN, DPC

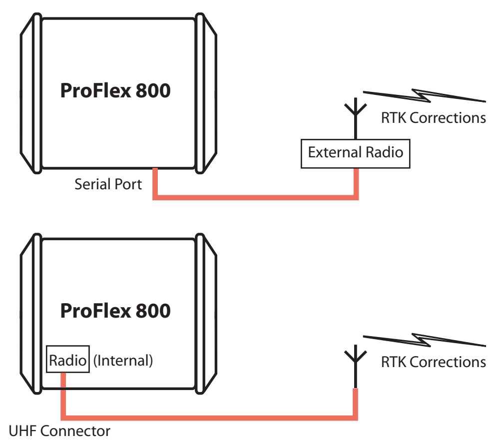
- Follow the instructions below to define the output of messages, whether in ATOM or Ashtech Legacy format:
  – Select the message type from the **Message** drop-down list, the output port from the **Output** drop-down list, then enter its output rate, in seconds, in the **Rate** field, and finally click on the **Add** button. The new message definition will then appear as a new row in the table on the right.
  – To change the definition of an existing message (port, rate), select the corresponding row in the table. This populates the three fields on the left with the definition of that message. Edit the port and/or rate and then click on the **Modify** button to save your changes.The table row is updated accordingly.

    Note that depending on the current selection on this page, the button located underneath the three fields on the left may be either grayed or with a different label (**Add** or **Modify**).

- Deleting a message definition can be done by simply clicking on the corresponding “trash” sign in the **Clear** column on the far right. This deletes the table row.
- There is also a **Clear All** button under the table that allows you to delete all message definitions from the table in one click.

- Click on the **Configure** button to save all the changes made and then go back to the **Base Setup** menu
- Use one of the typical applications described below to make the generated data available to users:
  - Radio transmitter
  - Direct IP via modem
  - Direct IP via Ethernet
  - NTRIP server via modem
  - NTRIP server via Ethernet
  - RTK corrections delivered on port A, B or F
  - Ethernet data streaming.

Radio Transmitter



- Click on **Base Setup > Transmitter** and define the general parameters of the base, as explained in section *General Parameters on page 68*. Then proceed with the steps below.
- Scroll down the page to display the Transmitter frame. In the **Message** field, select the type of differential data the base will generate and the radio will transmit (ATOM, RTCM, CMR, CMR+ or DBEN). Following your selection,

you will see the detail of the selected data on the right of this field, as defined in **Data Output > Differential Messages**.

- In the **Device** field, select the type of the radio transmitter the base is using (the internal or an external one). Depending on the type of radio used, you will have to provide the following parameters to complete the configuration of the radio.

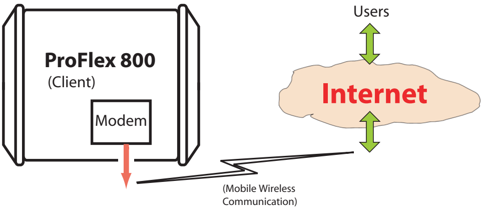
	U-Link TRx	Magellan UHF	PDL HPB/ LPB	ARF7474B EU	ARF7474A NA	ADL Vantage/ Vantage Pro	ADL Foundation
Port	A, B, F	A	A, B, F	A, B, F	A, B, F	A, B, F	D
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400	1200, 2400, 4800, 9600, 19200, 38400	1200, 2400, 4800, 9600, 19200, 38400	1200, 2400, 4800, 9600, 19200, 38400	1200, 2400, 4800, 9600, 19200, 38400	1200, 2400, 4800, 9600, 19200, 38400	NA
Mode	RS232, RS422	RS232, RS422	RS232, RS422	RS232, RS422	RS232, RS422	RS232, RS422	NA
Protocol	Transparent, DSNP	NA	Transparent, Trimtalk	NA	NA	Transparent, Trimtalk 450S, SATEL, TrimMarkII/IIe, TT450S, TRIMMARK3, Transparent FST, U-Link	Transparent, Trimtalk 450S, SATEL, TrimMarkII/IIe, TT450S, TRIMMARK3, Transparent FST, U-Link
Channel	0-15	0-15	0-15	0-2	NA	1-32	1-32
Air Link Speed	4800, 7600, 9600	NA	4800, 9600, 19200	NA	NA	4800, 8000, 9600, 16000, 19200	4800, 8000, 9600, 16000, 19200
RTS/CTS	NA	NA	On/Off	On/Off	On/Off	On/Off	-
Scrambler	NA	NA	On/Off	NA	NA	On/Off	On/Off
FEC	NA	NA	On/Off	NA	NA	On/Off	On/Off
Current Power (W)	NA	NA	NA	NA	NA	0.1, 0.5, 1, 2, 4	0.1, 0.5, 1
Load Transmitter Settings button	Yes	Yes	Yes	Yes	No	Yes	No

Note that the **Load Transmitter Settings** button is used to read the current setting of the radio. The changes you make to these settings will be effective in the radio only after running the last step below.

By defining now the settings of the serial port used (A, B or F), you will save time as you won't need to go through the **Connections**>**Serial Ports** submenu to make these settings.

- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver and the radio. You have now reached the end of the configuration phase.

Direct IP Via Modem



The internal modem should be configured first:

- Click on the **Connections** menu and then on the **Bluetooth/ Modem** sub-menu.
- Set the following parameters in the **Internal Modem/Device Settings** pane:
  - **Power**: Select “On”. Then choose whether the modem should be turned on automatically or manually:

    Automatic: The modem will be switched on or off automatically when the base is respectively turned on or off.

    Manual: The modem will be powered up only by going through the **Connections** > **Bluetooth/Modem** page and setting the modem to “Power On” (or using the $PASHS,MDM,ON command).
  - **Automatic Connection**: Check this option.
  - **2G Only**: Enabling this check box will limit the use of the modem only if a 2G mobile communication network is available in the working area. When it is cleared, the modem will be allowed to operate either in a 2G or 3G network, whichever is available.
  - **Pin**: 4- to 8-character pin code of the SIM card used in the modem for GPRS operation.

- Set the following parameters in the **Internal Modem/GPRS Mode Settings** pane (the mobile communication provider you are using should be able to give you all this information):
  - **Internet Protocol**: Choose the Internet protocol (TCP or UDP) allowing the modem to perform an Internet connection.

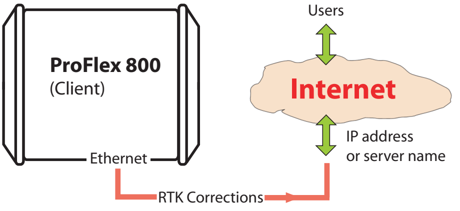
- **Access Point**: Enter the URL of the mobile communication provider.
- **Access Point Login**: Enter the login of the mobile communication provider.
- **Password**: Enter the password of the mobile communication provider.

- Click on the **Configure** button.
- Now please follow all the steps described in section *General Parameters on page 68* and then proceed with the steps below.
- Still on the **Base Setup** page, make sure the **Connection** fields in the **Serial Port x** panes are all set to "None/Cable"
- In the **Network 1** pane, choose "Modem Direct IP - Port E" in the **Connection** field.
- The base being necessarily a client, enter the information (**Connect Now**, **Address**, **Port**) allowing it to connect to the rover (the server) to which it is supposed to deliver corrections. No **Login** or **Password** is needed in this case.

  Enable **Connect Now** to allow the receiver to establish the connection right after you have clicked on **Configure**.
- In the **Differential Stream 1** pane, choose **Port**= "E - Modem" as the output port delivering the generated differential data. In the **Message** field, choose the type of differential message provided through this port (ATOM, RTCM, CMR, CMR+ or DBEN).

  NOTE: The receiver has been designed to offer two separate and independent differential data outputs. Each one can output a specific type of differential message. If only one output is used, select **Port**="None" for the other output.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver. You have now reached the end of the configuration phase.

Direct IP Via Ethernet



- First, click on the **Connections**> **Ethernet** submenu.
- Set the following Ethernet parameters to allow the receiver to access the network through its Ethernet port:
  - **DHCP**: Enabling this option means the local network to which the receiver is connected will automatically allocate a dynamic IP address to the receiver. If this option is disabled, you need to define the receiver's static **IP address**, and give information about the local network (**Subnetwork Mask** and **Gateway**). You may need to be assisted by a network expert -or IT Manager- to define these parameters (as well as the three parameters below).

    If you activate the **DHCP** option, then it's a good idea to define a hostname for your receiver and declare it to DynDNS (see **DynDNS** frame at the bottom of the page). DynDNS is a free service that will make sure the dynamic IP address allotted to the receiver by your ISP is always attached to your receiver's hostname. This requires that you open an account on DynDNS. For more information on this service, see *Creating an Account on Dyn.com on page 91*.
  - **DNS 1 IP Address**: Enter the IP address of the primary DNS providing the correspondence between the receiver server name and its IP address.
  - **DNS 2 IP Address**: Enter the IP address of the secondary DNS providing the correspondence between the receiver server name and its IP address
  - (**MAC Address** is a read-only field showing the hardware identification of the receiver's Ethernet port.)
- Ignore the **Port I settings** frame on the right.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver.
- Unless already done, please follow all the steps described in section *General Parameters on page 68* before proceeding with the steps below.
- Still on the **Base Setup** page, make sure the **Connection** fields in the **Serial Port x** panes are all set to “None/Cable”
- In the **Network x** pane, choose “Ethernet Direct IP - Port P” in the **Connection** field.
- Because the base is necessarily a client, enter the information (**Connect Now**, **Address**, **Port**) allowing it to connect to the rover (the server) to which it is supposed to deliver its corrections. No **Login** or **Password** is needed in this case.

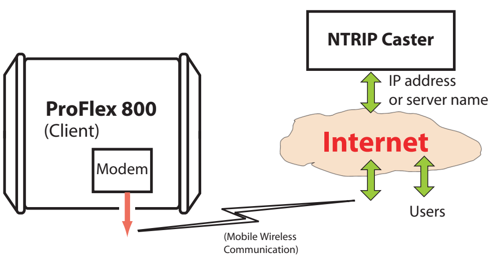
Enable **Connect Now** to allow the receiver to establish the connection right after you have clicked on **Configure**.

- In the corresponding **Differential Stream x** pane, choose **Port**= “P - Ethernet” as the output port delivering the generated differential data. In the **Message** field, choose the type of differential message provided through this port (ATOM, RTCM, CMR, CMR+ or DBEN).

  NOTE: The receiver has been designed to offer two separate and independent differential data outputs. Each one can output a specific type of differential message. If only one output is used, select **Port**=“None” for the other output.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver. You have now reached the end of the configuration phase.

NTRIP Server Via Modem

CAREFUL: In the RTCM sense, an “NTRIP server” is a source of corrections feeding an NTRIP caster (see *RTCM paper 200-2004/SC104-ST*). But from the point of view of the network terminology, an “NTRIP server” is a client, not a server.



The internal modem should be configured first:

- Click on the **Connections** menu and then on the **Bluetooth/ Modem** sub-menu.
- Set the following parameters in the **Internal Modem/Device Settings** pane:
  – **Power**: Select “On”. Then choose whether the modem should be turned on automatically or manually:

    Automatic: The modem will be switched on or off automatically when the rover is respectively turned on or off.

    Manual: The modem will be powered up only by going through the **Connections** > **Bluetooth/Modem** page and setting the modem to "Power On" (or using the $PASHS,MDM,ON command).

  - **Automatic Connection**: Check this option.
  - **2G Only**: Enabling this check box will limit the use of the modem only if a 2G mobile communication network is available in the working area. When it is cleared, the modem will be allowed to operate either in a 2G or 3G network, whichever is available.
  - **Pin**: 4- to 8-character pin code of the SIM card used in the modem for GPRS operation.

- Set the following parameters in the **Internal Modem/GPRS Mode Settings** pane (the mobile communication provider you are using should be able to give you all this information):
  - **Internet Protocol**: Choose the Internet protocol (TCP or UDP) allowing the modem to perform an Internet connection.
  - **Access Point**: Enter the URL of the mobile communication provider.
  - **Access Point Login**: Enter the login of the mobile communication provider.
  - **Password**: Enter the password of the mobile communication provider.
- Click on the **Configure** button.
- Click on **Base Setup > NTRIP Server** and define the general parameters of the base, as explained in section *General Parameters on page 68*. Then proceed with the steps below.
- Scroll down the page to display the NTRIP Server 1 frame. In the **Connection** field, select "External NTRIP Caster via Modem".
- Enter the information (**Connect Now**, **Address**, **Port**, **Password**, **Mount Point**) allowing the base to connect to the NTRIP caster (the server) to which it is supposed to deliver its corrections.

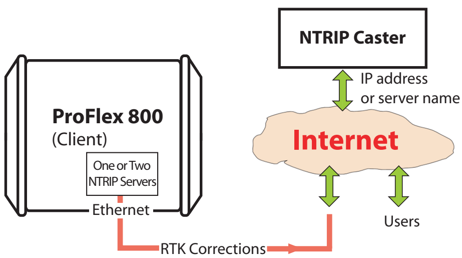
  Enable **Connect Now** to allow the receiver to establish the connection right after you have clicked on **Configure**.
- In the **Message** field, select the type of differential data the base will deliver (ATOM, RTCM, CMR, CMR+ or DBEN). Following your selection, through a click on the "I" symbol, you will see the detail of the selected data on the right of this field, as defined in **Data Output > Differential Messages**.

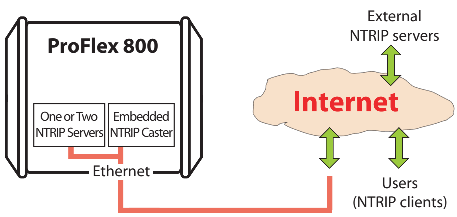
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver. You have now reached the end of the configuration phase.

NTRIP Server Via Ethernet

CAREFUL: In the RTCM sense, an "NTRIP server" is a source of corrections feeding an NTRIP caster (see *RTCM paper 200-2004/SC104-ST*). But from the point of view of the network terminology, an "NTRIP server" is a client, not a server.

As explained earlier (see *How to Start on page 66*), in that configuration you can define one or two NTRIP servers sending their data streams either to an external NTRIP caster (see first figure below) or to the embedded NTRIP caster (see second figure below). All combinations are possible. Choose the ones that meet your requirements.





- First, click on the **Connections**> **Ethernet** submenu.
- Set the following Ethernet parameters to allow the receiver to access the network through its Ethernet port:
  - **DHCP**: Enabling this option means the local network to which the receiver is connected will automatically allocate a dynamic IP address to the receiver. If this option is disabled, you need to define the receiver's static **IP address**, and give information about the local network (**Subnetwork Mask** and **Gateway**). You may need to be assisted by a network expert -or IT Manager- to

define these parameters (as well as the three parameters below).

If you activate the **DHCP** option, then it's a good idea to define a hostname for your receiver and declare it to DynDNS (see **DynDNS** frame at the bottom of the page). DynDNS is a free service that will make sure the dynamic IP address allotted to the receiver by your ISP is always attached to your receiver's hostname. This requires that you open an account on DynDNS. For more information on this service, see *Creating an Account on Dyn.com on page 91*.

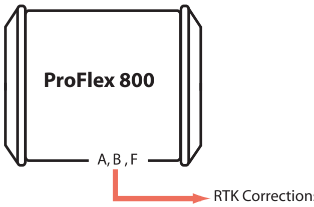
– **DNS 1 IP Address**: Enter the IP address of the primary DNS providing the correspondence between the receiver server name and its IP address.
– **DNS 2 IP Address**: Enter the IP address of the secondary DNS providing the correspondence between the receiver server name and its IP address
– (**MAC Address** is a read-only field showing the hardware identification of the receiver's Ethernet port.)

- Ignore the **Port I settings** frame on the right.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver.
- Click on **Base Setup > NTRIP Server** and define the general parameters of the base, as explained in section *General Parameters on page 68*. Then proceed with the steps below.
- Scroll down the page to display the NTRIP Server 1/2 frames. In the **Connection** field, select "External NTRIP Caster via Ethernet" or "Embedded NTRIP Caster".
- Enter the information (**Connect Now**, **Address**, **Port**, **Password**, **Mount Point**) allowing the base to connect to the NTRIP caster (the server) to which it is supposed to deliver its corrections. If you choose "Embedded NTRIP Caster", the Address is automatically set to "localhost" and you should choose a mount point from the list of mount points managed by the embedded NTRIP caster.

  Enable **Connect Now** to allow the receiver to establish the connection right after you have clicked on **Configure**.
- In the **Message** field, select the type of differential data the base will deliver (ATOM, RTCM, CMR, CMR+ or DBEN). Following your selection, you will see the detail of the selected data on the right of this field, as defined in **Data Output > Differential Messages**.

- Resume the above settings for the second NTRIP server if you need one.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver. You have now reached the end of the configuration phase.

RTK Corrections Delivered on Port A, B or F



- Unless already done, please follow all the steps described in section *General Parameters on page 68* before proceeding with the steps below.
- If you intend to use port B or F for the connection to the external radio, click on the **Connections** - **Serial Ports** submenu, enable the **Power ON** option for serial ports B &F (bottom of the page) and click on the **Configure** button. If port A will be used, skip this step.
- Come back to the **Base Setup** page. In the **Serial Port x** pane corresponding to the port you want the receiver to use (A, B or F), set the following parameters:
  - **Connection**: Choose the name of the corrections transmitter device connected to the port. As a general rule, choose “None/Cable” for any external corrections transmitter connected to that port. But if the device used is a license-free radio, type ARF7474B EU or ARF7474A NA, choose specifically this type of radio.
  - Port settings (**Baud Rate**, **Mode**, **RTS/CTS**): Set the serial port to match the external device connected to it. Setting these fields will update the corresponding fields on the **Serial Ports** sub-menu page.
- Make sure the **Connection** fields in the **Network x** panes are all set to “None”.
- In the **Differential Stream x** pane, in the **Port** field, choose the port to which the external device is connected. In the **Message** field, choose the type of differential message provided through this port (ATOM, RTCM, CMR, CMR+ or DBEN).

NOTE: The receiver has been designed to offer two separate and independent differential data outputs. Each one can output a specific type of differential message. If only one output is used, select **Port**="None" for the other output.

- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver.
- If the external radio used is a standalone, radio transmitter, skip this step. But if an ARF7474x license-free radio is used, click on the **Connections** - **Radio** submenu and from the **Type** field located in the **External Radio** pane, select the type of license free radio used. Then click on the **Configure** button. You have now reached the end of the configuration phase.

Ethernet Data Streaming

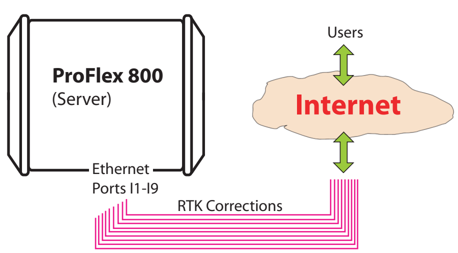
Typically a base can be configured to deliver real-time corrections to whoever asks for them through an IP connection. This is achieved through the receiver's Ethernet port Ix.

The receiver is fitted with nine independent data outputs, with the possibility for the administrator to define a specific data format for each output.

In addition, for each data output, the administrator can choose whether the base will be the server or the client in the IP connection.

As a server (typical application), it will deliver its data to any client asking for it and authorized to do so. Dozens of different users can be connected on the same port.

As a client (more specific), the base will start delivering its data after it has been able to establish a communication with the specified IP address.



Follow the instructions below:

- Click on **Base Setup > Data Streaming on IP** and define the general parameters of the base, as explained in section

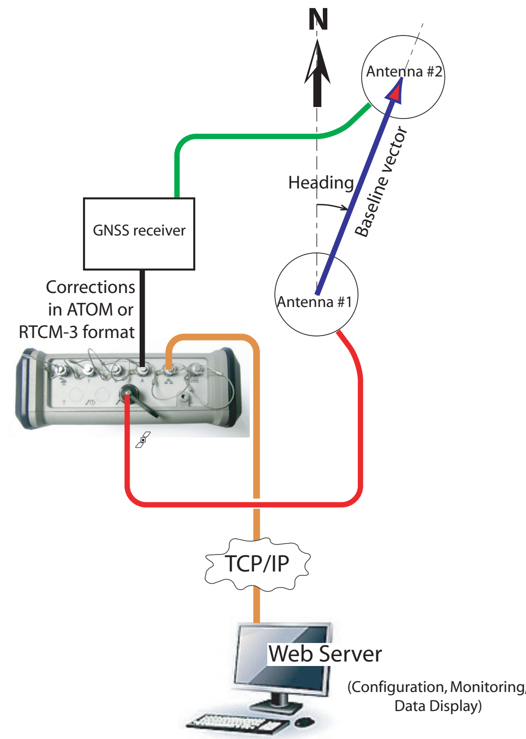
General Parameters on page 68. Then proceed with the steps below.

- Scroll down the page to display the Ethernet Streaming frame.
- For each data stream the base should generate, enable the **Port Ix** option corresponding to the port you want to use. Then in the same line, set the following fields:
- **Mode**: Specify the role played by the base in the IP connection (server or client).
- **Protocol**: Select the protocol that will be used in the IP connection (“TCP” or “UDP”). “TCP” should be chosen preferably. In cases where you need to output data at a very high update rate, UDP may be used instead.
- **IP Address**: (A valid field only if the base is used as the client) Enter the IP address of the system (rover) that will acquire the data stream.
- **IP Port**: Specify the IP port of this system.
- **Message Type**: Specify the type of data message the receiver will deliver on this port (ATOM, RTCM, CMR, CMR+ or DBEN). Click on the “I” symbol to the right of this field to read the details of the selected message type.
- After you have defined all the ports used, click on the Configure button to let the Web Server load all your new parameters to the receiver. You have now reached the end of the configuration phase.

Setting a Rover to Deliver Heading Measurements

Theory of Operation

ProFlex 800 can deliver heading measurements using corrections in RTCM3.1 or ATOM format from an external GNSS receiver connected to Antenna #2. ProFlex 800 is connected to Antenna #1. The location of antenna #2 represents the origin of the vector determined by the ProFlex 800. This is illustrated in the diagram below.



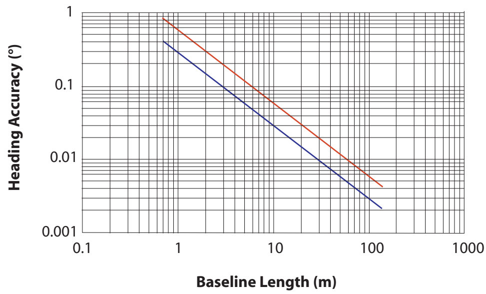
Antenna Setup

Choosing the Appropriate Baseline Length

In theory, the baseline length (i.e. the horizontal distance between the phase centers of the two GNSS antennas used, also called antenna separation) can be set between 5 centimeters and 1,000 meters.

In practice, you will choose the baseline length taking into account the level of expected accuracy as well as the various installation constraints in the vehicle.

The chart below shows the expected heading accuracy for a baseline length ranging from 30 centimeters to 150 meters.

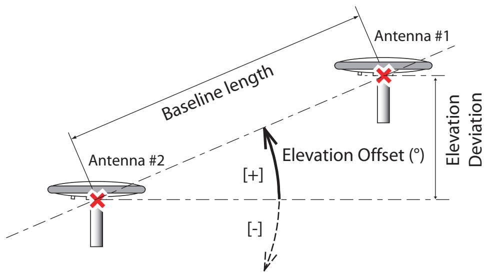


This chart deserves a few more comments and explanations:

- Accuracy has a linear relationship to baseline length. However a too long baseline length can result in differential multipath between antennas and introduction of vehicle flexing into the heading solution. These two factors are detrimental to heading accuracy. In addition, the longer the baseline length, the longer the calibration sequence. That's why baseline lengths of three to five meters are recommended. Baseline lengths less than one meter are not advised.
- Accuracy figures given above are 1-sigma values, or rms, which means that 67% of the measurements are at or below these figures.
- Heading accuracy will be about a factor of 2 better than pitch or roll accuracy. Pitch and roll accuracies are the same.
- In each figure, the lower line (blue) represents accuracy achievable if no multipath errors were present. In a normal environment, this is not possible. Multipath effects from typical environments are depicted by the upper line (red). For a given baseline length, the performance of the ProFlex 800 should lie somewhere near the upper line.
- A moving vehicle does not experience as many multipath effects as when it is stationary. This is because multipath is a correlated error. Correlated errors become more noise-like under vehicle dynamics and therefore can be filtered out. Therefore, accuracy results improve toward the lower line (blue) when the vehicle is moving.

Elevation Offset

Ideally, the two antennas should be installed at the same elevation. You may however be facing some installation constraints on your vehicle compelling you to install the antennas at different elevations. If that is the case, this is how you should calculate the elevation offset between the two antennas after measuring the elevation deviation and the baseline length. The sign of the elevation offset is also provided on the diagram below (elevation offset negative if Antenna #2 is lower than Antenna #1 and vice versa).

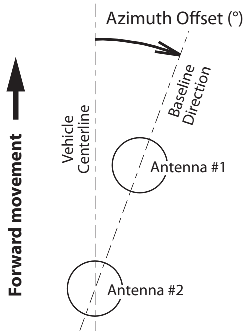


$$\left|Elevation\ Offset\ (°)\right| = arcsin\ \frac{Elevation\ Deviation\ (m)}{Baseline\ Length\ (m)}$$

The elevation offset should not be greater than 45 degrees (or less than -45 degrees), or the receiver will consider the antenna setup to be invalid and so will not deliver any heading, roll or pitch measurements.

Azimuth Offset

Ideally, the antennas should be installed to generate a baseline strictly parallel or perperpendicular to the vehicle centerline. However, you may also be facing some installation constraints on your vehicle compelling you to install the antennas differently. The azimuth offset describes the non-alignment of the baseline with the vehicle centerline. When the baseline is strictly parallel to the centerline and the baseline is oriented in the direction of forward movement, the azimuth offset is zero. In all other cases, the offset is non-zero and should be measured as shown in the diagram below.

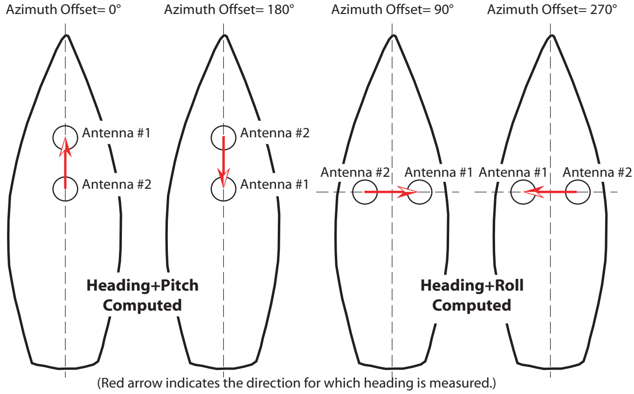


The non-alignment of the baseline with the vehicle centerline may be intentional (see explanations in the next section below).

Correlation Between Azimuth Offset, Antenna Setup & Measurements Made

Consider the following four setups before installing your antennas. A ship is shown in the examples but this could be any other type of vehicle.

Depending on the type of measurements you wish the receiver to perform (heading+roll or heading+pitch) and the installation possibilities offered in the vehicle, you will choose the most appropriate setup and set the azimuth offset accordingly.



(Red arrow indicates the direction for which heading is measured.)

Delivering an RTK Position for Antenna #1

There may be an additional requirement you should take into account when setting up your antennas for heading measurements, which is the fact that your application may also require that the receiver deliver an RTK solution of position for Antenna #1. In this case, the absolute location of Antenna #1 in the vehicle is probably critical and this will impact the location of Antenna #2 as well.

Setting the Heading Mode

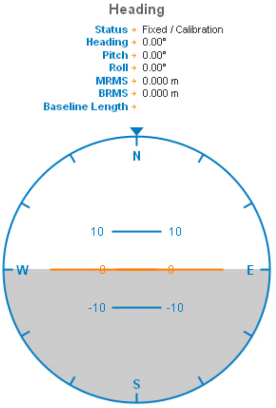
- Run the ProFlex Web Server
- Click on the **Configuration** tab
- Enter the administrator username and password, then click **OK**.
- Click on **Heading** in the left-hand part of the web page.
- In the **Antenna 1** field, select the model of antenna used as antenna #1. Ignore the **Antenna 2** field.
- If you wish the receiver to output heading at a fast rate (20 Hz), check the **Fast Output** option.
- Keep or change the default value (5°) of **Position Elevation Mask**.
- Keep or change the default settings for GPS, GLONASS, SBAS, QZSS and GALILEO tracking, at your convenience.
- In the **Mode** field, select “External” as the heading mode used.
- In the **Input Port** field, select the port that will receive corrections from the external GNSS receiver (Antenna #2)
- Enter the parameters that result from the particular setup of your two antennas:
  – **Baseline length** (in m). You may not enter this value and instead check the **Auto Calibration** box (recommended). By doing this, you will let the receiver determine by itself the exact length of the baseline through a calibration sequence that will start as soon as you click the **Configure** button.
  – **Azimuth offset** (in degrees)
  – **Elevation offset** (in degrees)
  – **Baseline length error**: WIth **Auto Calibration** checked (recommended), the value given to this parameter is ignored. For more information on this parameter, please call the technical support.
- Click on the **Configure** button. This will instantly start the Auto Calibration process (provided the ProFlex 800

receives the expected data from the external GNSS receiver through the selected input port).

On the Status bar, in the first column, you will now read that the receiver is operating in "Rover/Heading" mode.

- Click on the **Status** tab and select **Receiver Status and Settings**.
- Scroll down until you read the Heading data block. Watching the **Status** field, you will see the receiver status successively switch from "Float/Calibration" to "Fixed/Calibration" then "Fixed/Operation".

  Further down on the page, the results of the heading process will be given both in tabular and graphic form once the calibration is complete and the status is "Fixed/Operation".



Creating an Account on Dyn.com

Dyn Standard DNS is an update mechanism, offered by *Dynamic Network Services, Inc.*, through which you can make sure the hostname of your ProFlex 800 will always match the dynamic IP address assigned to it by your Internet provider. This however requires that you create an account and choose the function you want to use.

Do the following to create an account:

- Open a new tab in your web browser.
- Type http://dyn.com/dns/ and press ENTER.
- Type on the **Sign In** button in the upper-right corner.
- Type on the "Create Account" link.

- Enter your credentials (username, password and email) and other information needed (safety number, registration, policy agreement).
- Click on **Create Account**. You will then receive an email containing a link allowing you to activate your account.
- Click on this link. This will open the DynDNS web site on which you will be logged in after you have re-entered your password. This confirms the creation of your account.
- Click on “Create Free Hostname”.
- Choose a name for your ProFlex 800 (hostname), keep “Host with IP address” selected, and enter the current IP address of your ProFlex 800: This is the public IP address of the ProFlex 800, and not necessarily the one displayed on the ProFlex 800 screen (see your IT manager for more information). If the receiver is connected to a local network (LAN), then a direct link must exist between the declared public IP address and the receiver’s personal IP address within the LAN.
- Choose the services you want to use (typically “VPN”, “remote desktop” and “web server”).
- Click **Add to Cart**.
- Click on “Proceed to checkout”.
- Click on “Activate Services”.

You can now activate the update mechanism through the Web Server. On the Web Server’s Configuration tab, select **Connections** then **Ethernet**. In the **DynDNS** frame, do the following:

- Check on the **Activation** button
- Keep the default address shown in the **System** field
- Enter the **Hostname** of your receiver, as declared when you opened your DynDNS account.
- Enter the credentials (**Username**, **Password**) you specified when creating your DynDNS account. These will authorize the receiver to access and use the DynDNS service.
- Specify the rate (**Period**), in seconds, at which the receiver should regularly access the DynDNS service to provide its current IP address. Through these regular connections, the receiver will allow the DynDNS service to update the association made between the declared hostname for the receiver and its currently valid IP address.

  The **Update Now** button can be used at this stage to force the receiver to send right away its IP address to the DynDNS service.

- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver.

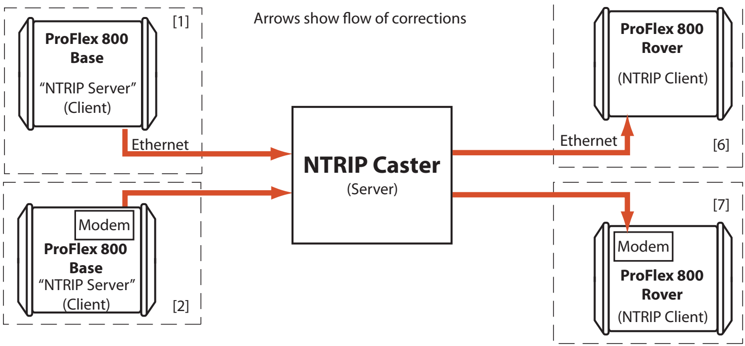
Configuration Memo

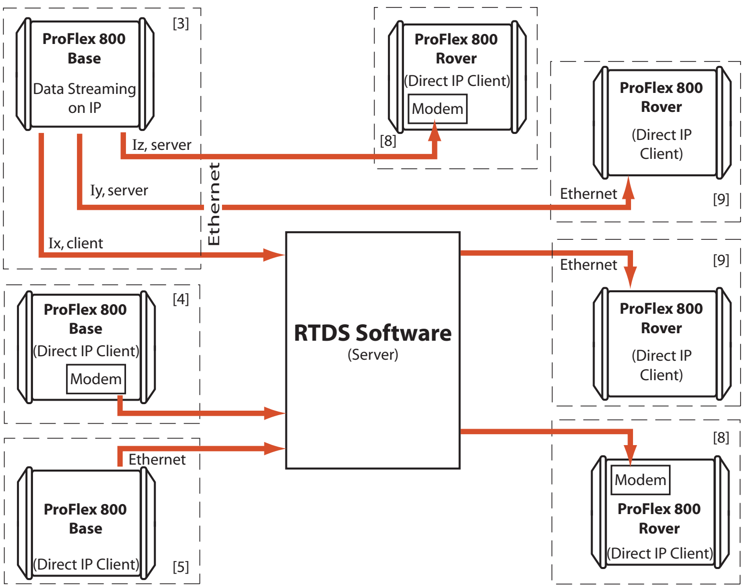
Entering the settings of a base/rover system is quite straightforward when a radio is used to transmit corrections from the base to the rover.

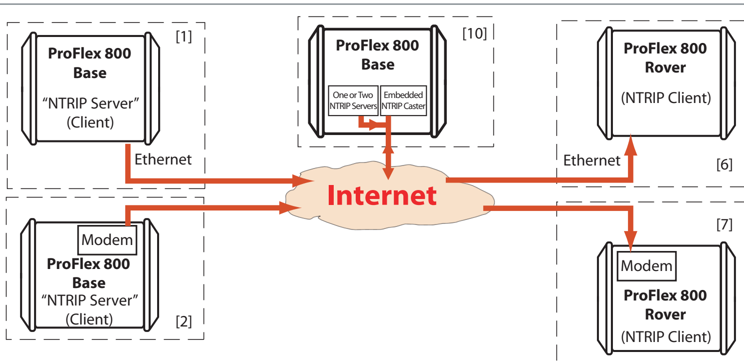
When an IP connection is used, understanding the possible base/rover associations is not so clear because in addition, you have to take account of the server-client requirement inherent in any IP connection.

The diagrams below should help you keep in mind which associations are possible when using an IP connection (through GPRS modem or Ethernet port).

- **[1]**: Base, “NTRIP server” via Ethernet
- **[2]**: Base, “NTRIP server” via modem
- **[3]**: Base, Ethernet data streaming
- **[4]**: Base, Direct IP client via modem
- **[5]**:Base, Direct IP client via Ethernet
- **[6]**: Rover, NTRIP client via Ethernet
- **[7]**: Rover, NTRIP client via modem
- **[8]**: Rover, Direct IP client via modem
- **[9]**: Rover, Direct IP client via Ethernet
- **[10]**: Base, 2 NTRIP servers + embedded NTRIP caster


Arrows show flow of corrections
[1]
ProFlex 800
Base
"NTRIP Server"
(Client)
Ethernet
[2]
Modem
ProFlex 800
Base
"NTRIP Server"
(Client)
NTRIP Caster
(Server)
ProFlex 800
Rover
(NTRIP Client)
Ethernet
[6]
[7]
Modem
ProFlex 800
Rover
(NTRIP Client)

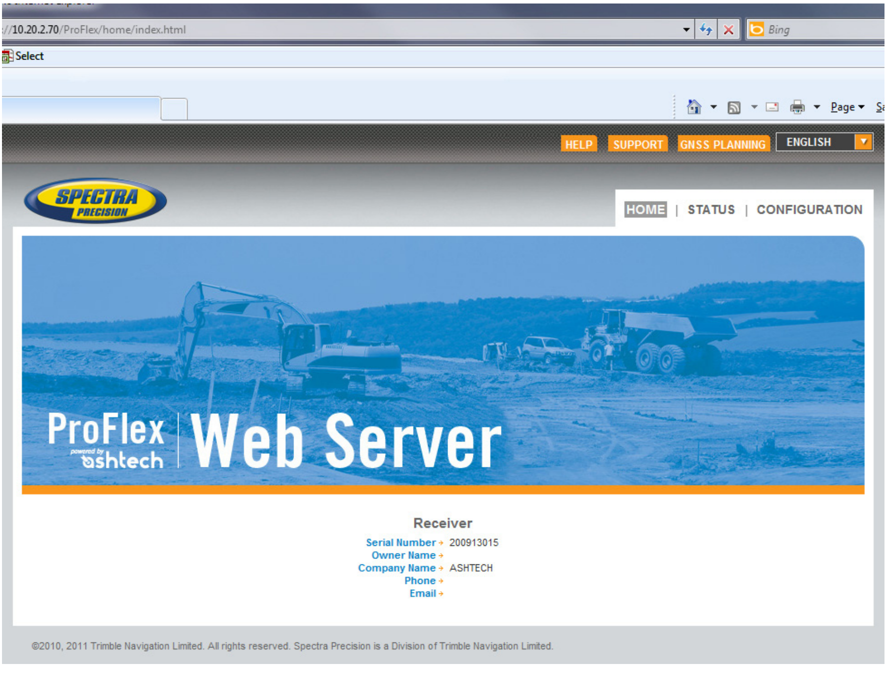

[3]
ProFlex 800
Base
Data Streaming
on IP
Iz, server
Iy, server
Ix, client
Ethernet
ProFlex 800
Rover
(Direct IP Client)
Modem
[8]
ProFlex 800
Rover
(Direct IP
Client)
Ethernet
[9]
RTDS Software
(Server)
[4]
ProFlex 800
Base
(Direct IP Client)
Modem
Ethernet
ProFlex 800
Base
(Direct IP Client)
[5]
Ethernet
[9]
ProFlex 800
Rover
(Direct IP
Client)
[8]
Modem
ProFlex 800
Rover
(Direct IP Client)


[1]
ProFlex 800
Base
"NTRIP Server"
(Client)
Ethernet
[2]
Modem
ProFlex 800
Base
"NTRIP Server"
(Client)
[10]
ProFlex 800
Base
One or Two
NTRIP Servers
Embedded
NTRIP Caster
Internet
ProFlex 800
Rover
(NTRIP Client)
Ethernet
[6]
[7]
Modem
ProFlex 800
Rover
(NTRIP Client)

Chapter 3. Web Server Help Files Collection

Home Tab

The Web Server Home tab appears after you have typed the correct IP address in the Address box of your web browser and pressed the Enter key.



In the right-upper corner of the window, you have access to the on-line help (**HELP** link) and to technical support (**SUPPORT** link).

You can also change the language of the Web Server interface. This will simultaneously change the language of the Help files accessible through the HELP link.

Still from the right-upper corner of this window, you can run GNSS Planning, a web-based application allowing you to get information on the GNSS constellations visible from a given point on the Earth surface, and for future or past periods of time.

In its lower part, the Home tab lists the parameters that clearly identify the remote receiver. The table below lists all these parameters. For your information, the third column indicates the relevant $PASH commands.

Parameter	Designation	$PASH
Receiver serial number	Hardware-coded receiver serial number	$PASHQ,RID
Owner name	Owner name	$PASHS,WEB,OWN
Company name	Name of the company operating the receiver	$PASHS,WEB,OWN
Phone	Contact phone number	$PASHS,WEB,OWN
Email	Contact email	$PASHS,WEB,OWN

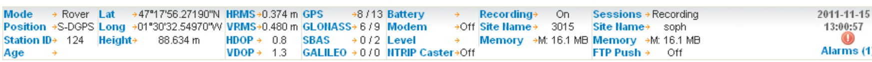
(The last four parameters can be changed from the Administrator menu on the Configuration tab.)

Depending on what you want to do with the receiver, click on one of the other two available tabs. Prior authentication as the “Administrator” or a “User” is required before you are allowed to access one of these tabs:

- **Status**: This tab provides detailed information about the current status of the receiver. This is a read-only function. You first need to log in as a “User” or as the “Administrator” before you are given the right to access this tab. When you click on this tab, the Web Server will remember which page was last opened on this tab, and so will display it by default. You can then choose the one you would like to display by clicking in the menu on the left.
- **Configuration**: This tab allows you to make changes to the current configuration of the receiver. You first need to log in as the “Administrator” before you are given the right to access this tab. When you click on this tab, the Web Server will remember which page was last opened on this tab, and so will display it by default. You can then choose the one you would like to display by clicking in the menu on the left.

Status Bar and Units Used

The status bar is permanently displayed in the upper part of the **Status** or **Configuration** tab, giving the current operating status of the receiver. The content of the status bar is refreshed every one to two seconds.

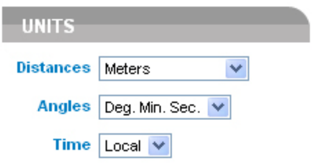


By column from left to right:

Column #1	
Mode	Receiver operating mode (“Base”, “Rover”, “Rover/Heading” or “Hot Standby RTK”)
Position	Type of position solution currently available from the receiver (“No position”, “Autonomous”, “DGPS”, “S-DGPS”, “RTK Fixed” or “RTK Float”)
Station ID	If a base: • 0 to 4095 for a station transmitting ATOM or RTCM3.x corrections • 0 to 1023 for a station transmitting RTCM2.3 corrections • 0 to 31 for a station transmitting CMR/CMR+ corrections If a rover: • Shows the ID of the base station received. • In S-DGPS, shows the ID of the SBAS satellite used.
Age	Age of corrections, in seconds (0 to 999 seconds)
Column #2	
Lat	Latitude of position currently computed by the receiver
Long	Longitude of position currently computed by the receiver
Height	Height of position currently computed by the receiver
Heading	Current heading value measured by the receiver if used in Rover/Heading mode
Column #3	
HRMS	Horizontal Root Mean Square
VRMS	Vertical Root Mean Square
HDOP	Horizontal Dilution of Precision (0 to 9.9)
VDOP	Vertical Dilution of Precision (0 to 9.9)
Column #4	
GPS	Number of GPS satellites used vs. number of tracked GPS satellites
GLONASS	Number of GLONASS satellites used vs. number of tracked GLONASS satellites
SBAS	Number of SBAS satellites used vs. number of tracked SBAS satellites
GALILEO	Number of GALILEO satellites used vs. number of tracked GALILEO satellites
QZSS	Number of QZSS satellites used vs. number of tracked QZSS satellites
Column #5	
Battery	Percentage of remaining charge in the installed battery

Modem	Modem power status ("Off", "On", "Starting", "Ready", "Dialing", "Online" or "None")
Level	Input signal level (0 to 100, or blank when Modem Status= Online)
NTRIP Caster	"off" or, if "On", number of sources available (S:xx) and number of connected clients (,C:xxx)
Column #6	
Recording	Raw data recording status ("On" or "Off")
Site Name	Site name (4 characters) attached to logged data
Memory	Identification of memory used ("M" for internal, "U" for USB key)+ Number of free Megabytes on this memory.
Column #7	
Sessions	Session status ("ON" "OFF", "RECORDING")
Site Name	Site name (4 characters) attached to data logged through sessions
Memory	Identification of memory used ("M" for internal, "U" for USB key)+ Number of free Megabytes on this memory.
FTP Push	Indicates whether the recorded raw data files are uploaded to an external FTP server ("On") or not ("Off").
Column #8	
Date	Current date (YYYY-MM-DD)
Time	Current local or UTC time (hh:mm:ss) according to the setting below.
Alarm report	Blank area if no alarm has been detected. "Alarms" displayed if an alarm has been detected in the receiver, followed by the number of raised alarms, between brackets (x). A click on "Alarms" will open the Status-Alarms web page to list this or these alarms.

To change the units, select your preference from the **Units** pane on the left-hand side of the Web Server window. This pane is visible in both the **Status** and **Configuration** tabs.



Distance Units

- Meters
- US Survey Feet
- International Feet

Angle Units

The possible formats for angles, including latitudes and longitudes, are the following:

- Degrees (Deg.)
- Degrees, minutes (Deg. Min.)
- Degrees, minutes, seconds (Deg. Min. Sec.)

The format of latitude and longitude depends on the chosen angle unit. The corresponding formats are described in the table below.

Angle Unit Used	Latitude Format	Longitude Format
Deg.	DD.DDDDDDDD° N or DD.DDDDDDDD° S	DDD.DDDDDDDD° E or DDD.DDDDDDDD° W
Deg. Min.	DD°MM.MMMMMM' N or DD°MM.MMMMMM' S	DDD°MM.MMMMMM' E or DDD°MM.MMMMMM' W
Deg. Min. Sec.	DD°MM' SS.SSSSS" N or DD°MM' SS.SSSSS" S	DDD°MM' SS.SSSSS" E or DDD°MM' SS.SSSSS" W

Where:

- N for North, S for South; E for East, W for West
- "D.." for degree digits, "M.." for minute digits, "S.." for second digits

When typing in a latitude or longitude, leading and trailing zeroes can be omitted. Degree (°), minute (') and second (") symbols can be omitted as well.

For example, typing 5 6.45 N is a valid entry for 5° 06.450000' N.

If you use the "Deg." angle unit, you can use signs for directions:

- "-" sign for South (S) or West (W)
- No sign or "+" sign for North (N) or East (E)

Time Units

Time is always expressed in 24-hour format. You can choose between the following two options:

- UTC: UTC time provided by the receiver.
- Local: Local time derived from the UTC time provided by the receiver, taking into account the time zone read from the computer's regional settings.

Status Tab

Reading the Status Pages

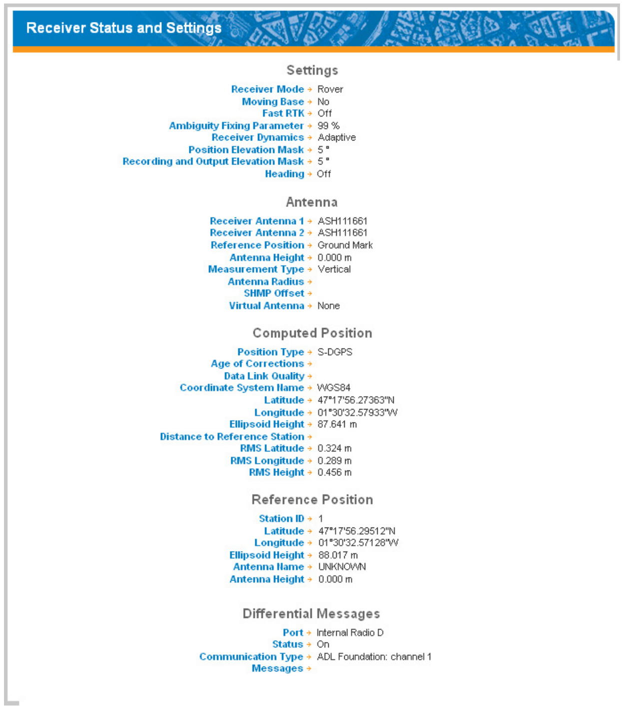
Please read below the general instructions and notes about the **Status** tab:

- Clicking on the **Status** tab causes the connected receiver to return its current status parameters.
- You may have to wait a few seconds before the receiver can respond.
- Most of the pages on the **Status** tab are refreshed at least every 10 seconds. On the **Receiver Status & Settings** page, the data are refreshed every second.
- In each of the tables presented hereafter to describe the receiver status parameters, the third column provides for reference the relevant $PASHQ commands, that is the query commands you could use alternatively to read the current values of the described parameters.

Receiver Status & Settings

The Receiver Status & Settings page provides six different groups of information:

- Settings
- Antenna
- Heading (only if external heading mode activated)
- Computed Position
- Reference Position
- Differential Messages



These five groups are detailed below.

Settings

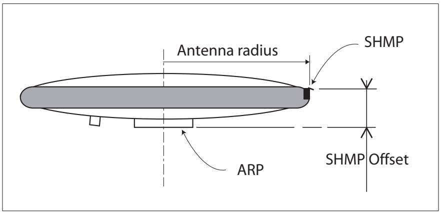
See the description of each parameter in the table below.

Parameter	Designation	$PASHQ
Receiver Mode	Tells whether the receiver is a base or a rover.	CPD,MOD
Moving Base	“Yes” if the base is moving “No” if it is static.	CPD,MOD
Fast RTK	Fast RTK output mode (“On” or “Off”)	CPD,FST
Ambiguity Fixing Parameter	“0”, “95.0”, “99.0” or “99.9”. “0” means the receiver stays in float mode (Flying RTK) once achieved.	CPD,AFP
Receiver Dynamics	“Static”, “Quasi-static”, “Walking”, “Ship”, “Automobile”, “Aircraft”, “Unlimited”, “Adaptive” or “User-defined”.	DYN
Position Elevation Mask	Angle value in degrees (0-90). Relevant to the position processing in a rover.	PEM

Parameter	Designation	$PASHQ
Recording and Output Elevation Mask	Angle value in degrees (0-90). Relevant to raw data recording and output.	ELM
Heading	Heading mode currently used (external or off)	CPD
With Heading Mode activated (external):		
Heading Port	Port used to route data from the external GNSS receiver to your receiver.	CPD
Azimuth Offset	Azimuth offset in degrees	CPD
Elevation Offset	Elevation offset in degrees	CPD
Maximum Baseline Elevation	In degrees	CPD
Maximum Baseline Length Error	In meters	CPD

Antenna

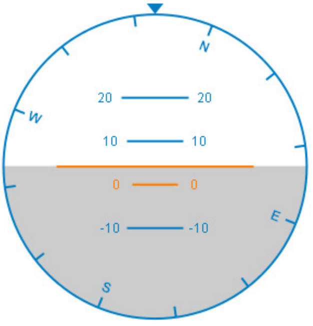
Parameter	Designation	$PASHQ
Receiver Antenna	Name of the GNSS antenna connected to the coaxial connector marked with a satellite icon (located on the receiver rear panel); a case-sensitive parameter (31 characters max.)	ANP,OWN
Reference Position	Refers to the antenna reduction mode. Indicates the physical location for which the receiver computes a position. This can be the antenna phase center, the ARP (Antenna Reference Point) or the ground mark.	ANR
Antenna Height	Height above the ground, in meters.	ANH
Measurement Type	"Vertical" or "Slant". "Vertical" is the general case, "Slant" is used when the GNSS antenna is mounted on a tripod.	ANH
Antenna Radius	Horizontal distance, in meters, from the geometrical center to the edge of the antenna used.	ANT
SHMP Offset	Antenna parameter describing the vertical offset of the Slant Height Measurement Point, measured from the ARP, in meters.	ANT
Virtual Antenna	Name of the virtual antenna used, if any. "OFF" if no virtual antenna is used.	ANP



Heading

This data group is shown only after ”external” heading mode has been activated and summarizes all the current results of the heading computation (in tabular and graphic form).

Parameter	Designation	$PASHQ
Status	Heading measurement status: • None • Calibration • Float/Calibration • Fixed/Operation	Deduced from ATT (f6 and f7)
Heading	Current heading angle, in degrees.	ATT
Pitch	Current pitch angle, in degrees.	ATT
Roll	Current roll angle, in degrees.	ATT
MRMS	Carrier measurement RMS error, in meters	ATT
BRMS	Baseline RMS error, in meters	ATT
Baseline Length	Baseline length, in meters	



Computed Position

This group returns information if the receiver is a rover. See the description of each parameter in the table below.

Parameter	Designation	$PASHQ
Position Type	“Autonomous”, “S-DGPS”, “DGPS”, “RTK-Float” or “RTK Fixed”.	POS
Age of Corrections	Age of differential corrections, in seconds. Blank for a receiver not receiving corrections. Always blank for a base.	POS
Data Link Quality	A percentage describing the quality of the corrections received. The greater the better.	see DDS, d7
Coordinate System Name	Coordinate system in which the receiver delivers its position solutions. Either “WGS 84” or as read from last RTCM-3 1021, 1023, 1025 message received.	see LCS
Latitude Longitude Ellipsoid Height	Latitude of computed position. Longitude of computed position. Height of computed position above ellipsoid.	POS
Distance to Reference Station	Baseline length. In a base, is representative of the deviation between the entered reference position and the computed position for the base (should be a few meters max.).	VEC
RMS Latitude RMS Longitude RMS Height	Standard deviation of latitude error. Standard deviation of longitude error. Standard deviation of height error.	GST

Reference Position

This group returns information on the base (or the base used if the receiver is a rover). See the description of each parameter in the table below.

Parameter	Designation	$PASHQ
Station ID	Station ID, as transmitted to the rover: • 0-1023 (RTCM 2.3) • 0-4095 (RTCM 3.x and ATOM) • 0-31 (CMR & CMR+)	STI
Latitude Longitude Ellipsoid Height	Latitude of reference position. Longitude of reference position. Height of reference position above ellipsoid.	CPD,POS
Antenna Name	Name of the GNSS antenna connected to the receiver, a case-sensitive parameter (31 characters max.)	ANP
Antenna Height	Antenna height above reference point	CPD,ANT

Differential Messages

This group returns information about the differential messages processed by the receiver.

In a base, several differential messages may be made available, on different ports and with different content.

In a rover, up to two different differential messages can be received.

In either case, the following information is provided for each type of differential message.

Parameter	Designation	$PASHQ
Port	Type and number of the port used to route the differential message.	BAS CPD,REM
Status	Port status, depends on the port type: • Always “On” for ports A to D. If for some reason, the port assigned to a differential message is off, then no information at all would be reported for this message. • For ports E, P and Q, there are three possible statuses: “Connected” means the connection is active, “Dialing” means the connection to the socket is in progress, “Automatic dial programmed (x s)” means the connection is not active but attempts to connect are run every x seconds (x=10 s for ports P and Q and x=50 s for port E). • For ports Ix, when used in connections where your receiver is the server, the Status field provides the number (n) of current connections to the server: “ n connection(s)”. • For ports Ix, when used in connections where your receiver is the client, there are several possible statuses: “Connected”, “Init in progress” or “Dialing”.	-
Communication Type	For a base, identifies the destination of the differential message. For a rover, identifies the source of the differential message.	-
Messages	Detail of the differential message generated by the base, or received by the rover, on this port. For a rover receiver, each message listed in this area includes rate and age information.	-

Satellites

The Satellites page details the data received from the different constellations. The information provided is split into six tabs: Status, GPS, GLONASS, GALILEO, SBAS, QZSS and Polar View.

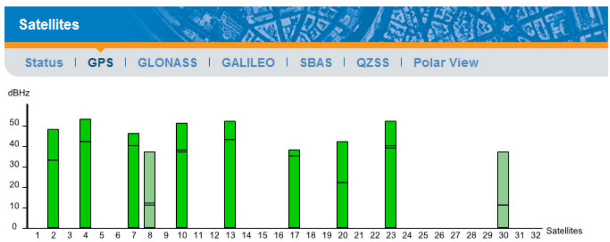
Status:

Parameter	Designation	$PASHQ
GPS	Indicates whether the receiver has the GPS reception capability (On) or not (Off).	GPS
GLONASS	Indicates whether the receiver has the GLON-ASS reception capability (On) or not (Off).	GLO
GALILEO	Indicates whether the receiver has the GALI-LEO reception capability (On) or not (Off).	GAL
SBAS	Indicates whether the receiver has the SBAS reception capability (On) or not (Off).	SBA
QZSS	Indicates whether the receiver has the QZSS reception capability (On) or not (Off)	QZS
Recording and Output Elevation Mask	Gives the current value of elevation angle used in the data recording and output process.	ELM
Position Elevation Mask	Gives the current value of elevation angle used in the position computation process.	PEM

For each visible satellite of each constellation received (GPS, GLONASS, GALILEO, SBAS and QZSS):

Parameter	Designation	$PASHQ
ID	Satellite ID number.	SAT
Status	Gives status information for each satellite: • Used: Satellite received and used. You may read “Used - SBAScorr”, “Used - DGPScorr”, “Used - L1RTKcorr” or “Used - L1L2RTKcorr” depending on which type of corrections are available for the satellite. • Tracked: Satellite received but not used. • Blank: Satellite in view. • No ephemeris: Satellite does not provide ephemeris data. • Unhealthy: Satellite declared unhealthy. • Bad URA: Bad user range accuracy.	SAT
Azimuth	Azimuth angle, in degrees, of the satellite.	SAT
Elevation	Elevation angle, in degrees, of the satellite.	SAT
SNR (dB.Hz)	Signal-noise ratios, in dB.Hz: - For L1C, L1P(Y), L2CS, LP2(Y) and L5 signals (GPS) - For L1C and L2C signals (GLONASS) - For E1 and E5a signals (GALILEO) - For L1C signal (SBAS) - For L1C, L2CS and L5 (QZSS)	SAT

Parameter	Designation	$PASHQ
Smooth Count (s)	Smooth counts, in seconds: - For L1C, L1P(Y), L2CS, LP2(Y) and L5 signals (GPS) - For L1C and L2C signals (GLONASS) - For E1 and E5a signals (GALILEO) - For L1C signal (SBAS). - For L1C, L2CS and L5 (QZSS) Smooth count refers to that period of time during which the signal phase is tracked smoothly without disruption (no cycle slip).	

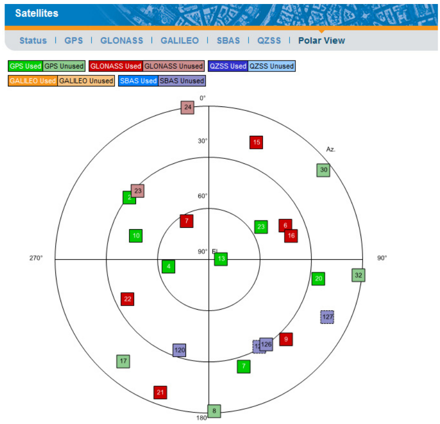


				SNR (dBHz)					Smooth Count (s)				
ID	Status	Az.	El.	L1C	L1P(Y)	L2CS	L2P(Y)	L5	L1C	L1P(Y)	L2CS	L2P(Y)	L5
2	Used - SBAS corr.	306	34	48	33		33		>255	>255		>255	
4	Used - SBAS corr.	250	66	53	42		42		>255	>255		>255	
7	Used - SBAS corr.	160	28	46		40			>255		>255		
8	Tracked	178	4	37	12		11		>255				
10	Used - SBAS corr.	292	49	51	38		37		>255	>255		>255	
13	Used - SBAS corr.	68	80	52	43		43		>255	>255		>255	
16		74	0										
17	Used - SBAS corr.	218	9	38		35			>255		>255		
20	Used - SBAS corr.	102	21	42	22		22		>255	>255		>255	
23	Used - SBAS corr.	58	51	52	40		39		>255	>255		>255	
27		32	3										
30	Tracked	48	6	37	11		11		>255			53	

The Polar View shows the location in the sky of each of the visible satellites from the four different constellations. Different colors are used to display the numbers of the visible satellites:

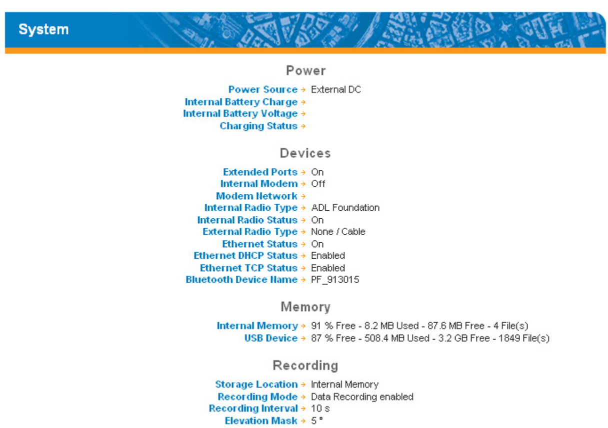
- Green: GPS (dark green; satellite used; pale green: satellite not used)
- Red: GLONASS (dark red: satellite used; pale red: satellite not used)
- Orange: GALILEO (dark orange: satellite used; pale orange: satellite not used)
- Blue: SBAS (dark blue: satellite used; purple: satellite not used)

- Dark blue: QZSS (ink blue: satellite used; pale blue: satellite not used)
- For all constellations, the numbers of the satellites that are visible but not tracked are framed in dotted line.



System

This page gives a global view of the receiver operation. The information returned by the receiver is split into four sections: Power, Devices, Memory and Recording.



Power:

Parameter	Designation	$PASHQ
Power Source	Indicates the current power source (internal or external).	PWR

Parameter	Designation	$PASHQ
Internal Battery Charge	Indicates the percentage of remaining power in the internal battery.	PWR
Internal Battery Voltage	Indicates the current output voltage of the internal battery.	PWR
Charging Status	Indicates whether the internal battery is currently being charged or not.	PWR

Devices:

Parameter	Designation	$PASHQ
Extended Ports	Indicates the current status of the extended ports B and F (on or off)	ECP
Internal Modem	Gives the current status of the internal modem (Off, On, Ready, Dialing, Online or None)	MDM
Modem Network	Displays network type (2G/3G) and name	MDM,STS
Internal Radio Type	Indicates the type of internal radio used.	RDP,TYP
Internal Radio Status	Indicates whether the internal radio is currently on or off.	RDP,PAR
External Radio Type	Indicates the type of external radio used.	RDP,TYP
Ethernet Status	Gives the current status of the Ethernet port (On or Off).	ETH
Ethernet DHCP Status	Indicates whether the DHCP mode is used (Enabled) or not (Disabled).	ETH
Ethernet TCP Status	Indicates the type of TCP/IP connection used (“Disabled”, “Secured” or “Enabled”).	TCP
Bluetooth Device Name	Gives the name of the built-in Bluetooth device.	BTH

Memory:

Parameter	Designation	$PASHQ
Internal Memory	Percentage of used/free space in the internal memory and number of files stored in that memory.	FLS
USB Device	With a USB device connected to the receiver, percentage of used/free space on that key and number of files stored on that device.	FLS

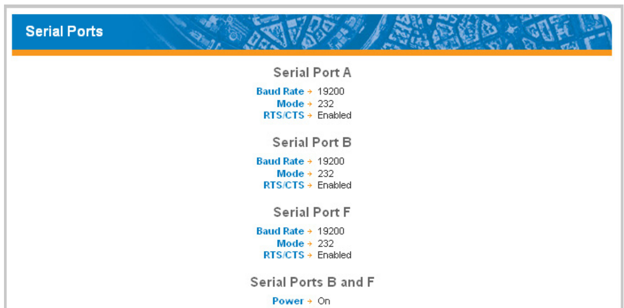
Recording:

Parameter	Designation	$PASHQ
Storage Location	Indicates the medium where data are recorded (Internal Memory or USB key).	FIL,LST

Parameter	Designation	$PASHQ
Recording Mode	Describes how the receiver is set up at power up regarding raw data recording and if it is currently recording data or not.	REC
Recording Interval	Indicates the current rate, in seconds, of data recording.	DRI
Elevation Mask	Gives the current value, in degrees, of the elevation mask used in data recording and data output.	ELM

Serial Ports

The Serial Ports page provides the current configuration of each of the receiver serial ports.

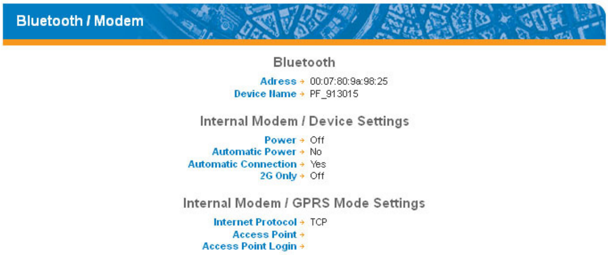


For each port, the following parameters are returned.

Parameter	Designation	$PASHQ
Baud Rate	Current value of baud rate used on the port	PRT
Mode	Indicates whether the port is currently an RS232 (232) or RS422 (422) serial port. Only port A can be RS422 or RS232. All the others are necessarily RS232.	MDP
RTS/CTS	Indicates whether the handshaking protocol is used (Enabled) or not (Disabled).	CTS
Power	(Relevant to ports B and F only) indicates whether the ports are currently powered on (On) or not (Off). Ports B and F are usable and recognized only when power is applied to them.	ECP

Bluetooth & Modem

The Bluetooth & Modem page provides the current configuration of Bluetooth and the internal modem. The modem cannot be used in CSD and GPRS mode at the same time, however the page shows the current settings for the two operating modes.



Bluetooth:

Parameter	Designation	$PASHQ
Address	Bluetooth address (17 characters)	BTH
Device Name	Bluetooth name (64 characters max.)	BTH

Internal Modem - Device Settings:

Parameter	Designation	$PASHQ
Power	Tells whether the modem is currently on or off	MDM
Automatic Power	Tells whether the modem is powered automatically when the receiver is powered on (Yes) or if it's powered on manually (No).	MDM
Automatic Connection	Tells if the modem is allowed (Yes) or not allowed (No) to establish a CSD (or GPRS) connection after it has been powered up or after recovering from a power shutdown.	MDM
2G only	Indicates whether the internal modem is forced to operate in a 2G network only (On) or allowed to operate in any network, whether a 2G or 3G network (Off).	MDM

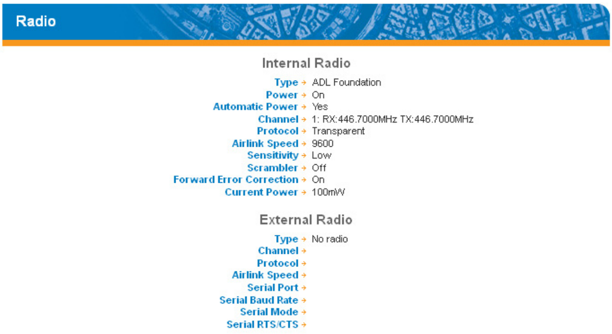
Internal Modem - GPRS Mode Settings:

Parameter	Designation	$PASHQ
Internet Protocol	Internet protocol used in the IP connection (TCP or UDP)	MDM

Parameter	Designation	$PASHQ
Access Point	Access point name allowing the modem to establish a connection to the mobile communication provider	MDM
Access Point Login	Login required for a successful connection	MDM

Radio

The Radio page provides the current configuration of the internal or external radio used by the receiver. Typically, the receiver will use either an internal or external radio.



Internal Radio:

Parameter	Designation	$PASHQ
Type	Indicates the model of radio used by the receiver.	RDP,TYP
Power	Tells you if the radio is currently on or off.	RDP,PAR
Automatic Power	Indicates whether the radio is powered in automatic (Yes) or Manual mode (No).	RDP,PAR
Channel	Gives the channel number corresponding to the carrier frequency the radio is currently receiving.	RDP,PAR
Protocol	Indicates the protocol used to demodulate the received data.	RDP,PAR
Airlink Speed	Indicates the speed at which the received data are modulated by the base transmitter. This allows the radio to properly demodulate the received signal.	RDP,PAR
Sensitivity	Current sensitivity setting for the radio (Low, Medium, High).	RDP,PAR
Scrambler	Current Scrambler setting (On or Off)	RDP,PAR
Forward Error Correction (FEC)	Current FEC setting (On or Off))	RDP,PAR

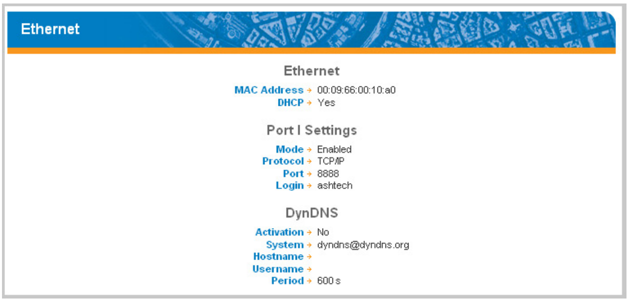
Parameter	Designation	$PASHQ
Current Power	Current radio transmission power (in mW).	RDP,PAR

External Radio:

Parameter	Designation	$PASHQ
Type	Indicates the model of radio used by the receiver through one of its external ports.	RDP,PAR
Channel	Gives the channel number corresponding to the carrier frequency the radio is currently transmitting or receiving.	RDP,PAR
Protocol	Indicates the protocol used to demodulate the received data or modulate the transmitted data.	RDP,PAR
Airlink Speed	Indicates the speed at which the data are modulated or demodulated by the radio.	RDP,PAR
Serial Port	Indicates the serial port to which the external radio is connected.	RDP,PAR
Serial Baud Rate	Baud rate used on the port.	PRT
Serial Mode	Type of serial link used on the port (RS232 or RS422).	MDP
Serial RTS/CTS	Indicates whether the handshaking protocol is enabled (On) or disabled (Off) on the port.	CTS

Ethernet

The Ethernet page provides the current configuration of the Ethernet port in the receiver.



Ethernet:

Parameter	Designation	$PASHQ
MAC Address	Hardware identification of the Ethernet device.	ETH
DHCP	Indicates whether the DHCP mode is currently enabled (Yes) or disabled (No).	ETH
IP Address	(If DHCP=No) Current IP address of the receiver	ETH
Subnetwork Mask	(If DHCP=No) Subnetwork mask	ETH

Parameter	Designation	$PASHQ
Gateway	(If DHCP=No) Gateway IP address	ETH
DNS1 IP Address	(If DHCP=No) IP address of first Domain Name System	ETH
DNS2 IP Address	(If DHCP=No) IP address of second Domain Name System	ETH

Port I Settings:

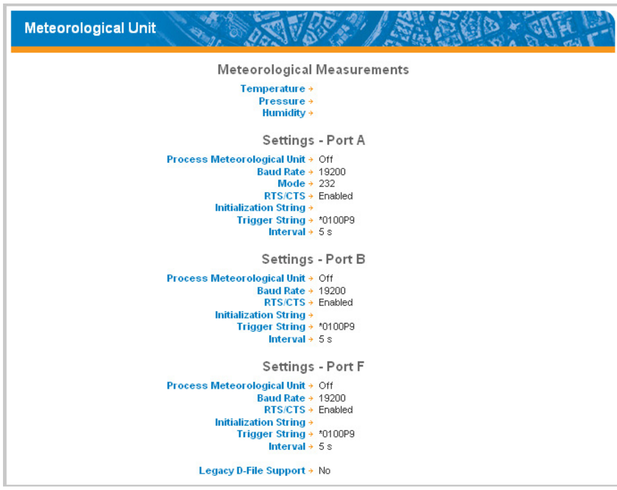
Parameter	Designation	$PASHQ
Mode	Indicates the current status of the TCP/IP server, which can be one of the following: • Disabled • Secured (Enabled with authentication) • Enabled (Enabled without authentication)	TCP
Protocol	IP protocol used (TCP or UDP)	DST
Port	IP port number	TCP
Login	TCP/IP server connection login	TCP

DynDNS:

Parameter	Designation	$PASHQ
Activation	Indicates whether the process forcing the receiver to send its IP address to the DynDNS server every x seconds is enabled (Yes) or disabled (No)	DDN
System	DynDNS address	DDN
Hostname	The hostname you chose for your receiver.	DDN
Username	Username used to log in on the DynDNS web site.	DDN
Period	Rate in seconds at which the receiver must send its IP address to the DynDNS server.	DDN

Meteorological Unit

The Meteorological Unit page provides the current values of meteo data sent by the meteorological unit, as well as the configuration of each of the receiver serial ports to which the meteorological unit may be connected. This page also indicates the file format used to record meteo data.



Current values of meteorological data:

Parameter	Designation	$PASHQ
Temperature	Current value of temperature delivered by the meteorological unit.	XDR
Pressure	Current value of pressure delivered by the meteorological unit.	XDR
Humidity	Current value of humidity delivered by the meteorological unit.	XDR

For each serial port (A, B, F), the following parameters are returned:

Parameter	Designation	$PASHQ
Process Meteorological Unit	Tells whether the receiver is allowed to query the meteorological unit, if connected to this port.	MET
Baud Rate	Current value of baud rate used on the port	PRT
Mode	Indicates whether the port is currently an RS232 (232) or RS422 (422) serial port. Only port A can be RS422 or RS232. All the others are necessarily RS232.	MDP
RTS/CTS	Indicates whether the handshaking protocol is used (Enabled) or not (Disabled) on this port.	CTS

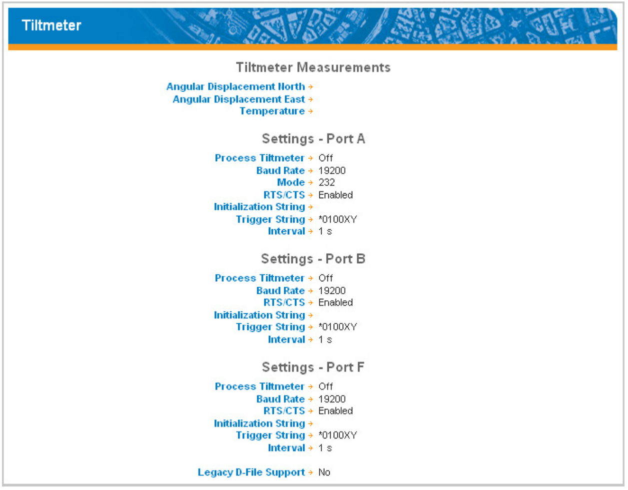
Parameter	Designation	$PASHQ
Initialization String	String used by the receiver to initialize the meteorological unit, if connected to this port.	MET
Trigger String	String used by the receiver to query the meteorological unit, if connected to this port.	MET
Interval	Current value of time interval, in seconds, used by the receiver to query the meteorological unit, if connected to this port.	MET

Legacy D-File Support:

Parameter	Designation	$PASHQ
Legacy D-File Support	Indicates whether the legacy D-file is supported (Yes) or not (No). In the latter case, only the G-file is supported.	RFT

Tiltmeter

The Tiltmeter page provides the current values of data sent by the tiltmeter, as well as the configuration of each of the receiver serial ports to which the tiltmeter may be connected. This page also indicates the file format used to record tiltmeter data.



Current values of tiltmeter data:

Parameter	Designation	$PASHQ
Angular Displacement North	Current value of angular displacement (North), as delivered by the tiltmeter.	XDR
Angular displacement East	Current value of angular displacement (East) as delivered by the tiltmeter.	XDR
Temperature	Current value of temperature, as delivered by the tiltmeter.	XDR

For each serial port (A, B, F), the following parameters are returned:

Parameter	Designation	$PASHQ
Process tiltmeter	Tells whether the receiver is allowed to query the tiltmeter, if connected to this port.	TLT
Baud Rate	Current value of baud rate used on the port	PRT
Mode	Indicates whether the port is currently an RS232 (232) or RS422 (422) serial port. Only port A can be RS422 or RS232. All the others are necessarily RS232.	MDP
RTS/CTS	Indicates whether the handshaking protocol is used (Enabled) or not (Disabled) on this port.	CTS
Initialization String	String used by the receiver to initialize the tiltmeter, if connected to this port.	TLT
Trigger String	String used by the receiver to query the tiltmeter, if connected to this port.	TLT
Interval	Current value of time interval, in seconds, used by the receiver to query the tiltmeter, if connected to this port.	TLT

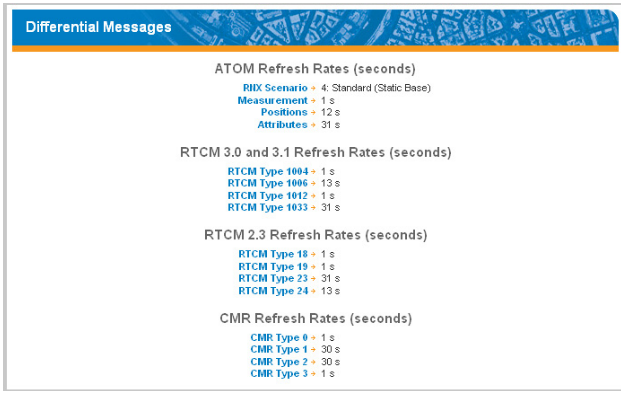
Legacy D-File Support:

Parameter	Designation	$PASHQ
Legacy D-File Support	Indicates whether the legacy D-file is supported (Yes) or not (No). In the latter case, only the G-file is supported.	RFT

Data Output

This section consists of three pages, each of them listing a category of output data delivered by the receiver.

Differential Messages:

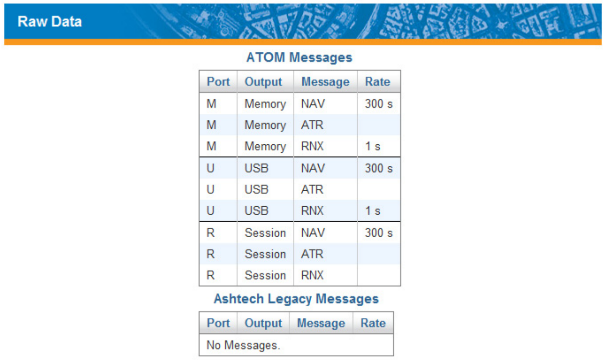


Each currently active message type is listed per category of available data format (ATOM, RTCM, CMR), together with its individual refresh rate, in seconds.

NMEA Messages:

Each currently active message type is listed together with the identification of the port delivering the message as well as its individual refresh rate, in seconds.

Raw Data:


Raw Data

ATOM Messages

Port	Output	Message	Rate
M	Memory	NAV	300 s
M	Memory	ATR	
M	Memory	RNX	1 s
U	USB	NAV	300 s
U	USB	ATR	
U	USB	RNX	1 s
R	Session	NAV	300 s
R	Session	ATR	
R	Session	RNX	

Ashtech Legacy Messages

Port	Output	Message	Rate
No Messages.			

Each currently active message type is listed per category of available data format (ATOM, Ashtech), with the identification of the port delivering the message as well as its individual refresh rate, in seconds.

The meaning of ports A, B, etc. are reminded in the table below.

Port Designation	Physical Identification
A, B, F	Serial ports
C	Bluetooth
E	Modem
I	Ethernet
P, Q	Ethernet
M	Internal memory
U	USB Device
R	Sessions

Embedded NTRIP Caster

Current

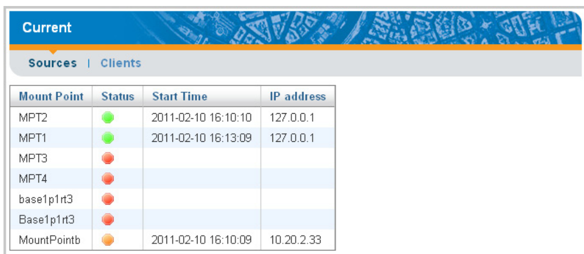
This web page gives access to two different tabs:

- **Sources** tab: This tab lists the mount points currently seen by the NTRIP caster. For each mount point, the table provides the mount point name, the time when the data source started to be available through that mount point, and the IP address of that source. The **Status** column (second column) indicates the following:

Status	Meaning
Green light	Mount point declared in the NTRIP caster source table and data are currently available through this mount point.

Status	Meaning
Red light	Mount point declared in the NTRIP caster source table but no data are currently available through this mount point.
Orange light	Mount point not declared in the NTRIP caster source table. Data currently available from this mount point. A receiver alarm is also triggered in that case.

- **Clients** tab: This tab lists all the users currently connected to the NTRIP caster. For each user, the table provides the user name, the mount point to which the user is connected, the time when the connection to the mount point started and the user IP address.

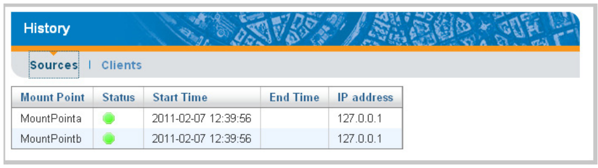


Mount Point	Status	Start Time	IP address
MPT2		2011-02-10 16:10:10	127.0.0.1
MPT1		2011-02-10 16:13:09	127.0.0.1
MPT3			
MPT4			
base1p1rt3			
Base1p1rt3			
MountPointb		2011-02-10 16:10:09	10.20.2.33

History

The History web page is an interpretation of the log file presented below. This page gives access to two different tabs:

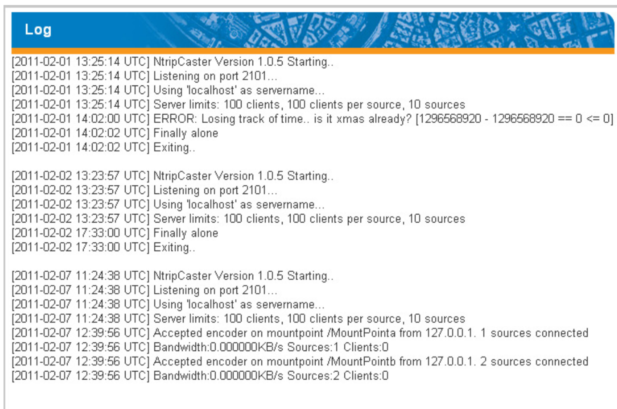
- **Sources** tab: This tab lists all the available sources of corrections since the log file was started. For each source, the table provides the mount point name, the current status of the source (green: available; red: unavailable), the times when the source started and stopped to be available, as well as its IP address.
- **Clients** tab: This tab lists all the users that have been or were connected to the NTRIP caster since the log file was created. For each user, the table provides the user name, the mount point to which the user is, or was connected, the times when the connection to the mount point started and stopped, as well as the user IP address.



Mount Point	Status	Start Time	End Time	IP address
MountPointa		2011-02-07 12:39:56		127.0.0.1
MountPointb		2011-02-07 12:39:56		127.0.0.1

Log

This web page provides a view of the log file, which is a viewable text file listing all the events detected since the log file was created.



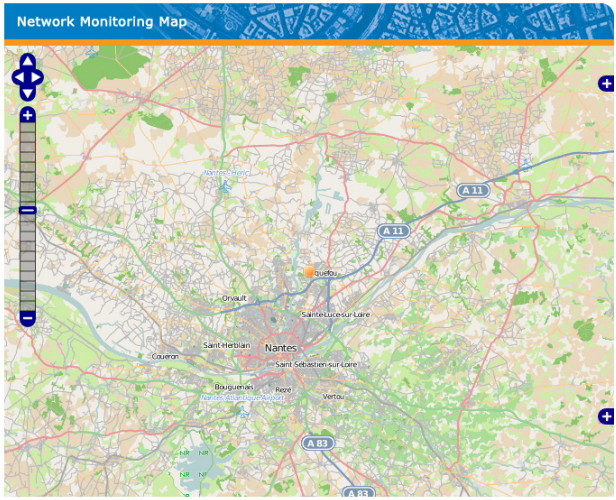

```
[2011-02-01 13:25:14 UTC] NtripCaster Version 1.0.5 Starting..
[2011-02-01 13:25:14 UTC] Listening on port 2101...
[2011-02-01 13:25:14 UTC] Using 'localhost' as servername...
[2011-02-01 13:25:14 UTC] Server limits: 100 clients, 100 clients per source, 10 sources
[2011-02-01 14:02:00 UTC] ERROR: Losing track of time.. is it xmas already? [1296568920 - 1296568920 == 0 <= 0]
[2011-02-01 14:02:02 UTC] Finally alone
[2011-02-01 14:02:02 UTC] Exiting..

[2011-02-02 13:23:57 UTC] NtripCaster Version 1.0.5 Starting..
[2011-02-02 13:23:57 UTC] Listening on port 2101...
[2011-02-02 13:23:57 UTC] Using 'localhost' as servername...
[2011-02-02 13:23:57 UTC] Server limits: 100 clients, 100 clients per source, 10 sources
[2011-02-02 17:33:00 UTC] Finally alone
[2011-02-02 17:33:00 UTC] Exiting..

[2011-02-07 11:24:38 UTC] NtripCaster Version 1.0.5 Starting..
[2011-02-07 11:24:38 UTC] Listening on port 2101...
[2011-02-07 11:24:38 UTC] Using 'localhost' as servername...
[2011-02-07 11:24:38 UTC] Server limits: 100 clients, 100 clients per source, 10 sources
[2011-02-07 12:39:56 UTC] Accepted encoder on mountpoint /MountPointa from 127.0.0.1. 1 sources connected
[2011-02-07 12:39:56 UTC] Bandwidth:0.000000KB/s Sources:1 Clients:0
[2011-02-07 12:39:56 UTC] Accepted encoder on mountpoint /MountPointb from 127.0.0.1. 2 sources connected
[2011-02-07 12:39:56 UTC] Bandwidth:0.000000KB/s Sources:2 Clients:0
```

When the log file reaches 1Mbyte in size, it is closed and saved, becoming the “old” log file. A new log file is then created.

Later when the new log file reaches 1 Mbyte in size, it is closed and saved, becoming in turn the “old” log file. Data logging is then resumed in the first log file, etc.

Network Monitoring Map

This web page displays a map of the area where the NTRIP caster is being used. The view and scale of the map is automatically adjusted to show the location of the NTRIP caster (orange spot) as well as those of the base stations delivering corrections (NTRIP sources) (green spots) and of all the connected users (blue spots) that return their respective locations to the NTRIP caster.



Tools are available on the left to zoom in or out, or to slide the map in all directions.

Alarms

This page allows you to list all the alarms triggered in the receiver since it was last powered on. The table is cleared every time the receiver is powered on. When an alarm is set, go to **Terminal Window** to acknowledge it.

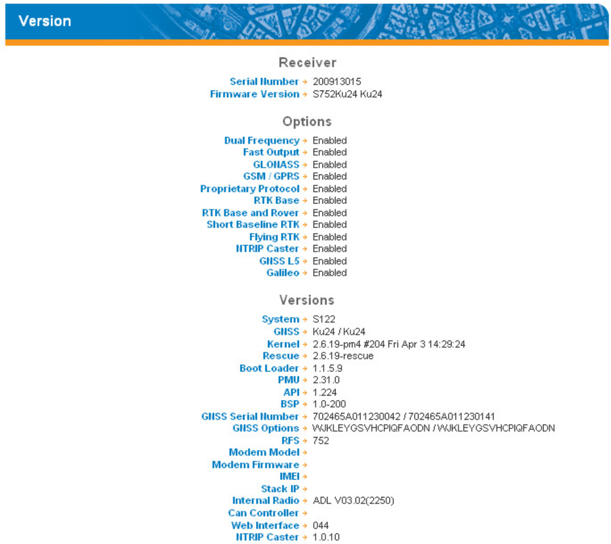
The following information is provided for each alarm.

Parameter	Designation
Date	Date when the alarm was triggered.
Code	Alarm code, as reported on the receiver display screen.
Sub Code	Alarm sub-code, as reported on the receiver display screen.
Message	Brief identification of the alarm.

Version

The Version page provides three different groups of information:

- Receiver
- Options
- Versions



These three groups are detailed below.

Receiver

See the description of each parameter in the table below.

Parameter	Designation	$PASHQ
Serial Number	Receiver Serial Number	RID
Firmware Version	An 8-character string in the form "Sxxxxxxx". The first four characters stand for the System firmware version, and the last four for the GNSS firmware version. If the receiver is fittted to operate in heading mode, an additional string of 4 characters identifies the firmware version of the second GNSS board used.	RID

Options

See the description of each parameter in the table below.

For each possible firmware option, "Enabled" means the option has been installed. A blank field means the opposite ("Disabled").

Parameter	Designation	$PASHQ
Dual Frequency	GNSSL2 option ("P" option)	RID

Parameter	Designation	$PASHQ
Fast Output	FASTOUTPUT option (“F” option)	RID
GLONASS	GLONASS option (“S” option)	RID
GSM / GPRS	MODEM option (“Z” option)	RID
Proprietary Protocol	RTK with proprietary formats only (“M” option)	RID
RTK Base	RTK base option (“N” option)	RID
RTK Base & Rover	Unlimited RTK (“K” option)	RID
Short Baseline RTK	Limited RTK range (“L” option)	RID
Flying RTK	Flying RTK mode only (“R” option)	RID
NTRIP Caster	Embedded NTRIP Caster (“C” option)	RID
GNSS L5	L5 frequency tracking (“Q” option)	RID
Galileo	Galileo satellites tracking (“O” option)	RID

Versions

See the description of each parameter in the table below.

Parameter	Designation	$PASHQ
System	System firmware version	VERSION
GNSS	GNSS firmware version (4 characters). If the receiver is fittted to operate in heading mode, an additional string of 4 characters identifies the firmware version of the second GNSS board used.	VERSION
Kernel	Kernel firmware version	VERSION
Rescue	Rescue firmware version	VERSION
Boot Loader	Boot Loader firmware version	VERSION
PMU	PMU firmware version	VERSION
API	API firmware version	VERSION
BSP	BSP firmware version	VERSION
GNSS Serial Number	GNSS Serial Number (a 16-character string). If the receiver is fittted to operate in heading mode, an additional string of 16 characters follows, separated from the first one by a “/”, which identifies the serial number of the second GNSS board used.	VERSION
GNSS Options	A string of letters. Each letter represents an installed option. If the receiver is fittted to operate in heading mode, an additional string follows, separated from the first one by a “/”, which identifies all the firmware options installed in the second GNSS board used.	VERSION
RFS	Root File System firmware version	VERSION
Modem Model	As designated by its manufacturer	VERSION
Modem firmware	Modem firmware version	VERSION
IMEI	Modem hardware ID	VERSION

Parameter	Designation	$PASHQ
Stack IP	Modem Stack IP firmware version	VERSION
Internal Radio	Internal radio firmware version	VERSION
Can Controller	Can Controller firmware version	VERSION
Web Interface	Web Interface firmware version	VERSION
NTRIP Caster	NTRIP caster firmware version	VERSION

Configuration Tab

Making Changes to a Receiver Configuration

Please read below the general instructions and notes about the **Configuration** tab:

- Clicking on the **Configuration** tab causes the connected receiver to display its current settings.
- You may have to wait a few seconds before the receiver can respond.
- The content of the **Configuration** tab is read once on opening each page.
- Whenever you change one or more receiver parameters in a page, you need to click on the **Configure** button located at the bottom of the screen to let the Web Server upload the new parameters to the receiver.

  When you click on the **Configure** button, a routine is run to check the validity of the new parameters and a new page opens in the Web Server. If the new parameters are valid, the message **Successful** is displayed after all the new parameters have effectively been uploaded to the receiver.

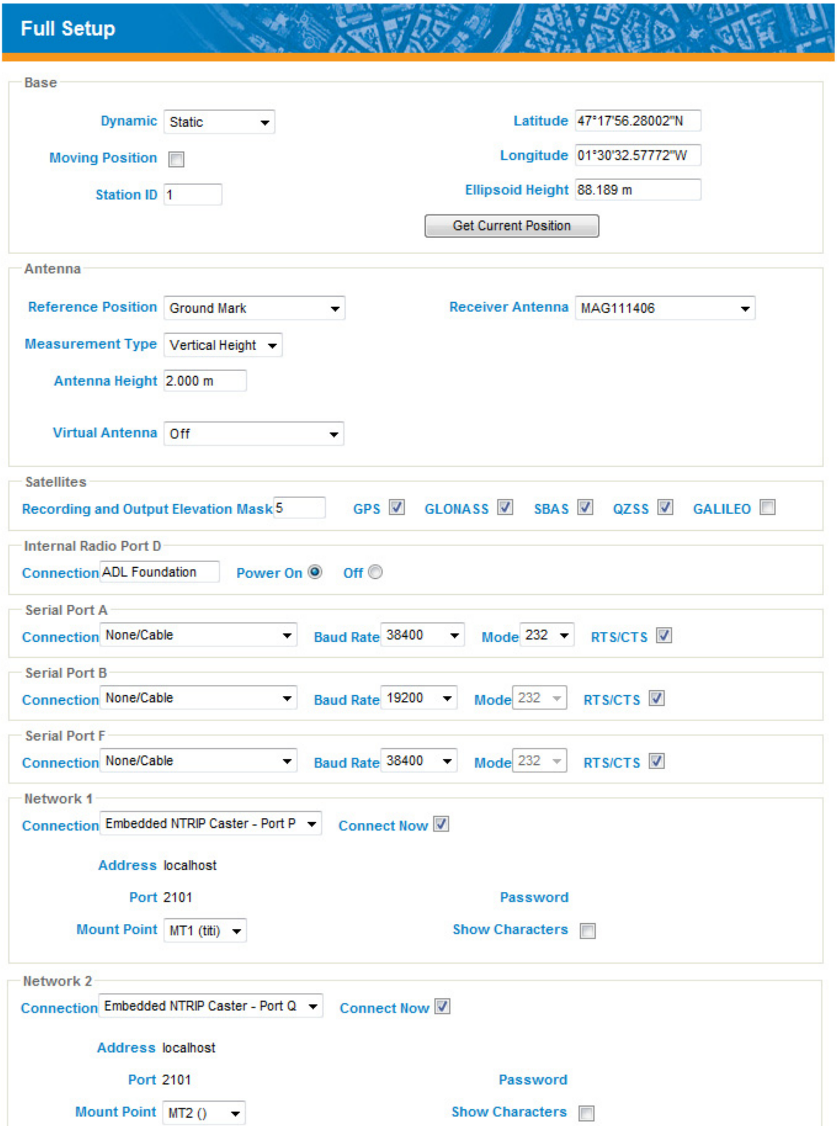
  If some of them are not valid, the message **Failed** is displayed, followed by the list of invalid parameters. You then need to return to the relevant Configuration page, correct the erroneous parameters and resume the Configuration operation.

  Note that in the receiver, any attempt to replace a parameter (hence a valid one) with a new parameter that is invalid will always abort (i.e. the receiver will keep the valid parameter in its memory).
- In each of the tables presented hereafter to describe the receiver configuration parameters, the third column provides for reference the relevant $PASHS command, that is the set command you could alternatively use to set or change the described parameters.

Base Full Setup

If the receiver you are communicating with is a base or if you want to change it into a base, click on **Base Setup**. The following groups of parameters need to be defined:

- Base
- Antenna
- Satellites
- Internal Radio (port D)
- Serial Ports (A, B, F)
- Network 1, Network 2
- Differential Streams (1 and 2)
- Ethernet Streaming



These groups of parameters are detailed below.

Base

Use this area to enter the operating mode for the base, as well as its position (if appropriate). See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Dynamic	Choose the dynamic model that best suits the base motion. For a static base, the good choice is obviously “Static”. For a moving base, choose the best option describing the motion of the base receiver.	DYN
Moving Position	Enable this button if the base you are defining is a moving base.	CPD,MOD
Station ID	Choose and enter a station Id for your reference station, according to the type of differential messages it will generate: • 0-1023 (RTCM 2.3) • 0-4095 (RTCM 3.x and ATOM) • 0-31 (CMR & CMR+)	STI
“Get current position” button	Click on this button if you want to allocate the last position computed by the receiver as the reference position for the base. As a result, the Lat/Lon/Height fields below are updated with the coordinates of this last computed position.	CPD,MOD
Latitude Longitude Ellipsoid Height	Latitude, longitude and ellipsoidal height defining the reference position of the base.	POS

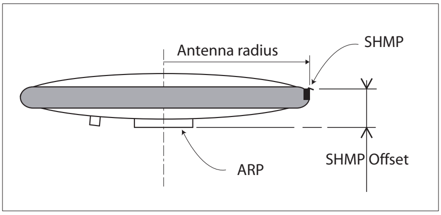
Antenna

Use this area to define the parameters of the antenna used physically at the base, as well as a virtual antenna if necessary. A virtual antenna may be defined to allow the base to deliver raw data as if it were collected with this antenna.

See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Reference Position	Select one of the options below to define the physical location of the base: • L1 phase center • Antenna Reference Point (ARP) • Ground mark	ANR
Measurement Type	Specify the type of measurement (“Slant” or “Vertical”) through which the above antenna height was measured.	ANH
Antenna Height	Enter the measured antenna height according to the measurement type used and the selected distance unit.	ANT or ANH

Parameter	Designation	$PASHS
Receiver antenna	Select the name of the antenna used at the base. This antenna name can only be chosen from a list of antenna names stored in the receiver. UNKNOWN, NULLANTENNA, ADVNULLAN-TENNA are special definitions of antennas typically used as virtual antennas.	ANP,OWN
Antenna Radius	(Only if “Slant Height” measurement type selected). Enter the antenna radius according to the selected distance unit.	ANT
SHMP Offset	(Only if “Slant Height” measurement type selected). Enter the vertical offset of the Slant Height Measurement Point for the antenna used by the rover. Take care to enter this parameter in the selected distance unit. See also the Note below.	ANT
Virtual Antenna	This parameter allows you to define a virtual antenna: • Select “Off” if you do not want to define one • If you want one, select the virtual antenna name for which you would like the receiver to deliver raw data, i.e. as if the raw data had been collected using this antenna. This antenna name can only be chosen from a list of antenna names stored in the receiver. NULLANTENNA, ADVNULLANTENNA, etc. are the most commonly used virtual antennas.	ANP,OUT



Satellites

Use this area to define the constellations tracked by the base as well as the elevation mask applied to all constellations. See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Recording and Output Elevation Mask	Enter the elevation mask, in degrees, used by the receiver to determine which raw/differential data from each visible satellite should be recorded or output, depending on the elevation of the satellite. No data from any visible satellite located below this elevation angle will be recorded or output.	ELM
GPS	Check this button to enable GPS tracking. Clear it otherwise	GPS
GLONASS	Check this button to enable GLONASS tracking (requires installed S option). Clear it otherwise.	GLO
SBAS	Check this button to enable SBAS tracking.Clear it otherwise.	SBA
QZSS	Check this button to enable QZSS tracking. Clear it otherwise	QZS
GALILEO	Check this button to enable GALILEO tracking. Clear it otherwise	GAL

Internal Radio (Port D)

The receiver uses the “ADL Foundation” model from Pacific Crest as the internal radio. Use this area to turn on or off the internal radio. Turn it on if the receiver is required to use it. Otherwise keep it turned off.

Serial Ports

Use this area to set the receiver ports and declare the different external devices connected to them. For each port (ports A, B, F), set their parameters as explained in the table below.

Parameter	Designation	$PASHS
Connection	Choose the device to which the port is connected. The possible choices are: • None/Cable: The port is not used or is connected to an external device via a cable. • U-Link TRx (on port A only): The port is connected to a U-Link TRx. • Magellan UHF (on port A only): The port is connected to transmitter P/N 800986-x0. • PDL HPB/LBP: The port is connected to a PDL transmitter. • ARF7474B EU: The port is connected to a license-free radio for use in European countries. • ARF7474A NA: The port is connected to a license-free radio for use on the North American continent. • ADL Vantage/Vantage Pro: The port is connected to an ADL transmitter. • XDL Rover: The port is connected to an external receiver (PacCrest XLD Rover model)	RDP,TYP (+ ECP)
Baud Rate	Choose a baud rate from the list. The selected rate will be used by the port.	PRT
Mode	Port A only. Specify the type of serial link ("RS232 or "RS422") for Port A.	MDP
RTS/CTS	Check this button to enable the RTS/CTS handshaking protocol on the port (if 232). Clear it otherwise.	CTS

Network 1

Use this area to declare the type of connection used by the base to distribute its data through a mobile communication network or through the Internet (network 1). See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Connection	Choose the type of network connection used in the receiver: • None: No network connection used. • Modem Direct IP - Port E: The base is connected to a remote server (possibly RTDS) via Internet using its internal modem and a Direct IP connection. • Modem NTRIP Server - port E: The base is connected to the Internet via its internal modem using an IP connection for sending its data to an NTRIP caster. (The base is then a “client”.) • Ethernet Direct IP - port P: The base is connected to the Internet through its Ethernet port. • Ethernet NTRIP Server - port P: The base is connected to the Internet through its Ethernet port using an IP connection to send its data to an NTRIP caster. (The base is then a “client”.) • Embedded NTRIP Caster - Port P: (Available only if the NTRIP caster option is installed): The base delivers its data to the embedded NTRIP caster via port P.	MDM,.. NTR,PAR DIP

Direct IP via port E (Modem) or port P (Ethernet)

Parameter	Designation	$PASHS
Connect Now	Check this button to let the receiver perform the requested network connection after you have clicked on the Configure button.	-
Address	IP address of the remote server	DIP,PAR
Port	IP port number of the remote server	DIP,PAR
Login	(Optional, depending on the remote server) Login required to connect to the remote server	DIP,PAR
Password	(Optional, depending on the remote server used) Password required to connect to the remote server. If a login and password are needed for the connection to the server, then the receiver will send the $GPUID command to the server after you have entered these two parameters and clicked on the Configure button.	DIP,PAR

NTRIP Server via port E (Modem) or port P (Ethernet)

Parameter	Designation	$PASHS
Connect Now	Check this button to let the receiver perform the requested network connection after you have clicked on the Configure button.	-

Parameter	Designation	$PASHS
Address	IP address of the NTRIP caster	NTR,PAR
Port	IP port number of the NTRIP caster	NTR,PAR
Mount Point	Mount point used to connect to the NTRIP caster	NTR,MTP
Password	Password required to send data to the NTRIP caster	NTR,PAR

Embedded NTRIP Caster via port P (Ethernet)

Parameter	Designation	$PASHS
Connect Now	Check this button to let the receiver perform the requested network connection after you have clicked on the Configure button.	-
Address	A read-only field reading ”localhost”, invoking the IP address of the receiver itself.	-
Port	A read-only field indicating the IP port of the NTRIP caster, as defined on the NTRIP caster settings page.	-
Mount Point	Choose one of the mount points declared in the embedded NTRIP caster through which the data will be made available to caster users.	NTR,MTP
Password	A read-only field indicating the password of the NTRIP caster, as defined on the NTRIP caster settings page.	

Network 2

Use this area to declare the type of connection used by the base to distribute its data through the Internet (network 2). See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Connection	Choose the type of network connection used in the receiver: • None: No network connection used. • Ethernet Direct IP - port Q: The base is connected to the Internet through its Ethernet port. • Ethernet NTRIP Server - port Q: The base is connected to the Internet through its Ethernet port using an IP connection to send its data to an NTRIP caster. (The base is then a “client”.) • Embedded NTRIP Caster - Port Q: (Available only if the NTRIP caster option is installed): The base delivers its data to the embedded NTRIP caster via port Q.	MDM,.. NTR,PAR DIP

Direct IP via port Q (Ethernet)

Parameter	Designation	$PASHS
Connect Now	Check this button to let the receiver perform the requested network connection after you have clicked on the Configure button.	-
Address	IP address of the remote server	DIP,PAR
Port	IP port number of the remote server	DIP,PAR
Login	(Optional, depending on the remote server) Login required to connect to the remote server	DIP,PAR
Password	(Optional, depending on the remote server used) Password required to connect to the remote server. If a login and password are needed for the connection to the server, then the receiver will send the $GPUID command to the server after you have entered these two parameters and clicked on the Configure button.	DIP,PAR

NTRIP Server via port Q (Ethernet)

Parameter	Designation	$PASHS
Connect Now	Check this button to let the receiver perform the requested network connection after you have clicked on the Configure button.	-
Address	IP address of the NTRIP caster	NTR,PAR
Port	IP port number of the NTRIP caster	NTR,PAR
Mount Point	Mount point used to connect to the NTRIP caster	NTR,MTP
Password	Password required to send data to the NTRIP caster	NTR,PAR

Embedded NTRIP Caster via port Q (Ethernet)

Parameter	Designation	$PASHS
Connect Now	Check this button to let the receiver perform the requested network connection after you have clicked on the Configure button.	-
Address	A read-only field reading ”localhost”, meaning that this parameter is managed by the receiver itself.	-
Port	A read-only field indicating the IP port of the NTRIP caster, as defined on the NTRIP caster settings page.	-
Mount Point	Choose one of the mount points declared in the embedded NTRIP caster through which the data will be made available to caster users.	NTR,MTP
Password	A read-only field indicating the password of the NTRIP caster, as defined on the NTRIP caster settings page.	

Differential Streams

A receiver configured as a base can generate two independent, differential data streams (1 and 2). This area allows you to define these two streams. For each differential stream, define the following parameters.

Parameter	Designation	$PASHS
Port	Choose the port delivering the differential stream. The possible choices are: • D - Stream sent to internal radio via port D • A - Serial: Stream available on port A. • B - Serial: Stream available on port B. • F - Serial: Stream available on port F. • C - Bluetooth: Stream sent to external device through Bluetooth. • E - Modem: Stream forwarded to internal modem • I - Ethernet: Stream available on the Ethernet port through Direct IP connection (the base is a server) • P - Ethernet: Stream available on the Ethernet port through Direct IP or NTRIP connection. The base is a client. • Q - Ethernet: Stream available on the Ethernet port through Direct IP or NTRIP connection. The base is a client. • M - Memory: Stream saved to internal memory. • U - USB Device: Stream sent to external device via the USB port.	BAS
Message	Choose the type of differential data delivered by the port: • None • ATOM • RTCM3.x • RTCM2.3 • CMR • CMR+ • DBEN Place the mouse cursor over the ”I” sign (to the right of the Message drop-down list) to read the details of the currently set messages.	BAS

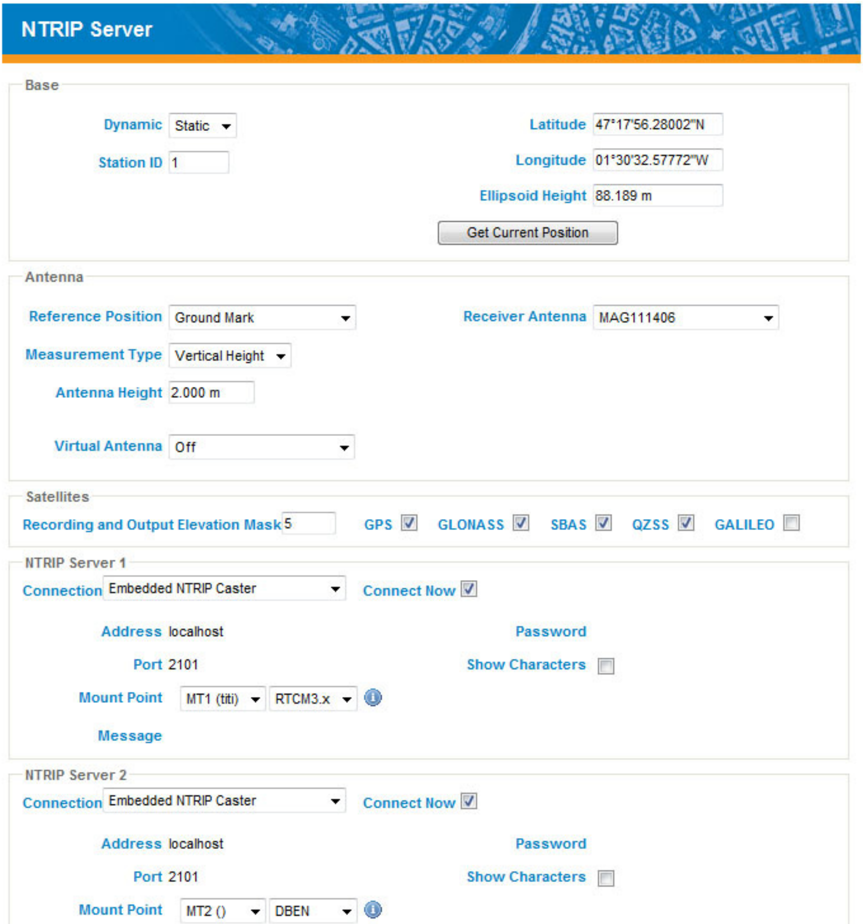
Ethernet Streaming

Use this area to configure the I1 to I9 ports of the receiver as well as the type of data delivered through these ports. Each port can support up to ten connections simultaneously. Define the following parameters for each port:

Parameter	Designation	$PASHS
Port Ix	Click this option if the port is to be used. If the port is to be idle, keep the option cleared.	DST
Mode	Specify whether the port will be used in Server or Client mode: • In Client mode, you will choose the remote server with which the base will communicate through an IP connection. • In Server mode, the base will make its output data available for any remote client allowed to communicate with it through an IP connection.	DST
Protocol	Specify whether the IP connection will be using the TCP or UDP protocol.	DST
IP Address	If the port is used in Client mode, enter the IP address of the remote server with which the port will communicate. This field is irrelevant if you select the Server mode.	DST
IP Port	If the port is used in Client mode, enter the port number of the remote server with which the port will communicate. If it's used in Server mode, enter the port number of the port you are currently setting.	DST
Message Type	Choose from the list below the type of message routed through the port: • None: no data delivered through the port. • ATOM • RTCM3.x • RTCM2.3 • CMR • CMR+ • DBEN Place the mouse cursor over the "I" sign (to the right of the Message Type drop-down list) to read the details of the currently set messages.	BDS

Setting the Base as an NTRIP Server

This page is an abridged version of the Base Setup-Full Setup page in which only the settings required to configure a base as an NTRIP server are presented. The base can serve as an NTRIP server for two external NTRIP casters, possibly delivering different data to each of the NTRIP casters, or for the embedded NTRIP caster.



Base

Use this area to enter the position of the base.

Parameter	Designation	$PASHS
Dynamic	Necessarily static.	DYN
Station ID	Choose and enter a station ID for your reference station, according to the type of differential messages it will generate: • 0-1023 (RTCM 2.3) • 0-4095 (RTCM 3.x and ATOM) • 0-31 (CMR & CMR+)	STI

Parameter	Designation	$PASHS
"Get current position" button	Click on this button if you want to allocate the last position computed by the receiver as the reference position for the base. As a result, the Lat/Lon/ Height fields below are updated with the coordinates of this last computed position.	CPD,MOD
Latitude Longitude Ellipsoid Height	Latitude, longitude and ellipsoidal height defining the reference position of the base. May be entered manually or using the "Get Current position" button.	POS

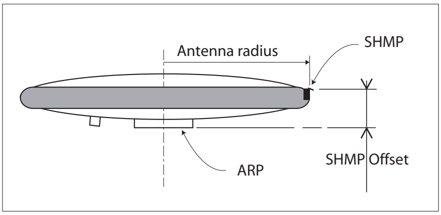
Antenna

Use this area to define the parameters of the antenna used physically at the base, as well as a virtual antenna if necessary. A virtual antenna may be defined to allow the base to deliver raw data as if it were collected with this antenna.

See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Reference Position	Select one of the options below to define the physical location of the base: • L1 phase center • Antenna Reference Point (ARP) • Ground mark	ANR
Measurement Type	Specify the type of measurement ("Slant" or "Vertical") through which the above antenna height was measured.	ANH
Antenna Height	Enter the measured antenna height according to the measurement type used and the selected distance unit.	ANT or ANH
Receiver Antenna	Select the name of the antenna used at the base. This antenna name can only be chosen from a list of antenna names stored in the receiver. UNKNOWN, NULLANTENNA, ADVNULLANTENNA are special definitions of antennas typically used as virtual antennas.	ANP,OWN
Antenna Radius	(Only if "Slant Height" measurement type selected). Enter the antenna radius according to the selected distance unit.	ANT
SHMP Offset	(Only if "Slant Height" measurement type selected). Enter the vertical offset of the Slant Height Measurement Point for the antenna used by the rover. Take care to enter this parameter in the selected distance unit. See also the Note below.	ANT

Parameter	Designation	$PASHS
Virtual Antenna	This parameter allows you to define a virtual antenna: • Select “Off” if you do not want to define one • If you want one, select the virtual antenna name for which you would like the receiver to deliver raw data, i.e. as if the raw data had been collected using this antenna. This antenna name can only be chosen from a list of antenna names stored in the receiver. This antenna name can only be chosen from a list of antenna names stored in the receiver. NULLANTENNA, ADVNULLANTENNA, etc. are the most commonly used virtual antennas.	ANP,OUT



Satellites

Use this area to define the constellations tracked by the base as well as the elevation mask applied to all constellations. See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Recording and Output Elevation Mask	Enter the elevation mask, in degrees, used by the receiver to determine which raw/differential data from each visible satellite should be recorded or output, depending on the elevation of the satellite. No data from any visible satellite located below this elevation angle will be recorded or output.	ELM
GPS	Check this button to enable GPS tracking. Clear it otherwise.	GPS
GLONASS	Check this button to enable GLONASS tracking (requires installed S option). Clear it otherwise.	GLO
SBAS	Check this button to enable SBAS tracking.Clear it otherwise.	SBA
QZSS	Check this button to enable QZSS tracking. Clear it otherwise.	QZS
GALILEO	Check this button to enable GALILEO tracking. Clear it otherwise.	GAL

NTRIP Server 1

Use this area to declare the type of connection used by the base to deliver its data to an NTRIP caster via a mobile communication network (port E) or directly through the Internet (port P). See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Connection	Choose the type of network connection used in the receiver to connect to the NTRIP caster: • External NTRIP Caster via Modem: The base is connected to the Internet via its internal modem used in GPRS mode (port E used). • External NTRIP Caster via Ethernet: The base is directly connected to the Internet through its Ethernet port (port P used). • Embedded NTRIP Caster: (Available only if the NTRIP caster option is installed): The base delivers its data to the embedded NTRIP caster.	MDM,.. NTR,PAR
Connect Now	Check this button to let the receiver perform the requested network connection after you have clicked on the Configure button.	
Address, Port, Mount Point, Password	Enter the network information relevant to the NTRIP caster to which the base is expected to deliver its data. When the base delivers its data to the embedded NTRIP caster, there is no password or IP address needed. You only have to choose the mount point through which the data from the base will be made available to users through the NTRIP caster.	
Message	Choose the type of message generated by the base. Then place the mouse cursor over the ”I” sign (to the right of the Message drop-down list) to read the details of the currently set messages.	-

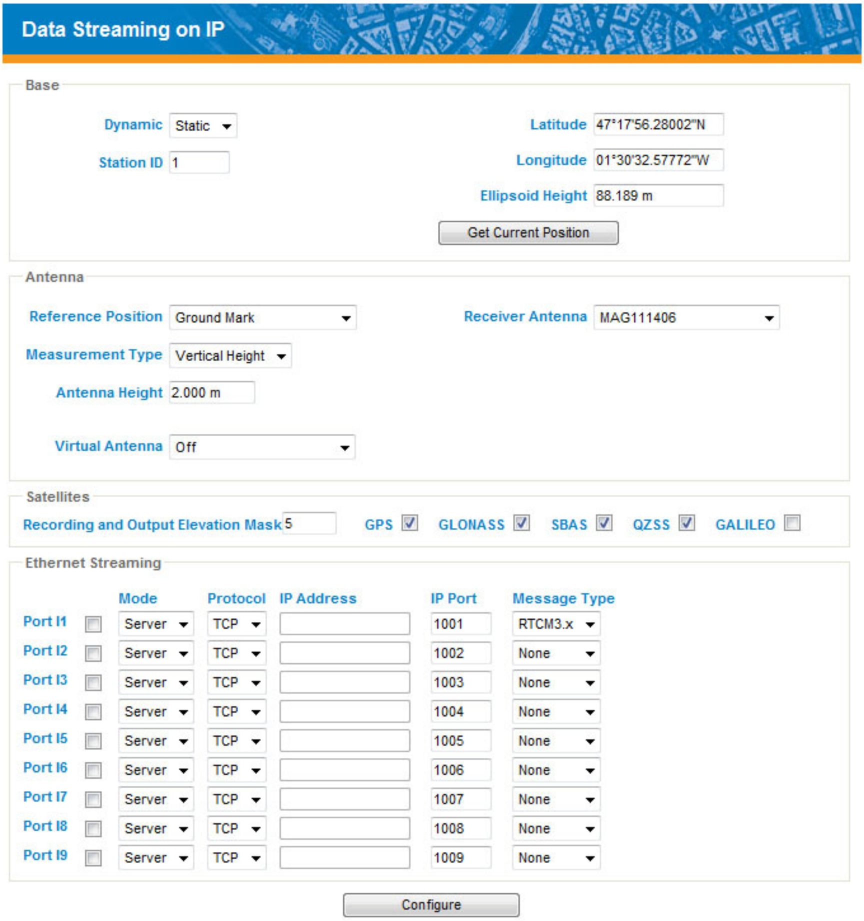
NTRIP Server 2

Use this area to declare the type of connection used by the base to deliver its data to a second NTRIP caster, directly through the Internet (port Q). See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Connection	Choose the type of network connection used in the receiver to connect to the NTRIP caster: • None: No connection to an NTRIP caster required • External NTRIP Caster via Ethernet: The base is directly connected to the Internet through its Ethernet port (port Q used). • Embedded NTRIP Caster: (Available only if the NTRIP caster option is installed): The base delivers its data to the embedded NTRIP caster.	MDM,.. NTR,PAR
Connect Now	Check this button to let the receiver perform the requested network connection after you have clicked on the Configure button.	
Address, Port, Mount Point, Password	Enter the network information relevant to the NTRIP caster to which the base is expected to deliver its data. When the base delivers its data to the embedded NTRIP caster, there is no password or IP address needed. You only have to choose the mount point through which the data from the base will be made available to users through the NTRIP caster.	
Message	Choose the type of message generated by the base. Then place the mouse cursor over the "I" sign (to the right of the Message drop-down list) to read the details of the currently set messages.	-

Setting a Base to Generate Data Streams on its Ethernet Port

This page is an abridged version of the Base Setup-Full Setup page only showing the settings required to configure a base for generating data streams on its Ethernet port (ports I1 to I9).



These groups of parameters are detailed below.

Base

Use this area to enter the position of the base.

Parameter	Designation	$PASHS
Dynamic	Necessarily static.	DYN

Parameter	Designation	$PASHS
Station ID	Choose and enter a station ID for your reference station, according to the type of differential messages it will generate: • 0-1023 (RTCM 2.3) • 0-4095 (RTCM 3.x and ATOM) • 0-31 (CMR & CMR+)	STI
“Get current position” button	Click on this button if you want to allocate the last position computed by the receiver as the reference position for the base. As a result, the Lat/Lon/Height fields below are updated with the coordinates of this last computed position.	CPD,MOD
Latitude Longitude Ellipsoid Height	Latitude, longitude and ellipsoidal height defining the reference position of the base. May be entered manually or using the “Get Current position” button.	POS

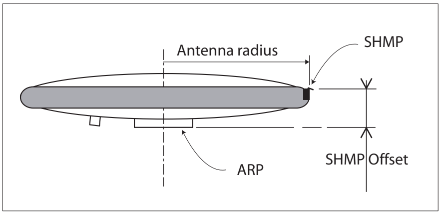
Antenna

Use this area to define the parameters of the antenna used physically at the base, as well as a virtual antenna if necessary. A virtual antenna may be defined to allow the base to deliver raw data as if it were collected with this antenna.

See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Reference Position	Select one of the options below to define the physical location of the base: • L1 phase center • Antenna Reference Point (ARP) • Ground mark	ANR
Measurement Type	Specify the type of measurement (“Slant” or “Vertical”) through which the above antenna height was measured.	ANH
Antenna Height	Enter the measured antenna height according to the measurement type used and the selected distance unit.	ANT or ANH
Receiver antenna	Select the name of the antenna used at the base. This antenna name can only be chosen from a list of antenna names stored in the receiver. UNKNOWN, NULLANTENNA, ADVNULLANTENNA are special definitions of antennas typically used as virtual antennas.	ANP,OWN
Antenna Radius	(Only if “Slant Height” measurement type selected). Enter the antenna radius according to the selected distance unit.	ANT

Parameter	Designation	$PASHS
SHMP Offset	(Only if “Slant Height” measurement type selected). Enter the vertical offset of the Slant Height Measurement Point for the antenna used by the rover. Take care to enter this parameter in the selected distance unit. See also the Note below.	ANT
Virtual Antenna	This parameter allows you to define a virtual antenna: • Select “Off” if you do not want to define one • If you want one, select the virtual antenna name for which you would like the receiver to deliver raw data, i.e. as if the raw data had been collected using this antenna. This antenna name can only be chosen from a list of antenna names stored in the receiver. NULLANTENNA, ADVNULLANTENNA, etc. are the most commonly used virtual antennas.	ANP,OUT



Satellites

Use this area to define the constellations tracked by the base as well as the elevation mask applied to all constellations. See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Recording and Output Elevation Mask	Enter the elevation mask, in degrees, used by the receiver to determine which raw/differential data from each visible satellite should be recorded or output, depending on the elevation of the satellite. No data from any visible satellite located below this elevation angle will be recorded or output.	ELM
GPS	Check this button to enable GPS tracking. Clear it otherwise.	GPS
GLONASS	Check this button to enable GLONASS tracking (requires installed S option). Clear it otherwise.	GLO
SBAS	Check this button to enable SBAS tracking.Clear it otherwise.	SBA

Parameter	Designation	$PASHS
QZSS	Check this button to enable QZSS tracking.Clear it otherwise.	QZS
GALILEO	Check this button to enable GALILEO tracking.Clear it otherwise.	GAL

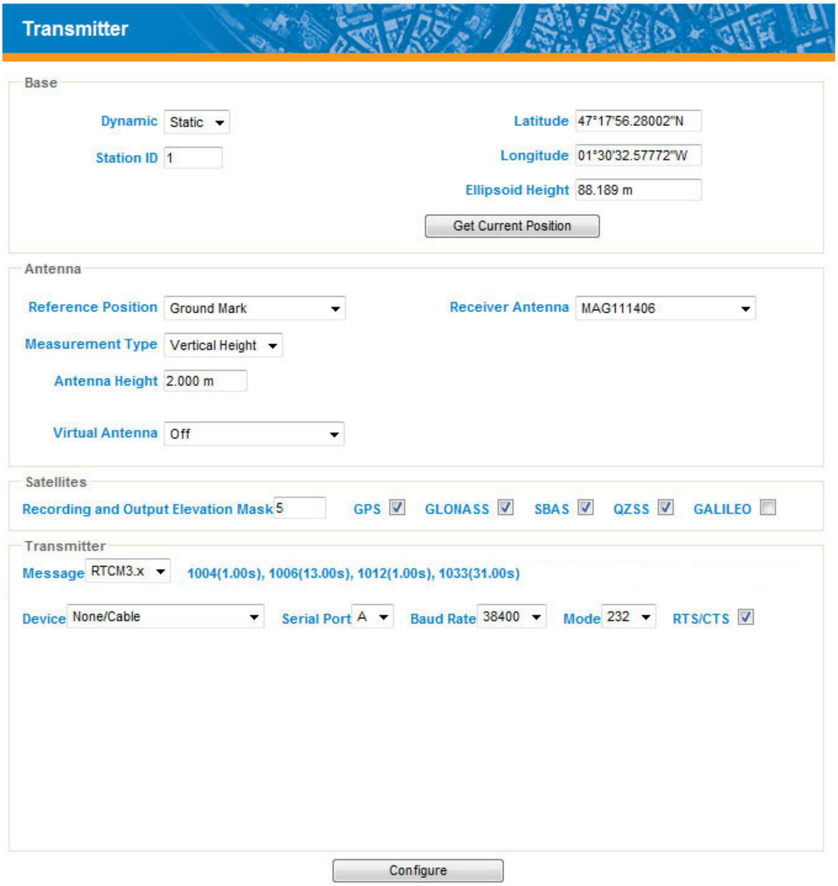
Ethernet Streaming

Use this area to configure the I1 to I9 ports of the receiver as well as the type of data delivered through these ports. Each port can support up to ten connections simultaneously. Define the following parameters for each port:

Parameter	Designation	$PASHS
Port Ix	Click this option if the port is to be used. If the port is to be idle, keep the option cleared.	DST
Mode	Specify whether the port will be used in Server or Client mode: • In Client mode, you will choose the remote server with which the base will communicate through an IP connection. • In Server mode, the base will make its output data available for any remote client allowed to communicate with it through an IP connection.	DST
Protocol	Specify whether the IP connection will be using the TCP or UDP protocol.	DST
IP Address	If the port is used in Client mode, enter the IP address of the remote server with which the port will communicate. This field is irrelevant if you select the Server mode.	DST
IP Port	If the port is used in Client mode, enter the port number of the remote server with which the port will communicate. If it's used in Server mode, enter the port number of the port you are currently setting.	DST
Message Type	Choose from the list below the type of message routed through the port: • None: no data delivered through the port. • ATOM • RTCM3.x • RTCM2.3 • CMR • CMR+ • DBEN Place the mouse cursor over the "I" sign (to the right of the Message Type drop-down list) to read the details of the currently set messages.	BDS

Setting a Base With a Radio Transmitter

This page is an abridged version of the Base Setup-Full Setup page only showing the settings required to configure a base with the internal or an external radio transmitter.



These groups of parameters are detailed below.

Base

Use this area to enter the position of the base.

Parameter	Designation	$PASHS
Dynamic	Necessarily static.	DYN

Parameter	Designation	$PASHS
Station ID	Choose and enter a station ID for your reference station, according to the type of differential messages it will generate: • 0-1023 (RTCM 2.3) • 0-4095 (RTCM 3.x and ATOM) • 0-31 (CMR & CMR+)	STI
“Get current position” button	Click on this button if you want to allocate the last position computed by the receiver as the reference position for the base. As a result, the Lat/Lon/Height fields below are updated with the coordinates of this last computed position.	CPD,MOD
Latitude Longitude Ellipsoid Height	Latitude, longitude and ellipsoidal height defining the reference position of the base. May be entered manually or using the “Get Current position” button.	POS

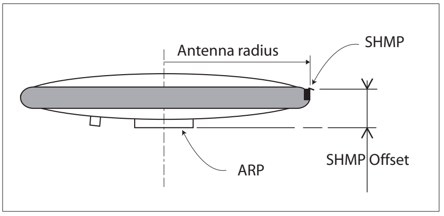
Antenna

Use this area to define the parameters of the antenna used physically at the base, as well as a virtual antenna if necessary. A virtual antenna may be defined to allow the base to deliver raw data as if it were collected with this antenna.

See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Reference Position	Select one of the options below to define the physical location of the base: • L1 phase center • Antenna Reference Point (ARP) • Ground mark	ANR
Measurement Type	Specify the type of measurement (“Slant” or “Vertical”) through which the above antenna height was measured.	ANH
Antenna Height	Enter the measured antenna height according to the measurement type used and the selected distance unit.	ANT or ANH
Receiver antenna	Select the name of the antenna used at the base. This antenna name can only be chosen from a list of antenna names stored in the receiver. UNKNOWN, NULLANTENNA, ADVNULLANTENNA are special definitions of antennas typically used as virtual antennas.	ANP,OWN
Antenna Radius	(Only if “Slant Height” measurement type selected). Enter the antenna radius according to the selected distance unit.	ANT

Parameter	Designation	$PASHS
SHMP Offset	(Only if "Slant Height" measurement type selected). Enter the vertical offset of the Slant Height Measurement Point for the antenna used by the rover. Take care to enter this parameter in the selected distance unit. See also the Note below.	ANT
Virtual Antenna	This parameter allows you to define a virtual antenna: • Select "Off" if you do not want to define one • If you want one, select the virtual antenna name for which you would like the receiver to deliver raw data, i.e. as if the raw data had been collected using this antenna. This antenna name can only be chosen from a list of antenna names stored in the receiver. NULLANTENNA, ADVNULLANTENNA, etc. are the most commonly used virtual antennas.	ANP,OUT



Satellites

Use this area to define the constellations tracked by the base as well as the elevation mask applied to all constellations. See the description of each parameter in the table below.

Parameter	Designation	$PASHS
Recording and Output Elevation Mask	Enter the elevation mask, in degrees, used by the receiver to determine which raw/differential data from each visible satellite should be recorded or output, depending on the elevation of the satellite. No data from any visible satellite located below this elevation angle will be recorded or output.	ELM
GPS	Check this button to enable GPS tracking.Clear it otherwise.	GPS
GLONASS	Check this button to enable GLONASS tracking (requires installed S option). Clear it otherwise.	GLO
SBAS	Check this button to enable SBAS tracking.Clear it otherwise.	SBA

Parameter	Designation	$PASHS
QZSS	Check this button to enable QZSS tracking.Clear it otherwise.	QZS
GALILEO	Check this button to enable GALILEO tracking.Clear it otherwise.	GAL

Transmitter

Use this area to set the receiver port to which the radio transmitter is connected, declare the type of radio used and enter its settings.

Parameter	Designation	$PASHS
Message	Choose the type of differential message that will be broadcast by the transmitter. The detail of the selected message appears next to the field.	BAS
Device	Select the model of the radio used: • None/Cable • U-Link TRx • Magellan UHF: Radio transmitter P/N 800986 • PDL HPB/LPB • ARF7474B EU: License-free radio for use in Europe • ARF7474A NA: License-free radio for use in North America • ADL Vantage/Vantage Pro • ADL Foundation	RDP,TYP

Following the selection of a radio type, new fields appear after and just underneath the **Device** field showing the required settings for the transmitter. The table below lists the possible choices for each setting, depending on the selected radio.

	U-Link TRx	Magellan UHF	PDL HPB/ LPB	ARF7474B EU	ARF7474A NA	ADL Vantage/ Vantage Pro	ADL Foundation
Port	A, B, F	A	A, B, F	A, B, F	A, B, F	A, B, F	D
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400	1200, 2400, 4800, 9600, 19200, 38400	1200, 2400, 4800, 9600, 19200, 38400	1200, 2400, 4800, 9600, 19200, 38400	1200, 2400, 4800, 9600, 19200, 38400	1200, 2400, 4800, 9600, 19200, 38400	NA
Mode	RS232, RS422	RS232, RS422	RS232, RS422	RS232, RS422	RS232, RS422	RS232, RS422	NA

	U-Link TRx	Magellan UHF	PDL HPB/ LPB	ARF7474B EU	ARF7474A NA	ADL Vantage/ Vantage Pro	ADL Foundation
Protocol	Transpar-ent, DSNP	NA	Transpar-ent, Trimtalk	NA	NA	Transparent, Trimtalk 450S, SATEL, Trim-MarkII/IIe, TT450S, TRIMMARK3, Transparent FST, U-Link	Transparent, Trimtalk 450S, SATEL, Trim-MarkII/IIe, TT450S, TRIM-MARK3, Trans-parent FST, U-Link
Channel	0-15	0-15	0-15	0-2	NA	1-32	1-32
Air Link Speed	4800, 7600, 9600	NA	4800, 9600, 19200	NA	NA	4800, 8000, 9600, 16000, 19200	4800, 8000, 9600, 16000, 19200
RTS/CTS	NA	NA	On/Off	On/Off	On/Off	On/Off	-
Scrambler	NA	NA	On/Off	NA	NA	On/Off	On/Off
FEC	NA	NA	On/Off	NA	NA	On/Off	On/Off
Current Power (W)	NA	NA	NA	NA	NA	0.1, 0.5, 1, 2, 4	0.1, 0.5, 1
Load Transmit-ter Settings button?	Yes	Yes	Yes	Yes	No	Yes	No

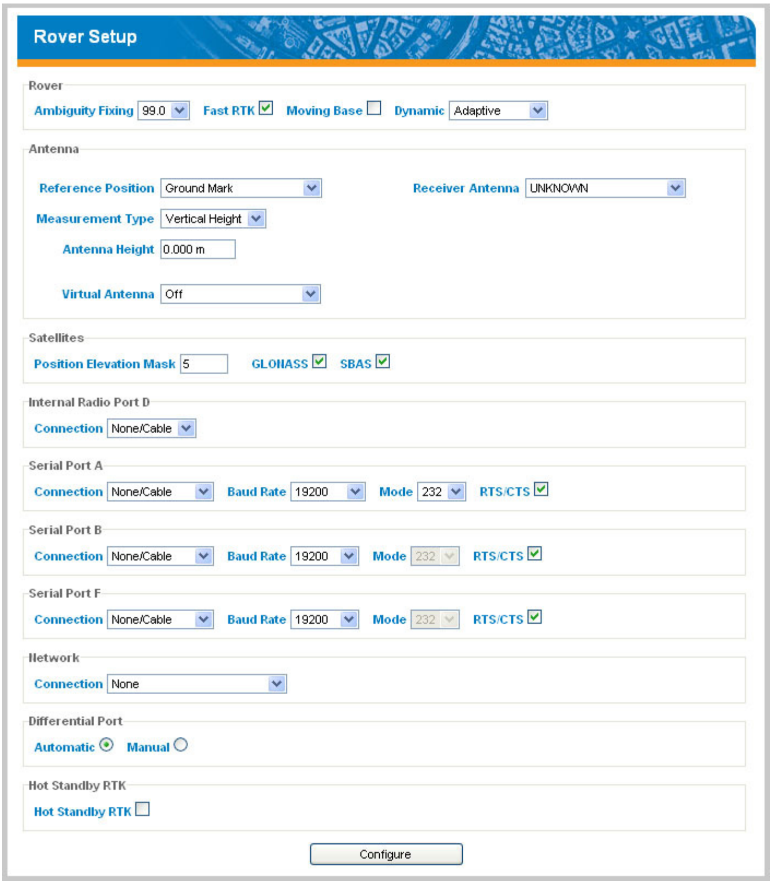
- NA: Not Applicable.
- Possible choices for air link speed depend on channel spacing and protocol used.
- Using the **Load Transmitter Settings** button: When this button is made visible at the bottom of the web page, first click on it to read the current settings of the chosen radio type ("Loading.." is displayed in the **Channel** field while these settings are being sent for your reading). (Using this button is equivalent to using the $PASHQ,RDP,PAR command.) As a result, the relevant fields are refreshed to view the current radio settings.
- Relevant $PASHS command for all radio parameters: RDP,PAR.

Rover Setup

If the receiver you are communicating with is a rover or if you want to change it into a rover, click on **Rover Setup**. Seven groups of parameters need to be defined:

- Rover
- Antenna
- Satellites
- Internal Radio Port (D)
- Serial Ports (A, B, F)

- Network
- Differential Port
- Hot Standby RTK



These groups of parameters are detailed below.

Rover

Use this area to specify the position computation mode used as well as the type of base the rover will be working from.

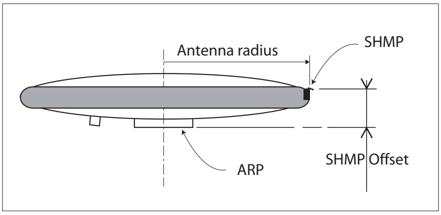
Parameter	Designation	$PASHS
Ambiguity Fixing	Define the confidence level required of every RTK solution to be valid. The possible choices are: • 0: The rover will stay in “Flying RTK” mode (float mode) once this type of solution is obtained (RTK solution never delivered). • 95.0: 95% of the measurements need to pass the internal quality tests. • 99.0: 99% of the measurements need to pass the internal quality tests. • 99.9: 99.9% of the measurements need to pass the internal quality tests.	CPD,AFP
Fast RTK	Set this option as follows: • Check it to enable Fast RTK. • Clear it to disable Fast RTK.	CPD,FST
Moving Base	Keep this box cleared for a rover using a static base, check it if the rover will be working from a moving base. Enabling the Moving Base option will clear the Fast RTK option if it was enabled previously.	CPD,MOD
Dynamic	Choose the dynamic model that best suits the rover motion.	DYN

Antenna

Use this area to define the parameters of the antenna used physically at the rover, as well as a virtual antenna if necessary. A virtual antenna may be defined to allow the rover to deliver raw data as if those were collected with this antenna.

Parameter	Designation	$PASHS
Reference Position	Select one of the options below to define the reference location of the antenna: • L1 phase center • Antenna Reference Point (ARP) • Ground mark	ANR
Measurement Type	Specify the type of measurement (“Slant” or “Vertical”) through which the above antenna height was measured.	ANH
Antenna Height	Enter the measured antenna height according to the measurement type used and the selected distance unit.	ANT or ANH

Parameter	Designation	$PASHS
Receiver antenna	Select the name of the antenna used by the rover. This antenna name can only be chosen from a list of antenna names stored in the receiver. UNKNOWN, NULLANTENNA, ADVNULLAN-TENNA are special definitions of antennas typically used as virtual antennas.	ANP,OWN
Antenna Radius	(Only if "Slant Height" measurement type selected). Enter the antenna radius according to the selected distance unit.	ANT
SHMP Offset	(Only if "Slant Height" measurement type selected). Enter the vertical offset of the Slant Height Measurement Point for the antenna used by the rover. Take care to enter this parameter in the selected distance unit. See also the Note below.	ANT
Virtual Antenna	This parameter allows you to define a virtual antenna: • Select "Off" if you do not want to define one • If you want one, select the virtual antenna name for which you would like the receiver to deliver raw data, i.e. as if the raw data had been collected using this antenna. This antenna name can only be chosen from a list of antenna names stored in the receiver. NULLANTENNA, ADVNLLANTENNA, etc. are the most commonly used virtual antennas.	ANP,OUT



Satellites

Use this area to define the constellations received by the rover as well as the elevation mask applied for all constellations.

Parameter	Designation	$PASHS
Position Elevation Mask	Enter the elevation mask, in degrees, used by the receiver to compute the position. No data from any visible satellite located below this elevation angle will be used in the position processing.	ELM

Parameter	Designation	$PASHS
GPS	Check this button to enable GPS tracking. Clear it otherwise.	GPS
GLONASS	Check this button to enable GLONASS tracking (requires installed S option). Clear it otherwise.	GLO
SBAS	Check this button to enable SBAS tracking. Clear it otherwise.	SBA
QZSS	Check this button to enable QZSS tracking. Clear it otherwise.	QZS
GALILEO	Check this button to enable GALILEO tracking. Clear it otherwise.	GAL

Internal Radio Port

Use this area to turn on or off the internal radio connected to port D.

Parameter	Designation	$PASHS
Connection	This combo box is in fact a status (read-only) field indicating the type of internal radio currently connected to port D (ADL Foundation).	RDP,TYP
Power	Use these buttons to control power on the internal radio. Selecting “On” will power up the internal radio when later you click on the Configure button at the bottom of the page. Likewise, selecting “Off” will turn off the radio.	RDP,ON or OFF

Serial Ports

Use this area to set the receiver ports and declare the different external devices connected to them. For each port (ports A, B, F), set their parameters as explained in the table below.

Parameter	Designation	$PASHS
Connection	Choose the device to which the port is connected. The possible choices are: • None/Cable: The port is not connected to any radio. • ARF7474B EU: The port is connected to an external license-free radio receiver (for use in Europe). • ARF7474A NA: The port is connected to an external license-free radio receiver (for use in North America). • XDL Rover: The port is connected to an external receiver (PacCrest XDL Rover model)	RDP,TYP (+ ECP)
Baud Rate	Choose a baud rate from the list. The selected rate will be used by the port.	PRT
Mode	Port A only. Specify the type of serial link (“RS232 or “RS422”) for Port A.	MDP

Parameter	Designation	$PASHS
RTS/CTS	Check this button to enable the RTS/CTS handshaking protocol on the port. Clear it otherwise.	CTS

Network

Use this area to declare the type of connection used by the rover to acquire base data through a mobile communication network or through the Internet. The content of this area changes depending on your choice in the **Connection** field.

Parameter	Designation	$PASHS
Connection	Choose the type of network connection used in the receiver: • None: No network connection used. • Modem Direct IP - Port E: The rover is connected to the Internet via its internal modem using a Direct IP connection. • Modem NTRIP Client - Port E: The rover is connected to the Internet via its internal modem as a client for an NTRIP connection. • Ethernet Direct IP - Port P: The rover is connected to the Internet through its Ethernet port using a Direct IP connection. • Ethernet NTRIP Client - Port P: The rover is connected to the Internet through its Ethernet port as a client for an NTRIP connection.	MDM,.. NTR,PAR

If “Modem Direct IP - Port E” or “Ethernet Direct IP - Port P” is selected, enter the following parameters:

Parameter	Designation	$PASHS
Connect Now	Check this option if you want the connection to take place just after you click on the Configure button.	MDM,DAL
Address	Enter the IP address or hostname (32 characters max.) of the system the rover has to connect to.	DIP
Port	Enter the IP port number (0-65535) of the system the rover has to connect to.	DIP
Login	If required, enter the login (20 characters max.) through which the connection is allowed.	DIP
Password	If required, enter the password (20 characters max.) through which the connection is allowed.	DIP

If “Modem NTRIP Client - Port E” or “Ethernet NTRIP Client - Port P” is selected, enter the following parameters:

Parameter	Designation	$PASHS
Connect Now	Check this option if you want the connection to take place just after you click on the Configure button.	NTR,MTP
Address	Enter the IP address of the NTRIP caster	NTR,PAR
Port	Enter the IP port number of the NTRIP caster	NTR,PAR
Mount Point	This field is automatically completed when selecting a row in the open source table (see below).	
Login	Enter the login allowing the receiver to establish the connection with the NTRIP caster.	NTR,PAR
Password	Enter the password allowing the receiver to establish the connection with the NTRIP caster.	NTR,PAR
Load Source Table	Once the IP address and IP port number of the NTRIP server have been entered (see above), click on the Load Source Table button to list the data stream names available from the NTRIP caster. Select one from the table. This will complete the Mount field above automatically.	NTR,LOD
Send NMEA	If the rover operates in a VRS network, check this button so the rover can return its position to the network through an NMEA message. Keep it cleared in all other cases.	NME,GGA

Differential Port

Use this area to indicate the way the rover should detect the incoming differential data stream or streams. In Manual mode, you will need to indicate the port(s) used.

Parameter	Designation	$PASHS
Automatic	Check this option if you want the rover to detect the incoming differential data stream(s) by itself.	CPD,REM
Manual	Check this option if you want to indicate the port(s) on which the incoming differential data stream(s) is (are) received.	CPD,REM

Parameter	Designation	$PASHS
Stream 1, Stream 2	This field is displayed only when “Manual” is chosen. Choose the port on which each of the differential data streams #1 and #2 is received. The possible choices are: • None: No incoming differential data stream • A - Serial: Port A • B - Serial: Port B • F - Serial: Port F • C - Bluetooth • D - Internal Radio • E - Modem • I - Ethernet: Serial-like connection in server mode • P - Ethernet: NTRIP or Direct IP in client mode	CPD,REM

Hot Standby RTK

Hot Standby RTK is the process of making available a second RTK position solution in the background. Should the primary RTK solution stop being delivered by the receiver for some reason, then the second RTK solution would be provided instead, until the primary RTK solution is back again and valid.

Parameter	Designation	$PASHS
Hot Standby RTK	Check this option if you want the rover to operate in Hot Standby RTK.	CPD,MOD
Stream	This field is visible only after the above option has been activated. Choose the port routing the differential data stream feeding the second RTK engine. This may be A, B, C, D, E, F, I or P.	CPD,MOD

Heading

This page is used when you want the receiver to deliver heading, roll or pitch measurements.

In the so-called “external” heading mode, the receiver uses its own antenna connected to the “Antenna 1” input. One of its ports is declared as the one providing the receiver with corrections in ATOM or RTCM-3 format from an external GNSS receiver to which the second GNSS antenna (defined as “Antenna 2” on your receiver) is connected. The local “Antenna 2” input is not used here.

Combining these incoming data with the data from its own antenna, the receiver will be able to determine the heading of the baseline connecting the two antennas.

The two antennas should be installed to guarantee an ever-fixed baseline length.

Warning!

The heading determined by the receiver always depicts the direction from “Antenna 2” to “Antenna 1”.

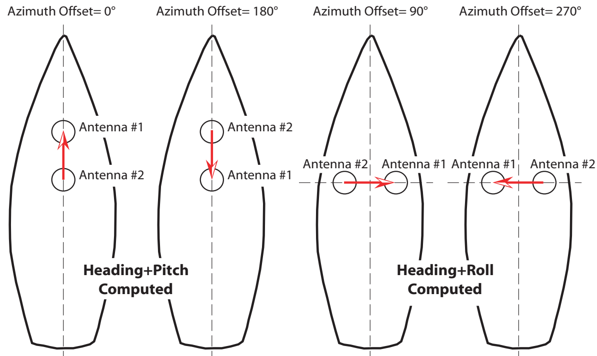
Depending on the orientation of the baseline with respect to the vehicle centerline (ship, plane, land vehicle, etc.), the receiver will either compute the heading+pitch or heading+roll angles. The value you assign to the azimuth offset parameter will determine whether the receiver will compute the roll or pitch angle:

- **Computing Heading+Pitch**: The baseline should be strictly parallel (azimuth offset= 0°), or roughly parallel (azimuth offset close to 0°), to the vehicle centerline. “Antenna 1” should be placed ahead of “Antenna 2” with respect to direction of travel.

  NOTE: You can reverse the locations of Antenna 1 and Antenna 2, but in this case you should enter a azimuth offset equal, or close to 180°.
- **Computing Heading+Roll**: The baseline should be strictly perpendicular (azimuth offset= 90°), or roughly perpendicular (azimuth offset close to 90°), to the vehicle centerline. For an observer taking a look at the antennas from the back of the vehicle while looking towards the front of the vehicle, “Antenna 1” should be seen on the right and “Antenna 2” on the left.

  NOTE: You can reverse the locations of Antenna 1 and Antenna 2, but in this case you should enter an azimuth offset equal, or close to 270°.

The typical baseline orientations and the computed angles resulting from these orientations are summarized in the figure below.



(Red arrow indicates the direction for which heading is measured.)


Warning!

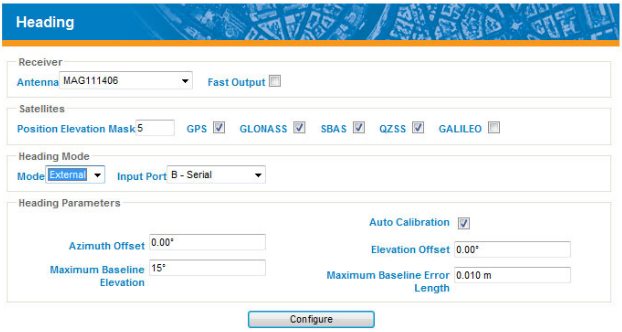
If the azimuth offset is set to a value exceeding 15° from either North, South, West or East, then the receiver will deliver the heading component of attitude, but not the pitch or roll angle.

From the operational point of view, the receiver that uses “Antenna 1” operates as a rover while the receiver using “Antenna 2”(external receiver) operates as a moving base.

Activating the external heading mode in your receiver will necessarily re-configure the receiver using “Antenna 1” as a rover. If it was previously set up as a base, then it will instantaneously become a rover as soon as you activate the heading mode. If it’s already a rover computing RTK positions, switching to heading mode will not impact the processing and availability of RTK positions.

The following groups of parameters need to be defined:

- Receiver
- Satellites
- Heading



Receiver

Parameter	Designation	$PASHS
Antenna	Select the model of antenna used as “Antenna 1”. Antenna 1 is the antenna connected to the coaxial plug marked with a satellite icon.	ANP,OWN
Fast Output	Set this option as follows: • Check it to enable fast output of heading measurements. • Clear it to disable fast output of heading measurements.	CPD,FST

Satellites

Use this area to define the constellations received by the receiver as well as the elevation mask applied for all constellations.

Parameter	Designation	$PASHS
Position Elevation Mask	Enter the elevation mask, in degrees, used by the receiver to compute the heading. No data from any visible satellite located below this elevation angle will be used in the heading measurement.	ELM
GPS	Check this button to enable GPS tracking. Clear it otherwise.	GPS
GLONASS	Check this button to enable GLONASS tracking (requires installed S option). Clear it otherwise.	GLO
SBAS	Check this button to enable SBAS tracking. Clear it otherwise.	SBA
QZSS	Check this button to enable QZSS tracking. Clear it otherwise.	QZS

Parameter	Designation	$PASHS
GALILEO	Check this button to enable GALILEO tracking. Clear it otherwise.	GAL

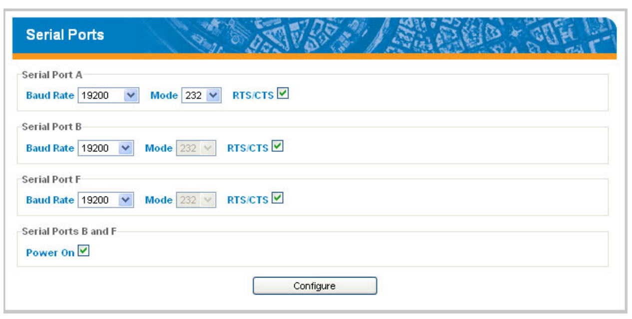
Heading

Parameter	Designation	$PASHS
Mode	Make the appropriate selection: • Off: No heading measurement requested • External: Heading measurement requested, external GNSS receiver and its antenna used to provide the receiver with the appropriate data.	CPD,ARR,MOD
Input Port	(Visible only if Mode= “External”) Choose the serial port through which data from the external GNSS receiver (and the second GNSS antenna) are applied to the receiver (A, B, F, C, D, E, I or P).	CPD,ARR,MOD
Baseline Length	Enter the distance between the two antennas used (baseline length). Setting this parameter to “0” forces the receiver to start an-auto calibration sequence. **Auto Calibration**: Checking this button amounts to entering “0” in the Baseline Length field, which, as explained above, will result in starting an auto-calibration sequence.	CPD,ARR,LEN
Azimuth Offset	Designates the angle deviation (0-359.99°) between the horizontal component of the baseline and the horizontal direction of the object for which you want to determine the heading. This parameter makes sense in a vehicle for example where the baseline resulting from the installation of the two antennas is not parallel to the direction in which the vehicle is moving (default: 0). Specifying the azimuth offset also allows the receiver to deliver an accurate measurement of the roll or pitch angle (depending on whether the baseline is oriented in a direction respectively perpendicular or parallel to that of the vehicle). Keep this parameter equal to zero if it does not make sense to define an azimuth offset in your application.	CPD,ARR,OFS

Parameter	Designation	$PASHS
Maximum Baseline Elevation	Set the maximum value of expected baseline elevation (0-90°; Default: 15°).	CPD,ARR,PAR
Elevation Offset	Designates the angle deviation (±90°) between the orientation of the baseline and the orientation of the object for which you want to determine the roll or pitch angle. This parameter makes sense in a ship for example where the baseline resulting from the installation of the two antennas is not parallel to the orientation of the deck (default: 0). Keep this parameter equal to zero if it does not make sense to define an elevation offset in your application.	CPD,ARR,OFS
Maximum Baseline Length Error	Set the maximum error that is tolerated in the determination of the baseline length (0.001-10.000 meters)	CPD,ARR,PAR

Serial Ports

This page is used to set the receiver serial ports (A, B and F).



For each port, set the parameters below.

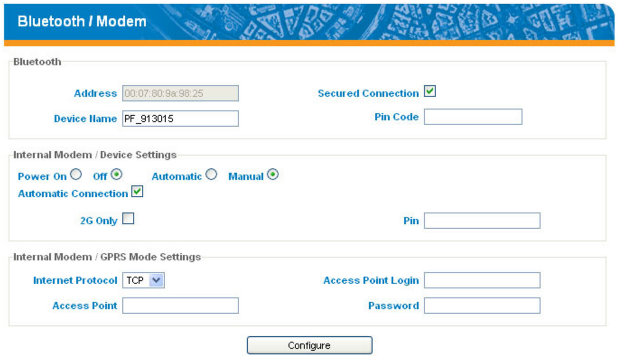
Parameter	Designation	$PASHS
Baud Rate	Choose an option from the drop-down list.	PRT
Mode	(Port A only) Choose an option from the drop-down list (RS232 or RS 422).	MDP
RTS/CTS	Enable or disable the handshaking protocol.	CTS
Power ON	(Ports B & F only) Use this option to turn on or off ports B and F.	ECP,ON or OFF

Bluetooth/Modem Connections

This page is used to define the properties of the receiver's Bluetooth and internal modem devices. The following groups of parameters need to be defined:

- Bluetooth

- Internal Modem - Device Settings
- Internal Modem - GPRS Mode Settings



These groups of parameters are detailed below.

Bluetooth

Use this area to enter the Bluetooth parameters of the receiver.

Parameter	Designation	$PASHS
Address	(A Read-Only parameter). This field provides the MAC address of the Bluetooth device in the receiver (hardware identification of the device).	($PASHQ,BTH)
Device Name	Freely choose a label (64 characters max.) to designate the Bluetooth device in the receiver.	BTH,NAME
Secured Connection	Enable this option if you want to secure the connection of the receiver with any remote Bluetooth device. With a secured connection, any Bluetooth client will be asked to enter a pin code before it is allowed to communicate with your receiver. If this option is disabled, no pin code will be required and the connection will be established directly.	BTH,PIN
Pin Code	This field is displayed only after you have enabled the Secured Connection option. Enter a pin code (any number between 0 and 99999999). This pin code will be requested every time an external Bluetooth device will attempt to connect to your receiver.	BTH, PIN

Internal Modem - Device Settings

Use this area to enter the parameters of the internal modem.

Parameter	Designation	$PASHS
Power On/Off	Select "On" to power on the modem, or "Off" to power it off.	MDM,OFF or ON
Automatic/Manual Power	Choose one of the options below: • Automatic: The modem will be powered on automatically when the receiver is powered on. • Manual: The modem will be powered on only on request from the receiver.	MDM,PAR
Automatic Connection	Enable this option for a rover using the internal modem in CSD or GPRS mode.	MDM,PAR
2G Only	Tell whether the internal modem should be forced to operate in a 2G network only (On) or allowed to operate in any network, whether a 2G or 3G network (Off).	MDM,PAR
Pin	Pin code (4 to 8 digits) of the SIM card used by the modem.	MDM,PAR

Internal Modem - GPRS Mode Settings

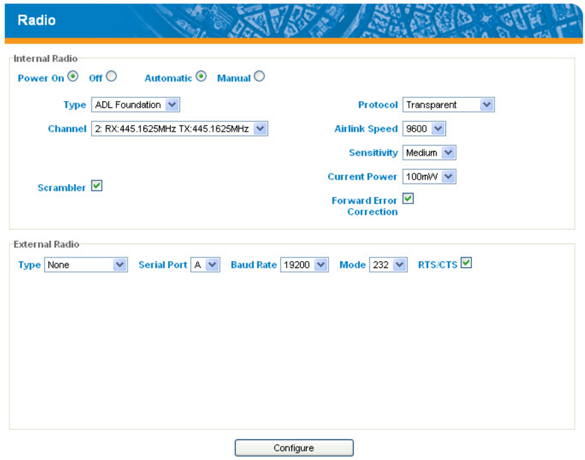
Use this area to set the internal modem when used in GPRS mode (General Packet Radio Service mode).

Parameter	Designation	$PASHS
Internet Protocol	Select one of the following Internet protocols to be used by the modem in GPRS mode: • TCP • UDP	MDM,PAR
Access Point	Enter the URL of the mobile communication provider.	MDM,PAR
Access Point Login	Enter the login of the mobile communication provider.	MDM,PAR
Password	Enter the password of the mobile communication provider.	MDM,PAR

Radio Connections

This page is used to define the properties of the internal or external radio used by the receiver. The following groups of parameters need to be defined:

- Internal Radio.
- External Radio, if the receiver is a base, or is being changed into a base.



These groups of parameters are detailed below.

Internal Radio

Use this area to set the internal radio.

Parameter	Designation	$PASHS
Power On/Off	Enable this option to turn on the internal radio receiver right after you have clicked on the Configure button.	RDP,ON or OFF
Automatic/ Manual	Enable this option if you want the internal radio to be powered on automatically when the receiver is powered on. If this option is disabled, the internal radio will be powered on only on request from the receiver.	RDP,PAR
Type	This field reports the type of internal radio currently used (a read-only field): • No radio • Auto-detecting...: The receiver is currently trying to identify the type of radio used. You need to refresh the whole screen (F5 key) to see if it has been able to come up with an answer. • ADL Foundation: The internal radio was detected as a Pacific Crest ADL Foundation radio.	-
Channel	Choose one of the available channels for this radio. (The channels are read from the radio when opening the Web Server Configuration tab.)	RDP,PAR

Parameter	Designation	$PASHS
Protocol	Choose one of the protocols below, depending on the type of radio used at the other end of the radio data link. The available protocols are: Transparent, TrimTalk450S, SATEL, TrimMarkII/IIe, TT450S, TRIMMARK 3, Transparent FST, U-Link.	RDP,PAR
Airlink Speed	Choose one of the baud rates available (4800, 8000, 9600)	RDP,PAR
Sensitivity	Set the reception sensitivity of the internal radio used (High, Medium, Low).	RDP,PAR
Current Power	If used as a transmitter, choose the level of radiated power (100 mW, 500 mW, 1 W) when the ADL Foundation radio is used as a transmitter	RDP,PAR
Scrambler	Set the scrambler setting (on or off)	RDP,PAR
FEC	Set the FEC setting (on or off). For some protocols, this setting is forced to OFF (the option been unavailable, the box is dimmed).	RDP,PAR

External Radio

Use this area to set the external radio used by a base. After you select a radio type from the **Type** field, new fields will appear in the External radio pane for you to set additional radio-related parameters.

Parameter	Designation	$PASHS
Type	Select the model of the external radio connected to the base: • No radio • U-Link TRx • Magellan UHF: Radio transmitter P/N 800986 • PDL HPB/LPB (PacCrest radios) • ARF7474B EU: License-free radio for use in Europe • ARF7474A NA: License-free radio for use in North America • ADL Vantage/Vantage Pro (PacCrest radios)	RDP,TYP

Following the selection of a radio type, new fields appear just above the **Type** field showing the current settings of the receiver serial port to which the external radio is supposed to be connected. Check/modify these settings.

Parameter	Designation	$PASHS
Serial Port	Specify the receiver serial port to which the external radio is connected. .	RDP,PAR
Baud Rate	Choose the baud rate to be used on this port to communicate with the external radio.	RDP,PAR

Parameter	Designation	$PASHS
Mode	Specify the type of this serial port (RS232 or RS422), if relevant (only port A may be RS422).	MDP
RTS/CTS	Enable or disable the handshaking protocol on this port (except U-Link TRx and Magellan UHF).	CTS

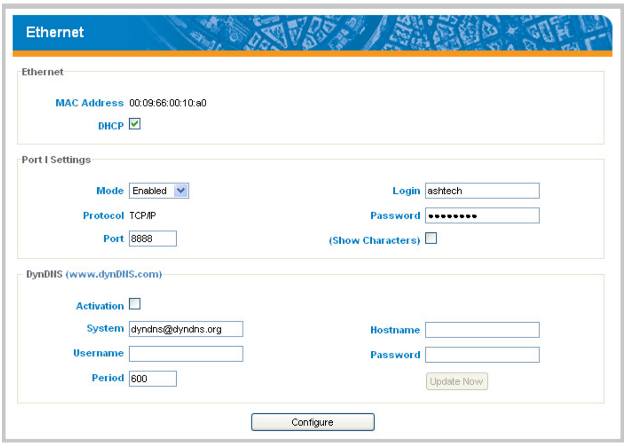
Then set the radio parameters:

Parameter	Designation	$PASHS
Load radio settings button	(All radios except ARF7474A NA) First click on this button to load the current settings of the chosen radio type (“Loading..” is displayed in the Channel field while these settings are being loaded). As a result, the Channel, Protocol, Current Power and Airlink Speed fields are refreshed to view the current radio settings.	$PASHQ, RDP,PAR
Channel	(All radios except ARP7474A NA) Choose one of the available channels for this radio.	RDP,PAR
Protocol	(For U-Link TRx and Pacific Crest radios only) Choose one of the protocols below: • DSNP (U-Link TRx only) • Transparent • TrimTalk (PDL HPB/LPB only) • TrimTalk450S (ADL Vantage/Vantage Pro only) • SATEL (ADL Vantage/Vantage Pro only) • TrimMarkII/IIe (ADL Vantage/Vantage Pro only) • TT450S (ADL Vantage/Vantage Pro only) • TRIMMARK 3 (ADL Vantage/Vantage Pro only) • Transparent FST (ADL Vantage/Vantage Pro only) • U-Link (ADL Vantage/Vantage Pro only)	RDP,PAR
Airlink Speed	(For U-Link TRx and Pacific Crest radios only) Choose one of the baud rates below: • 4800 • 7600 (U-Link TRx only) • 9600 • 19200 (PDL HPB/LPB only)	RSP,PAR
Forward Error Correction	(For Pacific Crest radios only) Choose whether this option must be enabled or not in the transmitter:. • Button on: Enabled • Button off: Disabled	RDP,PAR
Scrambler	(For Pacific Crest radios only) Choose whether this option must be enabled or not in the Pacific Crest transmitter: • Button on: Enabled • Button off: Disabled	RDP,PAR

Parameter	Designation	$PASHS
Current Power	For ADL Vantage/Vantage Pro only. Choose the radiated power at the antenna output. Until you have clicked **Load Radio Settings**, this field only shows four dashes (“----”). After the radio settings have been loaded, you may be given the possibility to choose from several power values.	RDP,PAR

Ethernet Port

This page is used to set the receiver’s Ethernet port.



Ethernet:

Parameter	Designation	$PASHS
MAC Address	A read-only parameter providing the hardware identification of the Ethernet port.	-
DHCP	Enable this option to let the local network allocate a dynamic IP address to the receiver. If disabled, a static IP address needs to be allotted to the receiver.	ETH,PAR
IP Address	(If DHCP option cleared) Static IP address assigned to the receiver.	ETH,PAR
Subnetwork Mask	(If DHCP option cleared) Subnetwork mask associated to the static IP address.	ETH,PAR
Gateway	(If DHCP option cleared) Gateway associated to the static IP address.	ETH,PAR
DNS 1 IP Address	Enter the first IP address of the DNS providing the correspondence between the receiver server name and its IP address.	ETH,PAR
DNS 2 IP Address	Enter the second IP address of the DNS providing the correspondence between the receiver server name and its IP address.	ETH,PAR

Port I Settings:

Parameter	Designation	$PASHS
Mode	Choose the type of protection required to control receiver access from the Internet through its Ethernet port I. Choose one of the options below: • Disabled: No communication with the receiver is possible. • Enabled: Communication is allowed without restriction. • Secured: Communication with the receiver is enabled only after a login and password have been provided (the receiver can however output data through the Ethernet port even if no login and password have not been provided yet).	TCP,PAR
Protocol	A read-only field showing the currently selected IP protocol (TCP or UDP) on port I.	$PASHQ,DST
Port	Enter the IP port number (100-65535) through which a connection with the receiver is possible (default: 8888).	TCP,PAR
Login	Enter the login (32 characters max.) required of users in the case of a secured connection.	TCP,PAR
Password	Enter the password (32 characters max.) required of users in the case of a secured connection.	TCP,PAR
(Show characters)	Use this option to show or hide the above password. When hidden, the password is replaced with "*" characters.	-

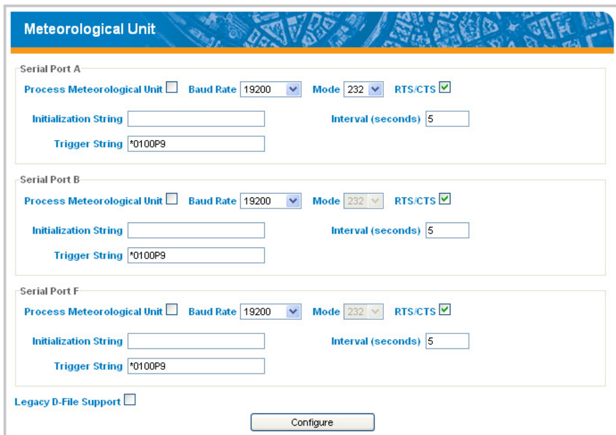
DynDNS:

Parameter	Designation	$PASHS
Activation	Use this button to activate or deactivate the use of the DynDNS server.	DDN,PAR
System	Name of the DynDNS server.	DDN,PAR
Hostname	The hostname you chose for your receiver.	DDN,PAR
Username, password	Username and password of your DynDNS account (see below how to create an account and choose the type of service you are expecting from the DynDNS server). The DynDNS server will accept the receiver's new IP address only if it is provided by an authorized user.	DDN,PAR
Period	Choose the rate at which the receiver should regularly inform the DynDNS server of its own IP address.	DDN,PAR

Parameter	Designation	$PASHS
"Update Now" button	Use this button to force the receiver to send its IP address right away to the DynDNS server.	DDN,SET

Meteorological Unit

The Meteorological Unit page is used to set the conditions in which the receiver will communicate with and get information from the meteorological unit.



For each serial port (A, B, F), the following parameters can be set to allow a connection to the meteorological unit:

Parameter	Designation	$PASHS
Process meteorological unit	Enable this option to allow the receiver to query the meteorological unit, if connected to this port.	MET
Baud Rate	Set the port baud rate	PRT
Mode	Set the port mode (RS232 or RS422). Only port A can be RS422 or RS232. All the others are necessarily RS232.	MDP
RTS/CTS	Enable or disable the handshaking protocol on this port.	CTS
Initialization string	Define the string used by the receiver to initialize the meteorological unit, if connected to this port.	MET
Trigger string	Define the string used by the receiver to query the meteorological unit, if connected to this port.	MET

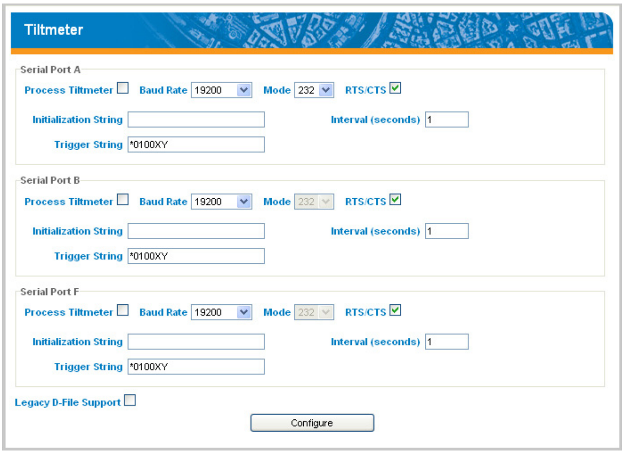
Parameter	Designation	$PASHS
Interval	Set the time interval, in seconds, used by the receiver to query the meteorological unit, if connected to this port.	MET

Data format:

Parameter	Designation	$PASHS
“Legacy D-File Support” check box	Meteo data are part of the data saved in G-files. If you check this option, they will also be saved as separate D files (Ashtech legacy format).	RFT

Tiltmeter

The Tiltmeter page is used to set the conditions in which the receiver will communicate with and get information from the tiltmeter.



For each serial port (A, B, F), the following parameters can be set to allow a connection to the tiltmeter:

Parameter	Designation	$PASHS
Process tiltmeter	Enable this option to allow the receiver to query the tiltmeter, if connected to this port.	TLT
Baud Rate	Set the port baud rate	PRT
Mode	Set the port mode (RS232 or RS422). Only port A can be RS422 or RS232. All the others are necessarily RS232.	MDP
RTS/CTS	Enable or disable the handshaking protocol on this port.	CTS

Parameter	Designation	$PASHS
Initialization string	Define the string used by the receiver to initialize the tiltmeter, if connected to this port.	TLT
Trigger string	Define the string used by the receiver to query the tiltmeter, if connected to this port.	TLT
Interval	Set the time interval, in seconds, used by the receiver to query the tiltmeter, if connected to this port.	TLT

Data format:

Parameter	Designation	$PASHS
“Legacy D-File Support” check box	Tiltmeter data are part of the data saved in G-files. If you check this option, they will also be saved as separate D files (Ashtech legacy format).	RFT

Data Output

This page is used to define the data messages delivered by the receiver on its various ports. The following groups of parameters need to be defined:

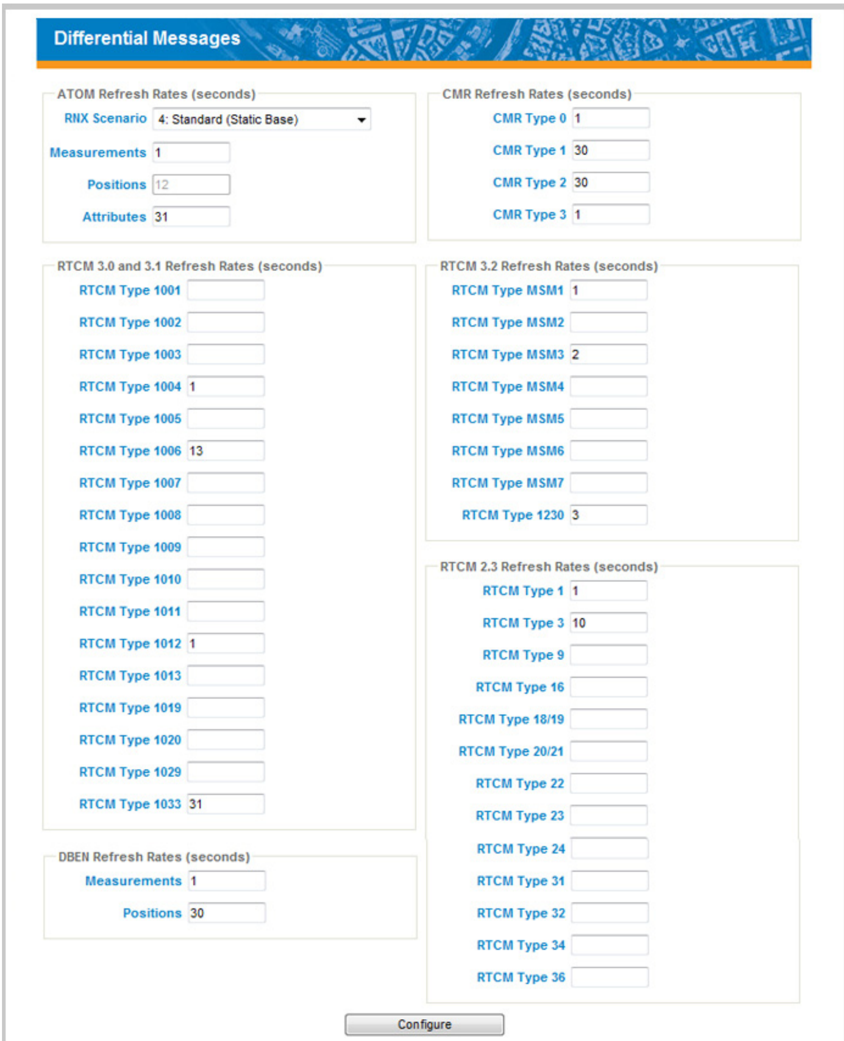
- Differential messages
- NMEA messages
- Raw data

These groups of parameters are detailed below.

Differential Messages

Use this page to define the differential messages generated by a base. The following data formats are possible:

- ATOM
- CMR
- RTCM 2.3
- RTCM 3.0 & 3.1
- DBEN



All the message types pertaining to a given data format are listed vertically.

To enable the output of a differential message, you just need to enter the desired refresh rate (in seconds) for this message in the corresponding field.

Leaving a field blank means you don't want the message type to be output.

For all ATOM message types, you also need to choose between the different formats available:

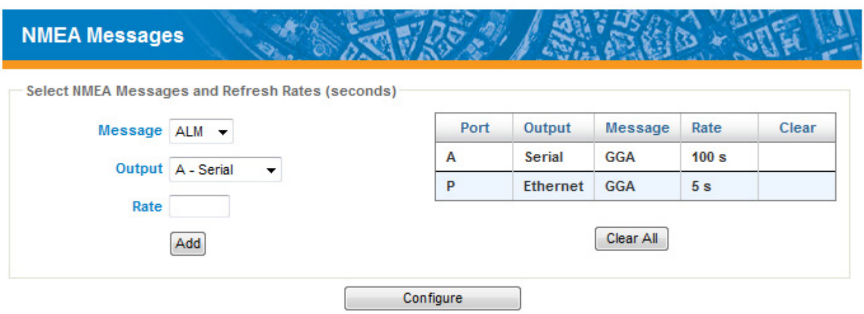
- 4: Standard (Static Base)
- 100: Compact (Static Base)
- 101: Super Compact (Static Base)
- 204: Standard (Moving Base)
- 300: Compact (Moving Base)

For each of the listed CMR and RTCM message types, you can place the mouse cursor over the "I" sign adjacent to the Refresh Rate field and read the full definition of the message.

The ports used to output the differential messages are defined on the **Base Setup** page. *A priori*, it does not make sense to output differential messages in a rover.

NMEA Messages

Use this page to define the NMEA messages generated by a receiver, whether a base or a rover.



To define the output of an NMEA message on a given port, you just need to select the message type from the **Message** drop-down list, the output port from the **Output** drop-down list, then enter its output rate, in seconds, in the **Rate** field, and click on the **Add** button. All the messages you add or modify on this page will be definitively saved in the receiver after you click on the **Configure** button located at the bottom of the page.

The new message definition will then appear as a new row in the table on the right.

Before you select a message type from the drop-down list, you can hold the mouse cursor over this message name in the drop-down list. After about one second, a tip box will appear providing the full definition of this message.

Note that for messages PTT, TTT and XDR, you don't have to define an output rate, due to the very nature of these messages.

To change the settings of an existing message (port, rate), select the corresponding row in the table. This populates the three fields on the left with the settings of that message. Edit the port and/or rate and then click on the **Modify** button. The table row is updated accordingly. Remember you must always click on the **Configure** button to save the changes in the receiver.

Note that depending on the current selection on this page, the button located underneath the three fields on the left may be either grayed or with a different label (**Add** or **Modify**).

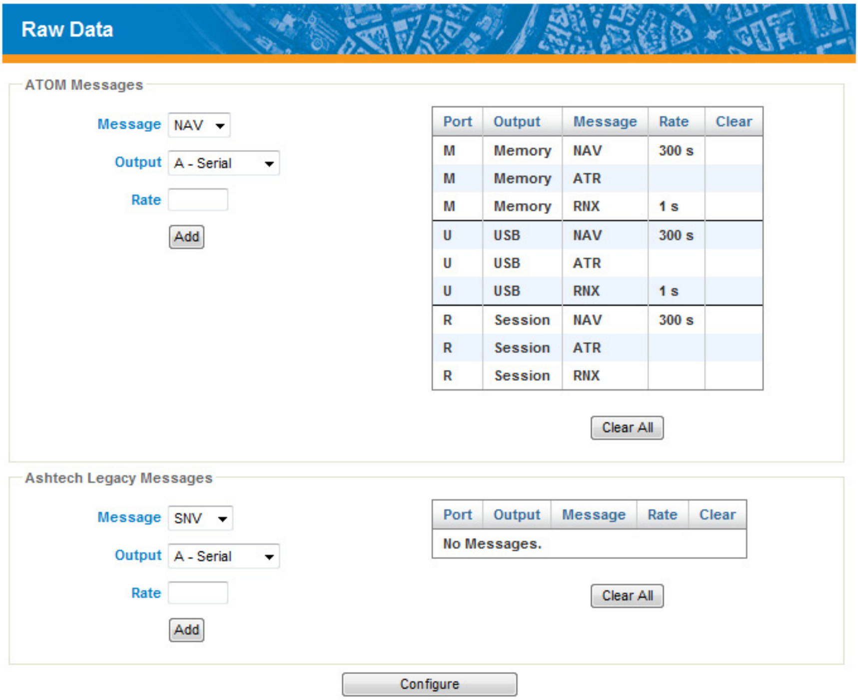
Deleting a message definition can be done by simply clicking on the corresponding "trash" sign in the **Clear** column on the far right. This deletes the table row.

There is also a **Clear All** button underneath the table that allows you to delete all the message definitions from the table in one click.

Raw Data

Two data formats are possible:

- ATOM (navigation data and other data)
- Ashtech Legacy (navigation data and other data)



Follow the instructions below to define the output of messages, whether in ATOM or Ashtech Legacy format:

- Select the message type from the **Message** drop-down list, the output port from the **Output** drop-down list, then enter its output rate, in seconds, in the **Rate** field, and click on the **Add** button. The new message definition will then appear as a new row in the table on the right.

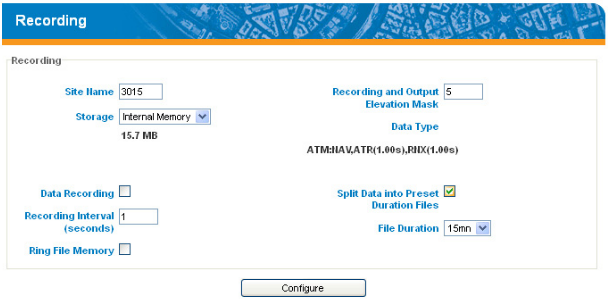
  Before you select a message type from the drop-down list, you can hold the mouse cursor over this message name in the drop-down list. After about one second, a tip box will appear providing the full definition of this message.
- To change the settings of an existing message (port, rate), select the corresponding row in the table. This populates the three fields on the left with the settings of that message. Edit the port and/or rate and then click on the **Modify** button. The table row is updated accordingly. All the messages you add or modify on this page will be definitively saved in the receiver after you click on the **Configure** button located at the bottom of the page.

Note that depending on the current selection on this page, the button located underneath the three fields on the left may be either grayed or with a different label (**Add** or **Modify**).

- Deleting a message definition can be done by simply clicking on the corresponding "trash" sign in the **Clear** column on the far right. This deletes the table row.
- There is also a **Clear All** button under the table that allows you to delete all message definitions from the table in one click.

Recording

Use this page to control raw data recording in the receiver outside of any programmed sessions.



The parameters are the following.

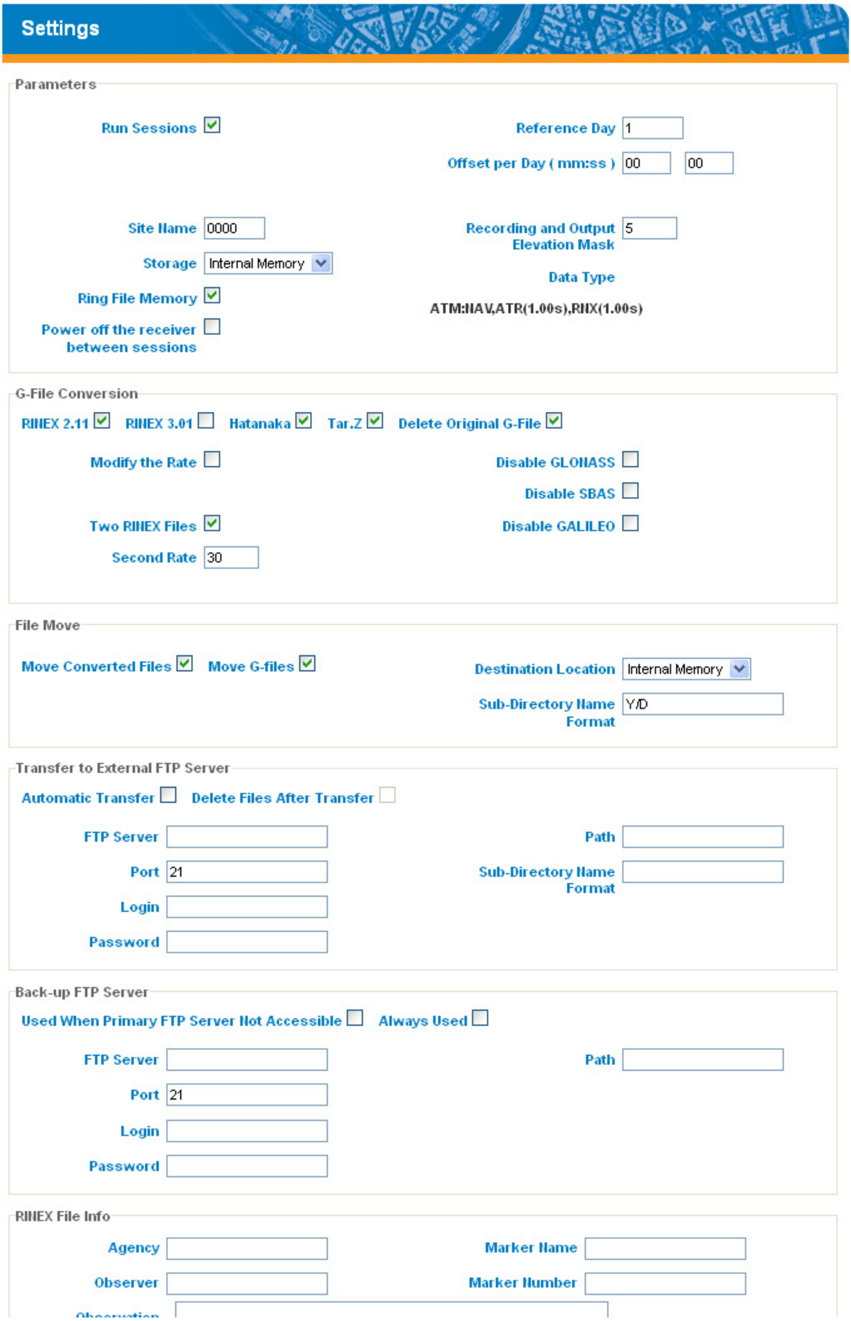
Parameter	Designation	$PASHS
Site Name	Enter a 4-character string identifying the site where data recording will take place. The following characters are not allowed in the site name: / * . \ ,	SIT
Storage	Tell the receiver where to store the recorded raw data. On selecting a memory device (Internal Memory or USB Device), you can read, underneath the field, the amount of free memory currently available on the selected device. Selecting the USB device implies that you know there is one currently connected to the receiver.	MEM
Recording and Output Elevation Mask	Enter the elevation mask angle in degrees (0-90°). The data from all the satellites located in the elevation mask, seen from the recording site, will not be recorded.	ELM
Data Type	A read-only field listing the type of raw data messages currently set to be recorded by the receiver.	-

Parameter	Designation	$PASHS
Data Recording	Set this option to enable raw data recording in the receiver right after you have clicked on the Configure button at the bottom of this page. You can also keep this option cleared and later start data recording by pressing the Log button on the receiver front panel.	REC
Recording Interval	Enter the raw data recording rate, in seconds. Depending on the installed firmware option, this value can range from 0.05 s, 0.1 s or 0.5 s to 999 s.	DRI
Ring File Memory	Enabling this option will allow the receiver to delete the oldest record file when the memory used is almost full (less than 15 Mbytes still free). This will allow the receiver to constantly log data without external intervention. When this function is enabled/disabled for recording, it is as well for sessions.	RFM
Split Data into Preset Duration Files	Enable this option if you want the receiver to create a new file after every x minutes or hours of raw data recording, "x" been defined in the field below. With this option disabled, raw data will be saved to a single file, with no limit of duration.	DRD
File Duration	(This field is visible only after "Split Data into Preset Duration Files" has been enabled). Indicate the time span that each new raw data file should cover before it is closed and a new one is open. For example setting this field to "15" means that at all times, the receiver will be able to provide a record file containing the last 15 minutes of raw data decoded by the receiver.	DRD

Session Settings

The Session Settings page is used for various purposes. These are listed below:

- Enable or disable the execution of programmed sessions
- Define the day when programmed sessions will start
- Define the conditions in which data will be collected during programmed sessions (site name, storage media used, masks, ring file memory)
- Manage record files (file conversion, file transfer, file deletion). Files can be transferred to an external FTP server or to the selected receiver memory (internal or USB) for further access through the embedded FTP server.
- Defining optional parameters the receiver will insert into the header of all RINEX files it will generate from G-files.


Settings
Parameters
Run Sessions
Reference Day
1
Offset per Day (mm:ss)
00
00
Site Name
0000
Recording and Output Elevation Mask
5
Storage
Internal Memory
Data Type
Ring File Memory
ATM:NAV,ATR(1.00s),RNX(1.00s)
Power off the receiver between sessions
G-File Conversion
RINEX 2.11
RINEX 3.01
Hatanaka
Tar.Z
Delete Original G-File
Modify the Rate
Disable GLONASS
Disable SBAS
Two RINEX Files
Disable GALILEO
Second Rate
30
File Move
Move Converted Files
Move G-files
Destination Location
Internal Memory
Sub-Directory Name Format
Y/D
Transfer to External FTP Server
Automatic Transfer
Delete Files After Transfer
FTP Server
Path
Port
21
Sub-Directory Name Format
Login
Password
Back-up FTP Server
Used When Primary FTP Server Not Accessible
Always Used
FTP Server
Path
Port
21
Login
Password
RINEX File Info
Agency
Marker Name
Observer
Marker Number

General Settings

Parameter	Designation	$PASHS
Run Sessions	Use this button to enable or disable the execution of the programmed sessions.	SES,ON SES,OFF
Reference Day	Enter the day of year (1-366) when the first programmed session will start. Should be greater than or equal to the current day of year for a postponed start, otherwise “1” for immediate start.	SES,PAR
Offset per Day	Use this field if you wish to introduce minutes and seconds of time shift so that every day, the same GPS constellation is visible from the same site during the same session (typical value: 4 minutes).	SES,PAR
Site Name	Give a name to the site where data are recorded. G-file names will be derived from this name.	SES,PAR
Storage	Choose the storage media where record files will be stored.	SES,PAR
Ring File Memory	Enabling this option will allow the receiver to delete the oldest record file when the memory used is almost full (less than 15 Mbytes still free). This will allow the receiver to constantly log data without external intervention. When this function is enabled/disabled for sessions, it is as well for “conventional” recording.	RFM
Power Off Receiver Between Sessions	Enabling this option will allow the receiver to switch automatically to sleep mode at the end of each session and to be woken up just before the next session starts. With this option disabled, the receiver will stay powered up even between sessions.	SES,PAR
Recording and Output Elevation Mask	Set the recording elevation mask, in degrees (default: 5°). Data from masked satellites will not be recorded.	SES,PAR
Data Type	A read-only field identifying the type of raw data recorded.	

G-File Conversion

Parameter	Designation	$PASHS
RINEX 2.11	Use this option to convert G-files to RINEX 2.11 format.	SES,PAR
RINEX 3.01	Use this option to convert G-files to Rinex 3.01 format.	SES,PAR

Parameter	Designation	$PASHS
Hatanaka	This option can be used in conjunction with one of the previous two ones to convert G-files to Rinex 2.11 or 3.01 in Hatanaka format.	SES,PAR
Tar.Z	Use this option to compress G-files in Tar.Z format. Can be used together with option Rinex 2.11 or 3.01.	SES,PAR
Delete Original G-File	Use this option to remove original G-files after they have been converted and compressed.	SES,PAR
Change Rate	Enable this option if you wish to use a measurement period different from the one used in the G-file	RXC,PAR
Rate	This field will appear if you have enabled the Change Rate option. Enter the new measurement period that will be used when converting the G-file to a RINEX file.	RXC,PAR
Create 2nd RINEX File	Enable this option if you wish to create two RINEX files, instead of one, when converting the G-file.	SES,PAR
Second Rate	This field will appear if you have enabled the Create 2nd RINEX File option. Enter the measurement period that will be used when converting the G-file to a second RINEX file.	SES,PAR
Disable GLONASS	Enabling this option will result in rejecting all GLONASS measurements from the RINEX conversion.	RXC,PAR
Disable SBAS	Enabling this option will result in rejecting all SBAS measurements from the RINEX conversion.	RXC,PAR
Disable GALILEO	Enabling this option will result in rejecting all GALILEO measurements from the RINEX conversion.	RXC,PAR

File Move

Set this pane when you wish to store record files locally so that users can download these files through an IP connection using the embedded FTP server.

Parameter	Designation	$PASHS
Move Converted Files	Use this option to ask the receiver to move the record files to the specified location (see below) once they have been converted to the specified format (see table above)	SES,PAR
Move G-Files	Use this option to ask the receiver to move the original record files (G-files) to the specified location (see below) once they have been created.	SES,PAR
Destination Location	Tell the receiver where to store record files (in its internal memory or to some connected USB device)	SES,PAR

Parameter	Designation	$PASHS
Sub-directory name format	Tell the receiver how to name the subdirectories it will create to store record files. Use the case-sensitive syntax presented in the table below to name these subdirectories (default: Y/D).	SES,PAR

Subdirectory naming conventions:

Character	Description
s or S	4-character sitename
Y	4-digit year (2010= 2010)
y	2-digit year (10= 2010)
m	2-digit month (01= January)
M	3-character month (Jan= January)
d	2-digit day in month (1-31)
D	3-digit day in year (1-365)
p or P	data_<d> or DATA_<d>, where <d> is the period in seconds

Example: Using “Y/M/d/s” would create the following three subdirectories for files recorded in Lisbon on February 21, 2010:

- /2010/Feb/21/LISB/

When two RINEX files are created with different periods, character “p” or “P” should be used so the receiver can store the two types of RINEX files in different directories.

If the subdirectory format is “s/Y/D/p” then the files logged at 1 second recording interval, on site “CARQ”, on Feb 1, 2012 (day 32) will be pushed to the folder named “.../CARQ/2012/32/data_1” and the files logged at 30 seconds will be moved to the folder “.../CARQ/2012/32/data_30”.

Transfer to External FTP Server

Parameter	Designation	$PASHS
Automatic Transfer	Enable this option if you want the receiver to transfer automatically RINEX files to the specified external FTP server. The transfer is effective only if a G-file conversion has been activated to generate RINEX files from G-files.	SES,PAR
Delete Files After Transfer	Enable this option if you want the receiver to delete record files from its memory once they have been transferred to the external FTP server.	SES,PAR

Parameter	Designation	$PASHS
FTP Server	External FTP server IP address or hostname (URL)	SES,FTP,PAR
Port	External FTP IP port (default is "21" according to convention)	SES,FTP,PAR
Login	External FTP server login	SES,FTP,PAR
Password	External FTP server password (always hidden; "*" characters appear instead)	SES,FTP,PAR
Path	Enter the path on the external FTP server where the receiver will be allowed to upload its record files as they are created.	SES,FTP,PAR
Sub-directory Name Format	Tell the receiver how to name the subdirectories it will create to store record files on the external FTP server. Use the case-sensitive syntax presented in the table below to name these directories.	SES,FTP,PAR

Subdirectory naming conventions:

Character	Description
s or S	4-character sitename
Y	4-digit year (2010= 2010)
y	2-digit year (10= 2010)
m	2-digit month (01= January)
M	3-character month (Jan= January)
d	2-digit day in month (1-31)
D	3-digit day in year (1-365)
p or P	data_<d> or DATA_<d>, where <d> is the period in seconds

Example: Using "Y/M/d/s" would create the following three subdirectories for files recorded in Lisbon on February 21, 2010:

- /2010/Feb/21/LISB/

When two RINEX files are created with different periods, character "p" or "P" should be used so the receiver can store the two types of RINEX files in different directories.

If the subdirectory format is "s/Y/D/p" then the files logged at 1 second recording interval, on site "CARQ", on Feb 1, 2012 (day 32) will be pushed to the folder named ".../CARQ/2012/32/data_1" and the files logged at 30 seconds will be moved to the folder ".../CARQ/2012/32/data_30".

Back-up FTP Server

Parameter	Designation	$PASHS
Used When Primary FTP Server Not Accessible / Always Used	Choose whether the back-up FTP server should always be used as a raw data file repository, or only when the external FTP server, defined as the primary FTP, has become inaccessible for some reason.	SES,FTP,PAR
FTP Server	Back-up FTP server IP address or hostname (URL)	SES,FTP,PAR
Port	Back-up FTP IP port (default is “21” according to convention)	SES,FTP,PAR
Login	Back-up FTP server login	SES,FTP,PAR
Password	Back-up FTP server password (always hidden; “*” characters appear instead)	SES,FTP,PAR
Path	Enter the path on the back-up FTP server where the receiver will be allowed to upload its record files as they are created. The same convention as in the primary FTP is used for naming subdirectories in the backup FTP (see “Sub-directory Name Format” field above).	SES,FTP,PAR

RINEX File Info

You can define the following additional and optional parameters for insertion into the header of every single RINEX file the receiver will generate:

- Agency
- Observer
- Marker Name
- Marker Number
- Observation Comment
- GPS Navigation Comment
- GLONASS Navigation Comment
- SBAS Navigation Comment
- GALILEO Navigation Comment
- Meteo Comment
- Meteo Sensor Manufacturer
- Meteo Sensor Type
- Temperature Accuracy
- Pressure Accuracy
- Humidity Accuracy

Session Scheduling

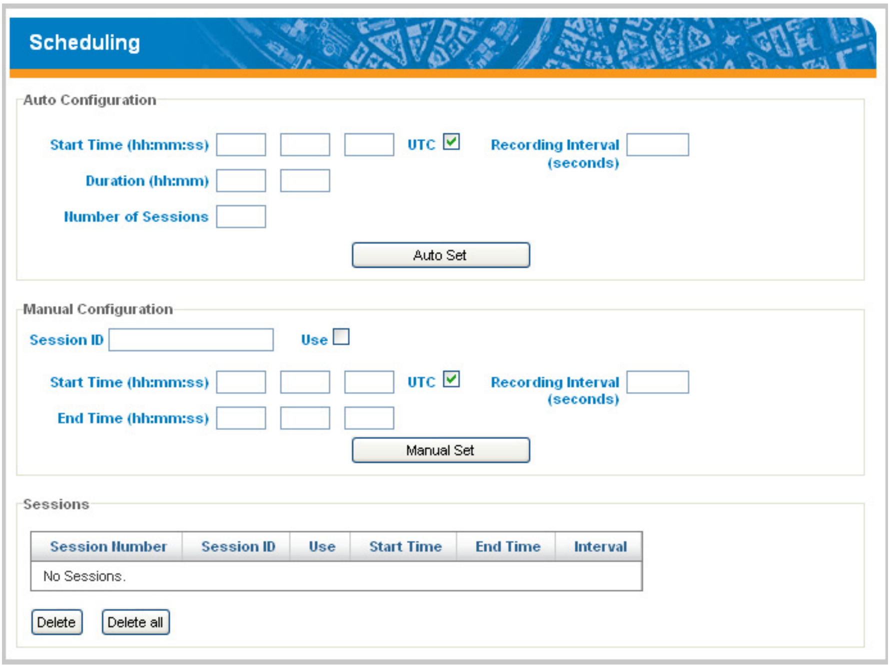
The Session Scheduling page is used to define sessions, either automatically or manually.

A “session” represents an interval of time during which you want the receiver to log raw data in a G-file at the requested recording interval. By default, sessions are repeated every day at the same time.

- Defining sessions automatically means creating a series of consecutive sessions “in one shot”, from only the four parameters you specify. Data recording is allowed by default in all the sessions created through this method.
- Defining sessions manually means specifying the start and end times of each session. Each of the desired sessions should be defined that way, one after the other.

Whereas by default, sessions defined automatically are necessarily executed one after the other, with no idle time in between, sessions defined manually can from the start be separated by idle times, resulting from adequately chosen start and end times for sessions that are consecutive.

Caution! Enabling the execution of programmed sessions is controlled by the **Run Sessions** and **Reference Day** parameters (see *Session Settings on page 178*).



Auto Configuration

Using this pane, you can automatically define a series of sessions in one operation by entering the following parameters.

Parameter	Designation	$PASHS
Start Time	Enter the start time of the first session (hh:mm:ss).	SES,AUT
UTC	Check this option if “Local” is chosen as the time unit (see Units pane on the left) and you wish to enter the Start Time above in UTC time.	-
Duration	Enter the duration of the session. This duration will be the same for all the sessions.	SES,AUT
Number of sessions	Enter the number of sessions that should take place every day (96 max.).	SES,AUT
Recording Interval	Enter the data recording rate, in seconds, that will be used during every session.	SES,AUT
Auto Set button	Click on this button to create sessions according to your three choices above. Clicking on this button will overwrite the last session settings entirely.	SES,AUT

Example:

Choosing “Start Time=09:00:00”, “Duration=01:00” and “Number of sessions=12” means that you are asking the receiver to perform 12 one-hour sessions, from 9:00 am to 9:00 pm. The series of sessions will be repeated every day.

Manual Configuration

Use this pane to create or modify each of the sessions you need, one after the other.

Parameter	Designation	$PASHS
Session ID	Enter the identification string of the session (allowed values: A to X;AA to XA;AB to XB; AC to XC).	SES,SET
Use	Enable this option to allow data recording during the session.	SES,SET
Start Time	Enter the start time of the session (hh:mm:ss).	SES,SET
UTC	Check this option if “Local” is chosen as the time unit (see Units pane on the left) and you wish to enter the Start Time (above) and End Time (below) in UTC time.	-
End Time	Enter the end time of the session (hh:mm:ss).	SES,SET
Recording Interval	Give a name to the site where data are recorded. G-file names will be derived from this name.	SES,SET
Manual Set button	Click on this button to create a session according to your four choices above. Repeat the procedure as many times as there are sessions to define.	SES,SET

Sessions

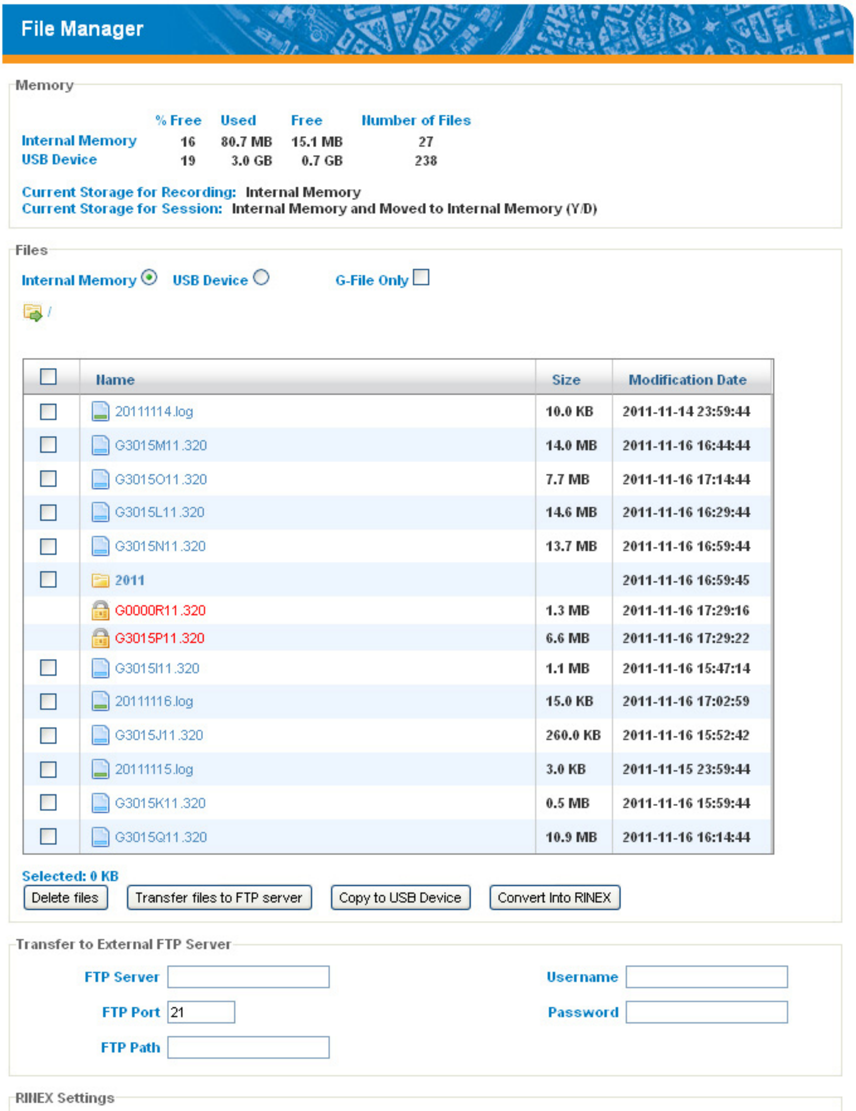
This pane lists the sessions currently programmed in the receiver. You can do the following from this pane:

- Modify a session: Click in the corresponding row. As a result, all the fields in the Manual Configuration pane are filled accordingly so you can edit any of them. Click on the **Manual Set** button once you have made the desired changes (equivalent to running $PASHS,SES,SET). Sessions generated through the automatic method can also be edited through this procedure.
- Delete one or all sessions: Select the row containing the session you want to delete and then click on the **Delete button** located at the foot of the page. To delete all the sessions, no prior selection is required: just click on the **Delete all** button, also located at the foot of the page (equivalent to running $PASHS,SET,DEL).

NOTE: The session currently run by the receiver is shown in bold characters.

File Manager

This page is used to list the content of the receiver memory devices and to perform delete, transfer or copy operations on the listed files.



Memory

This is a read-only area. For each of the possible storage media (internal memory and USB device), the following information is provided:

- Percentage of free memory

- Number of kbytes used
- Total size of memory
- Number of files stored in memory

In the last two lines, the storage medium currently used to record raw data is provided:

- The first line indicates which medium is used when data recording takes place outside of any sessions.
- The second line indicates which medium is used when data recording takes place through programmed sessions.

Files

Parameter	Designation	$PASHS
Internal Memory / USB device	Check one of these buttons to select the memory on which to perform file management. Selecting “USB Device” implies that a USB device is currently connected to the remote receiver.	FIL,DEL
G-File only	Enable this option to apply a mask to the selected directory so that only the G-files present in this directory can be listed.	-
”Loading...” message	Appears at regular intervals of time. Means that the content of the web page is currently being updated.	-
Directory table	This table lists the files and directories found in the selected memory according to the choices you have made above. The following is provided for each file: name, size, modification date. You can do the following from within the table: • Click on each of the column headers to sort the list in direct or inverse alphabetical order. • Click on the filename to open or save the file on your computer. • Click on the button before the filename as a pre-selection before performing one of the actions described below. • Click on a folder to open it.	-
“Delete files” button	Click this button to delete all the files you have previously selected in the table.	FIL,DEL
“Transfer files to FTP server” button	Click on this button to transfer the selected files to an external FTP server (see below how to define this external FTP server).	FTP,PUT
“Copy to USB Device” button	Click on this button to copy the selected files to the USB device connected to the receiver.	

Parameter	Designation	$PASHS
"Convert to RINEX" button	Click on this button to convert the selected files to RINEX format. The header and content of every RINEX file the receiver will generate will be defined according to the RINEX Settings area below.	RXC,RUN

Work in Progress

This area is displayed only when one of the actions below is in progress:

- Transfer Files to FTP Sever
- Copy to USB Device
- Convert to RINEX

When this happens, the message "In Progress, Please Wait..." appears in the corresponding line.

Transfer to External FTP Server

File Manager can be used to upload files from the selected receiver memory to an FTP server of your choice. The network location and access permissions for this FTP server should be defined in this area according to the table below.

Parameter	Designation	$PASHS
FTP Server	Enter the IP address or host name of the external FTP server	FTP,PAR
FTP Port	Enter the FTP server port number (default: 21)	FTP,PAR
FTP Path	Enter the path on the external FTP server where you want to upload files.	FTP,PAR
Username	Enter the FTP server login	FTP,PAR
Password	Enter the FTP server password (always hidden; "*" characters appear instead)	FTP,PAR

RINEX Settings

Parameter	Designation	$PASHS
RINEX 2.11	Use this option to convert G-files to RINEX 2.11 format.	SES,PAR
RINEX 3.01	Use this option to convert G-files to Rinex 3.01 format.	SES,PAR
Hatanaka	This option can be used in conjunction with one of the previous two ones to convert G-files to Rinex 2.11 or 3.01 in Hatanaka format.	SES,PAR
Tar.Z	Use this option to compress G-files in Tar.Z format. Can be used together with option Rinex 2.11/3.01.	SES,PAR

Parameter	Designation	$PASHS
Modify the Rate	Enable this option if you wish to use a measurement period different from the one used in the G-file	RXC,PAR
Rate	This field will appear if you have enabled the Change Rate option. Enter the new measurement period that will be used when converting the G-file to a RINEX file.	RXC,PAR
Disable GLONASS	Enabling this option will result in rejecting all GLONASS measurements from the RINEX conversion.	RXC,PAR
Disable SBAS	Enabling this option will result in rejecting all SBAS measurements from the RINEX conversion.	RXC,PAR
Disable GALILEO	Enabling this option will result in rejecting all GALILEO measurements from the RINEX conversion.	RXC,PAR

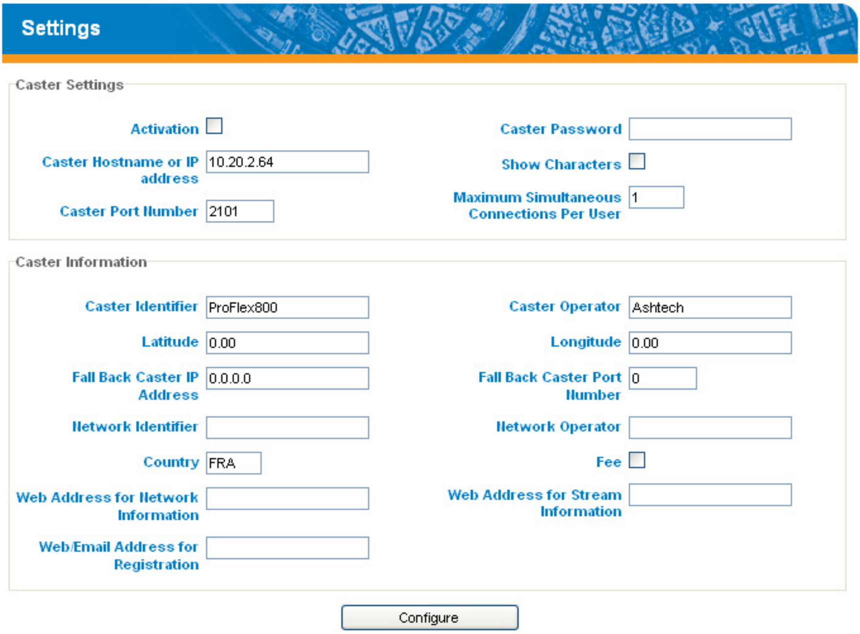
You can define the following additional and optional parameters for insertion into the header of every single RINEX file the receiver will generate:

- Agency
- Observer
- Marker Name
- Marker Number
- Observation Comment
- GPS Navigation Comment
- GLONASS Navigation Comment
- SBAS Navigation Comment
- GALILEO Navigation Comment
- Meteo Comment
- Meteo Sensor Manufacturer
- Meteo Sensor Type
- Temperature Accuracy
- Pressure Accuracy
- Humidity Accuracy

NTRIP Caster Settings

The NTRIP Caster Settings page provides two different groups of information:

- Caster Settings
- Caster Information



Caster Settings

It is from the data you enter in this section that the receiver will be able to run the NTRIP Caster and make it visible for users.

Parameter	Designation	$PASHS
Activation	Allows you to start or stop the NTRIP Caster function in the receiver.	CST,ON CST,OFF
Caster Hostname or IP Address, Caster Port Number	Enter the hostname or public IP address of the NTRIP caster, as seen from users. Not necessarily the same IP address as the local IP address assigned to the receiver (for more information, refer to your IT manager).	CST,PAR
Caster Password	Password to be used by NTRIP serv-ers to be allowed to connect to the NTRIP caster (through mount points).	CST,PAR

Parameter	Designation	$PASHS
Show Characters	Use this option to show or hide the above password. When hidden, the password is replaced with bullet characters.	-
Maximum Simultaneous Connections Per User	Use this field to limit the number of connections an identified user is allowed to establish at any given time.	CST,PAR

Caster Information

All the data you provide in this section are for insertion in the source table. Being only informative and optional, they do not affect the way the NTRIP Caster works.

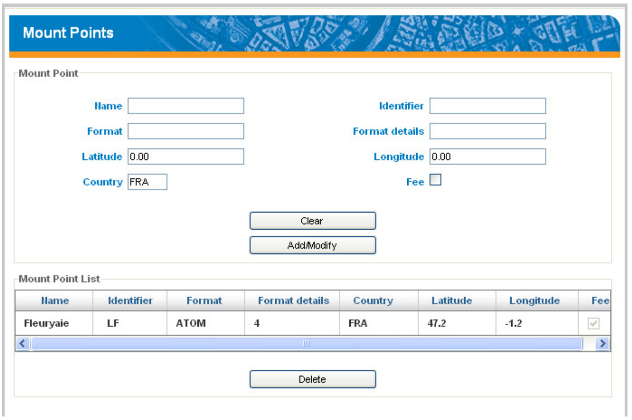
Parameter	Designation	$PASHS
Caster Identifier	Enter the caster identifier, e.g. the name of the provider.	CST,PAR
Caster Operator	Enter the name of the institution, agency or company operating the caster	CST,PAR
Latitude, Longitude	Enter the approximate position of the NTRIP caster. • Latitude, in degrees, two digits after decimal point (0 to ±90.00) • Longitude, in degrees, two digits after decimal point (0 to 360.00)	CST,PAR
Fallback Caster IP Address, Fallback Caster Port Number	The source table may provide users with information allowing them to connect to another IP address and port in case the NTRIP caster is no longer accessible.	CST,PAR
Network Identifier	Enter the network identifier, e.g. the name of the network of GNSS permanent reference stations.	CST,PAR
Network Operator	Enter the name of the institution, agency or company operating the network.	CST,PAR
Country	Enter the three-letter standard abbreviation of the country (country code; see ISO 3166) where the NTRIP caster is operated.	CST,PAR
Fee	Indicate whether users are charged for using the corrections available through the NTRIP Caster. This is just a reminder for the administrator. Enabling or disabling this button has no impact on the way the caster works.	CST,PAR
Web Address for Network Information	Enter the address of the web site where users can get additional information about the NTRIP caster network.	CST,PAR

Parameter	Designation	$PASHS
Web Address for Stream Information	Enter the address of the web site where users can get additional information about data streams available from the NTRIP caster.	CST,PAR
Web/Email Address for Registration	Enter the address of the web site where users can get additional registration information about the NTRIP caster.	CST,PAR

Mount Points

The Mount Points page allows you to declare all the data streams the NTRIP caster will be able to forward to users. Behind each mount point is a specific NTRIP server providing a specific format of data corrections from a given location.

The receiver hosting the NTRIP caster can also be configured to operate one or even two independent NTRIP servers. Two of the possible mount points can therefore represent NTRIP servers operated at the same location as the NTRIP caster, but each delivering a specific data stream.



Mount Point:

For each new mount point, define the following parameters:

Parameter	Designation	$PASHS
Name	Enter the mount point name. This is an important parameter because it is through that name that users choose the source of corrections they want and it is also through that name that the NTRIP caster can select the NTRIP server providing the corrections that users are requesting.	CST,MTP,ADD
Identifier	Enter the source identifier, e.g. the name of the city next to the source location.	CST,MTP,ADD

Parameter	Designation	$PASHS
Format	Enter the format of the corrections provided by through the mount point.	CST,MTP,ADD
Format Details	Enter the details of the format used by the NTRIP server for providing corrections through this mount point.	CST,MTP,ADD
Latitude, longitude	Enter the coordinates (in degrees, with two decimal places) of the approximate location of the NTRIP server providing data for this mount point.	CST,MTP,ADD
Country	Enter the three-letter standard abbreviation of the country (country code; see ISO 3166) where the NTRIP server is operated.	CST,MTP,ADD
Fee	For information, tell the NTRIP caster whether the data available through this mount point are free or not.	CST,MTP,ADD
“Clear” button	While editing a new mount point, you can use this button to clear in one click the Name, Identifier, Format and Format Details fields.	-
“Add/Modify” button	Use this button to add the mount point currently described in the above fields to the Mount Point List table	CST,MTP,ADD

Mount Point List:

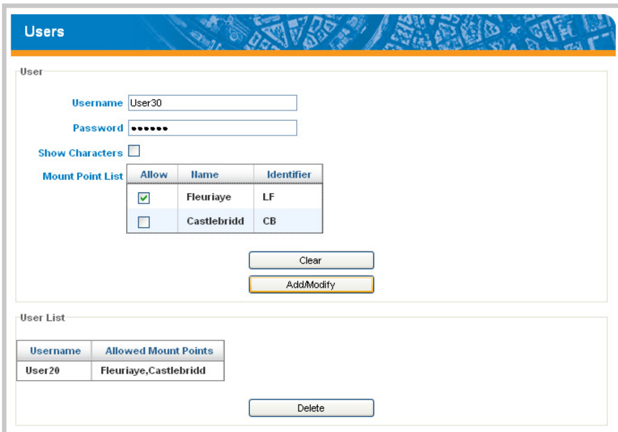
This table lists all the currently declared mount points (up to 10).

To modify the definition of a mount point, click in the corresponding row in this table. As a result, the current definition of the mount point appears in the fields above. Make the changes and then click on the **Add/Modify** button.

To delete a mount point, click in the corresponding row in the table, then click on the **Delete** button (corresponding to command $PASHS,CST,MTP,DEL).

NTRIP Caster Users

This web page is used to declare all the authorized users of the NTRIP caster (up to 100 different users). Users have each a name and password, as well as a list of mount points they are allowed to connect to.



User:

For each new user, define the following parameters:

Parameter	Designation	$PASHS
Username	Enter the user name.	CST,USR,ADD
Password	Enter the user password.	CST,USR,ADD
(Show Characters)	Use this option to show or hide the above password. When hidden, the password is replaced with "*" characters.	-
Mount Point List	Select the mount points the user will be authorized to connect to.	CST,USR,ADD
"Clear" button	While editing a new user, you can use this button to clear in one click the Username and Password fields as well as the Mount Point List table.	-
"Add/Modify" button	Use this button to add the user currently described in the above fields to the User List table	CST,USR,ADD

User List:

This table lists all the currently declared users (up to 100).

To modify the definition of a user, click in the corresponding row in this table. As a result, the current definition of the user appears in the fields above. Make the changes and then click on the **Add/Modify** button.

To delete a user, click in the corresponding row in the table, then click on the **Delete** button (corresponding to command $PASHS,CST,USR,DEL).

Advanced Setup (Configuration Tab)

Terminal Window

This section is used to communicate with the receiver through $PASH commands. The purpose and syntax of each available $PASH command is described in detail elsewhere in this manual.

To send a command to the receiver, type your command in the **Command** field and then click on the **Send** button. In the pane underneath the **Command** field, you will see your command duplicated in blue characters followed by the response line, in orange characters, returned after a while by the receiver.

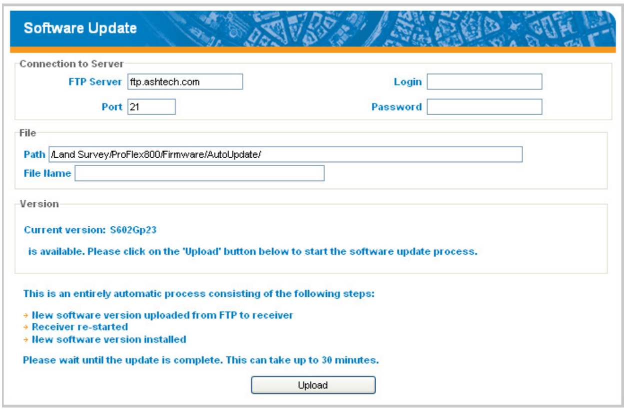
The commands you type and send are all stacked up into the **Command** field so it is easy for you to re-select and re-send one of those when needed.

Use the **Clear View** button to clear out the page.

If alarms have been set in the receiver, you may click on the **Acknowledge Alarms** button to acknowledge all these alarms. As a result, the $PASHS,WAK command is issued to perform this operation in the receiver.

Software Update

This page allows you to upgrade the firmware of the receiver if a new version is available from the specified FTP server.



When opening the **Software Update** page with all the default settings preserved, the Web Server connects to the Ashtech public FTP server and searches for a possible upgrade in the dedicated folder.

The result of that search appears on the same page, in the **Version** pane. Either a new version is available, and in this case the new version is mentioned (and you can see the name of the upgrade file in the **File Name** field), or there is no upgrade available, in which case only the version of the firmware currently installed in the receiver is displayed in the **Version** pane (and the **File Name** field is blank).

If a new version is available, you can upgrade your receiver by simply clicking on the **Upload** button and waiting until you are informed of the end of the installation phase (this may take up to 30 minutes).

The different parameters shown on the **Software Update** page are described below.

Connection to Server:

Parameter	Designation
FTP Server	Address of the FTP server providing updates (default: ftp.ashtech.com).
Port	IP Port giving access to the FTP server (default: 21).
Login	Login required for connection to the FTP server (default: blank, i.e. no login required).
Password	Password required for connection to the FTP server (default: blank, i.e. no password required).

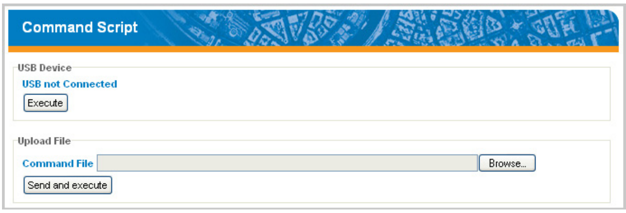
File:

Parameter	Designation
Path	Path to the folder on the FTP server where an upgrade may be posted.
File Name	With a connection to the default FTP server: • A blank field means there is no upgrade available. • The field automatically shows the name of the upgrade file if there is one posted on the FTP server (filename in the form "p_x00_upgrade_Vxxxxxxx.tar.bz2"). With a connection to a different FTP server, this field will always be blank until you type the name of the upgrade file, which should be accessible through the specified path above. The upgrade file may not have the same name as the initial upgrade file released by Spectra Precision but should keep the same extension (".tar.bz2"). If these conditions are met, the upgrade is also possible through a click on the Upload button.

Command Script

The Command Script page is used to ask the receiver to run a list of $PASH serial commands saved as an editable text file.

This file can be found either in the local USB device connected to the receiver, in which case it should be created with the "cmd" extension, or on the computer running the Web Server, in which case the selected file will first be uploaded to the receiver before it can execute the commands.



USB Device:

Parameter	Designation	$PASHS
Command Files table	If there is no USB device connected to the receiver, "USB not connected" is reported in this pane. If a USB device is connected, this table lists all the *.cmd files found in the root directory.	-

Parameter	Designation	$PASHS
Execute button	Click on this button after having selected a command file in the above table. As a result, the receiver will run the list of $PASH commands read from the selected file. A report is then provided on the Result web page.	CMD,LOD

Upload File:

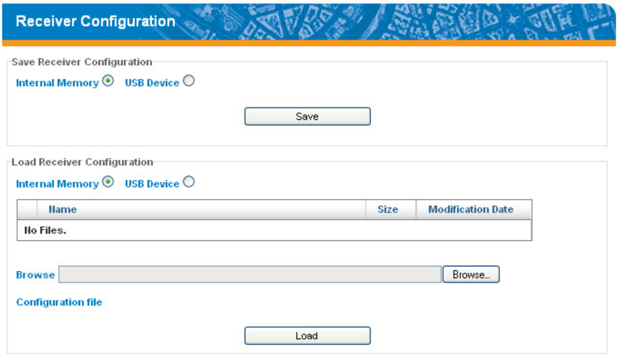
Parameter	Designation	$PASHS
Command File	Use the Browse button attached to this field to browse your computer's hard disk for the desired command file (a text file).	-
Send and Execute button	Click on this button after having selected a command file in the above field. As a result, the computer will upload the file to the receiver which will in turn run the list of $PASH commands read from this file. On completion of this sequence, a link to a log file will be provided on the Result web page so you can see by yourself how the receiver executed the list of commands.	CMD,LOD

Receiver Configuration

The Receiver Configuration page is used to save the receiver's current configuration as a *.PAR file. The syntax used to name the file is **<PF_SSSSS_dddhhmmss>.par** where:

- PF is the header for the receiver model
- SSSSS stands for the last 5 digits from the receiver serial number
- ddd is the current day number (1-366)
- hhmmss is the time of file creation

The Receiver Configuration page is also used to load a *PAR file. By doing this, you will replace the currently used receiver configuration with the one described in the loaded PAR file. The PAR file may be loaded from the receiver's internal memory or USB device, or from the local computer running the Web Server.



Save Receiver Configuration:

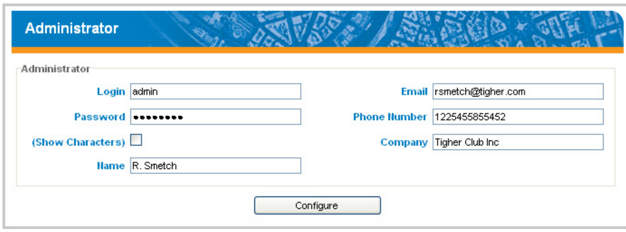
Parameter	Designation	$PASHS
Internal Memory	Check this option to save the configuration to the internal memory.	PAR,SAV
USB Device	Check this option to save the configuration to the USB device.	PAR,SAV
”Save” button	Click on this button to save the current receiver configuration. Once the PAR file has been created, its name will appear underneath the button. If you click on this filename, you will be able to make a copy of this file onto the computer running the Web Server.	PAR,SAV

Load Receiver Configuration:

Parameter	Designation	$PASHS
Internal Memory	Check this option to load the configuration file from the internal memory	PAR,LOD
USB Device	Check this option to load the configuration file from the USB device.	PAR,LOD
Browse, “Browse” button	Click on the Browse button to navigate to the local folder containing the PAR file you wish to load. Select the file, click Open. As a result the file name and path appears in the Browse field	PAR,LOD
“Load” button	Click on this button to load the PAR file selected in the Browse field. As a result, the receiver configuration is changed according to the content of this file.	PAR,LOD

Administrator

The Administrator page is used to change the name and password of the administrator as well as add miscellaneous information allowing Web Server users to easily identify the receiver on the Web Server home page.



Parameter	Designation	$PASHS
Login	Administrator login	WEB,PAR
Password	Administrator password	WEB,PAR
(Show characters)	Use this option to show or hide the above password. When hidden, the password is replaced with "*" characters.	-
Name	Administrator name	WEB,OWN
E-mail	Administrator email	WEB,OWN
Phone number	Administrator phone number	WEB,OWN
Company	Name of the company owning the receiver.	WEB,OWN

Changing the administrator login and password should be a well-considered action, and more particularly when several people have been given the administrator rights for the same receiver.

Users

The Users page is used to manage the list of authorized users. From this page, the administrator can add, modify or delete user profiles. A user profile consists of a login and a password.

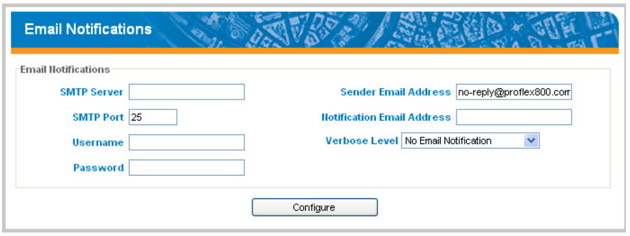
Parameter	Designation	$PASHS
Username	User login	WEB,USR,ADD

Parameter	Designation	$PASHS
Password	User password	WEB,USR,ADD
(Show characters)	Use this option to show or hide the above password. When hidden, the password is replaced with "*" characters.	-
Add/Modify button	To add a new user, enter her/his name and password in the corresponding fields and then click on the Add /Modify button. To modify the password of a user, first select this user from the users list (causing her/his name and password to appear in the Username and Password fields), change the password and then click on the Add/Modify button.	WEB,USR,ADD
Delete button	To delete a user, first select it from the users list (causing her/his name and password to appear in the Username and Password fields) and then click on the Delete button. The user disappears from the users list.	WEB,USR,DEL
Users list	Lists the names of the users currently allowed to access the Status tab of the Web Server.	

Changing a user password should be a well-considered action. Users should be informed in advance of the planned changes.

Email Notifications

The Email Notifications page is used to define the email parameters allowing a receiver to email notifications to the specified recipient.

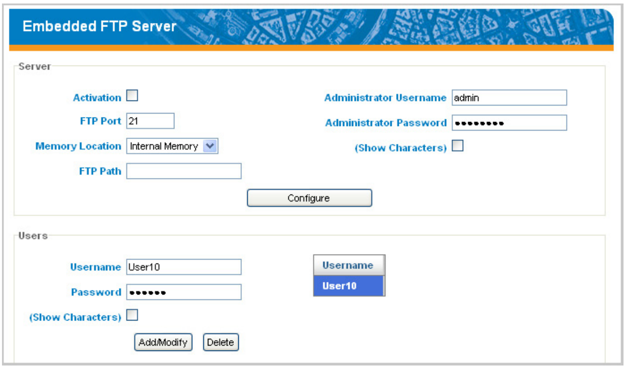


Parameter	Designation	$PASHS
SMTP Server	SMTP server address or hostname (depends on the network to which the receiver is connected)	EML,PAR
SMTP Port	SMTP port number	EML,PAR
Username	Email user name	EML,PAR

Parameter	Designation	$PASHS
Password	Email user password (always hidden; "*" characters appear instead)	EML,PAR
Sender Email Address	Email address used to return messages to the receiver if the email address of the recipient is not found.	EML,PAR
Notification Email Address	Recipient email address to which the receiver sends messages.	EML,PAR
Verbose Level	Email notification level: • No Email Notification • Standard Email Notification: The following events will generate an email: receiver startup, external power shutdown, all high-level alarms raised by the receiver. • Full Email Notification: The following events will generate an email: receiver startup, external power shutdown, all high- and medium-level alarms raised by the receiver.	EML,PAR

Embedded FTP Server

The Embedded FTP Server page is used to activate the embedded FTP server for further use by authorized users. Through this page, you can also define the FTP parameters and manage both the FTP administrator profile and user profiles.



Embedded FTP Server parameters:

Parameter	Designation	$PASHS
Activation	Click on this button to activate the embedded FTP server.	EFT,ON EFT,OFF
FTP port	Enter the IP port of the embedded FTP server. Default is 21, according to conventions.	EFT,PAR

Parameter	Designation	$PASHS
Memory location	Choose the memory attached to the embedded FTP server. This can be the receiver internal memory or a device connected to the receiver via the USB port (USB key or mass storage media).	EFT,PAR
FTP path	Enter the path giving access to the directory users will be authorized to download data from.	EFT,PAR
Administrator username	Keep or change the embedded FTP administrator username.	EFT,PAR
Administrator password	Keep or change the embedded FTP administrator password.	EFT,PAR
(Show characters)	Use this option to show or hide the above password. When hidden, the password is replaced with "*" characters.	-

NOTE: By default, and for convenience, the administrator profile of the embedded FTP server is the same as that of the Web Server. It is your responsibility to decide on whether these two profiles should remain the same or not.

Don't forget to click on the **Configure** button after setting this first set of parameters.

Managing the list of users:

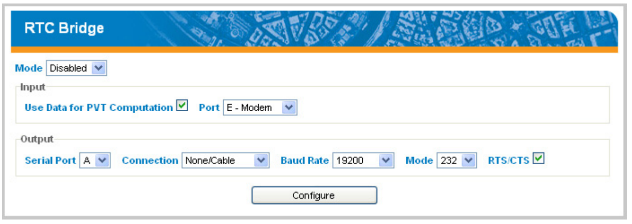
Parameter	Designation	$PASHS
Username	User login	EFT,USR,ADD
Password	User password	EFT,USR,ADD
(Show characters)	Use this option to show or hide the above password. When hidden, the password is replaced with "*" characters.	-
Add/Modify button	To add a new user, enter her/his name and password in the corresponding fields and then click on the Add /Modify button. To modify the password of a user, first select this user from the users list (causing her/his name and password to appear in the Username and Password fields), change the password and then click on the Add/Modify button.	EFT,USR,ADD
Delete button	To delete a user, first select it from the users list (causing her/his name and password to appear in the Username and Password fields) and then click on the Delete button. The user disappears from the users list.	EFT,USR,DEL

Parameter	Designation	$PASHS
Users list	Lists the names of the users currently authorized to use the embedded FTP server.	

Changing a user password should be a well-considered action. Users should be informed in advance of the planned changes.

RTC Bridge

The RTC Bridge page is used to configure the RTC Bridge function in a rover. The RTC Bridge function uses an external radio transmitter connected to the rover via one of the receiver's serial port to transmit RTK corrections to other rovers operated on the same site.



RTC Bridge Control:

Parameter	Designation	$PASHS
Mode	Use this field to enable or disable RTC Bridge.	BRD

Input Port:

Parameter	Designation	$PASHS
Use Data for PVT Computation	Check this button to allow the receiver to use the RTK corrections received on the input port (see below) in its position computation.	BRD
Port	Specify the input port receiving RTK corrections: Ethernet (P) or modem (E).	BRD

Output Port:

Parameter	Designation	$PASHS
Serial Port	Specify the port forwarding the RTK corrections to the external radio transmitter (A, B or F)	BRD

Parameter	Designation	$PASHS
Connection	Specify the radio used ("cable", U-Link TRx, Magellan UHF, Pacific Crest, ARF7474 A or B) to transmit RTK corrections to the other rovers located nearby.	BRD
Baud Rate	Specify the baud rate to be used on the port.	PRT
Mode	(Only if port A is used) Choose between RS232 and RS422 for port A, depending on the device connected to it.	MDP
RTS/CTS	Specify the handshake setting for the port.	CTS

Chapter 4. RTK Configuration Steps

Temporary RTK Base Setup

Prerequisites

- You will need a tripod and a tribrach (not provided) to install the base. You will also need an antenna extension pole fitted with a 5/8" male adaptor (not provided but available as an accessory).
- For a long-range radio link, i.e. more than 1 mile or 1.6 km, for which the radio antenna should be placed as high as possible, it is good practice to install the antenna on top of an antenna pole secured on a tripod (neither of these items is provided).
- To power an external radio, you need a 9-30 V DC power source. Using a standard 12 V DC battery is a convenient choice. In this configuration, the ProFlex 800 can be powered either from the same power source (recommended), using cable P/N 802143, or from its internal battery.

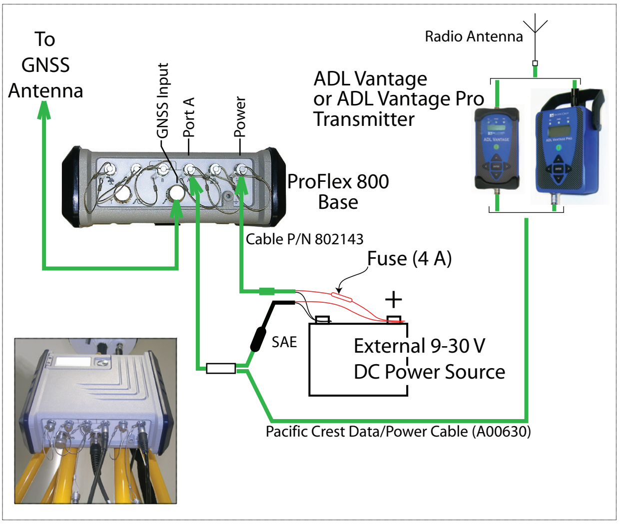
  Powering the ProFlex 800 from the external battery offers two advantages:

  1. Operating sessions can be extended significantly.
  2. The external battery operates as a trickle charger for the ProFlex 800's internal battery.

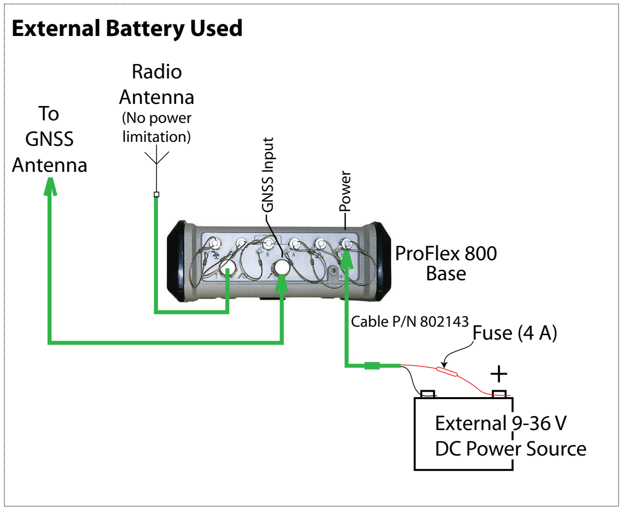
- For a ProFlex 800 fitted with an internal transceiver, the level of RF power radiated by the UHF antenna depends on the type of DC source used to power the receiver:
  – Internal battery used: The RF power is limited to 100 mW whatever the requested level of power.
  – External DC power used: The RF power level is as requested (not intentional limitation).

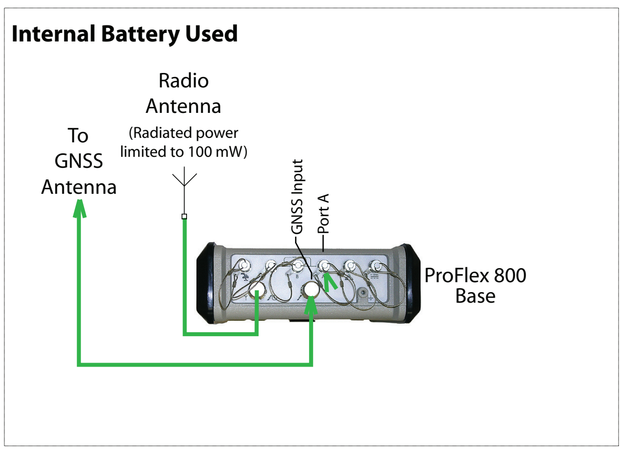
ADL Vantage (Pro) Radio Link

The connection diagram is as follows. The use of port A is recommended on the receiver side. However, any of the other serial ports may be used as well.


To
GNSS
Antenna
GNSS Input
Port A
Power
ADL Vantage
or ADL Vantage Pro
Transmitter
Radio Antenna
ProFlex 800
Base
Cable P/N 802143
Fuse (4 A)
+
SAE
External 9-30 V
DC Power Source
Pacific Crest Data/Power Cable (A00630)

Embedded Transceiver (ADL Foundation)



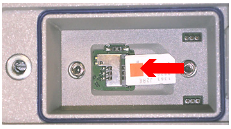


RTK Rover Setup

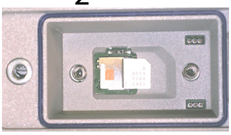
Prerequisites

- Insert a freshly charged battery into the ProFlex 800.
- Use a range pole fitted with a 5/8" male adaptor at the upper end (not provided).
- Mount the GNSS antenna at the top of the range pole.

1



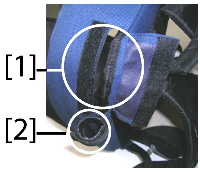
2



- Connect coaxial cable P/N P076510A to the GNSS antenna.
- If a radio link is used with the base, your rover should normally have been fitted with the radio receiver kit that matches the reception band covered by the radio transmitter used at the base.
- If a GPRS connection is used, your rover should normally have been fitted with the SIM card that will allow it to perform a network connection.

  To connect a SIM card, open the trapdoor and remove the battery. The SIM card can be inserted in a dedicated socket located at the bottom of the compartment. Insert the SIM card as shown on the picture.

Preparing the Backpack



1. Unzip the larger compartment of the backpack.
2. Insert the different cables needed into the backpack. All cables can pass through either of the velcro flaps **[1]** located at the top of the backpack.
   - **GNSS antenna**: Insert the TNC end of the 1.50 m “Quick Release” cable (P/N P076500A) into the backpack through one of the velcro flaps, then make it run along the inner edge of the compartment, down to where the rear panel of the receiver will be located once placed in the backpack.
   - **Data Link**:

     If cellular communication is used to receive RTK corrections, no special cable is needed.

     If a radio is used to receive RTK corrections, insert the UHF range pole into the side compartment of the backpack. Secure the pole using the short velcro strap **[2]** located on top of the side compartment. Pass the attached coaxial cable through a velcro flap **[1]**, then make it run along the inner edge of the main compartment, down to where the rear panel of the receiver will be located once placed in the backpack.
   - **Communication with field terminal**:

     If Bluetooth is used, no special cable is needed.

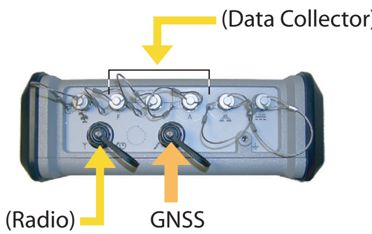
[3]

If wired communication is used, pass the Fischer end of serial data cable P/N 700461 (provided) through a velcro flap, and again make it run along the inner edge of the compartment, down to where the rear panel of the receiver will be located once placed in the backpack.

3. Anchor all the cables together, inside the compartment, using the short velcro straps **[3]**.
4. Insert the ProFlex 800 into the compartment in such a way that the rear panel is facing the bottom of the compartment **[4]**.

[4]

5. Connect all the ends of the cables present at the bottom of the compartment to the rear panel. The required connections are:
   - GNSS cable to GNSS Input #1 (mandatory)
   - UHF radio cable to UHF input (if a radio is used)
   - Serial data cable to the serial port of your choice (if a serial link is used with the field terminal).



[5]

6. If needed, connect the following antennas directly to the front panel of the receiver:
   - Bluetooth antenna, if wireless communication with the field terminal is preferred to a serial link.
   - Cellular antenna, if the internal cellular modem is used to receive RTK corrections.
7. Secure the receiver inside the backpack by tightening the three pairs of Velcro straps **[5]** over the case. If internal antennas are used, some straps should be positioned in such a way that the antennas can pass through the slots designed into these straps.
8. Turn on the ProFlex 800 and close (zip) the compartment.
9. Place the backpack on your back.

10. Connect the free ends of the quick-release coaxial cables together. This connects the GNSS antenna to the receiver.
11. Secure your field terminal on the range pole and turn it on. You are now ready to start using your system.

[6]

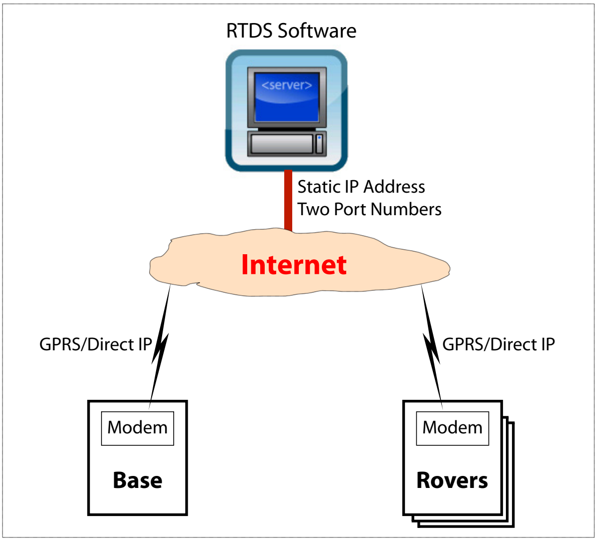
If you are using an external cell phone for acquiring RTK corrections, place it in the mesh pocket **[6]** located on the left-hand belt of the backpack.

Direct IP Connection To Your Own Base Through GPRS Modem and RTDS Software

Introduction

Until recently, Direct IP connections from Spectra Precision rovers were possible only with third-party reference stations. Today, with the Spectra Precision RTDS[1] software, you can also have your own base transmitting its corrections to your rovers through a Direct IP connection.

In this configuration, the RTDS software serves as the relaying device between the base and the rovers. The presence of a relaying device is required because modems are assigned an IP address by the network when they connect to it, and this IP address cannot be known ahead of time for both modems. The RTDS software solves this problem by providing a fixed IP address through which that base and rover modems can communicate.



Software Requirements & Features

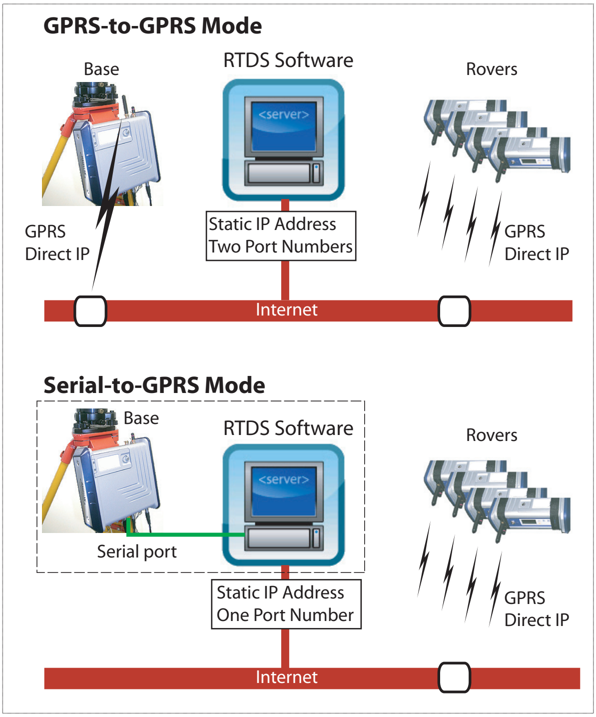
- The computer used to run the RTDS software is Internet-accessible through **a static IP address** and one or two port numbers.

1. RTDS for Real Time Data Server

- Several instances of the RTDS software can be run on the same computer, meaning the same computer can serve as data relay for several bases.
- Up to 100 rovers can receive data from a single instance of the RTDS software. All rovers communicate with a given instance of RTDS through the same port number.

Configuration Modes

The diagram below summarizes the possible two cases of use for the RTDS software with your system.



In Serial-to-GPRS mode, the base and the computer running RTDS are at the same location since a conventional RS232 serial line is used to connect one to the other.

Getting Started With RTDS

The implementation procedure can be outlined as follows:

1. You first need to know which IP address should be entered in your surveying system to establish a Direct IP connection to the RTDS software.

Unless you already have a static IP address, or if you don't know whether you have one or not, call your Internet Service Provider (ISP) to obtain **a static IP address** for the computer on which you will install the RTDS software.

With most ISPs, you'll have to pay a fee to get a static IP address option for your computer.

2. You then have to choose one or two **port numbers**. depending on whether you will be using the GPRS-to-GPRS or Serial-to-GPRS mode.

   In theory, port numbers can range from 1 to 65536 but No. 1 to No. 1024 are considered as reserved numbers.

   There are also conventions recommending the use of specific port numbers for specific applications. For example, all GNSS-related data exchanged on the Internet are usually routed through port 2101. This port number can then be chosen (plus others if necessary, for example, "2102", "2103", etc.), but remember that any numbers greater than 1024 may be chosen, provided they are not used on your computer for some other application.
3. Take the necessary steps to allow data to flow freely between RTDS and your surveying system through the chosen port number(s). This means you have to declare the use of this port (or these ports) in the ADSL modem firewall (or gateway), and possibly in the computer firewall. You may need some advice from your computer specialist to complete this operation.

   If your computer is part of a local network (LAN), ask the network administrator to perform the required network address translations (NAT) and declare the port numbers used so the data arriving at the public IP address can be routed to your computer through its local IP address and port.
4. Install the RTDS software on your computer. This is an easy step during which you just have to run the "Spectra Precision Real Time Data Server x.x-x setup.exe" file provided, then follow the instructions to complete the installation phase.
5. Determine whether you need to use the GPRS-to-GPRS or Serial-to-GPRS mode (see above), depending on your application. Choose the base location and computer location accordingly.
6. On the computer, launch RTDS and make the appropriate settings (plus make the serial connection if the Serial-to-GPRS mode is selected). See *RTDS on-line help* for more details.

7. Start the RTDS server and let the software run throughout your field survey, or permanently if you wish to set up a community base station.
8. Set the base in Direct IP mode so that it sends its corrections to the RTDS software. When defining the Direct IP connection, you need to enter:
   - The static IP address of the computer running the RTDS software.
   - The port number assigned to the base connection in the RTDS software (as entered in RTDS Software's **RTDS Config>Port Config>Base Port** field).

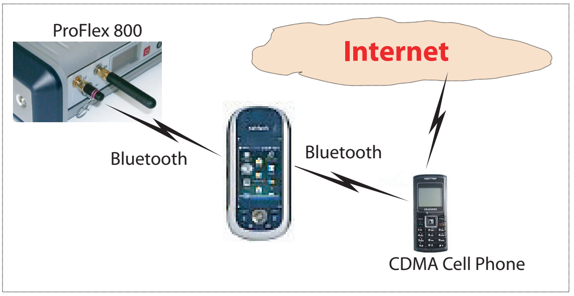
   The RTDS operator will see the base-to-server arrow blink when corrections are received from the base. The IP address of the base will appear under the base icon. The incoming data throughput will be indicated just underneath the blinking arrow.
9. Set the rover in Direct IP mode in order to receive corrections from the RTDS software.
   - The static IP address of the computer running the RTDS software.
   - The port number assigned to the rover connection in the RTDS software (as entered in RTDS Software's **RTDS Config>Port Config>Rover Port** field).

   On the rover side, wait until the data link icon appears on the front panel. When this happens, corrections are received and at least a float solution is available.

   The RTDS operator will see the server-to-rover arrow start blinking when at least one rover queries the server for corrections. The outgoing data throughput is also indicated just underneath the blinking arrow.

Using a CDMA Cell Phone for Network Connection

Your receiver is fitted with an internal GSM/GPRS modem but can also be operated with an external CDMA cell phone, as illustrated in the diagram below.



The CDMA connection is entirely controlled from the data collector, which will automatically forward corrections to the receiver via a Bluetooth link

The procedure for operating a rover with a CDMA cell phone can be outlined as follows:

For detailed information on steps 1-4, refer to "CDMA Connection Using an External Cell Phone" (pages 21-23) in the "Handheld Platform for ProMark120/220" Getting Started Guide.

1. On the data collector, you may need first to edit the default dialup string.
2. Use Bluetooth Manager on the data collector to detect the cell phone. When this is done, pair the data collector with the cell phone. This will ease and speed up future connections.
3. On the data collector, use the **Start>Settings>Network and Dial-up Connections** utility to create a dial-up connection to your Internet Service Provider.
4. Make this connection active.
5. On the data collector, take the necessary steps to make sure your receiver is configured to receive corrections via Bluetooth from the data collector.

   For example, if you are using FAST Survey, go to **Equip>GPS Rover**, **RTK** tab and select "Data Collector Internet" in the **Device** field. Select the desired connection type in the **Network** field (NTRIP, etc.). Assuming the connection data have already been entered for the selected mode, your rover should start receiving corrections and rapidly switch to the FLOAT then the FIXED position status.

Chapter 5. ProFlex 800 CORS Station

What is ProFlex 800 CORS?

ProFlex 800 CORS is a rugged and high-performance CORS reference station. Designed as an extension of the ProFlex 800 receiver, ProFlex 800 CORS integrates the best of today's technologies, including the exclusive Z-Blade™ algorithms and multi-constellation (GPS+GLONASS+QZSS+GALILEO+SBAS) capabilities.

The main features of ProFlex 800 CORS are the following:

- Embedded Z-Blade technology guarantees outstanding quality, availability and reliability of raw data acquisition, providing the best possible measurements from four GNSS constellations: GPS (including L5), GLONASS, SBAS, QZSS and GALILEO.
- Extended internal memory (8 Gbytes) for data storage.
- Embedded and password-protected *Web Server* giving the owner full remote control of the reference station via an Internet connection. The Web Server returns web pages on the owner's computer that give the owner the capability to monitor the operation of the reference station, or change partially or completely its settings.
- Generation of raw data files entirely manageable through the Web Server. Data recording is organized as sessions, with preset duration, ensuring round-the-clock data recording, day after day and year after year.
- Raw data files can be converted to Rinex 2.11, Rinex 3.01, Hatanaka or TarZ before being made available to users. RINEX conversion is performed on the fly (RINEX file is available immediately after a session is finished to meet rapid and ultra-rapid IGS services requirements). Up to two RINEX files with two different periods can be generated simultaneously.
- Embedded *Ring File memory* function offering unlimited use of the storage medium. Enabling this function will allow the oldest files in memory to be automatically

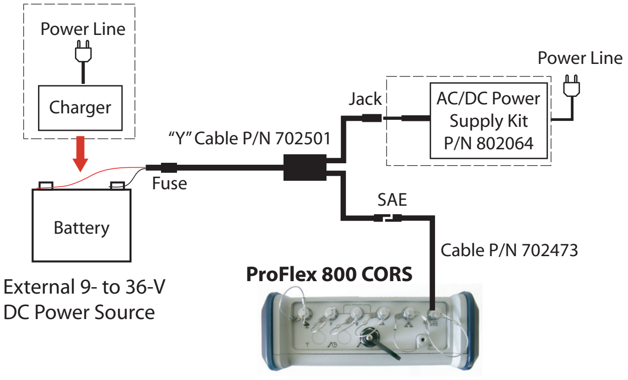
deleted if necessary to provide storage space for current files being recorded.

- Raw data files can be pushed automatically to an external FTP server. A backup FTP server can also be planned, either as a fallback FTP server in case the primary FTP fails, or as a second repository for data files.
- *Embedded NTRIP caster* (firmware option) offering the possibility of implementing a complete network service according to the NTRIP protocol. Using this protocol makes it possible to access various sources of data from different base stations through a single Internet connection, as well as efficiently protect these sources of corrections from unauthorized users.

  The embedded NTRIP caster allows you to organize a network of up to 10 different mount points (each of them receiving corrections from an NTRIP server) and up to 100 users given the ability to receiver corrections through these mount points.
- Smooth integration of meteorological and tilt data. Meteo and tiltmeter sensors fully controlled by the receiver.
- *Embedded FTP server* allowing the administrator to perform maintenance steps remotely or allow authorized users to download raw data files directly from the receiver.
- Automatic email notifications informing the administrator of possible malfunctions in real time.
- High degree of flexibility inherited from the ProFlex 800 receiver. In addition to delivering raw data files in ATOM or Rinex format, the ProFlex 800 CORS can deliver simultaneously real-time RTK corrections in ATOM (configurable), RTCM2.3, RTCM 3.0 & 3.1 or CMR format through various means:
  – As an IP server or client delivering different streams of raw data through up to nine virtual IP ports (**Ethernet data streaming**).
  – As an “**NTRIP Server**”, delivering its corrections to the embedded NTRIP caster (firmware option) or to an external or third-party NTRIP caster. Up to two independent NTRIP servers can be set up in the ProFlex 800 CORS.
  – Through Direct IP
  – Through a UHF radio link
  – Through its built-in GSM modem.

How to Safely Power the ProFlex 800 CORS

The setup below is recommended to power the ProFlex 800 CORS as it provides efficient protection from possible power cuts. The slide switch located in the battery compartment should be set to ON (pushed to the right) to make sure the receiver will start automatically after a power shutdown.



Note that the battery used will not be charged from the AC/DC supply kit. You will need a specific, separate charger for this purpose.

The ProFlex 800 CORS can still use its internal battery in this configuration to extend the operating time in case of persisting power cuts.

Display Screens

If you press the Scroll button several times, you will see the following displays successively.

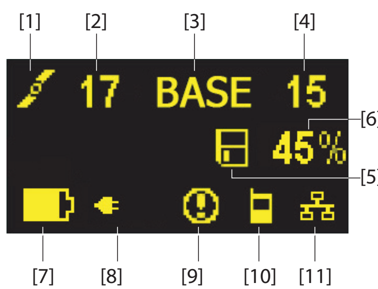
Power-On Screen

When you power on the receiver, the Ashtech logo appears on the screen. It is displayed until the receiver has completed its auto-test (this takes about 30 seconds).

Then the General Status screen is displayed.

General Status Screen

An example of General Status screen is shown below.



This screen displays the following information:

- : Satellite icon **[1]** (always displayed).
- Number of satellites tracked **[2]**.
- BASE **[3]**: A label indicating that the receiver is used as a base.
- Number of satellites used **[4]**: Number of satellites processed by the reference station and for which corrections are made available to users. These satellites are also used to compute an SDGPS solution of the base position. This solution is permanently available on the position computation screen (see *Position Computation Screen on page 228*).

- Raw data logging icon **[5]**:

	Data recording through front panel Log button or using Recording submenu in the Web Server: – Blinking: Raw data logging in progress – Fixed: No raw data logging in progress.
	Data recording through sessions: – Blinking: Raw data logging in progress – Fixed: No raw data logging in progress.
	ATL data recording for advanced diagnosis.

- Percentage of free memory in the storage medium used **[6]**.
- : Battery icon **[7]** with visual indication of remaining charge. If an external power source is used (AC adapter or external battery), the battery icon will be animated to indicate battery charging in progress.

   is displayed when there is no battery in the compartment and the receiver is operated from an external power source.
- Power status **[8]**.

Icon	Definition
Percent value	Percentage of remaining battery. This indication will flash when the remaining energy drops below 5%. When an internal battery is used with external power applied, this icon alternates between the plug and the percentage of charge on the battery.
	Replaces percentage when an external power source is used.

- Alarm status **[9]**.

Icon	Definition
	Alarm detected. Press the Scroll button to view the alarm type. Press it again to acknowledge the alarm, which then disappears from the list. Unless there is another alarm in the queue, in which case you will have to resume the acknowledge sequence, the screen then displays the memory screens.
None	No alarm detected

- GSM module (modem) status **[10]**. This may be one of the following icons:

Icon	Definition
Blank	Modem turned off.
	Blinking icon: Modem turned on but not initialized yet. Indicates signal strength at modem antenna input. Fixed icon: Modem turned on and initialized (ready for a connection). Indicates signal strength received at modem antenna input. The higher the number of bars, the better the signal. This icon will show four horizontal bars at the bottom when the input signal is zero. The symbol shown in the upper-left corner stands for “2G”. When the modem detects a 3G network, “3G” is displayed instead.
	Modem on line.

- **[11]**: USB status and/or Bluetooth status and/or Ethernet port status.

Icon	Definition
	USB port connected to active device
	Bluetooth active
	Ethernet port active
/	These two icons will appear successively when both the USB port and Bluetooth are active.
/ /	These three icons will appear successively when the USB port, the Ethernet port and Bluetooth are all active.
Blank	USB port unconnected and Bluetooth inactive.
Blank	USB port unconnected, Bluetooth and Ethernet inactive.

Memory Screens

From the General Status screen, press the Scroll button to access the Memory screens. Memory screens appear successively (see examples) at a display rate of about five seconds:

Left screen:

- First line: Percentage of free space in the internal memory.
- Second line: Number of files currently stored in the internal memory.
- Third line: Percentage of free space on the USB mass storage device.
- Fourth line: Number of files currently stored on the USB mass storage device.

Right screen:

- First line: Total space occupied by the files currently stored in the internal memory.
- Second line: Nominal size of the internal memory.
- Third line: Total space occupied by the files currently stored on the USB mass storage device.
- Fourth line: Nominal size of the USB mass storage device.

About the "*" symbol:

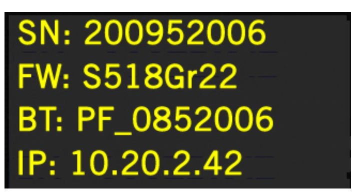
- It can only appear at the end of the first or third line.
- Where placed, it indicates that this storage medium is used for data logging.

What if there is no USB mass storage device connected to the receiver?

- Parameters relevant to the USB key size and space used and available are void (three dots displayed instead).
- Number of files is forced to "0".

Receiver Identification Screen

From any of the two Memory screens, press the Scroll button to access the Receiver Identification screen. See example below.



- Receiver Serial Number
- Firmware Version
- Receiver Bluetooth Identifier
- IP Address

Position Computation Screen

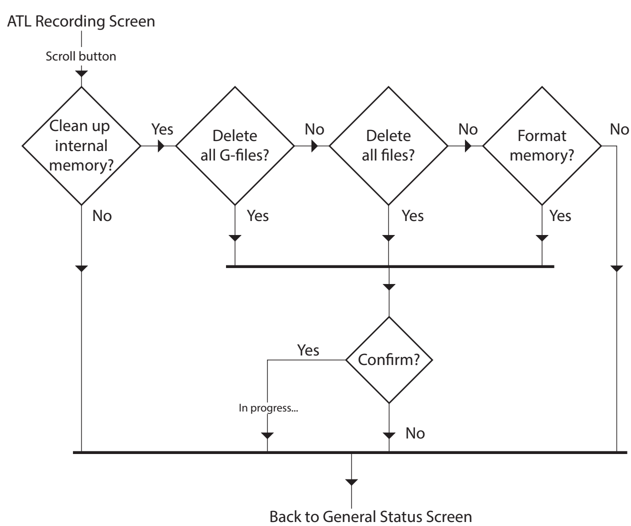
From the Receiver Identification screen, press the Scroll button to access the Position Computation screen. This screen displays the latitude, longitude and ellipsoidal height of the reference position assigned to the base (not a computed position). See example below.

The upper line contains the same information as in the upper line of the General Status screen.

A new press on the Scroll button will take you to the ATL Recording screen (see below).

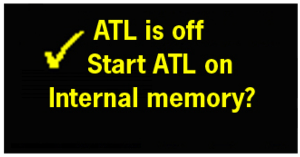
Memory Management Screen

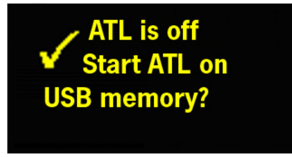
From the ATL Recording screen, press the Scroll button to access the Memory Management screen. The flowchart below summarizes the different tasks you can perform at this point in the management of the receiver memory.



ATL Recording Screen

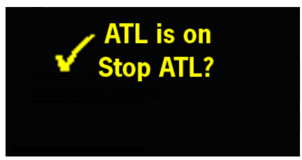
Pressing the Scroll button from the Position Computation screen will take you to the ATL Recording screen, which looks like one of the following, depending on whether a USB key is connected to the receiver (below, right) or not (below, left).





You don't normally have to record ATL data, but if for troubleshooting purposes, the Technical Support asks you to do so, then proceed as follows:

- Press the Log button (left-hand button). This will cause the receiver to start recording ATL data on the specified storage medium. The screen will then look like this:



  You can then freely use the Scroll button to access other receiver screens without affecting the ATL data collection in progress (pressing the Scroll button from this screen will take you back to the General Status screen).

- When enough ATL data have been recorded (Tech Support will usually indicate the duration of ATL data collection needed for troubleshooting), then come back to the ATL Recording screen and simply press on the Log button again to stop the recording.

NOTE 1: ATL data recording is totally independent of raw data recording: controlling ATL recording is done exclusively from the ATL recording screen, and raw data recording from any other screen.

NOTE 2: Before connecting a USB key to record ATL data, make sure there is no *.par files saved on the key as the presence of this type of file would initiate some other functions in the receiver.

Screen Backlight

The screen backlight is automatically turned off if no key is pressed for 1 minute. When the backlight is off, a short press on the Scroll button will turn it back on. The Scroll button will then recover its usual functions.

Data Transfer Screen

For more information on the screen displayed when downloading files, refer to *Downloading Raw Data on page 715*.

Introduction to ProFlex 800 CORS Configuration

Introductory Notes

This section more particularly focuses on how to successfully configure the ProFlex 800 CORS using the ProFlex Web Server. A few status screens are also presented.

It is assumed that you have all the information needed[1] to perform an IP connection from your computer to the ProFlex 800 CORS. This also implies that the Ethernet port is used on the receiver side, and you can run the receiver's embedded *ProFlex Web Server* from a web browser (Microsoft Internet Explorer, Mozilla FireFox, etc.) installed on your computer.

Note: If you need more information about how to make an IP connection to the receiver and run the Web Server from a local or remote computer, please refer to Getting the ProFlex 800 Ready for Running the Web Server on page 42.

The specific functions expected from a CORS station such as the ProFlex 800 CORS are to generate, convert, sort and distribute raw data files of preset duration (typically one hour). Raw data files may be delivered in native (ATOM) or Rinex format and also include meteo/tilt data from external sensors connected to the station.

Typically, raw data files are made available to users via an FTP server to which ProFlex 800 CORS automatically pushes the files as they are created. A second server can be set up as a backup FTP server.

While ensuring these primary functions, and like any Spectra Precision ProFlex 800 base, the ProFlex 800 CORS station can also provide real-time RTK corrections in different formats (ATOM, RTCM, CMR, DBEN) and through different means (Internet, radio, GSM modem), including the embedded NTRIP caster.

The different steps to learn how to configure a ProFlex 800 CORS station using the ProFlex Web Server may therefore be summarized as follows:

1.CORS station IP address, administrator login and password.

1. First steps with the ProFlex Web Server: Opening the ProFlex Web Server **Home** page to read the information identifying the receiver your computer is connected to. Then opening the **Status** tab to read receiver status information on the ever displayed **Status bar**.
2. Opening the **Configuration** tab to enter the general settings common to any base or reference station.
3. Still on the **Configuration** tab, entering the settings specific to the ProFlex 800 CORS. Before doing that, we encourage you to read the following topics:
   – Creating sessions
   – Raw data types and files collected during sessions
   – Storing G-files collected during sessions
   – Convering/deleting G-files collected during sessions
   – Moving files originating from sessions
   – Pushing files originating from sessions to an external FTP server
   – Recording raw data outside of any sessions
   – Embedded NTRIP caster
   – E-mail notifications
   – Embedded FTP server
   – External sensors.
4. Setting ProFlex 800 CORS to also deliver real-time RTK corrections.
5. Reading a few Status pages to check that the ProFlex 800 CORS is operating as expected.

The remainder of this chapter provides a detailed description of these five configuration steps.

Creating Sessions

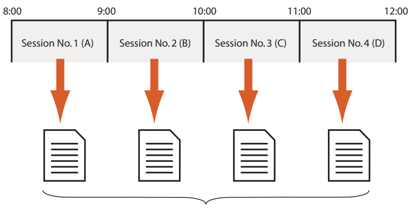
Sessions are periods of time in a day during which you want automatic raw data recording to take place.

In parallel, the receiver can be configured to be powered down automatically at the end of each session (sleep mode). It will wake up automatically just before the next session starts. However, the receiver will actually go to sleep mode only if there is enough idle time between your sessions.

Up to 96 sessions can be created per day.

Sessions are repeated every day.

The duration of a session will determine the period of time covered by the raw data file recorded during that session. For example, a one-hour session will result in a one-hour raw data file.



Sessions can be created either automatically (in this case they are all of the same duration), or created individually through a manual procedure.

The two methods can be combined. For example, sessions can first be created automatically and then adjusted manually and individually, if necessary. The following parameters can be edited for each session individually: session start and end times, recording interval and data recording control. No session overlapping is allowed. Doing so would trigger an alarm.

Creating sessions spanning over 24 hours gives a station operating round the clock.

Sessions are numbered from 1 to 96 max. Each session has a session ID. Session IDs are assigned as follows:

- Sessions No. 1 to No. 24: A-X
- Sessions No. 25 to No. 48: AA-XA
- Sessions No. 49 to No. 72: AB-XB
- Sessions No. 73 to No. 96: AC-XC

Note: Data recording can also take place out of any sessions through the ProFlex Web Server's Recording function.

Two additional options are available that may affect the way the programmed sessions are executed:

- **Reference Day** (1-366): This is the day when the execution of the programmed sessions should start. This option should be used when you want your station to start executing its sessions only several days after having configured the station.

  The principle is the following: If the current day is prior to the **Reference Day**, the station will wait until that day before starting executing the sessions. If it is after, the station will be allowed to start the sessions on the current day, according to the programmed sessions.

For example, with **Reference Day**=33 (Feb 2), if the current day is 30 (Jan 30), the station will start the first session only in three days, whereas if the current day is 51 (Feb 20), the station will start the programmed sessions on that day.

If you do not need to postpone the execution of the sessions, keep the default value (1) for this option.

- **Offset per Day** (in minutes and seconds): This option is specifically designed for users who wish to have the same sky view of the GPS constellation every day. As the time when the GPS constellation comes back to a given sky view happens 4 minutes earlier every day, setting this option to 04’00” will correct for this offset (i.e. this will allow the same GPS sky view to be observed every day through the same session).

  With **Offset per Day**=4’00”, a session initially set to start at 9:00 for example will start at 8:56 on the second day, at 8:52 on the third day, etc. The same rule applies to the session end time, and to all the other programmed sessions.

  If you do not need to offset the sessions, keep the default value (0’00”) for this option.

Raw Data Types and Files Collected During Sessions

The type of raw data collected during sessions are all those you have set on the **R port**. In addition, the amount of the raw data collected is tied to the elevation of the satellites tracked (**Recording Elevation Mask**).

Raw data are saved as *G-files*, using the same naming convention as the one used in manual recording. A specific **Site Name** can be defined for files recorded through sessions. The file naming convention used is recalled below:

G<SiteName><Index><Year>.<Day>

Example: GPT12C10.30 is the third G file generated on Jan 30, 2010 on a site named PT12.

Storing G-Files Collected During Sessions

G-files are saved either in the receiver’s internal memory or on a USB device, i.e. on the mass storage device connected to the receiver via its USB port. With this last option used, a really huge amount of memory can be associated with the receiver. In both cases, G-files are all indistinctly saved in the root directory of the selected storage device.

At this stage, special mention should be made of the **Ring File Memory**. With this option activated, the reference station will be able to collect data for an unlimited period of time without external intervention. In practice, this option will allow the receiver to automatically delete the oldest G-file when the amount of available free memory (in the selected storage device) falls below 15 Mbytes.

Converting/ Deleting G-Files Collected During Sessions

G-files can be converted to Rinex 2.11 or 3.01, with or without the Hatanaka option. This will happen only if ATOM navigation data are included in the G-file (the conversion will otherwise fail).

The receiver can automatically complete the RINEX file header while converting G-files to RINEX files. The fixed additional information you would like the receiver to insert into that header can be entered using **Sessions > Settings** on the ProFlex Web Server.

The recording rate for RINEX files may be different from the one used to collect the original G-files. It cannot however be less than 1 second.

A second RINEX file may be generated in parallel to the first one, possibly with a different rate. This file will be stored automatically in a subfolder named: “data_<rate_in_seconds>”.

If G-files are converted to Rinex, the resulting files can in addition be zipped in TarZ format.

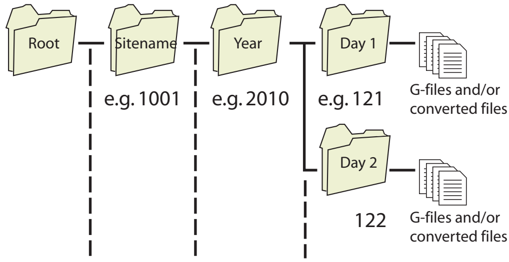
The file conversion/compression may be followed by the deletion of the original G-file, if desired.

Moving Files Originating from Sessions

The collected G-files and converted files may be moved to another location on the receiver. The purpose is to be able to sort the files according to the date of creation and the site of data collection.

The storage medium used in the File Move function may be different from the one initially used to store G-files. For example, the receiver may be asked to store the original G-files in its internal memory and then you can ask that the G-files and converted files be moved to the USB device.

When doing that, the receiver will automatically create subdirectories according to the rules you will have specified earlier. Typically, the receiver may create this type of tree structure as new files are collected:



Organizing the storage of the files is simply obtained by typing the appropriate codification of the subdirectories in the field named **Sub-directory Name Format**. This field uses a specific syntax with case-sensitive characters. A typical syntax used is the following:

S/Y/D

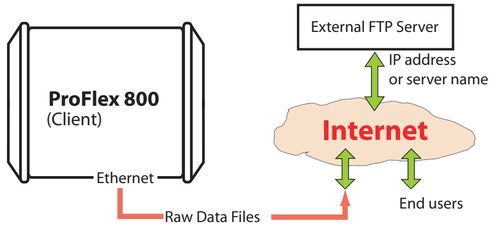
Where each letter tells the receiver in which order to create the subdirectories and how to name them (see table below).

Character	Description
s or S	4-character sitename
Y	4-digit year (2010= 2010)
y	2-digit year (10= 2010)
m	2-digit month (01= January)
M	3-character month (Jan= January)
d	2-digit day in month (1-31)
D	3-digit day in year (1-365)

Pushing Files Originating from Sessions to an External FTP Server - Backup FTP Server

Parallel with the File Move function, the converted files may be pushed automatically to an external FTP server through an IP connection, using the FTP communication protocol (activate the **Automatic Transfer** option).

End users will then be able to connect to that FTP server (primary FTP server) for downloading the data they need for their applications.



The reference station being the client for this transfer, you need to enter the IP address (or host name) and IP port of the remote FTP server, and also enter the login and password that will let the receiver upload its files to the server without any problem.

You can also sort the files while transferring them to the FTP server. This is done using the same method as in the Move File function (a dedicated **Sub-directory Name Format** field also exists in this case of use).

By default the created tree structure is attached to the root directory of the FTP server. Using the **Path** field, you can attach the tree structure to the subdirectory the FTP server owner will have assigned to you. For example, typing **Path**= CORS5212 or **Path**= /CORS5212/ (the first and last slashes are optional), means your subdirectories will be created in the CORS5212 subdirectory.

You can ask the receiver to delete the files from the receiver after it has pushed them to the external FTP server. This is achieved by enabling the **Delete Files After Transfer** option.

To make sure the files are always available to users, a backup FTP server can be made ready. The backup FTP server will use the same file organization as the one defined for the primary FTP server (through the above-mentioned **Sub-directory Name Format** field). The backup FTP server can be used in two different ways:

- Temporarily, following a failure of the primary FTP server. The backup FTP server will then instantly take over the role of the primary FTP server.

  At the beginning of each new session, the ProFlex 800 CORS checks to see if the primary FTP server is back to work and accessible. If that is the case, files will be pushed back to the primary FTP server (and the backup FTP server will stay idle in the background).

- Permanently, as a second repository for all the files collected by the CORS station.

Recording Raw Data Outside of Any Sessions

Raw data recording can also take place outside of any sessions. What's more, it can take place simultaneously with data recording performed through the programmed sessions.

This alternate recording capability can be controlled through the **Configuration** - **Recording** submenu in the ProFlex Web Server.

Like with sessions, this type of data recording produces a G-file but the recorded data are those set on the port corresponding to the storage medium used (and not on port R). If for example the internal memory is used to save the G-file, then the recorded data will be those set on port M.

The settings are very similar to, while independent of, those found for sessions (i.e. sitename, recording elevation mask, observation mask, recording interval). For example raw data can be collected at 1 Hz through sessions while those collected through the Recording function may be at 20 Hz. Also a different site name may be used so that you can easily identify those generated through the Recording function from those generated through sessions.

When logging raw data using the Recording function, the duration of the raw data files is controlled by the **Split Data into Preset Duration Files** parameter:

- If it's disabled, a single raw data file will be created with unlimited duration and size.
- If it's enabled and a duration is selected, the receiver will create as many files as necessary, all of them being of the requested duration.

As with sessions, the **Ring File Memory** option may be used in this case to manage the free memory space. When there's only 15 Mbytes left in memory, the older raw data file will be deleted to keep the level of free memory at around 15 Mbytes. Note that when activated, the **Ring File Memory** option applies to both the Recording and Sessions functions.

NOTE: This function only exists as a $PASHS command ($PASHS,RFB). Activating this function will make inaccessible the **Split Data into Preset Duration Files** parameter on the Web Server.

Embedded NTRIP Caster

Introduction

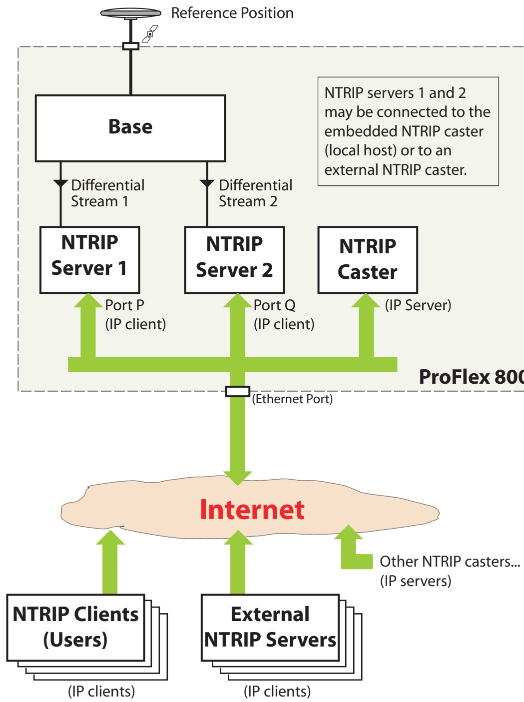
The *Embedded NTRIP Caster* allows you to build your own NTRIP network solution around the ProFlex 800 CORS station.

The embedded NTRIP caster can handle a total of 100 users and 10 mount points. The number of 100 users should be understood at the total number of possible users, irrespective of the mount points they are using. For example, if 90 users are connected to mount point *n*, then only a total of 10 users can be connected to any of the other mount points.

One of the distinguishing features of ProFlex 800 CORS is its capacity to accommodate internally two NTRIP servers directly “feeding” the embedded NTRIP caster. The other NTRIP servers, if any (up to 8), will therefore be all external to the ProFlex 800 CORS.

- The two internal NTRIP servers will both provide correction data from the “base” section of the ProFlex 800 CORS (see figure below), typically in different formats.
- *Internal NTRIP server 1* uses Ethernet port P to deliver its correction data to the caster. The correction data are internally routed from the base either through the internal modem or directly via Ethernet.
- *Internal NTRIP server 2* uses Ethernet port Q to deliver its correction data to the caster. The correction data can only be routed internally from the base via Ethernet.

The figure below shows the internal architecture of the ProFlex 800 CORS when the *Embedded NTRIP Caster* firmware option is enabled and running and two internal NTRIP servers are also set up and running.

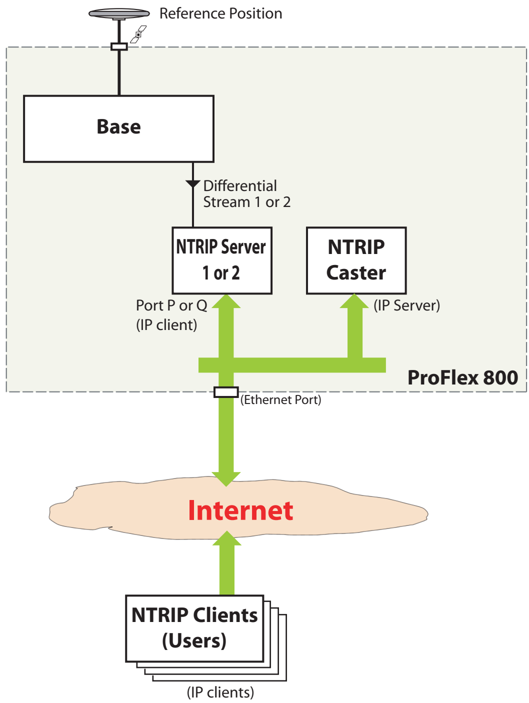


In its simplest configuration, the embedded NTRIP caster can be used to emulate the Direct IP mode (i.e. IP connection to a unique source of corrections), with the additional advantage that, contrary to conventional Direct IP, the embedded NTRIP caster can offer an effective protection of the source of corrections by restricting its use to the sole authorized users.

In this application, the ProFlex 800 CORS makes use of both its embedded NTRIP caster and an internal NTRIP server (see figure below):

- In the NTRIP caster, a single mount point is available and all declared users are allowed to use this mount point.
- The internal NTRIP server is connected to the NTRIP caster's unique mount point.

The result is that only the NTRIP caster users are allowed to use the source of corrections.



NTRIP Caster Control & Monitoring

The ProFlex Web Server provides an easy way to remote control and monitor the Embedded NTRIP caster.

Once the Embedded NTRIP Caster firmware option has been activated in the receiver, the Web Server shows the **Embedded NTRIP Caster** option both in the Status and Configuration menus.

On the Configuration menu, the **Embedded NTRIP caster** option is split into three submenus:

- The **Settings** submenu allows you to control the NTRIP caster function (ON/OFF), declare the public IP address of the caster, specify the unique password that all NTRIP servers will need to provide if they want to be authorized as a recognized source of corrections for the caster, and the maximum number of simultaneous connections accepted per user (default: 1). The submenu also allows you to provide all the informative data usually found in an NTRIP source table (this information is forwarded to users when querying the NTRIP caster).

- The **Mount Points** submenu allows you to define each of the possible 10 mount points of the NTRIP caster. Choosing the name of a mount point is important:
  - it is through that name that NTRIP servers can connect to the NTRIP caster.
  - it is through that name that users can choose which base station they want to receive correction data from.

  Informative data for each mount point can also be defined on this submenu, such as the approximate position of the base that will provide correction data through this mount point, the country where it's located, and whether using the data from this base is free or not.

  Each mount point definition appears in the table at the bottom of the page. You can easily modify each of them by selecting the corresponding row in the table.
- The **Users** submenu allows you to define all the possible users of the NTRIP caster. Defining a new user includes specifying a user name and password, as well as the allowed mount points. Refer to *Protecting Mount Points on page 242* for more information on the impact of explicitly assigning mount points to users.

  Each user definition appears in the table at the bottom of the page. You can easily modify each of them by selecting the corresponding row in the table.

On the Status menu, the **Embedded NTRIP caster** option is split into three submenus:

- The **Current** submenu provides the list of mount points through which sources of correction data are currently available, as well as the list of currently connected users. Each user is clearly identified (name, mount point used, time when connection started, IP address).
- The **History** submenu provides the same type of information as the **Current** submenu, with in addition the list of past connections (start and end times, users, mount points, IP addresses) since the NTRIP caster was started. It is in fact a more friendly way of representing the content of the log file presented below.
- The **Log** submenu views the raw content of the log file gathering all the events in relation with the embedded NTRIP caster since it was started.

Map

The Web Server provides a map of the NTRIP caster network using different colors to show the location of the caster, of the NTRIP servers (bases) and of the different users.

Protecting Mount Points

Protecting mount points may be done in an indirect way, as explained below:

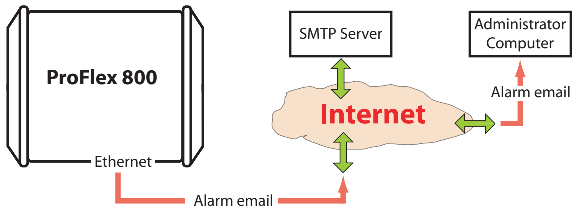
- Not assigning a mount point to any of the declared users implies that this mount point is accessible to anyone who can make an Internet connection to the NTRIP caster.

  Besides, the NTRIP caster may list mount points that are not declared as managed by the NTRIP caster. If such mount points are available, anyone who can make an Internet connection to the NTRIP caster will be allowed to connect to these mount points.
- Conversely, from the moment a mount point is assigned to a declared user, this mount point is no longer accessible to all. Only declared users explicitly granted the right to connect to that mount point will be able to do so.

  As the administrator of the NTRIP caster, you can for example create a user for the sole purpose of protecting your mount points. Allowing this user to connect to all your mount points will amount to placing right away a protection on all these mount points, preventing anyone else to connect to them. Then you can gradually add new users allowed to connect to one or more of the protected mount points.
- In order to keep the NTRIP caster accessible to a maximum of declared users, you can limit the number of simultaneous connections allowed per user. Too many simultaneous connections from one user would indeed limit the number of possible connections for all other users.
- **Warning!** Having declared users not assigned to a single mount point means they can access all the mount points managed by the caster!

E-mail Notifications

As the administrator of the CORS reference station, you may be informed via email of possible malfunctions detected by the receiver (see *List of Alarms on page 701*). This will allow you to quickly respond to the email alert by taking the appropriate maintenance steps.



You may choose between three different levels of notification:

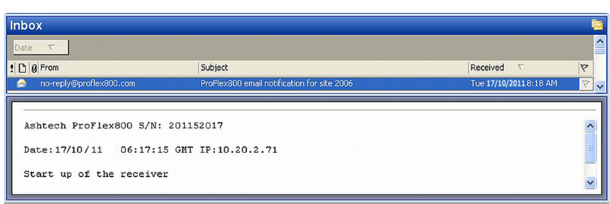
- **Full notification**. Each of the following events will generate an email:
  - "High" and "medium" alarms
  - Receiver powered on
  - Power shutdown causing the receiver to operate from its internal battery.
- **Standard notification**. Each of the following events will generate an email:
  - "High" alarms only
  - Receiver powered on
  - Power shutdown causing the receiver to operate from its internal battery.
- **No notification** at all.

Remember the receiver may report three categories of alarms:

- "High" alarms, indicative of serious problems
- "Medium" alarms
- "Low" alarms

The receiver is not designed to process incoming emails. It is therefore no use replying to an alarm email.

Example of email notification:

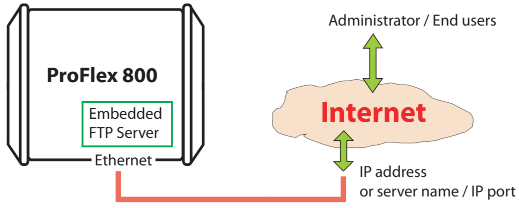


Embedded FTP Server

End users may download raw data files directly from the receiver memory. This can be done through the embedded FTP server, which gives remote access to the selected receiver memory and directory via an IP connection, using the FTP communication protocol.

In this case, end users should be given read access (through a user profile) to the directory containing the raw data files collected by the receiver.

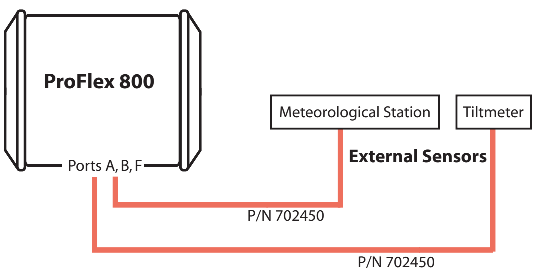
Alternatively, as the owner of the station, you may have to perform remote maintenance operations in the receiver memory. This connection gives you full read/write control on the specified directory and child directories.



Note that the embedded FTP server gives access only to the specified directory (and its child directories), whether you log in as the administrator or as a user.

External Sensors

The CORS reference station can also be interfaced with external sensors via its serial ports. Typically, this functionality is used to interface the receiver with a tiltmeter or a meteorological station.

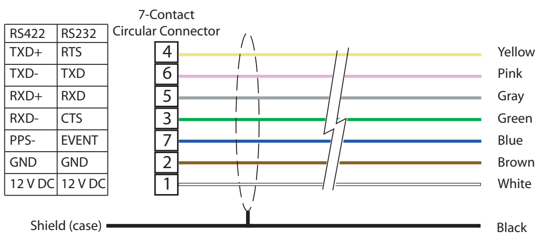


As the administrator, you can ask the receiver to initiate the communication with the external sensors in order to acquire data from these sensors. Initialization and trigger strings may in advance be assigned to the concerned serial ports for this purpose.

The acquired sensor data are inserted into the raw data file (G-file) currently recorded. Optionally the sensor data can also be saved as a D-files, in which case the D-files are saved in the same subdirectory as the corresponding G-files. Sensor data can also be output through the NMEA XDR message type.

External sensors can be connected to the ProFlex 800 using multi-function serial cable P/N 702450 (3 meters in length).

This cable has bare wires at one end, and a circular, seven-contact connector at the other end. The pinout is as shown in the diagram below.



Setting a CORS Reference Station

How to Start

- Open the Web Server's **Configuration** tab. The first time you click on this tab, the Web Server will ask you to log in as the administrator. Only the receiver administrator is authorize d to access the **Configuration** tab.

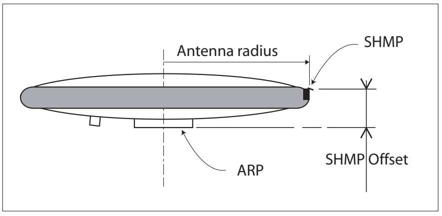
  You are allowed to change the destination of a receiver (e.g. it is currently a rover and you want to change it into a base). In this case, on opening the **Base Setup** tab, the Web Server will retain part of the rover settings that could be applied to the base (e.g. antenna type, etc.).
- Programming the data generated by the CORS station is addressed separately (see *Defining the Raw Data Generated by the CORS Station on page 247*).

General Parameters

- Click on the **Base Setup** menu. The **Full Setup** web page opens.
- Set the receiver parameters:
  - **Dynamic**: Choose "Static".
  - **Moving Position**: Keep this option disabled.
  - **Latitude, Longitude, Ellipsoid Height**: Enter the reference position of the CORS station (three-dimensional geographical coordinates).

(Clicking on the **Get current position** button assigns the last position computed by the receiver to the reference station as its reference position.)

- Set the GNSS antenna parameters:
  - **Reference Position**: Specify the physical point of the CORS station for which the receiver will collect data. The three possible choices are: Antenna L1 phase center, Antenna Reference Point (ARP) or Ground Mark (reference point).
  - **Measurement Type**: Specify the method that was used when setting up the CORS station to measure the height of the GNSS antenna (typically "Vertical" is used, "Slant" being most of the time used for temporary base setups on tripods).
  - **Antenna Height**: Value of base antenna height, expressed in the selected distance unit, as measured according to the specified measurement method.
  - **Receiver Antenna**: Specify the model of GNSS antenna used by the receiver.
  - **Antenna Radius**: In case of a "Slant Height" measurement, enter the antenna radius (this is a manufacturer specification), taking care to enter this parameter in the selected distance unit. See also the diagram below for more information.
  - **SHMP Offset**: In case of a "Slant Height" measurement, enter the SHMP offset (this is a manufacturer specification) taking care to enter this parameter in the selected distance unit. See also the diagram below for more information.



  - **Virtual Antenna**: This option is used to emulate a GNSS antenna other than the one really used (typically ADVNULLANTENNA is used).

    Choosing a virtual antenna different from the one really used affects the raw and differential data as if they had been collected by the virtual antenna, instead of the real one.

- Set the parameters relevant to the GNSS constellations used by the receiver:
  - **Recording and Output Elevation Mask**: Choose the elevation angle above the horizon creating the desired reception mask. After setting this angle, any satellite seen from the base with an elevation angle less than the specified one will be rejected from the list of usable satellites. The default value is 5°.
  - **GPS**, **GLONASS**, **SBAS**, **QZSS**, **GALILEO**: Enable the options corresponding to the constellations you want the receiver to work from.
- Click on the **Configure** button to save all the changes made.

Defining the Raw Data Generated by the CORS Station

Click on **Data Output** and then on the **Raw Data** submenu. Use the page that opens as explained below:

- All ATOM and Ashtech legacy raw data message types are listed below.

Format	Message types
ATOM	NAV, PVT, ATR, DAT, EVT, RNX
Ashtech legacy	DPC, SAL, SAG, SAW, SNG, SNV, SNW, ION, SBD, MPC, PBN

  (Typically, a G-file should contain NAV, RNX and ATR data to guarantee successful conversion of the file into RINEX files. NAV provides navigation data, RNX observations data, and ATR external sensor data.)
- Follow the instructions below to define the output of ATOM message types:
  - For each ATOM message type you need to define, select it from the **Message** drop-down list, then select the output port (“R - Session” necessarily) from the **Output** drop-down list, then enter its output rate, in seconds, in the **Rate** field, and finally click on the **Add** button. The new message definition will then appear as a new row in the table on the right.

    NOTE: You don’t have to define an output rate for EVT and DAT.
  - Should you change the definition of an existing message, select the corresponding row in the table. This populates the fields on the left with the definition

of that message. Edit the definition and then click on the **Modify** button to save your changes.The table row is updated accordingly.

Note that depending on the current selection on this page, the button located underneath the fields on the left may be either grayed or with a different label (**Add** or **Modify**).

– Deleting a message definition can be done by simply clicking on the corresponding "trash" sign in the **Clear** column on the far right. This deletes the table row.

There is also a **Clear All** button under the table that allows you to delete all message definitions from the table in one click.

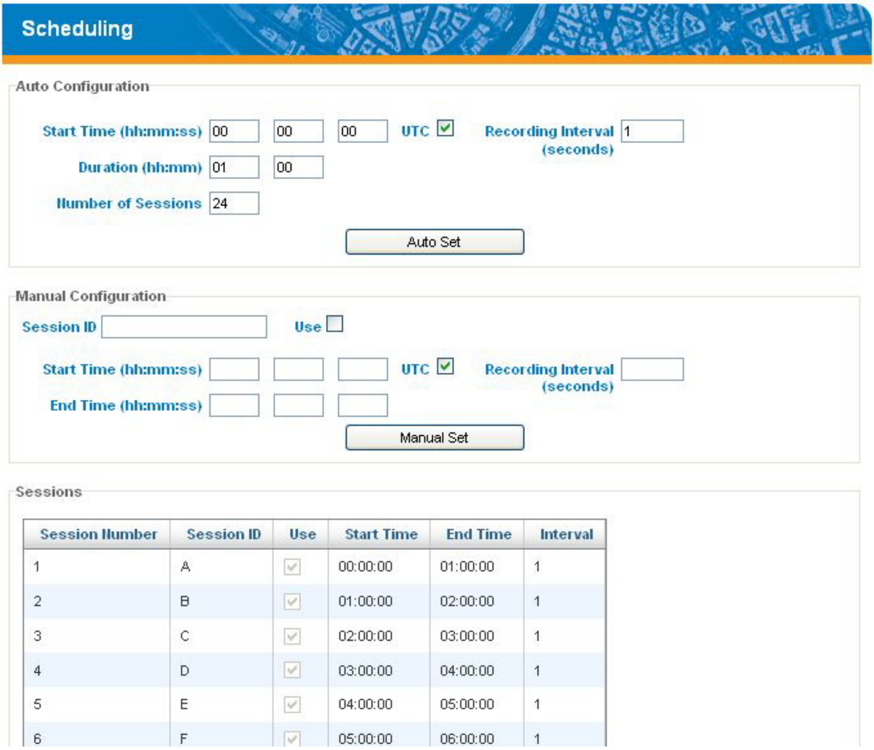
- Follow the same instructions as above to define the output of Ashtech legacy message types. Note that you don't have to define an output rate for SBD.

  Warning! The rates of message types RNX (ATOM message type) and MPC (Ashtech legacy message type) are in fact defined by the **Recording Interval** parameter on the **Sessions** - **Scheduling** web page (see *Programming Sessions on page 248*). The value you might enter on the **Raw Data** web page for these messages would anyway be ignored. It would even be overwritten with the value given to **Recording Interval** when the first session starts.
- Click on the **Configure** button to save all the changes made. The concatenation of the selected messages will constitute the G-files saved in the receiver (internal memory or USB device).

Programming Sessions

The typical use of sessions in a CORS station consists of defining 24 sessions representing each one-hour data recording at a 1-second recording interval. Follow the instructions below to create these sessions:

- Click on **Sessions** - **Scheduling**.
- Enter "00:00:00" as the **Start Time**, "1" as the **Recording Interval**, "01:00" as the **Duration** and "24" as the **Number of Sessions**.
- Click on the **Auto Set** button.
- Click on **Back** after the "Successful" message has been returned b the Web Server. You can now see the list of sessions you have just created in the Sessions table:



Clicking in a row inside the table allows you to edit the session individually. The changes are then entered by clicking on the **Manual Set** button

Note that the **Use** button is checked by default, which means data recording is allowed during the session.

Starting Sessions & Managing Raw Data Files

To start the execution of the programmed sessions on the current day, do the following:

- Click on **Sessions** - **Settings**
- Enable the **Run Sessions** check box.
- Keep default values for **Reference Day** ("1"), **Offset Per Day** ("00:00") and **Recording and Output Elevation Mask** (5°).
- Choose the storage medium. "Internal Memory" is about 95 Mbytes in size. Using an external device connected to the receiver's USB port ("USB Device") may allow the receiver to operate with an even larger memory.

- Check the **Ring File Memory** option. This will result in an unlimited operating time for the station while using a finite memory size.
- **Data Type** recalls the type of raw data collected through sessions.
- You may want to save receiver power between sessions when those are separated by more than 15 minutes of idle time. If so, check the **Power Off.. Between Sessions** button. Remember power will be applied automatically to the receiver 15 minutes before the beginning of the next session.
- In the G-File Conversion pane, choose the desired file conversion scenario (Rinex or Rinex Hatanaka, followed or not by file compression and original file deletion and possible rate change for the RINEX file). You can also ask for a second RINEX file, witch specific rate, to be generated as well.
- Using the different fields in the File Move pane, choose whether you want to move the raw data files (original and/ or converted files) to another location in the receiver (internal memory or USB device) so they can be at the same time sorted by sitename, year, month and day of creation.

  If you wish to do so, you have to specify –in the **Sub-directory Name Format** field– the syntax through which the receiver will be able to create new subdirectories as new raw data files are made available. The syntax may typically be in the form:

  S/Y/D

  Where each letter tells the receiver in which order to create the subdirectories and how to name them (see table below).

Character	Description
s or S	4-character sitename
Y	4-digit year (2010= 2010)
y	2-digit year (10= 2010)
m	2-digit month (01= January)
M	3-character month (Jan= January)
d	2-digit day in month (1-31)
D	3-digit day in year (1-365)
p or P	data_<d> or DATA_<d>, where <d> is the period in seconds

- Using the different fields in the Transfer to external FTP Server pane, choose whether you want the receiver to automatically transfer the collected raw data files (original and/or converted files) to an external FTP server.

  If so, activate the **Automatic Transfer** option and enter the identification parameters of the FTP server:
  - **FTP Server**, **Port**: FTP server IP address/hostname and IP port
  - **Login**, **Password**: Connection profile that gives the receiver the rights to upload data to the FTP server.
  - **Path**: Location on the FTP server where the receiver is allowed to post the files (syntax: /subdirectory/.../subdirectory/). The first and last slashes are optional.
  - **Sub-directory Name Format** field: Also in this case, files will be sorted by sitename, year, month and day of creation, using the same instructions as previously (File Move) to set this field.

  You can also ask the receiver to delete the raw data files once they have been transferred to the FTP server. This is done by enabling the **Delete Files After Transfer** option.
- You may define a second FTP server, called "backup FTP server" for securing the raw data file transfer to an external repository.

  In the Backup FTP Server pane, first specify the conditions in which the backup FTP server will be used:
  - Never (two buttons cleared)
  - Always (**Always Used** button checked)
  - Only when the primary FTP server is unable to fulfil its function (**Used When Primary FTP...** button checked)

  Then enter the data required for an IP connection to this second FTP server (address, login, password, path; keep the default value "21" for the IP port).

  Note that you don't need to define a folder naming convention for the backup FTP server. The same naming convention as the one defined for the primary FTP will be used (see **Sub-directory Name Format** field above).
- Click on the **Configure** button to save all your settings.

Programming Email Notifications

- Click on **Advanced Setup** and then on the **Email Notifications** submenu. Enter the following parameters:

– **SMTP Server** and **SMTP Port**: Enter respectively the name and port of the server in charge of routing the emails issued by the receiver.

  The SMTP server you need to use depends on the network the receiver is connected to. In most cases, it is the one of your Internet Service Provider.

  “25” is the well known port number for communications using the SMTP protocol.

– **Username** and **Password**: Give identification information allowing you to send emails to the specified SMTP server.

– **Sender Email Address**: Email address of the CORS station from which emails will originate. It is a good idea to keep the default email address (no-reply@proflex800.com), as it suggests that no response should be sent back to this address.

– **Notification Email Address**: Recipient email address, typically the email address of the CORS station administrator or of any person in charge of monitoring and maintaining the station. There can only be one recipient.

– **Verbose Level**: This field is used to control which of the possible alarms or warnings are allowed to trigger notification emails. (See also *List of Alarms on page 701*).

  “Full email notification” will let all the alarms and warnings trigger emails (no filtering).

  “Standard email notification” will only let the warnings and highest-priority alarms trigger emails (selective filtering).

  “No email notification” will prevent the receiver from issuing any emails, regardless of the nature of the possible alarms and warnings.

- Click on the **Configure** button to save all your settings. An email is then sent automatically to check that the email notification process is now working.

Activating the Embedded FTP Server & Creating New Users

- Click on **Advanced Setup** and then on the **Embedded FTP Server** submenu. Enter the following parameters:

  – Enable the **Activation** check box to activate the embedded FTP server.

  – **FTP Port**: Keep the default option (21) as it is the usual port number used for most FTP applications.

- In the **Memory Location** field, choose the memory the FTP server will give access to.
- In the **FTP Path** field, specify the path to the subdirectory (in the selected memory) the FTP server will have access to (syntax: /subdirectory/.../ subdirectory/). The first and last slashes are optional.
- **Administrator Username** and **Password** fields: Username and password for the administrator of the embedded FTP server (default: “admin”, “changeme”). Not to be confused with the administrator of the ProFlex Web Server. It is your responsibility to define distinct or similar connection profiles for these two administrators.

• Click on the **Configure** button to save all your settings.
• Click on **Back** to return to the Embedded FTP Server web page.
• In the Users pane, enter as many user profiles for the Embedded FTP server as necessary.

For each user, enter a **Username** and a **Password**, then click on **Add/Modify**.

To modify the password of a user profile, click on the corresponding username in the table on the right. This updates the **Userrname** and **Password** fields with the current settings of this profile. Edit the password and click on **Add/Modify**.

To delete a user profile, click on the corresponding username in the table on the right and click on **Delete**.

Setting the External Sensors

Before starting, you should know which sensors are used, and which receiver ports they are connected to.

If port B or F is used, you should first go to **Connections** - **Serial Ports** and enable the **Power ON** box, followed by a click on the **Configure** button.

Setting a tiltmeter or a meteorological unit refers to the same procedure. For this reason, only the setting of a meteorological unit is described below.

• Click on **Connections** and then on **Meteorological Unit**.
• Identify the pane describing the serial port to which the sensor is connected (Serial Port A, Serial Port B or Serial Port F). Then set the parameters located inside this pane as follows:
  - Enable the **Process Meteorological Unit** option so that the receiver can start querying the sensor right after clicking on **Configure**.

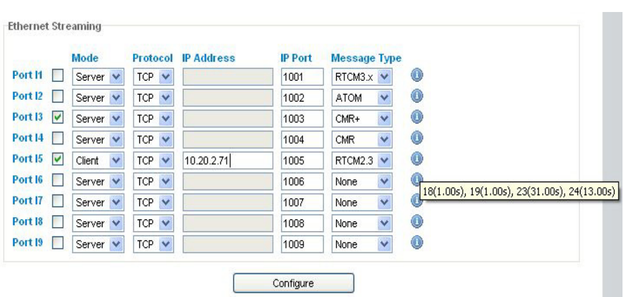
  – Set the port's **Baud Rate** and **RTS/CTS**
  – Enter the **Initialization String** and **Trigger String**. These are parameters specific to the sensor used. They should normally be found in the manufacturer's documentation.
  – Set the interval of time, in seconds, through which the receiver queries the meteorological unit (**Interval**).
- Set the **Legacy D-File Support** option as needed. Enabling this option means that the sensor data will not only be inserted into the collected G-file but also saved as a separate D-file. With this option cleared, no D-file will be created.
- Click on the **Configure** button to save all your settings.

Adding Delivery of Real-Time RTK Corrections

The ProFlex 800 CORS has the capability to deliver RTK corrections (differential messages) for real-time applications while being also busy collecting raw data files.

As an example, the instructions below allow you to configure the CORS station to perform Ethernet data streaming, delivering compact ATOM differential data on two IP ports (I3, I5). In one case, the station will be a server, and in the other it will be the client of, for example, 10.20.2.71.

- Click on the **Configuration** tab and then on **Data Output** - **Differential Messages**
- Select "Compact (Static Base)" in the **RNX Scenario** field
- Keep the default settings for the refresh rates of the associated parameters.
- Click on the **Configure** button to save all your settings.
- Click on **Base Setup** - **Data Streaming on IP** and perform the following settings in the Ethernet Streaming pane:



- Click on the **Configure** button to save all your settings.

For more information on the various possibilities of routing differential data to users, refer to the *ProFlex 800 Web Server Getting Started Guide* or the *ProFlex 800 Reference Manual*.

NTRIP Server Via Ethernet

- Click on **Base Setup > NTRIP Server**.
- Scroll down the page to display the "NTRIP Server 1" frame. In the **Connection** field, select "External NTRIP Caster via Ethernet".

  NOTE: If the Embedded NTRIP Caster firmware option is activated, a third option is available ("Embedded NTRIP Caster") through which you can connect the NTRIP server directly to the embedded NTRIP caster (instead of connecting it to an external NTRIP caster).
- Enter the information (**Connect Now**, **Address**, **Port**, **Password**, **Mount Point**) allowing the base to connect to the NTRIP caster (the server) to which it is supposed to deliver its corrections.

  NOTE: If you chose "Embedded NTRIP caster", the **Address** field has been unconditionally set to "localhost".
- Enable **Connect Now** to allow the receiver to establish the connection right after you have clicked on **Configure**.
- In the **Message** field, select the type of differential data the base will deliver (ATOM, RTCM, CMR or DBEN). Following your selection, you will see the detail of the selected data by placing the cursor over the "I" sign on the right of this field, as defined in **Data Output > Differential Messages**.
- If you need to define a second NTRIP server, scroll down to the "NTRIP Server 2" frame and resume the above steps.
- Click on the **Configure** button to let the Web Server load all your new parameters to the receiver.

Setting the Embedded NTRIP Caster

Remember the Embedded NTRIP Caster will be visible on the Status and Configuration tabs of the Web Server only after the NTRIP Caster firmware option ([C] option) has been activated in the receiver.

- Click on **Embedded NTRIP Caster > Settings**
- Enable the **Activation** button to start the embedded NTRIP caster (start-up will be effective after you have clicked on the **Configure** button).
- Enter the public IP address (or hostname) and IP port of the NTRIP caster:

By default the **Caster Hostname or IP Address** field shows the local IP address of the receiver (the one that can be read on the receiver display screen).

If the Ethernet port is set to work in DHCP and you have declared a hostname on the DynDNS site, then the field should be updated to hold that hostname.

If on the contrary, the public IP address to communicate with the receiver is a static address, then it should be known to the station administrator and entered in that field.

By default the **Caster Port Number** field reads “2101”. This value should not normally be changed.

- Define a password that NTRIP servers will have to provide for being authorized to connect to the NTRIP caster as correction data providers. Enter this password in the **Caster Password** field. The password can be displayed in plain by clicking on the **Show Characters** button.
- Use the **Maximum Simultaneous Connections per User** field to increase the number of connections a user can make at a time (default: 1). The upper limit is 100.
- Use the **Caster Information** area to enter informative data about the NTRIP caster. The whole set of information entered in this area will be made available to NTRIP caster users through the so-called NTRIP Source Table.
- Click on the **Configure** button to load all the NTRIP caster settings to the receiver.
- Click on **Embedded NTRIP Caster > Mount Points**. Use this tab to define all the mount points the NTRIP caster will have to manage. Behind each mount point is a base station installed at a given location and generating a given data format.

  While most of the data presented to define a mount point are mostly informative (identifier, data format, approximate location of the base, country, fee indicator), the **Name** field on the contrary is the key parameter through which the NTRIP caster will organize the connections between NTRIP servers and NTRIP clients (users). So each mount point name should be chosen to depict as accurately as possible the source of corrections available through the mount point. Making all those names as short as possible is also recommended for the convenience of NTRIP clients.

  For example, the mount point corresponding to a base station installed near the town of Balville and generating

ATOM differential data in compact format could be named: “Balv_ATO_Sc100”.

- After all the fields on the tab have been defined for a mount point, click on the **Add/Modify** button to save this mount point (there is no **Configure** button on the Mount Points tab). Resume this operation until all the required mount points have been created.
- At this point, now that all the mount points have been defined, you should make sure all the NTRIP servers are properly configured to serve the embedded NTRIP caster, i.e. their IP connection settings should mention the IP address or hostname of the NTRIP caster, the corresponding mount point name and the caster password.

  If you plan to use internal NTRIP servers (there may be two in the ProFlex 800 CORS, see *NTRIP Server Via Ethernet on page 255*), then for each of them, you will have to choose a mount point from the list of existing mount points. For both, the IP address of the caster will be forced to “localhost”. Unlike external NTRIP servers, the caster password is not requested when configuring an internal NTRIP server.
- Click on **Embedded NTRIP Caster > Users**. Use this tab to create the list of authorized users. For each user, a username and password, as well as the authorized mount points, should be defined.

  Remember that not assigning any user to a mount point results in making this mount point accessible not only to all declared users but also to anyone who can connect to the NTRIP caster.
- After all the fields on the tab have been defined for a user, click on the **Add/Modify** button to save this user (there is no **Configure** button on the Users tab). Resume this operation until all the users have been created.
- At this point, now that all the users have been defined, you should provide all these users with the following information so they can connect successfully to the NTRIP caster:
  – Caster IP address or hostname
  – IP port
  – Username and password
  – List of authorized mount points.

Monitoring ProFlex 800 CORS

Reading the Status pages of the ProFlex Web Server is a nice way of monitoring ProFlex 800 CORS through an IP connection. Opening the web pages requires that you log in either as the administrator or as a simple user.

This section gives a quick overview of the monitoring function. For a detailed description of all the status pages, refer to Chapter *ProFlex Web Server Help Files Collection*. For a detailed description of the Status Bar, you can also refer to *Status Bar and Units Used on page 97*.

After configuring ProFlex 800 CORS, you can cast an eye at the Status bar to check that (from left to right):

- The receiver mode is “Base”
- There is enough free memory
- The Sessions status is as expected (Off, On or Recording)
- The computed latitude longitude and ellipsoidal height are close enough to the entered reference position (to within a few meters)
- The values of HDOP and VDOP are low enough (less than 3)
- There is a sufficient number of received satellites (used/ tracked)
- No alarm has been triggered.

You can also go to the **Status** tab and click on **Receiver Status & Settings**. The resulting web page will give an overview of the station operation.

A click on **Satellites** will tell you more about the satellites received for each GNSS used.

A click on **System** will list the current status of the different hardware components of the receiver.

A click on **Connections** and then on each of its submenus will list status information for the different communication components or external devices used.

A click on **Data Output** will list the currently programmed data outputs.

A click on **Alarms** will list the alarms that have been triggered so far.

A click on **Version** will give identification information about the various hardware components used in the receiver.

Chapter 6. Integrating ProFlex 800 into Your Application

Installation Instructions

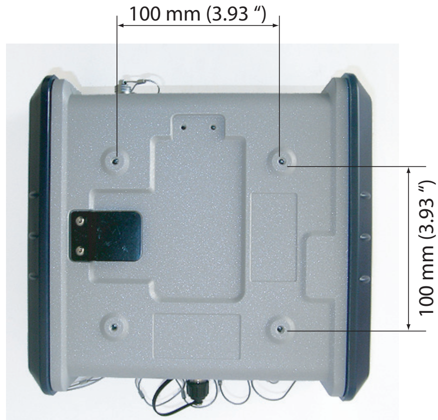
GNSS Antenna

First find the best place to install the GNSS antenna. Follow the usual recommendations for a GNSS antenna. Remember that the chosen location should be free of any close obstacles that could hinder GNSS reception, and mechanically safe for the antenna (no nearby parts in motion liable to damage the antenna).

Make sure you can easily measure the antenna height from where you install it. Accurately measuring the antenna height with respect to the height reference on the vehicle, machine or ship is critical for getting the best performance from your equipment.

Receiver

The recommended setup for the ProFlex 800 when used in harsh environments (vibrations, etc.) is to secure it from underneath. The bottom plane is fitted with four tapped holes M4 (tap depth=8 mm max.) forming a square 100 mm (3.93 inches) in size (a VESA-compliant feature).



- After you have decided where to install the GNSS antenna, find the best place to install the receiver, making sure the signal level at the GNSS antenna input will always stay within the permitted range:

  +23 dB < LNA Gain - RF network loss < +45 dB

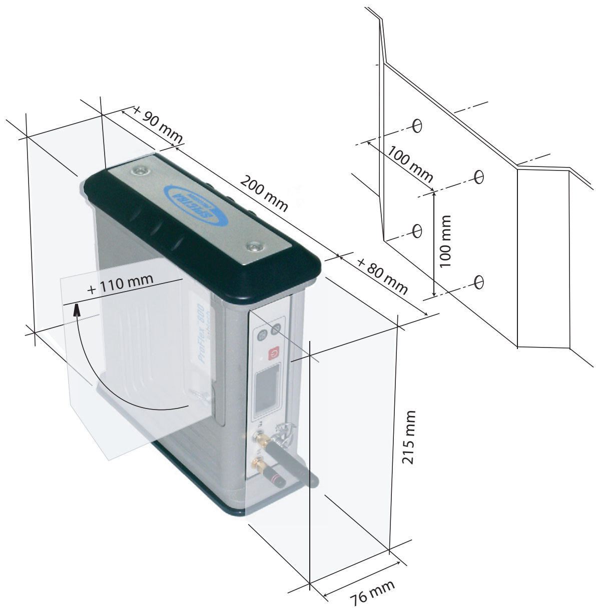
  This has an impact on the type of coaxial cable you will be using as well as its length.

  Note that there is no coaxial cable provided in the basic receiver package to perform the GNSS antenna-to-receiver connection. The reason for this is that there is no unique length for this cable that would meet all possible requirements in various applications. If however you bought any of the two UHF connection kits (more particularly intended for marine surveying), then you automatically have at your disposal a 10-meter TNC/TNC coaxial cable that can be used to perform this connection. It is always your responsibility to install the system so that the cable length and loss are appropriate for your setup.
- Make available a flat and rigid plane in which four holes dia. 4.2 mm (minimum) will be drilled to allow fixing screws to go through. The flat plane may have any orientation (horizontal, vertical or slant), but if the receiver is communicating with a cellular network or you are using Bluetooth to communicate with the receiver, the vertical orientation for the receiver is recommended so that the concerned antenna can be in the vertical position as well.

- Make room for the receiver, allowing for enough space at the rear and at the front of the receiver to accommodate the receiver itself and the cables connected to it, and also the Bluetooth and cellular antennas if used.

  If the internal battery is used (recommended for backup DC source in case of power outage), allow for enough space near the trapdoor so it can be easily opened to insert or remove the battery.

  To sum up, you should allow for a cubic space adjacent to the fixing plane with the following approximate dimensions (H x W x D) (see also diagram below): 186 x 215 x 370 mm (7.4 x 8.5 x 14.6 “)



  This should also be an open space allowing sufficient ventilation. Air should freely circulate around the receiver.

- Consider the following to orientate the receiver on its support: Do you need visual access to the display screen? Do you need frequent access to the USB port? Are you using the front panel buttons frequently? Do you often need to connect or disconnect cables to/from the rear panel? Will a Bluetooth connection be used between the receiver and the user interface?

Depending on your answers to these questions, you will orientate the receiver accordingly, making sure you can easily access the panel you need to use most.

NOTE: With the receiver installed on-board a vehicle, if a cellular connection is used, you may need, for best coverage, to use an external cellular antenna rather than the one that can be screwed directly to the front panel of the receiver. In this case, you will have to use a coaxial cable to connect this antenna to the receiver. Again, the type and length of coaxial cable used may significantly impact the performance level of the cellular link. Follow the usual recommendations to preserve a sufficient level of radio-frequency signal at the antenna, both in reception and transmission.

- When used on the bridge for example, the receiver can also be mounted horizontally on a cradle (not provided), a rack or a shelf, either from the bottom of the case, as explained previously, or from the two lateral panels if you want to create free space underneath the receiver (for running cables, etc.).

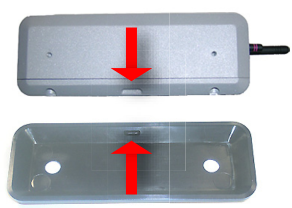
Mounting the receiver on a cradle, rack or shelf makes sense when the user regularly needs to read the display screen, press the three buttons on the front panel or use the USB port. This mounting configuration will usually be more interesting in marine surveying than in machine guidance.

When fixing the receiver from its two lateral panels, you need to prepare the two vertical support planes, drilling two holes dia. 4.2 mm (minimum) in each of them. The drilling plan should be designed taking into account the dimensions of the two lateral panels, as illustrated below.

After loosening and removing the two screws from either side of the receiver using an Allen key, remove the Spectra Precision logo plate (an aluminum plate) and then the dark-blue rubber pad.

When mounting the receiver, you do not need to put the two lateral Spectra Precision logo plates and rubber pads back in position. Not putting back these parts will not affect the sealing of the receiver case.

If on the contrary you wish to put these parts back, be careful with the orientation of the rubber pad. Make sure the tab on the rubber pad goes into the receiver case (see picture below).



Because of the thickness of the support, you will have to use screws that are longer than those initially used to secure the rubber pads and aluminum plates. Choose the right length for the new screws knowing that the depth of the tapped hole in the receiver case is 8 mm maximum.

UHF Antenna

Consider the following when you wish to use a UHF radio system to transfer base corrections to a rover:

- As standard, each of the available radio transmitter kits is provided with its own UHF whip antenna as well as the coaxial cable needed to connect the transmitter to the UHF antenna.

- Conversely, there is no antenna delivered as standard with each of the available radio receiver kits.
- However two UHF accessory kits are available, including a UHF whip antenna and coaxial cable, for use with the built-in radio receiver of your ProFlex 800. These two kits are more especially intended for marine surveying. One includes a 30-meter coaxial cable and the other a 10-meter coaxial cable. If these kits are not suitable for your application, the choice and purchase of the appropriate antenna and cable will be your responsibility.

Cellular Antenna

Connect the cellular antenna directly to the SMA connector on the receiver front panel. The best performance of the antenna is obtained when in vertical position, meaning the receiver should as far as possible be in vertical position as well, with the front panel oriented upward or downward.

As mentioned earlier, with the receiver installed on board a vehicle, you may need, for best coverage, to use an external cellular antenna. In this case, you will have to use a coaxial cable (not provided) to connect this antenna to the receiver. Remember the type and length of coaxial cable used may significantly impact the performance level of the cellular link.

Bluetooth Antenna

Connect this antenna directly to the reverse SMA connector on the receiver front panel. The best performance of the antenna is obtained when in vertical position, meaning the receiver should as far as possible be in vertical position as well, with the front panel oriented upward or downward.

Cables and Connectors

After installing the receiver, connect the different cables needed for your application.

Take the usual precautions to properly anchor the cables to the vehicle, machine or ship structure, in order to avoid any risks of malfunctioning due to unreliable connections.

Make sure the sealing caps of all free connectors are properly inserted into these connectors. This will ensure an efficient protection not only for these connectors but for the receiver as well.

Earth Terminal

In some applications, and more particularly in marine applications, you will need to electrically connect the receiver chassis to the superstructure.

Use a large section of braided wire to connect the receiver’s Earth terminal to the superstructure. The shorter the connection, the better. On the receiver side, use a screw

M4x10 mm and a washer to tighten the braid against the Earth terminal.

Manual Configuration Steps: Introductory Notes

Configuring the receiver manually consists of running less than 20 proprietary $PASH commands through which you will enter the parameters specific to your application.

See *Using Serial Commands on page 291* for more information on sending serial commands.

Some of these commands are required, some others are only optional, depending on how different from the receiver's default settings your application is.

After you have run these commands, the receiver will indefinitely operate in the new configuration. Being saved in the receiver's permanent memory, the new configuration will remain unchanged after a power cycle. Should you want to restore the default settings, please use the $PASHS,RST command.

NOTE: Introduced in 2009 together with ProFlex 500, the Web Server application is a tool designed to configure the receiver without having to handle a single $PASH command. This tool should always be preferred when an IP connection to the receiver can be established. However, having a good knowledge of the $PASH commands is always an asset to whoever claims to be an expert.

Required Settings

In the following sections, you will find the script that allows you to implement one of the configurations listed below:

- RTK rover using internal radio receiver (ADL Foundation)
- RTK rover in NTRIP mode
- RTK rover using corrections from port A
- RTK rover using corrections from port B or F
- RTK rover in Direct IP mode
- RTK rover delivering heading measurements
- Rover operating in long-range, Flying RTK mode
- RTK base using internal transmitter (ADL Foundation)
- RTK base using Ashtech radio transmitter (U-Link TRx)
- RTK base delivering corrections on its port A
- RTK base delivering corrections on its port B or F
- RTK base delivering corrections on its Ethernet port

- RTK base transferring its corrections to a static IP address (Direct IP) via its modem
- RTK base used as NTRIP server (connected to the Internet via its modem)

Each script provides a series of commands that should be run in the given order.

Identify the script that matches your application and then use it to guide you toward the configuration you wish to create.

As you follow the script, replace some of the indicated values with those corresponding to your application. The parameters shown in **bold characters** are those that probably need to be different for your application.

Optional Settings

Although designed to meet the requirements of a large number of applications, some of the default settings in the receiver may not be suitable for your application. Below are some settings you may need to change.

Purpose	Command
Sets the receiver to receive differential data from any port.	$PASHS,CPD,REM,**AUT** $PASHR,ACK*3D
Sets the position elevation mask (e.g. 10°).	$PASHS,PEM,**10** $PASHR,ACK*3D
Sets the elevation mask (raw data recording, raw & differential data output) (e.g. 10°).	$PASHS,ELM,10 $PASHR,ACK*3D
Sets the dynamic model (e.g. “8” for “adaptive model).	$PASHS,DYN,**8** $PASHR,ACK*3D
Sets the receiver in Fast RTK.	$PASHS,CPD,FST,**ON** $PASHR,ACK*3D
Sets the ambiguity fixing parameters (e.g. 99.9).	$PASHS,CPD,AFP,**99.9** $PASHR,ACK*3D
Enables or disables GPS tracking.	$PASHS,GPS,**ON** $PASHR,ACK*3D
Enables or disables GLONASS tracking.	$PASHS,GLO,**ON** $PASHR,ACK*3D
Enables or disables SBAS tracking.	$PASHS,SBA,**ON** $PASHR,ACK*3D
Enables or disables QZSS tracking.	$PASHS,QZS,**ON** $PASHR,ACK*3D
Enables or disables GALILEO tracking	$PASHS,GAL,**ON** $PASHR,ACK*3D
Disables the Ethernet connection, if not used, to save the internal battery.	$PASHS,ETH,**OFF** $PASHR,ACK*3D
Disables hardware handshake on port A, B or F.	$PASHS,CTS,**A**,**OFF** $PASHR,ACK*3D

Purpose	Command
Disables the extended communication port, if not used, to save the internal battery.	$PASHS,ECP,**OFF** $PASHR,ACK*3D
Base only:	
Sets the station ID.	$PASHS,STI,**10** $PASHR,ACK*3D

Rover Using Internal Radio

Script

Action	Command
Set the antenna name connected to the receiver:	$PASHS,ANP,OWN,**ASH111661** $PASHR,ACK*3D
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D
Enter the antenna height (e.g. a vertical height of 2.0 meters was measured):	$PASHS,ANT,0,0,**2** $PASHR,ACK*3D
Turn on the internal radio (unless the radio has been set in automatic power mode):	$PASHS,RDP,ON $PASHR,ACK*3D
Read the current status of the internal radio through the following two commands (mandatory)	$PASHQ,RDP,PAR,D Wait about 5 seconds, then: $PASHQ,RDP,CHT,D Wait about 5 seconds
Set the radio parameters, i.e. channel, protocol, air link speed and sensitivity:	$PASHS,RDP,PAR,D,ADL,**3**,AUT,**0**,**9600** ,**MED**,0,0
Set the receiver to be a rover:	$PASHS,CPD,MOD,ROV $PASHR,ACK*3D

Checking Radio Operation

Action	Command
Query the type of internal radio used. If NONE is returned, there is no radio inside, or the radio is not detected (in this case, perform a hardware reset):	$PASHQ,RDP,TYP,D $PASHR,RDP,TYP,D,**ADL***4E

Action	Command
Query the radio settings (channel, protocol, air link speed and sensitivity):	$PASHQ,RDP,PAR,D $PASHR,RDP,PAR,D,ADL,ON,**3**,AUT,**0**,**9600**, **MED**,447.1000,447.1000,25.0,430450,V02.53,0,0 *1E
Query the channel table:	$PASHQ,RDP,CHT,D $PASHR,RDP,CHT,ADL,**2**,**0**,**464.5000**,0.0000,**1**, **464.5500**,0.0000*3E

Rover Using Port A as Corrections Input

Action	Command
Set the name of the antenna connected to the receiver:	$PASHS,ANP,OWN,**MAG111406** $PASHR,ACK*3D
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D
Enter the antenna height (e.g. a vertical height of 2.0 meters was measured)	$PASHS,ANT,0,0,**2** $PASHR,ACK*3D
Set port A baud rate to 115200 Bd:	$PASHS,PRT,**A**,**9** $PASHR,ACK*3D
Set port A as an RS232 port (unless already done):	$PASHS,MDP,**A**,**232** $PASHR,ACK*3D
Set the receiver to be a rover:	$PASHS,CPD,MOD,ROV $PASHR,ACK*3D

Rover Using Port B or F as Corrections Input

Action	Command
Set the name of the antenna connected to the receiver:	$PASHS,ANP,OWN,**ASH111661** $PASHR,ACK*3D
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D
Enter the antenna height (e.g. a vertical height of 2.0 meters was measured):	$PASHS,ANT,0,0,**2** $PASHR,ACK*3D
Set port B or F baud rate to 115200 Bd:	$PASHS,PRT,**B**,**9** $PASHR,ACK*3D
Power on the extended communication port:	$PASHS,ECP,**ON** $PASHR,ACK*3D
Set the receiver to be a rover:	$PASHS,CPD,MOD,ROV $PASHR,ACK*3D

NTRIP Rover (Via Modem)

Script

Action	Command
Set the name of the antenna connected to the receiver:	$PASHS,ANP,OWN,**ASH111661** $PASHR,ACK*3D
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D
Enter the antenna height (e.g. a vertical height of 2.0 meters was measured):	$PASHS,ANT,0,0,**2** $PASHR,ACK*3D
Set the modem and GPRS parameters (Power mode, PIN code, APN settings, IP protocol, auto-dial, re-dials, 2G/3G):	$PASHS,MDM,PAR,PWR,**AUT**, PIN,**1234**,APN,**ssx.com**,LGN,**Ssx**, PWD,**ssx3**,IPT,**1**,ADL,**Y**,RNO,**3**, NET,**0** $PASHR,ACK*3D
Set the modem in GPRS and TCP/IP modes:	$PASHS,MDM,PAR,PTC,1,IPT,0 $PASHR,ACK*3D
Turn on the modem (unless the modem has been set in automatic power mode):	$PASHS,MDM,ON $PASHR,ACK*3D
Initialize the modem. Wait a few seconds until the receiver can respond to this command. NOTE: If the initialization fails, the message $PASHR,MDM,INI,FAILED*7D is returned.	$PASHS,MDM,INI $PASHR,MDM,INI,OK*7A
Enter the NTRIP caster parameters (see example in the right column). NOTE: The ADD field may contain either an IP address or a host name.	$PASHS,NTR,PAR,ADD, **83.167.123.12**,PRT,**2101**,LGN, **name**,PWD,**password**,TYP,0,IPP,E $PASHR,ACK*3D
Set the receiver to be a rover:	$PASHS,CPD,MOD,ROV $PASHR,ACK*3D
Set the receiver to send a GGA message periodically to the caster, if necessary.	$PASHS,NME,GGA,E,ON,5 $PASHR,ACK*3D
Ask the modem to connect to the mount point (e.g. NAN1): NOTE: If you don't know which mount point to connect the modem to, see *Acquiring the NTRIP Source Table* below.	$PASHS,NTR,MTP,**NAN1** $PASHR,ACK*3D

Acquiring the NTRIP Source Table

After the $PASHS,NTR,PAR command has been sent and the modem state has switched to INIT, you can ask the receiver to get the source table from the caster.

NOTE: The modem INIT state is indicated on the receiver front panel when the following icon (static) appears in the lower line: . The number of bars is proportional to the strength of the signal received by the cellular antenna. You can also use the $PASHQ,MDM to read this state.

Action	Command
Load the NTRIP source table to the receiver:	$PASHS,NTR,LOD $PASHR,NTR,OK*14
Query the source table: NOTE: In the receiver response, you can find the label of the mount point you would like the modem to connect to. If necessary, refer to the NTRIP or RTCM standard documentation to decode this information.	$PASHQ,NTR,TBL $PASHR,NTR,TBL SOURCETABLE 200 OK … ENDSOURCETABLE

Monitoring the Modem

Action	Command
Query the modem status and settings:	$PASHQ,MDM $PASHR,MDM,E,9,ONLINE,... or $PASHQ,MDM,STS $PASHR,MDM,STS,INIT,"Ssx F",2G,60*77
Query the modem signal level:	$PASHQ,MDM,LVL $PASHR,MDM,LVL,80*6E
Query the current mount point:	$PASHQ,NTR,MTP $PASHR,NTR,MTP,NAN1*05

Ending the NTRIP Connection

Action	Command
Ending the NTRIP connection:	$PASHS,NTR,MTP,OFF $PASHR,NTR,OK*14

Direct-IP Rover (Via Modem)

Script

Action	Command
Set the name of the antenna connected to the receiver:	$PASHS,ANP,OWN,**ASH111661** $PASHR,ACK*3D

Action	Command
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D
Enter the antenna height (e.g. a vertical height of 2.0 meters was measured):	$PASHS,ANT,0,0,**2** $PASHR,ACK*3D
Set the modem and GPRS parameters (Power mode, PIN code, APN settings, IP protocol, auto-dial, re-dials, 2G/3G):	$PASHS,MDM,PAR,PWR,**AUT**,PIN,**1234**,APN,**ssx.com**,LGN,**Ssx**,PWD,**ssx3**,IPT,**1**,ADL,**Y**,RNO,**3**,NET,**0** $PASHR,ACK*3D
Set the modem in GPRS and TCP/IP modes:	$PASHS,MDM,PAR,PTC,1,IPT,0 $PASHR,ACK*3D
Turn on the modem (unless the modem has been set in automatic power mode):	$PASHS,MDM,ON $PASHR,ACK*3D
Initialize the modem. Wait a few seconds until the receiver can respond to this command. NOTE: If the initialization fails, the message $PASHR,MDM,INI,FAILED*7D is returned.	$PASHS,MDM,INI $PASHR,MDM,INI,OK*7A
Set the receiver to be a rover:	$PASHS,CPD,MOD,ROV $PASHR,ACK*3D
Ask the modem to connect to the server: NOTE: The RIP field may contain either an IP address or a host name.	$PASHS,DIP,PAR,...IPP,E $PASHR,ACK*3D $PASHS,DIP,ON $PASHR,ACK*3D

Monitoring the Modem

Action	Command
Query the modem status and settings:	$PASHQ,MDM $PASHR,MDM,E,9,ONLINE,... or $PASHQ,MDM,STS $PASHR,MDM,STS,INIT,"Ssx F",2G,60*77
Query the modem signal level:	$PASHQ,MDM,LVL $PASHR,MDM,LVL,80*6E

Ending the Direct IP Connection

Action	Command
Ending the Direct IP connection:	$PASHS,DIP,OFF $PASHR,ACK*3D

Rover Operating in Long-Range Flying RTK Mode

Choose and set the configuration allowing the rover to receive corrections. See the different possible configurations.

Then you just need to use $PASHS,CPD,AFP,0 to force the rover to deliver a float solution (a Flying RTK solution).

Base With External Pacific Crest Radio Transmitter

Script

In the example below, it is assumed that the transmitter is connected to serial port A, and the receiver will generate differential data in RCTM V3.0 format. You may replace port A with port B or F, and RT3 with RT2 (RTCM2.3), ATOM, CMR or CMP (CMR+), or DBEN.

See $PASHS,RTC,TYP, $PASHS,RNX,TYP or $PASHS,CMR,TYP if you want to change the default messages and periods.

Action	Command
Set the name of the antenna connected to the receiver:	$PASHS,ANP,OWN,**ASH111661** $PASHR,ACK*3D
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D
Set the antenna height (for example a slant height of 1.45 meters was measured): NOTE: When a slant height is entered, you also need to enter the antenna radius and the ARP-to-SHMP vertical offset (negative if ARP is below SHMP).	$PASHS,ANT,**1.45**,**0.0921**,**-0.0516** $PASHR,ACK*3D
Enter the coordinates of the base:	$PASHS,POS,**4717.93777**,**N**, **130.541864**,**W**,**87.007** $PASHR,ACK*3D
Set the type of the radio transmitter and the serial port to which it is connected:	$PASHS,RDP,TYP,**A**,ADL $PASHR,ACK*3D
Set the baud rate of the port connected to the radio. The recommended value is 38400 Bd.	$PASHS,PRT,**A**,**7** $PASHR,ACK*3D
If port A is used for the connection to the transmitter, select the RS232 mode for this port.	$PASHS,MDP,A,232 $PASHR,ACK*3D
If port B or F is used for the connection to the transmitter, enable the extended communication port:	$PASHS,ECP,**ON** $PASHR,ACK*3D

Action	Command
Set the radio parameters (channel, protocol, air link speed)	$PASHS,RDP,PAR,**A**,ADL,**3**,,**0**,**9600** $PASHR,ACK*3D
Set the type of differential data that will be generated by the receiver as well as the port routing the data to the transmitter:	$PASHS,BAS,**A**,**RT3** $PASHR,ACK*3D
Set the receiver to be a base transmitting GPS data (+ GLONASS and/or SBAS data):	$PASHS,CPD,MOD,BAS,**0** $PASHR,ACK*3D

Checking Radio Operation

Action	Command
Query the radio settings (channel, protocol and air link speed):	$PASHQ,RDP,PAR,**A** $PASHR,RDP,PAR,A,ADL,,**3**,,**0**,**9600**,, 447.1000,447.1000,25.0,430450,V02.53,0,0*07
Query the channel table:	$PASHQ,RDP,CHT,**A** $PASHR,RDP,CHT,ADL,**2**,**0**,**464.5000**,0.0000,**1**, **464.5500**,0.0000*01

Base With Internal Radio Transmitter

Script

In the example below, it is assumed that the receiver will generate differential data in RCTM V3.0 format. You may replace RT3 with RT2 (RTCM2.3), ATOM, CMR or CMP (CMR+), or DBEN.

See $PASHS,RTC,TYP, $PASHS,RNX,TYP or $PASHS,CMR,TYP if you want to change the default messages and periods.

Action	Command
Set the name of the antenna connected to the receiver:	$PASHS,ANP,OWN,**ASH111661** $PASHR,ACK*3D
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D
Set the antenna height (for example a slant height of 1.45 meters was measured): NOTE: When a slant height is entered, you also need to enter the antenna radius and the ARP-to-SHMP vertical offset (negative if ARP is below SHMP).	$PASHS,ANT,**1.45**,**0.0921**,**-0.0516** $PASHR,ACK*3D

Action	Command
Enter the coordinates of the base:	$PASHS,POS,**4717.93777**,**N**, **130.541864**,**W**,**87.007** $PASHR,ACK*3D
Set the type of the internal radio transmitter used:	$PASHS,RDP,TYP,D,ADL $PASHR,ACK*3D
Set the radio parameters (channel, protocol, air link speed)	$PASHS,RDP,PAR,D,ADL,**3**,,**0**,**9600** $PASHR,ACK*3D
Set the type of differential data that will be generated by the receiver as well as the port routing the data to the transmitter:	$PASHS,BAS,**D**,**RT3** $PASHR,ACK*3D
Set the receiver to be a base transmitting GPS data (+ GLONASS and/or SBAS data):	$PASHS,CPD,MOD,BAS,**0** $PASHR,ACK*3D

Checking Radio Operation

Action	Command
Query the radio settings (channel, protocol, air link speed,RF output power):	$PASHQ,RDP,PAR,D $PASHR,RDP,PAR,D,ADL,,**3**,,**0**,**9600**,, 447.1000,447.1000,25.0,430450,V02.53,0,0,1,4FSK*48
Query the channel table:	$PASHQ,RDP,CHT,D $PASHR,RDP,CHT,ADL,**2**,**1**,**464.5000**,**464.5000***27

Base With Ashtech Radio Transmitter

Script

In the example below, it is assumed that the receiver will generate differential data in RCTM V3.0 format. You may replace RT3 with RT2 (RTCM2.3), ATOM, CMR or CMP (CMR+), or DBEN. In the connection between the receiver and the radio transmitter, port A is necessarily used on the receiver side.

See $PASHS,RTC,TYP, $PASHS,RNX,TYP or $PASHS,CMR,TYP if you want to change the default messages and periods.

Action	Command
Set the name of the antenna connected to the receiver:	$PASHS,ANP,OWN,**ASH111661** $PASHR,ACK*3D
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D

Action	Command
Set the antenna height (for example a slant height of 1.45 meters was measured): NOTE: When a slant height is entered, you also need to enter the antenna radius and the ARP-to-SHMP vertical offset (negative if ARP is below SHMP).	$PASHS,ANT,**1.45**,**0.0921**,**-0.0516** $PASHR,ACK*3D
Enter the coordinates of the base:	$PASHS,POS,**4717.93777**,**N**, **130.541864**,**W**,**87.007** $PASHR,ACK*3D
Set the type of the radio transmitter and the serial port to which it is connected (port A necessarily):	U-Link TRx: $PASHS,RDP,TYP,A,MDL $PASHR,ACK*3D Radio transmitter 800986: $PASHS,RDP,TYP,A,MGL $PASHR,ACK*3D
Set the baud rate of the port connected to the radio (port A; 19200 Bd necessarily):	$PASHS,PRT,A,6 $PASHR,ACK*3D
Select the RS422 mode for port A:	$PASHS,MDP,A,422 $PASHR,ACK*3D
Set the radio transmitter (channel number, protocol, air link speed):	U-Link TRx: $PASHS,RDP,PAR,A,MDL,**3**,,2,**4800** $PASHR,ACK*3D Radio transmitter 800986: $PASHS,RDP,PAR,A,MGL,**3**,,2,4800 $PASHR,ACK*3D
Set the type of differential data that will be generated by the receiver as well as the port routing the data to the transmitter:	$PASHS,BAS,A,**RT3** $PASHR,ACK*3D
Set the receiver to be a base transmitting GPS data (+ GLONASS and/or SBAS data):	$PASHS,CPD,MOD,BAS,**0** $PASHR,ACK*3D

Checking Radio Operation

Action	Command
Query the radio settings (channel, protocol and air link speed):	If a radio transmitter P/N 800986: $PASHQ,RDP,PAR,A $PASHR,RDP,PAR,A,MGL,,**3**,,2,4800,, 447.1000,447.1000,12.5,430-450,*48
Query the channel table:	If a radio transmitter P/N 800986: $PASHQ,RDP,CHT,A $PASHR,RDP,CHT,MGL,**2**,**0**,**464.5000**,0.0000,**1**, **464.5500**,0.0000*31

Base Using Port A as Corrections Output

In the example below, it is assumed that the receiver will generate differential data in RCTM V3.0 format. You may replace RT3 with RT2 (RTCM2.3), ATOM, CMR or CMP (CMR+) or DBEN.

See $PASHS,RTC,TYP, $PASHS,RNX,TYP or $PASHS,CMR,TYP if you want to change the default messages and periods.

Action	Command
Set the name of the antenna connected to the receiver:	$PASHS,ANP,OWN,**ASH111661** $PASHR,ACK*3D
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D
Set the antenna height (for example a slant height of 1.45 meters was measured): NOTE: When a slant height is entered, you also need to enter the antenna radius and the ARP-to-SHMP vertical offset (negative if ARP is below SHMP).	$PASHS,ANT,**1.45**,**0.0921**,**-0.0516** $PASHR,ACK*3D
Enter the coordinates of the base:	$PASHS,POS,**4717.93777**,**N**, **130.541864**,**W**,**87.007** $PASHR,ACK*3D
Set the baud rate of port A (e.g. 19200 Bd):	$PASHS,PRT,A,**6** $PASHR,ACK*3D
Select the RS422 or RS232 mode for port A:	$PASHS,MDP,A,**422** $PASHR,ACK*3D
Set the type of differential data that will be generated by the base as well as the port on which the corrections will be available:	$PASHS,BAS,A,**RT3** $PASHR,ACK*3D
Set the receiver to be a base transmitting GPS data (+ GLONASS and/or SBAS data):	$PASHS,CPD,MOD,BAS,**0** $PASHR,ACK*3D

Base Using Port B or F as Corrections Output

In the example below, it is assumed that the receiver will generate differential data in RCTM V3.0 format. You may replace RT3 with RT2 (RTCM2.3), ATOM, CMR or CMP (CMR+) or DBEN.

See $PASHS,RTC,TYP, $PASHS,RNX,TYP or $PASHS,CMR,TYP if you want to change the default messages and periods.

Action	Command
Set the name of the antenna connected to the receiver:	$PASHS,ANP,OWN,**ASH111661** $PASHR,ACK*3D
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D
Set the antenna height (for example a slant height of 1.45 meters was measured): NOTE: When a slant height is entered, you also need to enter the antenna radius and the ARP-to-SHMP vertical offset (negative if ARP is below SHMP).	$PASHS,ANT,**1.45**,**0.0921**,**-0.0516** $PASHR,ACK*3D
Enter the coordinates of the base:	$PASHS,POS,**4717.93777**,**N**, **130.541864**,**W**,**87.007** $PASHR,ACK*3D
Set the baud rate of port B or F (e.g. 19200 Bd):	$PASHS,PRT,**B**,**6** $PASHR,ACK*3D
Enable the extended communication port:	$PASHS,ECP,ON $PASHR,ACK*3D
Select the RS422 or RS232 mode for port A:	$PASHS,MDP,A,**422** $PASHR,ACK*3D
Set the type of differential data that will be generated by the receiver as well as the port on which the corrections will be available:	$PASHS,BAS,**B**,**RT3** $PASHR,ACK*3D
Set the receiver to be a base transmitting GPS data (+ GLONASS and/or SBAS data):	$PASHS,CPD,MOD,BAS,**0** $PASHR,ACK*3D

Base Using the Ethernet Port as the Corrections Output

In the example below, it is assumed that the receiver will generate differential data in RCTM V3.0 format. You may replace RT3 with RT2 (RTCM2.3), ATOM, CMR or CMP (CMR+) or DBEN.

See $PASHS,RTC,TYP, $PASHS,RNX,TYP or $PASHS,CMR,TYP if you want to change the default messages and periods.

See $PASHS,ETH,PAR and $PASHS,TCP,PAR to configure the TCP/IP connection.

Action	Command
Set the name of the antenna connected to the receiver:	$PASHS,ANP,OWN,**ASH111661** $PASHR,ACK*3D
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D
Set the antenna height (for example a slant height of 1.45 meters was measured): NOTE: When a slant height is entered, you also need to enter the antenna radius and the ARP-to-SHMP vertical offset (negative if ARP is below SHMP).	$PASHS,ANT,**1.45**,**0.0921**,**-0.0516** $PASHR,ACK*3D
Enter the coordinates of the base:	$PASHS,POS,**4717.93777**,**N**, **130.541864**,**W**,**87.007** $PASHR,ACK*3D
Enable the Ethernet connection:	$PASHS,ETH,ON $PASHR,ACK*3D
Set the type of differential data that will be generated by the receiver as well as the port on which the corrections will be available (port I):	$PASHS,BAS,I,**RT3** $PASHR,ACK*3D
Set the receiver to be a base transmitting GPS data (+ GLONASS and/or SBAS data):	$PASHS,CPD,MOD,BAS,**0** $PASHR,ACK*3D

Direct-IP Base (Via Modem)

Script

In the example below, it is assumed that the receiver will generate differential data in RCTM V3.0 format. You may replace RT3 with RT2 (RTCM2.3), ATOM, CMR or CMP (CMR+) or DBEN.

See $PASHS,RTC,TYP, $PASHS,RNX,TYP or $PASHS,CMR,TYP if you want to change the default messages and periods.

Action	Command
Set the name of the antenna connected to the receiver:	$PASHS,ANP,OWN,**ASH111661** $PASHR,ACK*3D
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D

Action	Command
Set the antenna height (for example a slant height of 1.45 meters was measured): NOTE: When a slant height is entered, you also need to enter the antenna radius and the ARP-to-SHMP vertical offset (negative if ARP is below SHMP).	$PASHS,ANT,**1.45**,**0.0921**,**-0.0516** $PASHR,ACK*3D
Enter the coordinates of the base:	$PASHS,POS,**4717.93777**,**N**, **130.541864**,**W**,**87.007** $PASHR,ACK*3D
Set the modem and GPRS parameters (Power mode, PIN code, APN settings, IP protocol, auto-dial, re-dials, 2G/3G):	$PASHS,MDM,PAR,PWR,**AUT**, PIN,**1234**,APN,**ssx.com**,LGN,**Ssx**, PWD,**ssx3**,IPT,**1**,ADL,**Y**,RNO,**3**, NET,**0** $PASHR,ACK*3D
Set the modem in GPRS and TCP/IP modes:	$PASHS,MDM,PAR,PTC,1,IPT,0 $PASHR,ACK*3D
Turn on the modem (unless the modem has been set in automatic power mode):	$PASHS,MDM,ON $PASHR,ACK*3D
Initialize the modem. Wait a few seconds until the receiver can respond to this command. NOTE:If the initialization fails, the message $PASHR,MDM,INI,FAILED*7D is returned.	$PASHS,MDM,INI $PASHR,MDM,INI,OK*7A
Set the type of differential data sent to the modem (port E):	$PASHS,BAS,E,**RT3** $PASHR,ACK*3D
Set the receiver to be a base transmitting GPS data (+ GLONASS and/or SBAS data):	$PASHS,CPD,MOD,BAS,**0** $PASHR,ACK*3D
Ask the modem to connect to the server: NOTE: The ADD field may contain either an IP address or a host name.	$PASHS,DIP,PAR,ADD,**192.65.54.** **1**,PRT,**80**,IPP,**E** $PASHR,ACK*3D $PASHS,DIP,ON $PASHR,ACK*3D

Monitoring the Modem

Action	Command
Query the modem status and settings:	$PASHQ,MDM $PASHR,MDM,E,9,ONLINE,... or $PASHQ,MDM,STS $PASHR,MDM,STS,INIT,"Ssx F",2G,60*77
Query the modem signal level:	$PASHQ,MDM,LVL $PASHR,MDM,LVL,80*6E

Ending the Direct IP Connection

Action	Command
Ending the Direct IP connection:	$PASHS,DIP,OFF $PASHR,ACK*3D

NTRIP Station

By following the script described below, and according to the terminology used in the NTRIP standard, the receiver will be configured to operate as an "NTRIP server", that is, a station capable of delivering its data to an NTRIP caster.

Script

In the example below, it is assumed that the receiver will generate differential data in RCTM V3.0 format. You may replace RT3 with RT2 (RTCM2.3), ATOM, CMR or CMP (CMR+) or DBEN.

See $PASHS,RTC,TYP, $PASHS,RNX,TYP or $PASHS,CMR,TYP if you want to change the default messages and periods.

Action	Command
Set the name of the antenna connected to the receiver:	$PASHS,ANP,OWN,**ASH111661** $PASHR,ACK*3D
Set the antenna reduction mode to ON, so that all coordinates refer to the ground mark:	$PASHS,ANR,ON $PASHR,ACK*3D
Set the antenna height (for example a slant height of 1.45 meters was measured): NOTE: When a slant height is entered, you also need to enter the antenna radius and the ARP-to-SHMP vertical offset (negative if ARP is below SHMP).	$PASHS,ANT,**1.45**,**0.0921**,**-0.0516** $PASHR,ACK*3D
Enter the coordinates of the base:	$PASHS,POS,**4717.93777**,**N**, **130.541864**,**W**,**87.007** $PASHR,ACK*3D
Set the modem and GPRS parameters (Power mode, PIN code, APN settings, IP protocol, auto-dial, re-dials, 2G/3G):	$PASHS,MDM,PAR,PWR,**AUT**, PIN,**1234**,APN,**ssx.com**,LGN,**Ssx**, PWD,**ssx3**,IPT,**1**,ADL,**Y**,RNO,**3**, NET,**0** $PASHR,ACK*3D
Set the modem in GPRS and TCP/IP modes:	$PASHS,MDM,PAR,PTC,1,IPT,0 $PASHR,ACK*3D
Turn on the modem (unless the modem has been set in automatic power mode):	$PASHS,MDM,ON $PASHR,ACK*3D

Action	Command
Initialize the modem. Wait a few seconds until the receiver can respond to this command. NOTE: If the initialization fails, the message $PASHR,MDM,INI,FAILED*7D is returned.	$PASHS,MDM,INI $PASHR,MDM,INI,OK*7A
Enter the NTRIP caster parameters (see example in the right column). NOTE: The ADD field may contain either an IP address or a host name.	$PASHS,NTR,PAR,ADD, **83.167.123.12**,PRT,**2101**,LGN, **name**,PWD,**password**,TYP,0 $PASHR,ACK*3D
Set the type of differential data sent to the modem (port E):	$PASHS,BAS,E,**RT3** $PASHR,ACK*3D
Set the receiver to be a base transmitting GPS data (+ GLONASS and/or SBAS data):	$PASHS,CPD,MOD,BAS,**0** $PASHR,ACK*3D
Ask the modem to connect to the mount point (e.g. NAN1): NOTE: If you don't know which mount point to connect the modem to, see *Acquiring the NTRIP Source Table* below.	$PASHS,NTR,MTP,**NAN1** $PASHR,ACK*3D

Acquiring the NTRIP Source Table

After the $PASHS,NTR,PAR command has been sent and the modem state has switched to INIT, you can ask the receiver to get the source table from the caster.

NOTE: The modem INIT state is indicated on the receiver front panel when the following icon (static) appears in the lower line: . The number of bars is proportional to the strength of the signal received by the cellular antenna. You can also use the $PASHQ,MDM to read this state.

Action	Command
Load the NTRIP source table to the receiver:	$PASHS,NTR,LOD $PASHR,NTR,OK*14
Query the source table: NOTE: In the receiver response, you can find the label of the mount point you would like the modem to connect to. The syntax used is in compliance with the recommendations of the NTRIP or RTCM standard.	$PASHQ,NTR,TBL $PASHR,NTR,TBL SOURCETABLE 200 OK … ENDSOURCETABLE

Monitoring the Modem

Action	Command
Query the modem status and settings:	$PASHQ,MDM $PASHR,MDM,E,9,ONLINE,... or $PASHQ,MDM,STS $PASHR,MDM,STS,INIT,"Ssx F",2G,60*77
Query the modem signal level:	$PASHQ,MDM,LVL $PASHR,MDM,LVL,80*6E
Query the current mount point:	$PASHQ,NTR,MTP $PASHR,NTR,MTP,NAN1*05

Ending the NTRIP Connection

Action	Command
Ending the NTRIP connection:	$PASHS,NTR,MTP,OFF $PASHR,NTR,OK*14

Chapter 7. Ethernet Connection

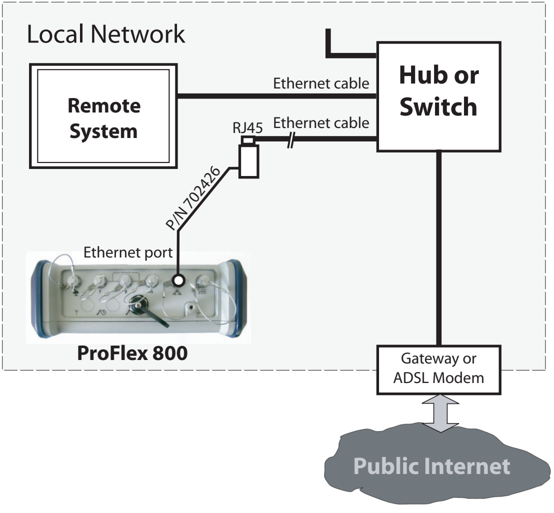
Setting Up the Ethernet Connection

The Ethernet adaptor cable provided (P/N 702426) should be used in all cases.

TCP/IP Connection Within a Local Network

In this case of use, the receiver and the remote system the receiver has to communicate with are connected to the same local network (LAN) and may even be in the same room. Here the communication will NOT take place through the public Internet, but simply within the local network.

The connection diagram typically is the following.



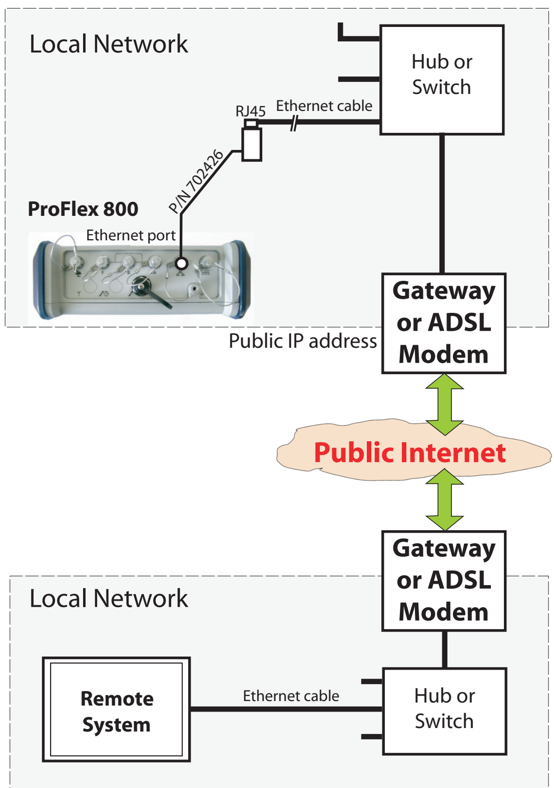
When the ProFlex 800 is the server, the valid receiver IP address to be communicated to the third-party equipment is the one read on the receiver display screen. To read this IP address, from the General Status screen, press the Scroll button twice to access the Receiver Identification screen. The IP address appears in the lower line.

The IT Manager may also create a host name for the receiver. The choice of using or not using the DHCP mode within the local network, and the consequence of this choice on which information to provide to the remote system for the connection are also the decision and responsibility of the IT Manager. When DHCP is used, an account may be opened on DynDNS.com to track the dynamic IP address assigned by the ISP to the receiver's public access point. See *Creating an Account on Dyn.com on page 91*.

TCP/IP Connection Through the Public Internet

In this case of use, the receiver and the remote system are connected to different local networks. Here the communication will necessarily take place through the public Internet.

The connection diagram typically is the following.



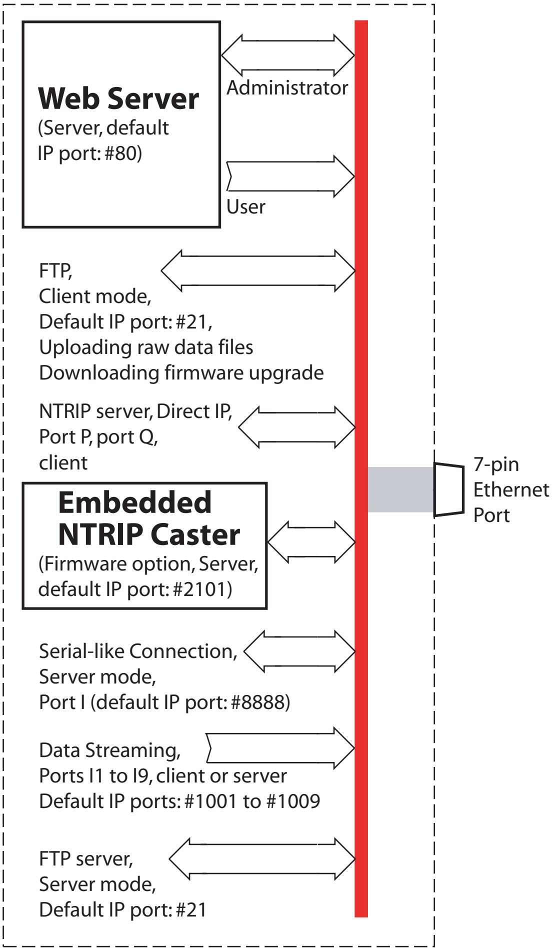
In this configuration, the IT Manager should take all the necessary steps for the remote system to be able to access the ProFlex 800 through the public IP address of the local network. The IP address read on the receiver display screen is NOT the one to be provided to the remote system.

It will therefore be the responsibility of the IT Manager to provide the receiver administrator with the appropriate connection information (<IP address:port number> or host name). Once again, if DHCP is used, an account may be opened on DynDNS.com to track the dynamic IP address assigned by the ISP to the receiver's public access point. See *Creating an Account on Dyn.com on page 91*.

Using the Ethernet Port

Introduction

The ProFlex 800 Ethernet port can be used simultaneously for various purposes. The different uses are summarized in the diagram below.



Terminology used:

ProFlex 800 used in server mode: The ProFlex 800 receives a data request from an outside equipment through its Ethernet port via an IP connection. The outside equipment needs to know the IP address (and IP port) or host name of the ProFlex 800 to be able to establish a communication with the receiver.

ProFlex 800 used in client mode: The ProFlex 800 sends a data request to an outside equipment through its Ethernet port via a TCP/IP connection. The ProFlex 800 needs to know the IP address (and IP port) or host name of the outside equipment to be able to establish a bidirectional communication with the outside equipment.

Running the Web Server

The Web Server is used to remotely configure and monitor the ProFlex 800. Using the Web Server is fully described in *Using the Web Server on page 41*. Below are a few key instructions on how to use the Web Server:

- The $PASHS,WEB,PAR command controls locally the availability of the Web Server for a remote user or administrator. Only the receiver owner can run this command locally.
- Access to the ProFlex Web Server is protected. A connection profile (login + password) is needed to run the Web Server. Full access (read/write) is given to the administrator. Read-only access is given to all user profiles.
- Use a web browser (Microsoft Internet Explorer, Mozilla Firefox, etc.) to launch the Web Server. Enter the IP address or host name of the ProFlex 800 in the Address box of the web browser. The different web pages of the Web Server, which are all html pages, can then be seen in the web browser window.
- The ProFlex 800 will keep operating normally with one or more active connections to the Web Server.
- Up to five users + the administrator can be connected simultaneously without affecting the operation of the receiver.

Connection to a Remote FTP Server

The Ethernet port can be used both for downloading and installing a new firmware upgrade from the specified FTP server, and also for uploading raw data files collected by the receiver to the specified FTP server, which may be different from the previous one. Below are a few key instructions on how to use this application:

- In this type of connection, the ProFlex 800 is always the client.
- Entering the identification of the FTP server from which to download firmware upgrades is accomplished using the $PASHS,UPL,PAR command.
- Installing an upgrade is done through the $PASHS,UPL,UPG command.
- Entering the identification of the FTP server where to upload raw data files is accomplished using the $PASHS,FTP,PAR command.

- Uploading files to the FTP server is done using the $PASHS,FTP,PUT command.
- Using the ProFlex Web Server is the easiest way to set up FTP connections.

Data Input/Output Through Port I

When used as an output, typically when the receiver is a base, port I may forward differential data to a client (see $PASHS,BAS).

Still as an output, typically when the receiver is a rover, port I may provide the following data to a client:

- Differential data (see $PASHS,ATM - $PASHS,RAW)
- NMEA messages (see $PASHS,NME)
- 1 PPS time tag message (see $PASHS,PTT)

In addition, port I can be used as an input port to apply serial $PASH commands from a terminal (this type of use is described in *Applying Commands Through TCP/IP on page 294*).

Port I can also be used as an input for differential data (see $PASHS,CPD,REM). This may be typically the case when the receiver is used as a rover.

Here are a few key instructions to understand how to implement and use port I through a TCP/IP connection:

- Port I can only be used in server mode, and through the TCP protocol.
- Port I is configurable through the $PASHS,TCP,PAR command. For a password-protected TCP/IP connection, use this command to define the login and password the client will have to enter before being allowed to send $PASH commands to the receiver via the I port.
- Only one client can be connected to port I at a time.
- Using the ProFlex Web Server is the easiest way to set up port I.

Implementing NTRIP or Direct IP Through Port P or Q

The main purpose of ports P and Q is to allow the implementation of the NTRIP or Direct IP mode through the Internet. This makes ports P and Q an alternative to using the internal modem to implement these modes.

Like port I, ports P and Q can also be used for the following:

- When used as an output, typically when the receiver is a base, port P or Q may forward differential data to a server (see $PASHS,BAS).

- Still as an output, typically when the receiver is a rover, port P or Q may provide NMEA messages to a server (see $PASHS,NME).
- Port P or Q can also be used as an input for differential data (see $PASHS,CPD,REM). This may be typically the case when the receiver is used as a rover.

Here are a few key instructions to understand how to use port P or Q through an IP connection:

- Port P or Q can only be used in client mode, using the TCP or UDP protocol.
- Use the $PASHS,NTR,PAR command to implement the NTRIP mode through port P or Q.
- Use the $PASHS,DIP command to implement the Direct IP mode through port P or Q.
- Using the ProFlex Web Server is the easiest way to set up port P or Q.

Differential Data Streaming Through Ports I1 to I9

The Ethernet port can also be used through ports I1 to I9 (Ix) to output differential data streams for use either in server or client mode. Ports I1 to I9 can only be used as outputs.

Here are a few key instructions to configure ports I1 to I9:

- Use $PASHS,DST to configure each port (server/client, UDP/TCP, IP port number).
- Use $PASHS,BDS to define the differential data available on each port.
- Use $PASHQ,DST,STS to read the current status of each of the Ix ports. This command also provides information on the status of ports E, P and I.
- In server mode, each port can up to five connections.
- Access to each of these ports is not password protected.
- Using the ProFlex Web Server is the easiest way to set up ports I1 to I9.

Log Files

The history of Ethernet connections and disconnections is kept in a log file stored in the root directory of the internal memory.

This file is kept in memory for a user-set period of time (see $PASHS,LOG,PAR). A new log file is created every day.

The naming convention used for log files is: “yyyymmdd.log” where yyyy is the year, mm is the month number (1-12) and dd is the day number (1-31) when the file was created. The file extension is “log”.

Chapter 8. Using Serial Commands

Introduction to Serial Commands

Serial commands allow you to communicate directly with the receiver in its proprietary command language. Serial commands can be used for various purposes such as:

- Changing default settings
- Monitoring different receiver statuses (internal operation, constellations, etc.)
- Outputting messages on request
- Installing firmware options, etc.

Serial commands fall into two categories:

- *Set* commands ($PASHS,...), used to set or modify the receiver's internal parameters.
- *Query* commands ($PASHQ,...), used to interrogate the receiver.

Standard NMEA messages will all be output with the standard ASCII NMEA preamble (e.g. $GPGGA) and not with the "$PASHR.." preamble.

The few conventions used to describe the serial commands in this manual are summarized in the table below.

String or sign	Description
$PASHS	Header for set commands (Whole line shown in bold characters)
$PASHQ	Header for query commands (Whole line shown in bold characters)
$PASHR	Receiver response line, in normal characters.
GP	Header in standard NMEA output messages for results provided by GPS.
GL	Header in standard NMEA output messages for results provided by GLONASS.
GA	Header in standard NMEA output messages for results provided by GALILEO.
GN	Header in standard NMEA output messages for results provided by GNSS (combination of several constellations).
$--	Header prefix for all standard NMEA messages delivered by the receiver.

String or sign	Description
[ ]	Optional field or parameter
,	Field delimiter
.	Decimal point (used in f-type fields)
c..	One-character string
d..	Integer
f..	Real number, with decimal places
h..	Parameter in hexadecimal notation
m..	Denotes specific data format used, such as angles (e.g. ddmm.mmm) or time (e.g. hhmmss.sss)
n	Used in the syntax of responses to query commands to indicate that a sequence of parameters will be repeated “n” times in the response. For example, n(f1,f2,f3) means the response will include the sequence “f1,f2,f3,f1,f2,f3,f1,f2,f3...”. The value of n is specific to each command.
s..	Character string
*cc	Checksum

In response to a well recognized and properly executed set command, the receiver will return the message:

$PASHR,ACK*3D

A set command is said to be “NAKed” when it is not accepted or acknowledged. The following message is then returned:

$PASHR,NAK*30

If this happens, check that the command has been typed correctly and the number and format of parameters are correct. In some cases, the execution of a set command may be contingent upon the prior activation of the corresponding firmware option.

Checksum Calculation: The checksum is computed by “exclusive-ORing” all of the bytes in the message between, but not including, the “$” and the “*”. The result is “*hh” where h is a hexadecimal character.

Applying Commands Through Bluetooth or a Serial Port

From the Office Computer

Use GNSS Solutions’ WinComm utility, or any terminal emulation program such as HyperTerminal (a standard Windows communication accessory), to send serial commands to the receiver.

Interfacing the chosen program with the receiver is achieved by establishing a connection through one of the computer's COM port (a serial data cable is then required), or using Bluetooth if this device is available on the computer.

For more information on WinComm, see *GNSS Solutions Reference Manual* or WinComm On-Line Help.

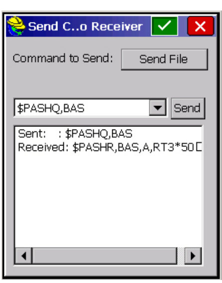
When using HyperTerminal, perform the following settings after creating a new connection (serial ports on Spectra Precision receivers are usually set as follows: 19200 Bd, 8 data bits, 1 stop bit, no parity, no flow control), and before typing your first command:

- In the HyperTerminal menu bar, select **File>Properties**.
- Click on the **Settings** tab.
- Click on the **ASCII Setup** button.
- Enable the following two options: **Send line ends with line feeds** and **Echo typed characters locally**. This will automatically complete all your command lines with <cr><lf> characters and allow you to see in real time the commands you are typing.
- Click **OK** twice to close the Properties window.

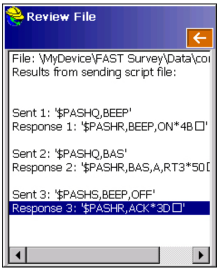
From FAST Survey

From the FAST Survey menu, tap on the **Equip** tab, then on the **GPS Utilities** button, and then on the **Send Command** button. It is assumed that the communication with the receiver has been established via Bluetooth or a serial cable.

Running a Single Command at a Time



- Tap your command directly in the combo box using FAST Survey's virtual keyboard. The keyboard appears automatically when you tap inside the box.
- Tap  after you have typed the command line.
- Tap on the **Send** button to send the command to the receiver. The command line as well as the response line(s) then appear at the bottom of the screen.



Running a Series of Commands

First of all, you need to create a TXT file containing all the commands you want the receiver to run. Save the file to the "MyDevice/FAST Survey/Data/" folder. Then do the following:

- Use the **Send File** button in the upper part of the window to select the TXT file and send it to the receiver.
- Once the receiver has executed all the commands included in the file, a new window is displayed listing each of the commands run in the receiver as well the resulting receiver response line(s).
- Tapping will take you back to the command window.

Applying Commands Through TCP/IP

The receiver can be remotely controlled through its Ethernet port.

By default, the Ethernet port is on and a default configuration allows you to connect to the receiver via a non-secured TCP/IP connection. However, if the Ethernet port is off and the TCP/IP function has been deactivated or needs new settings, follow the instructions below to set the Ethernet port.

Setting the Ethernet Port

Run the following three $PASH commands through one of the receiver's serial ports. The syntax of the commands mentioned below is fully described in the *Set Command Library* chapter.

The choices in the last two commands should be made in collaboration with your local network administrator.

1. **$PASHS,ETH,ON**: This command allows you to power up the Ethernet port. When the port is on, the Ethernet icon appears in the lower-right corner of the receiver screen.

   Script:

   $PASHS,ETH,ON
   $PASHR,ACK*3D

2. **$PASHS,ETH,PAR**: This command allows you to choose either a static or dynamic (DHCP) IP address for the receiver. If you choose DHCP, you don't need to enter any additional parameter.

   Script:

   $PASHS,ETH,PAR,DHP,1
   $PASHR,ACK*3D

If you choose a static IP address for the receiver, the command must also include the following parameters that the administrator of your local network (LAN) should provide you with:

- Static IP address
- Sub-network mask
- Gateway IP address
- DNS 1 IP address and DSN 2 IP address. These two parameters are used to link the receiver name with an IP address.

The $PASHQ,ETH command can be used to check the settings.

Script example:

**$PASHS,ETH,PAR,DHP,0,ADD,10.20.2.28,MSK,255.255.255.0,GTW,
10.20.2.1,DN1,134.20.2.16,DN2,134.20.2.3**
$PASHR,ACK*3D
$PASHQ,ETH
$PASHR,ETH,I,ON,02:03:04:85:06:07,DHP=1,ADD=10.20.2.28,MSK=255.
255.255.0,GTW=10.20.2.1,DN1=134.20.2.16,DN2=134.20.2.3*67

3. **$PASHS,TCP,PAR**: This command is used to define the Ethernet port (Port I) as a port dedicated to receiving and parsing $PASHS commands, and also outputting data (NMEA, RTCM, ATOM, etc.). The port may be activated to do so either with or without user authentication. The command is also used to define the IP port number (default: 8888).

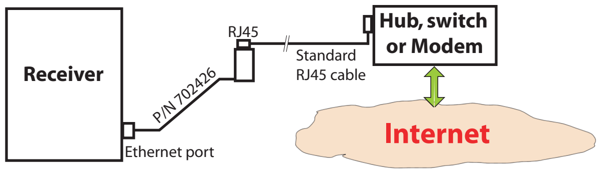
   If user authentication is chosen, the login and password must be provided in the command. Later, when remote users want to access the receiver, they will need to provide these two parameters.

   Script example (where TCP/IP is activated without authentication and $PASHQ,TCP is used to check the new setting):

   $PASHS,TCP,PAR,MOD,1
   $PASHR,ACK*3D
   $PASHQ,TCP
   $PASHR,TCP,MOD=1,LGN=,PWD=,ADD=192.34.76.1,
   PRT=8888*OC

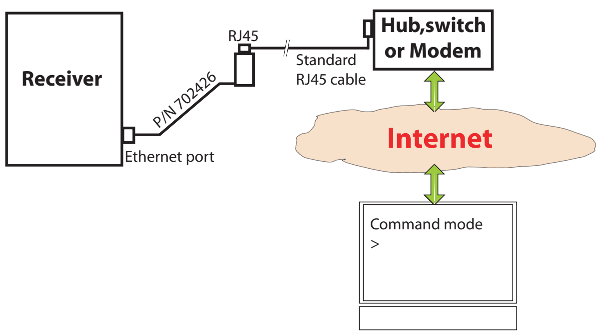
Connecting the Ethernet Port

After the Ethernet port has been configured, use the Ethernet adaptor cable (P/N 702426) and a standard RJ45 cable to connect the receiver, either to your local network through a hub or switch, or directly to a modem.



Ask your network administrator to make the receiver visible from the public network (Internet) according to the choices made earlier for the TCP/IP connection. Make sure that the chosen port (IP port No. 8888 by default) can be reached. The IP port number can be defined using the $PASHS,TCP,PAR command.

Using a TCP/IP Connection to Communicate With a Receiver



The most convenient way of communicating with a receiver through an IP connection is to access its Web Server using a web browser. This is explained in *Chapter 2*. Other solutions are however possible.

One of the most popular programs used to work in command mode through a TCP/IP connection is Microsoft HyperTerminal. This is the program we chose for the instructions below but you can use any other similar program of your choice.

- Run HyperTerminal on the remote computer (in **Start> Programs>Accessories>Communications>**)
- Name the connection and press **OK**
- In the **Connect using** field, select “TCP/IP (Winsock)”.
- Enter the receiver’s IP address in the **Host Address** field. If you don’t know this address, you can read it on the receiver display screen. Press the Scroll button until you

display the Receiver Identification screen. The IP address is shown in the lower line.

- Enter the chosen IP port number (default: 8888) in the **Port number** field.
- Click **OK**. You get the following reply from the connected receiver:

  Welcome!
  You are connected to the Ashtech receiver (SN:xxxxxxxxx). Please send the command $PASHS,TCP,UID,<login>,<password> to enter the login and the password
  >

- Before you type the requested command, make the following settings in HyperTerminal:
  – In the HyperTerminal menu bar, select **File>Properties**.
  – Click on the **Settings** tab.
  – Click on the **ASCII Setup** button.
  – Enable the following two options: **Send line ends with line feeds** and **Echo typed characters locally**. This will automatically complete all your command lines with <cr><lf> characters and allow you to see in real time the commands you are typing.
  – Click **OK** twice to close the Properties window.
- Now you can type the requested $PASHS,TCP,UID command. You need to know the login and password of the receiver you are trying to connect to. If your login and password are correct, the receiver will return the following response:

  $PASHR,TCP,OK*1B

  You are then allowed to send all possible $PASH commands. Note however that you cannot change the login and password through a TCP/IP connection, using the $PASHS,TCP,PAR command. This is only possible locally through a serial or Bluetooth connection.

  When authentication is required, you cannot send commands until the login and password have been provided to the receiver. The receiver will however output data through this connection without prior authentication if it has been configured to output data on port I.

Running Serial Commands from a USB Key

Serial commands can also be run from a USB key you connect to the receiver's USB port through the dedicated cable.

What you have to do is create a text file containing the list of serial commands you would like the receiver to execute.

In this file can also be inserted the $PASHS,CMD,WTI command, which is used to introduce an idle time before the receiver is allowed to execute the command that comes after.

After typing the last command in the file, press the ENTER key to insert a carriage return + line feed as the last item in the file. This is mandatory.

Then you just have to copy the file to the USB key's root directory.

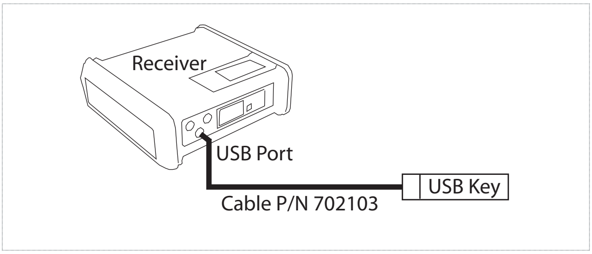
The receiver will always execute the list of commands (the *script*) in the given order, except for some commands like $PASHS,REC and $PASHS,INI, which are necessarily run last.

Starting the execution of the script may be done in two different ways:

- **Automatically**: The receiver will automatically prompt you to run the script when you connect the USB key to the receiver. This is achieved by simply naming the file "autoconfig.cmd"
- **Manually**: This is achieved by naming the file differently and using the $PASHS,CMD,LOD command to initiate the execution of the script.

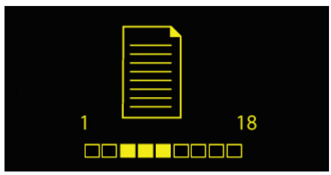
Described below is the typical procedure to make the receiver run automatically a series of commands stored on a USB key under a file named "autoconfig.cmd":

- Connect the USB key to the receiver.



- Wait until the USB logo appears on the receiver screen and a message is prompted (**Upload Script?**).

- Accept the request by pressing the Log button (you could reject it by pressing the Scroll button). The receiver will then start executing the script of commands. This is indicated on the display screen where you can see the number of commands to be run (on the right) and the rank of the command being currently run (on the left). In the example below, the receiver is running the 1st command of the 18 ones it has to go through:



- When all the commands have been run, the receiver comes back to the screen it was displaying before.
- Remove the USB key.
- You can now have a check on how the receiver ran each of the commands: Connect the USB key to a computer and edit the autoconfig.log file created on the USB key by the receiver while executing the commands. Each correctly executed command is followed by:

  $PASHR,ACK*3D

List of Commands

All the existing commands for the receiver are here arranged in two categories:

- Commands used to configure the receiver.
- Commands used to output the data users need in their applications.

In each of the two tables below, the commands appear in alphabetical order. All pairs of related set and query commands (e.g. $PASHS,ANH and $PASHQ,ANH) appear in the same row.

Receiver

Set Command	Description	Query Command	Description
$PASHS,ATL	Debug data recording	$PASHQ,ATL	Debug data recording
$PASHS,BEEP	Beeper	$PASHQ,BEEP	Beeper
$PASHS,CMD,LOD	Running a command file		
$PASHS,CMD,WTI	Inserting wait time		
$PASHS,INI	Receiver initialization		
		$PASHQ,LOG	Editing a log file
$PASHS,LOG,DEL	Deleting log files		
		$PASHQ,LOG,LST	Listing log files
$PASHS,LOG,PAR	Log file settings	$PASHQ,LOG,PAR	Log file settings
$PASHS,OPTION	Receiver firmware options	$PASHQ,OPTION	Receiver firmware options
		$PASHQ,PAR	Receiver parameters
$PASHS,PAR,LOD	Load Receiver Configuration		
$PASHS,PAR,SAV	Save Receiver Configuration		
$PASHS,PWR,OFF	Powering off the receiver	$PASHQ,PWR	Power status
$PASHS,PWR,PAR	Power management		
$PASHS,PWR,SLP	Sleep mode		
		$PASHQ,RCP	Receiver parameters
		$PASHQ,RID	Receiver identification
$PASHS,RST	Default settings		
$PASHS,UNT	Distance unit used on display	$PASHQ,UNT	Distance unit used on display
		$PASHQ,VERSION	Firmware version
$PASHS,WAK	Alarm acknowledgment		
		$PASHQ,WARN	Warning messages

Antenna

Set Command	Description	Query Command	Description
$PASHS,ANH	Antenna height	$PASHQ,ANH	Antenna height
$PASHS,ANP	Antenna parameters	$PASHQ,ANP	Antenna parameters
$PASHS,ANP,DEL	Deleting user-defined antenna		
$PASHS,ANP,OUT	Defining the virtual antenna	$PASHQ,ANP,OUT	Virtual antenna
$PASHS,ANP,OWN $PASHS,ANP,OW2 $PASHS,ANP,REF	Defining local antenna name Defining second antenna name Defining ref. antenna name	$PASHQ,ANP,OWN $PASHQ,ANP,OW2 $PASHQ,ANP,REF	Local antenna Local antenna (second one) Antenna used at the base
		$PASHQ,ANP,RCV	Antenna Name & Offsets of Received Base
$PASHS,ANR	Antenna reduction mode	$PASHQ,ANR	Antenna reduction mode
$PASHS,ANT	Antenna height	$PASHQ,ANT	Antenna height

Set Command	Description	Query Command	Description
		$PASHQ,CPD,ANT	Base antenna height

Communication Ports

Set Command	Description	Query Command	Description
		$PASHQ,BTH	Bluetooth settings
$PASHS,BTH,NAME	Bluetooth device name		
$PASHS,BTH,OFF	Disabling Bluetooth		
$PASHS,BTH,ON	Enabling Bluetooth		
$PASHS,BTH,PIN	Bluetooth device pin code		
$PASHS,CTS	Handshaking	$PASHQ,CTS	Handshaking
$PASHS,DSY	Daisy chain	$PASHQ,DSY	Daisy chain
$PASHS,ECP,OFF $PASHS,ECP,ON	Controlling power for extended communication port	$PASHQ,ECP	Extended communication port power status
$PASHS,MDP	Port A setting	$PASHQ,MDP	Port A setting
$PASHS,PRT	Baud rates	$PASHQ,PRT	Baud rates

GNSS Tracking

Set Command	Description	Query Command	Description
$PASHS,AGB	GLONASS biases	$PASHQ,AGB	GLONASS biases
$PASHS,CFG	GNSS tracking configuration	$PASHQ,CFG	GNSS tracking configuration
$PASHS,GAL	GALILEO tracking	$PASHQ,GAL	GALILEO tracking
$PASHS,GLO	GLONASS tracking	$PASHQ,GLO	GLONASS tracking
$PASHS,GPS	GPS tracking	$PASHQ,GPS	GPS tracking
$PASHS,PGS	Primary GNSS system	$PASHQ,PGS	Primary GNSS system
$PASHS,POP	Internal update rate (measure-ments and PVT)	$PASHQ,POP	Internal update rate (measurements and PVT)
$PASHS,QZS	QZSS tracking	$PASHQ,QZS	QZSS tracking
$PASHS,REF	External reference clock input	$PASHQ,REF	External reference clock input
$PASHS,SBA	SBAS tracking (ON/OFF)	$PASHQ,SBA	SBAS tracking status
$PASHS,SBA,MAN	SBAS sats; manual selection		
$PASHS,USE	Enable/disable sat tracking		

Position Processing

Set Command	Description	Query Command	Description
$PASHS,CPD,AFP	Ambiguity fixing parameter	$PASHQ,CPD,AFP	Ambiguity fixing parameter
$PASHS,CP2,AFP	Ambiguity for 2nd RTK engine	$PASHQ,CP2,AFP	Ambiguity for 2nd RTK engine
$PASHS,CPD,FST	RTK output mode	$PASHQ,CPD,FST	RTK output mode
$PASHS,CPD,MOD	Base/rover mode	$PASHQ,CPD,MOD	Base/rover mode
$PASHS,CPD,NET	Network corrections	$PASHQ,CPD,NET	Network operation mode
$PASHS,CPD,REM	Differential data port	$PASHQ,CPD,REM	Differential data port
$PASHS,CPD,RST	RTK process reset		

Set Command	Description	Query Command	Description
$PASHS,CP2,RST	Reset second RTK process		
$PASHS,CPD,VRS	VRS assumption mode	$PASHQ,CPD,VRS	VRS assumption mode
$PASHS,DYN	Receiver dynamics	$PASHQ,DYN	Receiver dynamics
$PASHS,LCS	Enable/disable use of local coordinate system	$PASHQ,LCS	Local coordinate system status
$PASHS,LTZ	Local time zone	$PASHQ,LTZ	Local time zone
$PASHS,PEM	Position elevation mask	$PASHQ,PEM	Position elevation mask
$PASHS,PHE	Event marker active edge	$PASHQ,PHE	Event marker active edge
$PASHS,PPS	PPS settings	$PASHQ,PPS	PPS settings
		$PASHQ,RCP	Receiver parameters
$PASHS,RCP,DEL	Deleting user-defined receiver name		
$PASHS,RCP,GBx	Defining GLONASS biases for user-defined receiver		
		$PASHQ,RCP,OWN	Receiver name
$PASHS,RCP,REF	Naming reference receiver	$PASHQ,RCP,REF	Reference receiver name
$PASHS,SNM	Signal-To-Noise Ratio Mask	$PASHQ,SNM	Signal-To-Noise Ratio Mask
$PASHS,SVM	Satellite use mask	$PASHQ,SVM	Satellite use mask
$PASHS,UDP	User-defined dynamic model	$PASHQ,UDP	User-defined dynamic model
$PASHS,UTS	Synchronization with GPS	$PASHQ,UTS	Synchronization with GPS
$PASHS,VCT	Type of vector coordinates	$PASHQ,VCT	Type of vector coordinates
$PASHS,VEC	Vector output mode	$PASHQ,VEC	Vector output mode
$PASHS,ZDA	Set time and date		

UHF Radios

Set Command	Description	Query Command	Description
$PASHS,RDP,OFF	Powering off internal radio		
$PASHS,RDP,ON	Powering on internal radio		
		$PASHQ,RDP,CHT	Radio channel table
		$PASHQ,RDP,LVL	Radio reception level
$PASHS,RDP,PAR	Setting the radio	$PASHQ,RDP,PAR	Radio parameters
		$PASHQ,RDP,PWR	Radio Type and Radiated Power
$PASHS,RDP,TYP	Radio type used	$PASHQ,RDP,TYP	Radio type used

Modem

Set Command	Description	Query Command	Description
		$PASHQ,MDM	Modem status and parameters
$PASHS,MDM,INI	Initializing the modem		
		$PASHQ,MDM,LVL	Modem signal level
$PASHS,MDM,OFF	Internal modem power off		
$PASHS,MDM,ON	Internal modem power on		
$PASHS,MDM,PAR	Setting modem parameters		
		$PASHQ,MDM,STS	Modem status
$PASHS,MWD	Modem timeout	$PASHQ,MWD	Modem timeout

Ethernet

Set Command	Description	Query Command	Description
		$PASHQ,DDN	DynDNS parameters
$PASHS,DDN,PAR	Setting DynDNS service		
$PASHS,DDN,SET	Sending IP address to DynDNS		
$PASHS,DST	Connection modes for data streams	$PASHQ,DST	Connection modes for data streams
		$PASHQ,DST,STS	Data stream port status
		$PASHQ,EFT	Embedded FTP server
$PASHS,EFT,ON	Starting embedded FTP server		
$PASHS,EFT,OFF	Stopping embedded FTP server		
$PASHS,EFT,PAR	Setting embedded FTP server		
$PASHS,EFT,USR,ADD	Adding embed. FTP server user		
$PASHS,EFT,USR,DEL	Deleting emb. FTP server user		
		$PASHQ,EML	Email settings
$PASHS,EML,PAR	Email parameters		
$PASHS,EML,TST	Testing email		
$PASHS,ETH,OFF $PASHS,ETH,ON	Controlling Ethernet port power supply		
$PASHS,ETH,PAR	Ethernet parameters	$PASHQ,ETH	Ethernet status and parameters
		$PASHQ,FTP	FTP status and settings
$PASHS,FTP,OFF	Ending FTP file transfer		
$PASHS,FTP,PAR	Setting FTP for file transfer		
$PASHS,FTP,PUT	Sending files to FTP server		
$PASHS,TCP,PAR	TCP/IP server settings	$PASHQ,TCP	TCP/IP server settings
$PASHS,TCP,UID	TCP/IP authentication		
		$PASHQ,UPL	FTP server settings (fw. upgrade)
		$PASHQ,UPL,LOG	Editing Firmware upgrade log file
		$PASHQ,UPL,LST	Listing firmware upgrades
$PASHS,UPL,PAR	Setting FTP server used for firmware upgrades		
$PASHS,UPL,UPG	Upgrading receiver firmware from FTP server		
		$PASHQ,WEB	Web Server control, owner information, connection profiles
$PASHS,WEB,OWN	Receiver owner information		
$PASHS,WEB,PAR	Web Server control and administrator profile		
$PASHS,WEB,USR, ADD	Adding user profiles for Web Server		
$PASHS,WEB,USR, DEL	Deleting user profiles		

NMEA Output

Set Command	Description	Query Command	Description
$PASHS,NME	NMEA messages (ON/OFF)	$PASHQ,NMO	NMEA output settings

Set Command	Description	Query Command	Description
$PASHS,NME,ALL	Disabling all NMEA messages		
$PASHS,NME,PER	NMEA output rate		
$PASHS,NPT	Tagging SBAS Differential positions in NMEA messages	$PASHQ,NPT	SBAS Differential positions in NMEA messages
$PASHS,USR,POS	Position Defined for User Message Type "GGA"	$PASHQ,USR,POS	Position Defined for User Message Type "GGA"
$PASHS,USR,TXT	Text Defined for User Message Type "TXT"	$PASHQ,USR,TXT	Text Defined for User Message Type "TXT"
$PASHS,USR,TYP	User Message Type	$PASHQ,USR,TYP	User Message Type
		$PASHQ,ALM	Almanac message
		$PASHQ,ATT	Heading, roll and pitch
		$PASHQ,CRT	Cartesian coordinates of position
		$PASHQ,DCR	Cartesian coordinates of baseline
		$PASHQ,DDS	Differential decoder status
		$PASHQ,DPO	Delta position
		$PASHQ,DTM	Datum Reference
		$PASHQ,GGA	GNSS position message
		$PASHQ,GLL	Geographic position-lat./long.
		$PASHQ,GMP	GNSS Map Projection Fix Data
		$PASHQ,GNS	GNSS fix data
		$PASHQ,GRS	GNSS range residuals
		$PASHQ,GSA	GNSS DOP & active satellites
		$PASHQ,GST	GNSS pseudo-range error statistics
		$PASHQ,GSV	GNSS satellites in view
		$PASHQ,HDT	True heading
		$PASHQ,LTN	Latency
		$PASHQ,POS	Computed position data
		$PASHQ,PTT	PPS time tag
		$PASHQ,RMC	Recomm. min. specific GNSS data
		$PASHQ,RRE	Residual error
		$PASHQ,SAT	Satellites status
		$PASHQ,SGA	GALILEO satellites status
		$PASHQ,SGL	GLONASS satellites status
		$PASHQ,SGP	GPS, SBAS & QZSS satellites status
		$PASHQ,VE2	Vector & accuracy data
		$PASHQ,VEC	Vector & accuracy data
		$PASHQ,VTG	COG and ground speed
		$PASHQ,XDR	Transducer measurements
		$PASHQ,ZDA	Time and date

Raw Data Output

Set Command	Description	Query Command	Description
$PASHS,ATM	ATOM messages	$PASHQ,ATM	ATOM data parameters
$PASHS,ATM,ALL	Disable ATOM messages		

Set Command	Description	Query Command	Description
$PASHS,ATM,PER	ATOM output rate		
$PASHS,ATM,VER	ATOM version	$PASHQ,PAR,ATM	ATOM version
		$PASHQ,ATO	ATOM message output settings
$PASHS,ELM	Elevation mask	$PASHQ,ELM	Elevation mask
$PASHS,RAW	Raw data messages (ON/OFF)	$PASHQ,RAW	Raw data settings
$PASHS,RAW,ALL	Disabling raw data messages		
$PASHS,RAW,PER	Raw data output rate		
		$PASHQ,RWO	Raw data output settings
$PASHS,SOM	Masking signal observations	$PASHQ,SOM	Masking signal observations
$PASHS,SOM,CTT	Cumul. Tracking Time Mask	$PASHQ,SOM,CTT	Cumulative Tracking Time Mask
$PASHS,SOM,NAV	Navigation data mask	$PASHQ,SOM,NAV	Navigation data mask
$PASHS,SOM,SNR	Signal-to-noise ratio mask	$PASHQ,SOM,SNR	Signal-to-noise ratio mask
$PASHS,SOM,WRN	Channel warnings mask	$PASHQ,SOM,WRN	Channel warnings mask
		ION, MPC, DPC, PBN, -SBA,DAT- SAL, SAG, SAW, SNG, SNV, SNW	See Chapter 11 - Raw Data Output

Base Setup

Set Command	Description	Query Command	Description
$PASHS,BAS	Differential data type	$PASHQ,BAS	Differential data type
$PASHS,BDS	Differential data streams	$PASHQ,BDS	Differential data streams
$PASHS,BRD	RTC Bridge	$PASHQ,BRD	RTC Bridge
		$PASHQ,CPD,POS	Base position
$PASHS,POS	Antenna position		
$PASHS,RTC,MSG	User message		
$PASHS,STI	Station ID	$PASHQ,STI	Station ID

Differential Messages

Set Command	Description	Query Command	Description
$PASHS,CMR,TYP	CMR message type & rate	$PASHQ,CMR,MSI	CMR message status
$PASHS,DBN,TYP	DBEN message type & rate	$PASHQ,DBN,MSI	DBEN message status
		$PASHQ,RNX,MSI	ATOM RNX differential message
$PASHS,RNX,TYP	ATOM RNX diff. message		
		$PASHQ,RTC	RTCM status
		$PASHQ,RTC,MSI	RTCM messages status
$PASHS,RTC,TYP	RTCM message type		

Memory & Recording

Set Command	Description	Query Command	Description
$PASHS,DRD	Data Recording Duration	$PASHQ,DRD	Data Recording Duration
$PASHS,DRI	Raw data recording rate	$PASHQ,DRI	Raw data recording rate
		$PASHQ,EXM	Extended internal memory status
$PASHS,EXM,OFF	Disabling extended int. memory		
$PASHS,EXM,ON	Enabling extended int. memory		
		$PASHQ,FIL,CUR	Info on G-file being recorded
$PASHS,FIL,D	Deleting files		
$PASHS,FIL,DEL	Deleting files & directories		
		$PASHQ,FIL,LST	Listing files in memory or USB key
		$PASHQ,FLS	List of raw data files
$PASHS,MEM	Memory device used	$PASHQ,MEM	Memory device used
$PASHS,OCC	Writing occupation data	$PASHQ,OCC	Occupation state and parameters
$PASHS,REC	Raw data recording	$PASHQ,REC	Raw data recording
$PASHS,RFB	Ring file buffer	$PASHQ,RFB	Ring file buffer
$PASHS,RFM	Ring file memory	$PASHQ,RFM	Ring file memory
$PASHS,RFT	Meteo/tilt data file type	$PASHQ,RFT	Meteo/tilt data file type
$PASHS,RXC,PAR	Embedded RINEX Converter	($PASHQ,PAR,RXC)	See $PASHQ,PAR.
$PASHS,RXC,RUN	Convert G-files to RINEX		
		$PASHQ,SES	Session programming
$PASHS,SES,AUT	Setting sessions automatically		
$PASHS,SES,DEL	Deleting one or all sessions		
$PASHS,SES,FTP,PAR	Setting FTP server, file upload		
$PASHS,SES,ON	Starting sessions		
$PASHS,SES,OFF	Stopping sessions		
$PASHS,SES,PAR	Session recording parameters		
$PASHS,SES,SET	Setting one session manually		
$PASHS,SIT	Site name	$PASHQ,SIT	Site name

GNSS Network

Set Command	Description	Query Command	Description
		$PASHQ,CST	NTRIP caster parameters
$PASHS,CST,MTP,ADD	Adding mount points		
$PASHS,CST,MTP,DEL	Deleting mount points		
$PASHS,CST,OFF	Turning off NTRIP caster		
$PASHS,CST,ON	Turning on NTRIP caster		
$PASHS,CST,PAR	Setting NTRIP caster		
$PASHS,CST,RST	NTRIP caster parameters		
$PASHS,CST,USR,ADD	Adding NTRIP caster users		
$PASHS,CST,USR,DEL	Deleting NTRIP caster users		
$PASHS,DIP	Server connection	$PASHQ,DIP	Direct IP parameters
$PASHS,DIP,OFF	Terminating Direct IP connect.		
$PASHS,DIP,ON	Disabling Direct IP connection		

Set Command	Description	Query Command	Description
$PASHS,DIP,PAR	Setting Direct IP parameters		
		$PASHQ,NTR	NTRIP settings
		$PASHQ,NTR,MTP	Connection to mount point
$PASHS,NTR,LOD	Loading NTRIP source table		
$PASHS,NTR,MTP	Connect to NTRIP mount point		
$PASHS,NTR,PAR	NTRIP settings		
		$PASHQ,NTR,TBL	Source table

External Heading

Set Command	Description	Query Command	Description
$PASHS,CPD,ARR,LEN	Heading mode, baseline length		
$PASHS,CPD,ARR,MOD	Heading mode		
$PASHS,CPD,ARR,OFS	Heading and elevation offsets		
$PASHS,CPD,ARR,PAR	Heading mode, limits of values		

External Sensors

Set Command	Description	Query Command	Description
		$PASHQ,MET	Meteorological unit settings
$PASHS,MET,CMD	Trigger string (meteo unit)		
$PASHS,MET,INIT	Initialization string (meteo unit)		
$PASHS,MET,INTVL	Query interval (meteo unit)		
$PASHS,MET,PAR	Setting the meteorological unit		
$PASHS,OUT,MET	Starting meteo data acquisition		
$PASHS,OUT,TLT	Starting tilt data acquisition		
		$PASHQ,TLT	Tiltmeter setup
$PASHS,TLT,CMD	Trigger string (tiltmeter)		
$PASHS,TLT,INIT	Initialization string (tiltmeter)		
$PASHS,TLT,INTVL	Query interval (tiltmeter)		
$PASHS,TLT,PAR	Setting the tiltmeter		

Chapter 9. Set Command Library

AGB: Enabling/Disabling GLONASS Bias Adjustments

Function

This command is used to enable or disable the adjustment of L1 & L2 GLONASS carrier biases in the receiver so that the GLONASS Double-Difference carrier residuals between the receiver and the *golden Ashtech receiver* are equal to zero (± noise errors).

MB 500 is considered as the golden Ashtech receiver.

After activating the adjustment function, the receiver name provided by any message supposed to deliver that name (e.g. RTCM-3 MT 1033) will appear in the form:

ASHTECH<space><name>

Where <space> is a space character between the two words and <name> is the receiver name entered through the $PASHS,RCP,OWN command.

Command Format

Syntax

$PASHS,AGB,s1[*cc]

Parameters

Parameter	Description	Range	Default
s1	Enabling (ON) or disabling (OFF) adjustment of GLONASS biases	ON, OFF	OFF
*cc	Optional checksum	*00-*FF	

Example

Enabling adjustment of GLONASS biases:

$PASHS,AGB,ON*1C

ANH: Antenna Height

Function

This command allows you to enter the antenna height measured according to the vertical measurement technique. Even if not specified explicitly, the height measurement type will always be “Vertical”.

Command Format

Syntax

$PASHS,ANH,f1[,c2][*cc]

Parameters

Parameter	Description	Range
f1	Antenna height.	0-6.553 m 6.553-100 m (see comment)
c2	Antenna height measurement type (V for “Vertical”)	V
*cc	Optional checksum	*00-*FF

Example

Entering the vertical measurement (2 m) of a rover antenna:

$PASHS,ANH,2.000

Comments

When you enter an antenna height greater than 6.553 m, be aware this will NOT be the value of antenna height broadcast through RTCM messages and the one saved to the G-file. Instead, a fixed value of 6.553 meters will be provided.

Relevant Query Command

$PASHQ,ANH

See also

$PASHS,ANR
$PASHS,ANT

ANP,DEL: Delete User-Defined Antenna

Function

This command allows you to delete the definition of a user-defined antenna.

Command Format

Syntax

$PASHS,ANP,DEL,s1[*cc]

Parameters

Parameter	Description	Range
s1	User-defined antenna name (case-sensitive)	31 characters max.
*cc	Optional checksum	*00-*FF

Example

Deleting RZ510A antenna definition:

$PASHS,ANP,DEL,RZ510A*1A

Relevant Query Command

$PASHQ,ANP

See Also

$PASHS,ANP,PCO
$PASHS,ANP,ED1
$PASHS,ANP,ED2

ANP,OUT: Defining a Virtual Antenna

Function

This command allows you to specify the name of an antenna that raw data will be adjusted to. By specifying the name of a virtual antenna, you ask the receiver to correct (“reduce”) the raw and differential data it generates from the received GNSS signals to make them available as if they had been received through *that* antenna.

Command Format

Syntax

$PASHS,ANP,OUT,s1[*cc]

Parameters

Parameter	Description	Range
s1	Virtual antenna name (case-sensitive) or “OFF” to specify that no virtual antenna is used.	31 characters max. or OFF
*cc	Optional checksum	*00-*FF

Examples

Setting the ADVNULLANTENNA as the virtual antenna:

$PASHS,ANP,OUT,ADVNULLANTENNA*73

Disabling the use of the virtual antenna:

$PASHS,ANP,OUT,OFF*2B

Comments

- By default, the receiver observables are not corrected for the type of GNSS antenna used. It’s only by providing separately the name of the GNSS antenna used (declared as the OWN antenna) that the antenna corrections can be performed when processing the receiver observables. Now precisely, the ANP,OUT command allows you to directly generate the raw and differential observables for the type of antenna you specify in the command (e.g. ADVNULLANTENNA).
- Be aware that the raw data reduction process is possible only if the name of the antenna physically used by the receiver has been specified through the $PASHS,ANP, OWN command and declared in the receiver’s antenna database as one of the default or user-defined antennas. Otherwise, the command will be NAKed.
- Raw data reduction will not be performed on data from any satellite located below the elevation mask.

- When raw data reduction is effective, any antenna name messages generated by the receiver will include the name of the virtual antenna, and not the antenna serial number or the setup ID.
- If no reference position has been entered in the receiver, raw data reduction is performed in such a way that the location of the L1 phase center is left unchanged.
- Antenna reduction is performed in such a way that the ARP is unchanged.If the reference position is given with respect to the ARP, and not to the L1 phase center, then the receiver computes the position of the ARP using the physical parameters of the antenna, and then re-computes the position of the L1 phase center according to the ANP,OUT antenna parameters. This guarantees that the reported reference position, the antenna name and the observables are all consistent with one another.

Relevant Query Command $PASHQ,ANP

See Also $PASHS,ANP,OWN

ANP,OWN: Naming the Local Antenna

Function This command is used to enter the name of the antenna to which the receiver is connected.

Command Format

Syntax

$PASHS,ANP,OWN,s1[,s2][,d3][*cc]

Parameters

Parameter	Description	Range
s1	User-defined antenna name (case-sensitive). Default name is “UNKNOWN”	31 characters max.
s2	Antenna serial number	31 characters max.
d3	Antenna setup ID	0-255
*cc	Optional checksum	*00-*FF

Comments

- Specifying the antenna name allows the receiver to know the antenna offset parameters using a predefined list. In the receiver, the predefined parameters can be listed using $PASHQ,ANP. New offset parameters can be added using $PASHS,ANP,PCO.

- The predefined list complies with the IGS antenna source table.
- The antenna name (and the optional serial number and setup ID) are also inserted into the RTCM antenna message when the receiver is used as a base.

Example

Entering “ASH111661” as the name of the receiver antenna name and “201115864” as the receiver serial number:

$PASHS,ANP,OWN,ASH111661,201115864*36

Relevant Query Commands

$PASHQ,ANP
$PASHQ,ANP,OWN

See Also

$PASHS,ANP,REF

ANP,PCO & ANP,EDx: Creating/Editing Antenna Definitions

Function

These commands allow you to create or modify antenna definitions. The definition of an antenna includes a name for the antenna, all its phase center offsets as well as the elevation-dependent delays (in 5-degree steps).

Command Format

Syntax

$PASHS,ANP,PCO,s1,f2,f3,f4,f5,f6,f7[*cc]
$PASHS,ANP,ED1,s1,f2,f3,f4,f5,f6,f7,f8,f9,f10,... ,f19,f20[*cc]
$PASHS,ANP,ED2,s1,f2,f3,f4,f5,f6,f7,f8,f9,f10,... ,f19,f20[*cc]

Parameters

ANP,PCO (PCO for Phase Center Offsets)

Parameter	Description	Range
s1	Antenna name	31 characters max.
f2	L1 phase center offset, in mm, in the North direction	±0-1000.0
f3	L1 phase center offset, in mm, in the East direction	±0-1000.0
f4	L1 phase center offset, in mm, in the vertical direction	±0-1000.0
f5	L2 phase center offset, in mm, in the North direction	±0-1000.0
f6	L2 phase center offset, in mm, in the East direction	±0-1000.0
f7	L2 phase center offset, in mm, in the vertical (up) direction	±0-1000.0
*cc	Optional checksum	*00-*FF

ANP,EDx (EDx for L1 and L2 Elevation Dependent delays)

Parameter	Description	Range
s1	Antenna name	31 characters max.
f2-f20	Elevation-dependant delays, in mm, for elevations from 90 to 0 degrees, in 5-degree steps.	±0-1000.0
*cc	Optional checksum	*00-*FF

Examples

Setting the PCO parameters for antenna ASH8987:

$PASHS,ANP,PCO,ASH8987,0,0,110,0,0,128*29

Setting the L1 delays for antenna MYANTENNA:

$PASHS,ANP,ED1,MYANTENNA,0,-2,0,-1.5,1,1.2,0,0,0,0,1,1,-1,0,1.2, -1.2,0,1,0*49

Relevant Query Command $PASHQ,ANP

See also $PASHS,ANP,DEL

ANP,REF: Naming the Antenna Used at the Base

Function This command is used to enter the name of the antenna used by the base with which the receiver is working.

Command Format

Syntax

$PASHS,ANP,REF,s1[,d2][*cc]

Parameters

Parameter	Description	Range	Default
s1	User-defined antenna name (case-sensitive).	31 characters max.	UNKNOWN
d2	Antenna name preference: • 0: s1 is ignored if a base antenna name is decoded from the incoming reference data. • 1: s1 is always used regardless of whether a base antenna name is decoded from the incoming reference data or not.	0, 1	0
*cc	Optional checksum	*00-*FF	

Comments

- Specifying the antenna name allows the receiver to know the antenna offset parameters using the predefined list. In the receiver, the predefined parameters can be listed using $PASHQ,ANP. New offset parameters can be added using $PASHS,ANP,PCO.
- The predefined list complies with the IGS antenna source table.

Example

Entering "MAG990596" as the name of the base antenna:

$PASHS,ANP,REF,MAG990596*3A

Relevant Query Command $PASHQ,ANP
$PASHQ,ANP,REF

See Also $PASHS,ANP,OWN

ANR: Antenna Reduction Mode

Function This command allows you to set the antenna reduction mode. The default value is ON.

Command Format

Syntax

$PASHS,ANR,s1[*cc]

Parameters

Parameter	Description	Range
s1	Antenna reduction mode: • **OFF**: No antenna reduction. The receiver ignores the antenna parameters entered via $PASHS, ANH or $PASHS,ANT. The computed position is that of the antenna's **L1 phase center**. This implies that the entered position for the base should also be that of its antenna's L1 phase center • **ON**: Antenna reduction is active (default). From the parameters entered through the $PASHS, ANH or $PASHS,ANT command, the position computed for the L1 phase center is projected to the ground thus making this point (**ground mark**) the real location of the rover. This implies that the entered position for the base should also be that of its ground mark. • **ARP**: The receiver ignores the antenna parameters entered via $PASHS,ANH or $PASHS,ANT. The computed position represents the location of the **ARP**. This implies that the entered position for the base should also be that of its antenna's ARP.	OFF, ON, ARP
*cc	Optional checksum	*00-*FF

Example

Setting the antenna reduction mode to ON:

$PASHS,ANR,ON*05

Relevant Query Command $PASHQ,ANR

See also $PASHS,ANH

$PASHS,ANT

ANT: Antenna Height

Function

This command is used to define the antenna height, especially when it was determined using the slant measurement method. However, a vertical measurement can also be entered through this command.

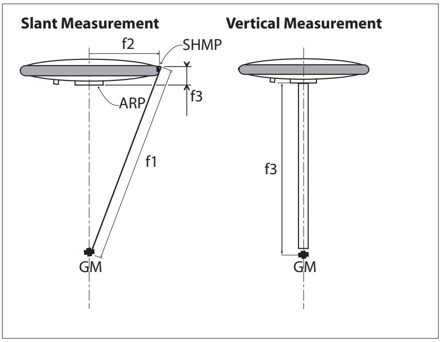
Using the $PASHS,ANT command overwrites all previous settings performed with the $PASHS,ANH command.

Command Format

Syntax

$PASHS,ANT,f1,f2,f3[*cc]

Diagrams and Definitions



- ARP: Antenna Reference Point (usually bottom of the antenna).
- SHMP: Slant Height Measurement Point (usually at the hedge of the antenna, above the ARP).
- Ground Mark (GM): above the ARP (same horizontal coordinates).

Parameters

Parameter	Description	Range
f1	Slant height measurement, from ground mark (GM) to antenna edge (SHMP).	0-6.553 m 6.553-100 m
f2	Antenna radius: horizontal distance from the geometrical center to the antenna edge.	0-6.553 m
f3	Vertical offset: • From ARP to SHMP, if radius and slant height are not null. • From Ground Mark to ARP, if radius and slant height are null.	0 to ±6.553 m 6.553-100 m
*cc	Optional checksum	*00-*FF

Examples

Entering the vertical measurement (2 m) of a rover antenna:

$PASHS,ANT,0,0,2.000*2E

Entering the slant measurement (1.543 m) of the MAG111406 antenna used at a base:

$PASHS,ANT,1.543,0.0921,-0.0516*0A

Comments

- The vertical height from ARP to ground mark can also be entered through the ANT command, which in this case should be used as follows:
  – Set **f1** and **f2** to “0.0”
  – Enter the antenna height from ARP to ground mark as **f3**. Only when **f1**=**f2**=0.0 can you define **f3** this way.
  – **f3** is negative when the ARP is below the SHMP.
- When you enter an antenna height greater than 6.553 m (see f1 and f2 above), be aware this will NOT be the value of antenna height broadcast through RTCM messages and the one saved to the G-file. Instead, a fixed value of 6.553 meters will be provided.

Relevant Query Command

$PASHQ,ANT

See Also

$PASHS,ANH
$PASHS,ANR

ATL: Debug Data Recording

Function

This command allows you to enable or disable the recording of debug data. The resulting log file (called “ATL file”) is saved to the memory selected through the $PASHS,MEM command. The file is named as follows:.

ATL_yymmdd_hhmmss.log

Normally you don’t have to record debug data. However, Technical Support may ask you to do so if a problem occurs in your receiver and Technical Support needs to analyze the resulting log file to fix the problem. The content of this file can only be analyzed by Technical Support as it uses a proprietary, undisclosed data format, which in addition is subject to change without notice.

Command Format

Syntax

$PASHS,ATL,s1[,d2][,f3][,d4][*cc]

Parameters

Parameter	Description	Range	Default
s1	Controls debug data recording: • ON: Enables debug data recording • OFF: Disables debug data recording • AUT: Automatically starts debug data recording every time the receiver is turned on.	ON, OFF, AUT	OFF
d2	Recorded data: • 0: Only $ATL messages from GNSS board to system board • 1: Only those from system board to GNSS board • 2: All data exchanged between GNSS board and system board	0-2	0
f3	Output interval, in seconds	0.05, 0.1, 0.2, 0.5, 1	1
d4	Configuration index	0-1	0
*cc	Optional checksum	*00-*FF	

Example

Enabling the ATL message:

$PASHS,ATL,ON*01

Comment

- If the memory selected through $PASHS,MEM is unavailable, then "ACK" is returned in response to the command enabling recording (ON or AUT), prompting you to read the status of the debug data recording using the $PASHQ,ATL command.

Relevant Query Command

$PASHQ,ATL

See Also

$PASHS,MEM

ATM: Enabling/Disabling ATOM Messages

Function

This command allows you to enable or disable ATOM messages on the specified port. For more details about the ATOM format, please refer to the *AshTech Optimized Messaging (ATOM) Reference Manual*.

Command Format

Syntax

$PASHS,ATM,s1,c2,s3[,f4][*cc]

Parameters

Parameter	Description	Range
s1	ATOM message type	PVT, ATR, NAV, DAT, EVT, RNX. See table below.
c2	• Port routing the ATOM message:A, B, F: Serial portC: Bluetooth port • E: Modem • I, I1-I9: Ethernet port • M, U: Internal memory (U), USB key (U) • R: Automatic recording session (internal or external memory)	A, B, C, E, F, I, M, R, U, I1-I9
s3	Enable (ON) or disable (OFF) this ATOM message type.	ON, OFF
f4	Output rate, in seconds.(Default value is specific to each message type.)	0.05 or 0.1-0.4 sec with [F] option activated. 0.5-0.9 s 1-999 s
*cc	Optional checksum	*00-*FF

ATOM Messages:

Data	ATOM Number	Description	Default Output Status on Ports A, B, F, I, I1-I9, E	Default Output Status on Ports M, U and R
PVT	4095,3	Positioning results	OFF	OFF
ATR	4095,4	Receiver attributes	OFF	ON
NAV	4095,5	GNSS navigation data	OFF	ON, at 300 seconds
DAT	4095,6	Raw GNSS data (DAT,FRM)	OFF	OFF (no output rate)
EVT	4095,14	Event	OFF	OFF
RNX	4095,7 Scenario 0	GNSS raw measuremenst	OFF	ON, at 1 second

ATOM PVT messages contain the following sub-blocks: COO, ERR, VEL, CLK, LCY, HPR, BLN, MIS, PRR and SVS.

DAT messages are generated every time a new frame is decoded.

Example

Enabling ATOM message type PVT on serial port A at a 1-second output rate:

$PASHS,ATM,PVT,A,ON,1*0E

Relevant Query Commands

$PASHQ,ATO
$PASHQ,ATM

See also

$PASHS,ATM,PER

$PASHS,ATM,ALL

ATM,ALL: Disabling All ATOM Messages

Function

This command disables all ATOM messages currently enabled on the specified port.

Command Format

Syntax

$PASHS,ATM,ALL,c1,OFF[*cc]

Parameters

Parameter	Description	Range
c1	Port related to the ATOM message(s) you want to disable. • A, B, F: Serial port • C: Bluetooth port • I, I1-I9: Ethernet port • E: Modem • M, U: Internal memory (M), USB key (U) • R: Data recording through session	A, B, C, E, F, I, M, U, I1-I9, R
*cc	Optional checksum	*00-*FF

Example

Disabling all ATOM messages on port A:

$PASHS,ATM,ALL,A,OFF*4E

Relevant Query Command

None.

See also

$PASHS,ATM

ATM,PER: Setting Unique Output Rate for all ATOM Messages

Function

This command is used to set the same output rate for all ATOM messages. This command will overwrite all the output rates set individually for each message type using $PASHS,ATM,RNX and $PASHS,ATM,PVT.

Command Format

Syntax

$PASHS,ATM,PER,f[*cc]

Parameters

Parameter	Description	Range
f	Output rate. Setting $PASHS,POP to “20” is a prior condition to operating at 0.05 s (20 Hz).	0.05 sec or 0.1-0.4 sec if the [F] option is activated 0.5-0.9 sec 1-999 sec
*cc	Optional checksum	*00-*FF

Example

Setting the output rate to 1 second:

$PASHS,ATM,PER,1*5B

Relevant Query Command

$PASHQ,ATM

See also

$PASHS,ATM

ATM,VER: Setting the Version of ATOM Messages

Function

This command is used to set the version in which the receiver will generate ATOM messages on all its ports. All ATOM messages are equally affected.

You can find more information on the format of ATOM messages in the *ATOM Reference Manual*.

Command Format

Syntax

$PASHS,ATM,VER,d[*cc]

Parameters

Parameter	Description	Range	Default
d	Index of ATOM version: • 1: ATOM V1 • 2: ATOM V2	1, 2	2
*cc	Optional checksum	*00-*FF	-

Example

Setting to ATOM V2:

$PASHS,ATM,VER,2*5E

Relevant Query Command

$PASHQ,PAR

See also

$PASHS,ATM

BAS: Differential Data Type

Function

This command is used in a base to select the type of differential data the base should generate and the port, or two ports, through which this data should be routed.

The command can also be used with the OFF operator to disable the output.

Command Format

Syntax

$PASHS,BAS,c1,s2[,c3,s4][*cc]

or, to disable the differential data output:

$PASHS,BAS,OFF[*cc]

Parameters

Parameter	Description	Range
c1	First port ID: • A, B, F: Serial port (A: default) • C: Bluetooth port • I, P, Q: Ethernet port • D: Internal transmitter • E: Modem • M, U: Internal memory (M), USB key (U)	A, B, C, D, E, F, I, P, Q, M, U
s2	Differential data type: • RT2: RTCM 2.3 messages • RT3: RTCM 3.0 & 3.1 messages (default) • CMR: CMR messages • CMP: CMR+ messages • ATM: ATOM messages • DBN: DBEN messages	RT2, RT3, CMR, CMP, ATM, DBN
c3	Second port ID: same as c1 above	A, B, C, D, E, F, I, P, Q, M, U
s4	Differential data type: same as s2 above.	RT2, RT3, CMR, CMP, ATM, DBN
*cc	Optional checksum	*00-*FF

Comments

When the GLONASS-only mode is activated ($PASHS,GPS,OFF and/or $PASHS,PGS,GLO), the following messages are not generated: RTCM2.3, CMR, CMR+ and DBEN.

Examples

Sending RTCM 3.0 message to the external UHF transmitter via port A:

$PASHS,BAS,A,RT3*51

Sending RTCM 2.3 messages to the external UHF transmitter via port D and CMR+ messages to the GSM modem via port E:

$PASHS,BAS,D,RT2,E,CMP*4E

Disabling the differential data output:

$PASHS,BAS,OFF*46

Relevant Query Command

$PASHQ,BAS

See also

$PASHS,CPD,MOD
$PASHS,RTC,TYP

$PASHS,RNX,TYP
$PASHS,CMR,TYP

BDS: Setting Differential Data Streams on Ports Ix

Function

This command allows you to define differential data messages you wish to make available on ports I1 to I9 for data streaming through TCP/IP connections.

Command Format

Syntax

$PASHS,BDS,s1,s2,s3[*cc]

Parameters

Parameter	Description	Range
s1	Differential data type: • RT2: RTCM 2.3 messages • RT3: RTCM 3.0&3.1 messages • CMR: CMR messages • CMP: CMR+ messages • ATM: ATOM messages • DBN: DBEN messages	RT2, RT3, CMR, CMP, ATM, DBN
s2	Data stream port	I1-I9
s3	Enable/disable control parameter	ON, OFF
*cc	Optional checksum	*00-*FF

The default settings are given in the table below.

	RT2	RT3	CMR	CMP	ATM
I1	OFF	**ON**	OFF	OFF	OFF
I2	OFF	OFF	OFF	OFF	OFF
I3	OFF	OFF	OFF	OFF	OFF
I4	OFF	OFF	OFF	OFF	OFF
I5	OFF	OFF	OFF	OFF	OFF
I6	OFF	OFF	OFF	OFF	OFF
I7	OFF	OFF	OFF	OFF	OFF
I8	OFF	OFF	OFF	OFF	OFF
I9	OFF	OFF	OFF	OFF	OFF

Examples

Enabling RTCM 3 differential data on port I3:

$PASHS,BDS,RT3,I3,ON*42

Disabling RTCM 2.3 differential data on port I1:

$PASHS,BDS,RT2,I1,OFF*OF

Relevant Query Command $PASHQ,BDS

See Also
$PASHS,DST
$PASHS,RTC,TYP
$PASHS,ATD,TYP

BEEP: Beeper Setup

Function This command enables or disables the internal beeper.

Command Format

Syntax

$PASHS,BEEP,s1[,d2][*cc]

Parameters

Parameter	Description	Range	Default
s1	Enables (ON) or disables (OFF) the beeper.	ON, OFF	ON
d2	Timeout, in seconds: • 0: No timeout. If an alarm is activated, the beeper will sound indefinitely until the alarm is acknowledged. • >0: If an alarm is activated, the beeper will sound only for a limited period of time (it will go out automatically at the end of the specified timeout).	0-99	30
*cc	Optional checksum	*00-*FF	

Example

Disabling the beeper:

$PASHS,BEEP,OFF*04

Relevant Query Command $PASHQ,BEEP

BRD: Enabling/Disabling the RTC Bridge Function

Function This command is used to control the RTC Bridge function. Its use is required only in the receiver in charge of forwarding its

RTK corrections to other nearby rovers through its licence-free radio transmitter (or its internal transmitter, if any).

Command Format

Syntax

$PASHS,BRD,s1[,d2,c3,c4][*cc]

Parameters

Parameter	Description	Range	Default
s1	Controls the availability of RTK corrections on the specified output port: • OFF: No RTK corrections forwarded to the output port. • ON: RTK corrections forwarded to the output port.	ON, OFF	OFF
d2	Enables or disables the use of RTK corrections in the receiver's position computation. • 0: RTK corrections used • 1: RTK corrections not used	0, 1	0
c3	Input port ID (port from which RTK corrections are available in the receiver).	E (modem) P (Ethernet) Q (Ethernet)	E
c4	Output port ID (serial port to which the licence-free radio transmitter is connected), or port D for internal transmitter.	A, B, F, D	A
*cc	Optional checksum	*00-*FF	

Examples

Enabling RTC Bridge in the receiver by forwarding RTK corrections from the modem to its port A (to which the license-free radio transmitter is connected):

$PASHS,BRD,ON,0,E,A*14

Disabling RTC Bridge by preventing RTK corrections from being forwarded to the output port:

$PASHS,BRD,OFF*42

Comments

- To receive data, the $PASHS,NTR,.. and $PASHS,DIP commands should be used.
- If the data needs to be sent to an external UHF transmitter, the $PASHS,RDP command should be used to configure the transmitter.
- The d2 parameter is taken into account only if the Automatic mode is selected for the choice of differential data inputs (see $PASHS,CPD,REM).

Relevant Query Command

$PASHQ,BRD

See also

$PASHS,NTR,..
$PASHS,DIP
$PASHS,RDP,TYP
$PASHS,RDP,PAR
$PASHS,CPD,REM

Using RTC Bridge

The RTC Bridge function is typically used to allow a rover to forward the RTK corrections it receives from an RTK network through its built-in modem to other rovers operated in the vicinity, using a license-free radio transmitter connected to one of its serial ports. Being a low-power unit (<500 mW),the license-free radio can be powered directly from the receiver, without the need for another external battery.

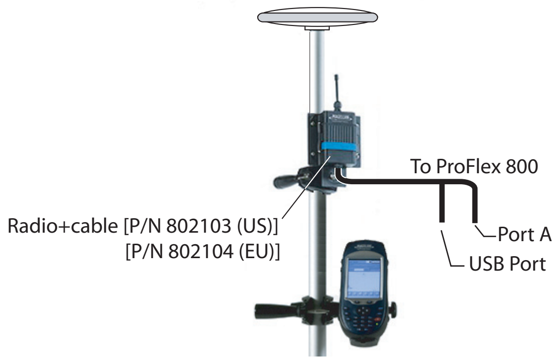
Starting RTC Bridge is a three-step procedure:

- Mounting the license-free radio onto the range pole or any appropriate support and connecting it toa serial port using the cable supplied.
- Setting the license-free radio, then the GPRS modem, using FAST Survey.
- Activating RTC Bridge through a serial command ($PASHS,BRD) sent from FAST Survey.

This procedure is detailed below.

Mounting and Connecting the License-Free Radio

In backpack configuration, the following setup is recommended for both the “transmitting” rover and the “receiving” rover(s).



Setting the License-Free Radio

Follow the instructions below. Each step should be executed in the specified order:

1. Establish a connection with the receiver from FAST Survey.
2. Select **Equip**>**GPS Rover** and then tap on the **RTK** tab
3. In the **Device** field, select "ARF7474.." corresponding to the license-free radio used.
4. Tap on and complete the license-free radio settings.
5. Still on the **RTK** tab and in the same **Device** field, select "Internal GSM".
6. Tap on and and complete the GSM settings.
7. Tap to complete the receiver setting.

Activating RTC Bridge

- In FAST Survey, select **Equip**>**GPS Utilities** and then tap on the **Send Command** button.
- In the combo box, type the following command, assuming port E is the input port and port A the output port:

  $PASHS,BRD,ON,0,E,A

- Tap on the **Send** button. The RTC Bridge function is activated once the receiver has executed the command and the $PASHR,ACK*3D line has been returned to FAST Survey.

- Tap  twice to close the **GPS Utilities** window and return to the FAST Survey menu.

NOTE: As for the configuration of the rovers supposed to receive the RTK corrections from this receiver, there is nothing else to be done apart from configuring the licence-free radio connected to each of them. Setting this radio can be done using FAST Survey, from the **RTK** tab of the **GPS Rover** window (select the appropriate radio model in the **Device** field).

BTH,NAME: Bluetooth Device Name

Function

This command is used to name the Bluetooth device.

Command Format

Syntax

$PASHS,BTH,NAME,s1[*cc]

Parameters

Parameter	Description	Range
s1	Bluetooth device name	64 characters max.
*cc	Optional checksum	*00-*FF

Example

Naming the Bluetooth device as “My Surveying Unit”:

$PASHS,BTH,NAME,My Surveying Unit*60

Relevant Query Command

$PASHQ,BTH

See also

$PASHS,BTH,PIN

BTH,OFF: Disabling Bluetooth

Function

This command is used to disable the Bluetooth module.

Command Format

Syntax

$PASHS,BTH,OFF[*cc]

Parameters

None.

Example

Turning off Bluetooth:

$PASHS,BTH,OFF

Relevant Query Command

$PASHQ,BTH

See also

$PASHS,BTH,ON
$PASHS,BTH,NAME
$PASHS,BTH,PIN

BTH,ON: Enabling Bluetooth

Function

This command is used to enable the Bluetooth module.

Command Format

Syntax

$PASHS,BTH,ON[*cc]

Parameters

None.

Example

Turning on Bluetooth:

$PASHS,BTH,ON

Relevant Query Command

$PASHQ,BTH

See also

$PASHS,BTH,OFF

$PASHS,BTH,NAME
$PASHS,BTH,PIN

BTH,PIN: Bluetooth Device Pin Code

Function

This command is used to assign a PIN code to the Bluetooth device.

Command Format

Syntax

$PASHS,BTH,PIN,d1[*cc]

Parameters

Parameter	Description	Range
d1	Bluetooth PIN code	16 digits max. -1: no PIN code
*cc	Optional checksum	*00-*FF

Example

Assigning PIN code “02” to the Bluetooth device:

$PASHS,BTH,PIN,02*7E

Relevant Query Command

$PASHQ,BTH

See also

$PASHS,BTH,NAME

CFG: GNSS Tracking Configuration

Function

This command is used to set the GNSS tracking configuration in the receiver.

Command Format

Syntax

$PASHS,CFG,s1[*cc]

Parameters

Parameter	Description	Range
s1	GNSS tracking configuration: • SSL: Single-signal tracking • DSL: Dual-signal tracking • TSL: Triple-signal tracking	SSL, DSL, TSL
*cc	Optional checksum	*00-*FF

The possible GNSS tracking configurations are detailed in the table below.

	Single Signal	Dual Signal	Triple Signal
GPS Tracking	14 GPS (similar to $PASHS,GNS,CFG, 0 or 1)	See $PASHS,GPS command	See $PASHS,GPS command
GLONASS Tracking	14 GLO (L1 only)	14 GLO (L1+L2)	10 GLO (L1+L2)
GALILEO Tracking	8 GAL E1 only	8 GAL (E1+E5a)	8 GAL (E1+E5a)
SBAS Tracking	2 + SBAS	2 SBAS	2 SBAS

Default Settings

They depend on the presence or not of firmware options ([P] option for L2, [Q] option for L5). See tables below (the $PASHS commands detailed in some of the cells below describe the resulting default settings, as if you had run these commands at start-up).

Common Defaults	[Q] Option Enabled	No [Q] Option
[P] Option Enabled	Default is DSL; GPS,ON,1C,2LW	
No [P] Option	Default is DSL; $PASHS,GPS,ON,1C,5Q	Default is SSL; $PASHS,CFG,DSL is NAKed

TSL Defaults	[Q] Option Enabled	No [Q] Option
[P] Option Enabled	$PASHS,GPS,ON,1C,2LW,L5	$PASHS,GPS,ON,1C,2W,2L
No [P] Option	$PASHS,CFG,TSL is NAKed	$PASHS,CFG,TSL is NAKed

Comments

- Changing the GNSS tracking configuration will automatically cause the receiver to re-start.
- The settings you make by running $PASHS,CFG have priority over those you make using $PASHS,GPS (for GPS), $PASHS,GLO (for GLONASS) and $PASHS,GAL (for Galileo). After you have run $PASHS,CFG to change the GNSS tracking configuration, GNSS tracking is set to the appropriate defaults, depending on the installed firmware options.
- Using $PASHS,CFG to change the GNSS tracking mode does not affect the output of periodical messages as long as they are compatible with the selected mode. For example, if "SSL" is selected and a message is then programmed through $PASHS,NME,POS,A,ON, then changing the GNSS tracking mode to "DSL" will not affect the message at all.
- The L2C signal has priority over the L2P signal if both signals are available for a given satellite (2LW mode)
- Whenever $PASHS,CFG is run, appropriate defaults are restored.

Example

Setting the receiver in dual-signal configuration:

$PASHS,CFG,DSL*40

Relevant Query Command

$PASHQ,CFG
$PASHQ,PAR

See also

$PASHS,GPS
$PASHS,GLO
$PASHS,SBA
$PASHS,GAL

CMD,LOD: Running a List of $PASH Commands

Function

This command is used to run the complete list of $PASH commands stored in a file found in the USB key currently connected to the receiver.

This implies that the file (in text editable format) should have first been saved to that key before connecting the key to the receiver's USB port.

Command Format

Syntax

$PASHS,CMD,LOD[,s][*cc]

Parameters

Parameter	Description	Range	Default
s	File name. If s is omitted, it is assumed that the file to be run is “autoconfig.cmd”.	255 characters max.	autoconfig.cmd
*cc	Optional checksum	*00-*FF	

Examples

Running the serial commands in autoconfig.cmd:

$PASHS,CMD,LOD*54

Running the serial commands in a file named “myconfig.cmd”:

$PASHS,CMD,LOD,myconfig.cmd*02

Comments

- The file can contain any $PASHS or $PAHSQ commands.
- If the file contains the $PASHS,REC or $PASHS,INI command, this command will always be run last, whatever its position in the file.
- All data lines returned by the receiver in response to the executed commands are written to a log file named as follows:

  <command_file_name>.log

- To insert an idle wait time of several seconds between any two $PASH commands, you can insert a specific command named $PASHS,CMD,WTI between these two commands. The $PASHS,CMD,WTI command may be inserted as many times as necessary in the file.
- Naming the command file “autoconfig.cmd” or “uploadconfig.cmd” on the USB key will allow the receiver to automatically start the execution of all the commands stored in the file when you plug the USB key to the receiver. 6A6EC3667E000The difference between the two file names is in the need for a user confirmation before running the file: “autoconfig.cmd” will require user confirmation, not “uploadconfig.cmd”.

Relevant Query Command

None.

See also

$PASHS,CMD,WTI

CMD,WTI: Inserting Wait Times

Function

This command can be inserted one or more times in the list of $PASH commands run with the CMD,LOD command. When running this command, in fact the receiver inserts a wait time of the requested value in the execution of the $PASH commands.

Command Format

Syntax

$PASHS,CMD,WTI,d[*cc]

Parameters

Parameter	Description	Range
d	Wait time generated by the command, in seconds.	1-3600
*cc	Optional checksum	*00-*FF

Example

The command line below inserted in a command file will generate a 10-s wait time when executed:

$PASHS,CMD,WTI,10*74

Comments

This command will be interpreted by the receiver only if found in a command file.

Relevant Query Command

None.

See also

$PASHS,CMD,LOD

CMR,TYP: CMR Message Type and Rate

Function

This command is used in a base to set the type and rate of CMR message the base will generate and output.

Command Format

Syntax

$PASHS,CMR,TYP,d1,d2[*cc]

Parameters

Parameter	Description	Range
d1	Message type	0, 1, 2, 3 (See table below)
d2	Output rate in seconds	0, 0.5 or 1-300 (See table below)
*cc	Optional checksum	*00-*FF

Message Type	Description	Output Rate (Range)	Output Rate (Default)
0	Observables	0, 0.5 s or 1-300 s	1 s
1	Base coordinates	0-300 s	30 s
2	Base description	0-300 s	30 s
3	GLONASS observables	0, 0.5 s or 1-300 s	1 s

Examples

Setting a CMR message type 0 (observables) at a 1-second output rate:

$PASHS,CMR,TYP,0,1*59

Setting a CMR message type 1 (base coordinates) at a 30-second output rate:

$PASHS,CMR,TYP,1,30*6A

Relevant Query Command

$PASHQ,CMR,MSI

See also

$PASHS,BAS
$PASHS,CPD,MOD,BAS
$PASHS,BDS

CPD,AFP - CP2,AFP: Setting the Confidence Level of Ambiguity Fixing

Function

This command is used to set the confidence level required of the ambiguity fixing process. The higher the confidence level, the more likely the ambiguities are fixed correctly, but the longer the time it takes to fix them.

Command Format

Syntax

For primary RTK engine:

$PASHS,CPD,AFP,f1[*cc]

For second RTK engine:

$PASHS,CP2,AFP,f1[*cc]

Parameters

Parameter	Description	Range	Default
f1	Confidence level, in percent, required of ambiguity fixing process. Choosing "0" means the receiver will not try to fix ambiguities but instead will stay indefinitely in Float mode.	Depending on firmware options installed: • 0, 95.0, 99.0 or 99.9 if either the [K], [L] or [M] option is installed • 0 only otherwise (none of these options installed)	Depending on firmware options installed: • 99.0 if either the (K], [L] or [M] option is installed • 0 necessarily otherwise
*cc	Optional checksum	*00-*FF	-

Example

Setting the confidence level to 99.9% for primary RTK engine:

$PASHS,CPD,AFP,99.9*62

Relevant Query Commands

$PASHQ,CPD,AFP
$PASHQ,CP2,AFP
$PASHQ,CPD

CPD,ARR,LEN: Setting the Baseline Length in Heading Mode

Function

This command is used to set the baseline length between the base and the rover in heading mode.

Command Format

Syntax

$PASHS,CPD,ARR,LEN,f1[*cc]

Parameters

Parameter	Description	Range	Default
f1	Baseline length in meters. When setting f1 to"0" and the heading mode is ON, the receiver switches to calibration mode. Once the baseline length is determined, the receiver automatically switches from calibration to heading operating mode.	0 or 0.05 to 1000 m	0
*cc	Optional checksum	*00-*FF	-

Example

Setting the baseline length to 2.5 meters:

$PASHS,CPD,ARR,LEN,2.5*21

Relevant Query Commands

$PASHQ,CPD,ARR,LEN
$PASHQ,CPD

See Also

$PASHS,CPD,ARR,MOD
$PASHS,CPD,ARR,PAR

CPD,ARR,MOD: Enabling/Disabling the Heading Mode

Function

This command is used to enable or disable the heading mode in the receiver. The heading mode is defined as a special RTK mode primarily used when the receiver is mounted on a solid body (e.g. a vehicle) and the baseline length is constant, to determine the vehicle's heading and pitch or roll.

Command Format

Syntax

$PASHS,CPD,ARR,MOD,s1[,c2][*cc]

Parameters

Parameter	Description	Range	Default
s1	Enabling/disabling command.	ON, OFF	OFF
c2	Input port for corrections data when the heading mode is on. External heading: • A, B, F: Serial ports • C: Bluetooth port • I, P, Q: Ethernet port • E: Modem • D: Radio	A, B, C, D, E, F, I, P, Q	H (two GNSS boards inside, internal heading), or A (one GNSS board inside, external heading).
*cc	Optional checksum	*00-*FF	-

Examples

Turning on the internal heading mode:

$PASHS,CPD,ARR,MOD,ON,H*6C

Turning on the external heading mode:

$PASHS,CPD,ARR,MOD,ON,A*65

Comments

- With "Antenna 1" connected to the main GNSS board and "Antenna 2" connected to the second GNSS board (or "Antenna 2" connected to an external GNSS receiver providing its corrections through a specified port on your receiver), the heading will describe the direction from Antenna 2 to Antenna 1.

Relevant Query Commands

$PASHQ,CPD,ARR,LEN
$PASHQ,CPD,..

See Also

$PASHS,CPD,ARR,LEN
$PASHS,CPD,BAS

CPD,ARR,OFS: Setting Azimuth & Elevation Offsets

Function

This command is used to set the azimuth and elevation offsets from the vehicle centerline.

Command Format

Syntax

$PASHS,CPD,ARR,OFS,f1[,f2][*cc]

Parameters

Parameter	Description	Range	Default
f1	Baseline azimuth offset angle.	0° to 359.99°	0°
f2	Baseline elevation offset angle	-45° to +45°	0°
*cc	Optional checksum	*00-*FF	-

Comments

- It is recommended to use a baseline elevation offset as close as possible to zero and a baseline azimuth offset as close as possible to n×90 degrees.
- If the azimuth offset is close to 0 or 180°, then the vehicle's pitch and heading will be estimated and output.
- If the azimuth offset is close to 90 or 270°, then the vehicle's roll and heading will be estimated and output.
- If the azimuth offset from either North, South, West or East exceeds 15 degrees, then the receiver delivers the heading component of attitude, but does not output pitch and roll.
- If the elevation offset is greater than 45 degrees or less than -45 degrees, then the receiver considers installation to be invalid and does not output any attitude information (i.e. no pitch, no roll and no heading).
- The specified values of offsets are used only when the rover is operating in heading mode.
- Sending the command without f1 or f2 will not change the corresponding offset value currently used, which will stay either that entered previously through a valid CPD,ARR, OFS command, or 0° (default value) if no such command was run.
- With “Antenna 1” connected to the GNSS input and “Antenna 2” connected to an external GNSS receiver providing its corrections through a specified port on your receiver), the heading will describe the direction of the vector connecting Antenna 2 (vector origin) to Antenna 1.

Example

Setting the baseline offsets to 90° azimuth and 2° elevation:

$PASHS,CPD,ARR,OFS,90,2*02

Query Command

$PASHQ,CPD,ARR,OFS

See Also

$PASHS,CPD,ARR,LEN
$PASHS,CPD,ARR,MOD

$PASHS,CPD,ARR,PAR

CPD,ARR,PAR: Setting Upper Limits in Heading Mode

Function

This command is used to set the upper limits of baseline elevation and expected maximum error in the entered baseline length.

Command Format

Syntax

$PASHS,CPD,ARR,PAR,d1[,f2][*cc]

Parameters

Parameter	Description	Range	Default
d1	Maximum value of expected baseline elevation (absolute value), in degrees. Parameter d1 only affects the heading operating mode and is not applied during baseline length auto-calibration.	0° to 90°	15
f2	Maximum value of tolerated baseline length error, in meters.	0.001 to 10.000	0.01
*cc	Optional checksum	*00-*FF	-

Comments

Sending the command without d1 or f2 will not change the corresponding limit currently used, which will stay either that entered previously through a valid CPD,ARR,PAR command, or the default value if no such command was run.

The default value for f2 is applicable only if the baseline length is user entered. It is not applicable if the baseline length results from a calibration process.

Example

Setting the limits to 10° for elevation and 0.02 m for baseline length error:

$PASHS,CPD,ARR,PAR,10,0.02*3D

Relevant Query Command

$PASHQ,CPD,ARR,PAR

See Also

$PASHS,CPD,ARR,LEN
$PASHS,CPD,ARR,MOD

$PASHS,CPD,ARR,OFS

CPD,FST: RTK Output Mode

Function This command enables or disables the fast RTK output mode (Fast CPD mode).

Command Format

Syntax

$PASHS,CPD,FST,s1[*cc]

Parameters

Parameter	Description	Range	Default
s1	Enables (ON) or disables (OFF) the fast RTK output mode	ON, OFF	ON
*cc	Optional checksum	*00-*FF	-

Example

Enabling the fast RTK output mode:

$PASHS,CPD,FST,ON

Relevant Query Command $PASHQ,CPD,FST

CPD,MOD: Base/Rover/Backup Mode

Function This command is used to set the addressed receiver as a base or a rover, thus defining the operating mode for the receiver. In addition the command allows you to specify the satellite constellations that will be used if the receiver is defined as a base. Additionally, this command allows a rover to be set to deliver two independent RTK position solutions. This can be done by activating the backup mode.

Command Format

Syntax

$PASHS,CPD,MOD,s1[,[d2],[d3],[c4]][*cc]

Parameters

Parameter	Description	Range	Default
s1	CPD mode: • BAS: Base • ROV: Rover • BKP: Backup ("Hot Standby RTK")	BAS, ROV, BKP	ROV
d2	Constellations used in the base: • 0: GPS, GLONASS, SBAS (default) • 1: Only GPS and SBAS • 2: Only GPS and GLONASS • 3: Only GPS	0-3	0
d3	Position mode. If s1=BAS: • 0: Base position is a static position (as set through $PASHS,POS). • 1: Base position is a moving position • 2: "Current position" (the command allocates the currently computed position to the base. The base position is then kept unchanged.) If s1=ROV: • 0: Rover operates with static base • 1: Rover operates with moving base	0-2	0
c4	Input port for backup mode: • A, B, F: Serial ports • C: Bluetooth port • I, P, Q: Ethernet port • D: Radio • E: Modem	A, B, C, D, E, F, I, P, Q	A
*cc	Optional checksum	*00-*FF	

Examples

Setting the receiver as a base using all constellations:

$PASHS,CPD,MOD,BAS,0*28

Setting the receiver as a rover:

$PASHS,CPD,MOD,ROV*2F

Setting the receiver to operate as a rover in which the backup mode is activated and port A is used for that purpose:

$PASHS,CPD,MOD,BKP,,,A*50

Comments

- With s1=BAS (Base mode) and d3=2 ("Current position"), once the current position has been defined as the base position, then the position mode is automatically switched to "0". The base position can then be read using the $PASHQ,CPD,POS command.

- In "Hot Standby RTK" (s1=BKP), the receiver computes two independent positions from the two independent corrections streams entering the receiver. The input port for the correction stream of the primary RTK is defined by the $PASHS,CPD, REM command. The input port for the correction stream of the backup RTK position is defined by parameter c4 in $PASHS,CPD,MOD. The receiver checks that the submitted value for c4 is compatible with the settings last performed with $PASHS,CPD,REM.

  In "Hot Standby RTK", the position delivered by the receiver through the chosen output messages (ATM, PVT, GGA, etc.) is the best position between the primary RTK and backup RTK. The receiver itself determines which is the best position, based on all the available parameters and indicators. At any time, users can find out which RTK provides the best position by analyzing the Base Station ID field in these messages.
- The backup position is computed only from reference data received at integer seconds of time intervals.
- In "Hot Standby RTK", the Fast CPD mode must always be ON if you want the receiver to work properly. In addition, the base is assumed to be static regardless of the current value assigned to parameter d3 in $PASHS,CPD,MOD.

Relevant Query Command

$PASHQ,CPD,MOD

See also

$PASHS,BAS
$PASHS,CPD,REM
$PASHS,CPD,FST

CPD,NET: Network Corrections

Function

This command sets the behavior of the receiver with relation to network corrections, i.e. RTK correction data delivered by a network.

Command Format

Syntax

$PASHS,CPD,NET,d1[,d2][*cc]

Parameters

Parameter	Description	Range	Default
d1	RTK network operating mode relative to GPS corrections: • 0: GPS corrections from network are not used. • 1: FKP/MAC GPS corrections from network are used when available and healthy, otherwise they are rejected.	0-1	1
d2	RTK network operating mode relative to GLONASS corrections: • 0: GLONASS corrections from network are not used. • 1: FKP/MAC GLONASS corrections from network are used when available and healthy, otherwise they are rejected.	0-1	1
*cc	Optional checksum	*00-*FF	

Example

Setting the receiver to process GPS and GLONASS network corrections:

$PASHS,CPD,NET,1,1*51

Relevant Query Command

$PASHQ,CPD,NET

CPD,REM: Differential Data Port

Function

This command sets the reception mode for all differential data.

If Automatic is chosen, all received differential data is processed whatever the input ports.

On the contrary, if Manual is chosen, only the data coming in through the specified ports (one or two ports) will be processed.

Command Format

Syntax

$PASHS,CPD,REM,s1[,c2][,c3][*cc]

Parameters

Parameter	Description	Range	Default
s1	Reception mode: • AUT: Automatic (default) • MAN: Manual	AUT, MAN	AUT
c2	Input port #1: • A B, F: Serial port • C: Bluetooth port • I, P, Q: Ethernet port • D: Radio • E: Modem	A, B, C, D, E, F, I, P, Q	
c3	Input port #2: • A, B, F: Serial port • C: Bluetooth port • I, P, Q: Ethernet port • D: Radio • E: Modem	A, B, C, D, E, F, I, P, Q	
*cc	Optional checksum	*00-*FF	

Examples

Setting the receiver to receive and process differential data in Automatic mode:

$PASHS,CPD,REM,AUT*38

Setting the receiver to receive and process differential data in Manual mode with the data received on port D:

$PASHS,CPD,REM,MAN,D*52

Relevant Query Command

$PASHQ,CPD,REM

See also $PASHS,CPD,MOD

CPD,RST - CP2,RST: RTK Process Reset

Function

This command resets the RTK processing.

Command Format

Syntax

In the primary RTK engine:

$PASHS,CPD,RST[*cc]

In the second RTK engine:

$PASHS,CP2,RST[*cc]

Parameters

None.

Example

Resetting the RTK processing in the primary RTK engine:

$PASHS,CPD,RST*5B

Relevant Query Command

None.

CPD,VRS: VRS Assumption Mode

Function

This command is used specifically to set the receiver (a rover) to operate in the so-called "compulsory VRS mode" through which it is forced to consider that the differential corrections it receives are always VRS corrections (this impacts the way corrections are processed internally).

When not operated in this mode, the receiver will automatically detect whether the received corrections are, or are not, VRS corrections (Automatic detection).

Command Format

Syntax

$PASHS,CPD,VRS,d[*cc]

Parameters

Parameter	Description	Range	Default
d	VRS assumption mode: • 0: Automatic detection • 1: Compulsory VRS mode • 2: Never switches to VRS mode	0, 1, 2	0
*cc	Optional checksum	*00-*FF	

Example

Enabling the compulsory VRS mode:

$PASHS,CPD,VRS,1*44

Comment

Users working in VRS using the CMR or RT2 format should activate the compulsory VRS mode (d=1).

Relevant Query Command

$PASHQ,CPD,VRS

CST,MTP,ADD: Adding/Modifying Mount Points

Function

This command is used to add or modify a mount point in the embedded NTRIP caster. All the information you enter with this command is made available to users through the source table.

Warning! Make sure the command does not exceed 349 characters in length before sending it to the receiver.

Command Format

Syntax

$PASHS,CST,MTP,ADD,s1[,s2,s3,s4,s5,f6,f7,s8][*cc]

Parameters

Parameter	Description	Range	Default
s1	Mount point name. An abbreviated name is recommended (no space character allowed). The identifier field (s3) may be used to enter a more detailed definition of the mount point name.	100 characters max.	-
s2	Mount point identifier	100 characters max.	-

Parameter	Description	Range	Default
s3	Format of the data available through the mount point (ATOM, RTCM, etc.)	100 characters max.	-
s4	Details of the data format (message types, etc.). Comma symbols may be entered as delimiters provided quotation marks are used to encompass the whole string (see example below). The semicolon character is not allowed in the string.	100 characters max	-
s5	Country code.	3 characters	FRA
f6	Latitude, in degrees, with two decimal places.	±90.00	0.00
f7	Longitude, in degrees, with two decimal places.	±180.00	0.00
s8	Fee indicator: • Y: Use of the mount point is subject to a fee. • N: Use of the mount point is free.	Y, N	N
*cc	Optional checksum	*00-*FF	

Example

Creating the "NAN2" mount point for an NTRIP server delivering RTCM3.0 data, messages 1014 and 1012:

$PASHS,CST,MTP,ADD,NAN2,Nantes LF2,RTCMV3.0,"1004(1s), 1012(1s), 1006(13s)",FRA,47.17,1.00,N*7A

Relevant Query Command

$PASHQ,PAR,CST

See Also

$PASHS,CST,PAR
$PASHS,CST
$PASHS,CST,MTP,DEL

CST,MTP,DEL: Deleting a Mount Point

Function

This command is used to delete a mount point from the embedded NTRIP caster source table.

Command Format

Syntax

$PASHS,CST,MTP,DEL,s1[*cc]

Parameters

Parameter	Description	Range	Default
s1	Name of the mount point you want to delete.	100 characters max.	-
*cc	Optional checksum	*00-*FF	

Example

Deleting the "NAN2" mount point:

$PASHS,CST,MTP,DEL,NAN2*6A

Relevant Query Command

$PASHQ,PAR,CST

See Also

$PASHS,CST,PAR
$PASHS,CST,MTP,ADD

CST,OFF: Stopping the Embedded NTRIP Caster

Function

This command is used to ask the receiver to stop running the embedded NTRIP caster. By default, the embedded NTRIP caster is off.

Command Format

Syntax

$PASHS,CST,OFF[*cc]

Parameters

None.

Example

Stopping the embedded NTRIP caster:

$PASHS,CST,OFF*52

Relevant Query Command

$PASHQ,CST

See Also

$PASHS,CST,ON
$PASHS,CST,PAR

CST,ON: Starting the Embedded NTRIP Caster

Function

This command is used to launch the embedded NTRIP caster in the receiver. By default, the embedded NTRIP caster is off.

Command Format

Syntax

$PASHS,CST,ON[*cc]

Parameters

None.

Example

Starting the embedded NTRIP caster:

$PASHS,CST,ON*1C

Relevant Query Command

$PASHQ,CST

See Also

$PASHS,CST,OFF
$PASHS,CST,PAR

CST,PAR: Embedded NTRIP Caster Parameters

Function

This command is used to define the parameters of the embedded NTRIP caster. All these parameters will appear in the NTRIP caster source table.

Warning! Make sure the command does not exceed 349 characters in length before sending it to the receiver.

Command Format

Syntax

$PASHS,CST,PAR,d1,s2,s3,d4,s5,s6,s7,f8,f9,s10,d11,s12,s13,c14[,s15, s16,s17][*cc]

Parameters

Parameter	Description	Range	Default
d1	IP port number of the NTRIP caster	100-65535	2101

Parameter	Description	Range	Default
s2	Host domain name or IP address of the NTRIP caster. By default, the address of the NTRIP caster is the receiver's IP address. In this case, s2 does not need to be specified. If another IP address is used, please mention it as s2.	128 characters max.	x.x.x.x
s3	NTRIP caster password. This password is used by NTRIP servers (data sources) to connect to the NTRIP caster.	32 characters max.	
d4	Number of simultaneaous connections per user.	1-100	1
s5	NTRIP caster identifier. Use this field to provide more information describing/identifying the NTRIP caster.	100 characters max.	ProFlex800
s6	NTRIP caster operator: Name of the institution, agency or company running the caster.	100 characters max.	Ashtech
s7	Country code	3 characters	FRA
f8	Latitude, in degrees with two decimal places.	±90.00	0.00
f9	Longitude, in degrees with two decimal places.	0.00 to 359.99	0.00
s10	Fallback caster IP address. (Fallback caster: the caster where to connect to in case this one breaks down).	128 characters max	0.0.0.0
d1	Fallback caster IP port number	0, 100-65535	0
s12	Network identifier, e.g. name of a network of GNSS permanent stations.	100 characters max	-
s13	Network operator: Name of the institution, agency or company running the network.	100 characters max	-
c14	Fee indicator: • Y: Usage is charged • N: No user fee	Y, N	N
s15	Web address where network information can be found.	100 characters max	-
s16	Web address where data stream information can be found.	100 characters max	-
s17	Web or email address where registration information can be found.	100 characters max	-
*cc	Optional checksum	*00-*FF	

Example

Entering parameters defining the embedded NTRIP caster:

$PASHS,CST,PAR,2102,83.165.25.14,password,10,NTRIP Caster ProFlex800,Ashtech,FRA,47.10,-1.00,123.12.132.12,2101,My

Network,Ashtech,Y,www.ashtech.com, www.ashtech.com, proflex800@ashtech.com*00

Relevant Query Command

$PASHQ,CST

See Also

$PASHS,CST,ON
$PASHS,CST,OFF
$PASHS,CST,USR,ADD
$PASHS,CST,USR,DEL
$PASHS,CST,MTP,ADD
$PASHS,CST,MTP,DEL

CST,RST: Resetting the Embedded NTRIP Caster

Function

This command is used to reset the embedded NTRIP caster in the receiver.

Resetting the caster means deleting all existing mount points and users and setting the caster definition to its default values.

Command Format

Syntax

$PASHS,CST,RST[*cc]

Parameters

None.

Example

Resetting the embedded NTRIP caster:

$PASHS,CST,RST*48

Relevant Query Command

None.

See Also

$PASHS,CST,PAR

CST,USR,ADD: Adding/Modifying NTRIP Caster Users

Function

This command is used to add or modify a user allowed to connect the embedded NTRIP caster. Up to 100 users may be defined.

Command Format

Syntax

$PASHS,CST,USR,ADD,s1,s2,s3[,s4,s5,s6,s7,s8,s9,s10,s11,s12,s13][*cc]

Parameters

Parameter	Description	Range	Default
s1	Name of the new user (case sensitive).	32 characters max.	-
s2	User password	32 characters max.	-
s3	Indicator for user-authorized mount points: • ALL: all existing mount points can be accessed by the user. • SEL: Only the listed mount points (see s4,...,s13 below) can be accessed by the user.	ALL, SEL	ALL
s4,...,s13	List of existing mount points the user is allowed to connect to. Mount point name 1, up to mount point name 10	100 characters max. (each)	-
*cc	Optional checksum	*00-*FF	

Examples

Entering a user named "Ashtech" allowed to connect to all the existing mount points managed by the embedded NTRIP caster:

$PASHS,CST,USR,ADD,Ashtech,password,ALL*16

Modifying the "Ashtech" user so it is only allowed to use only two of the existing mount points:

$PASHS,CST,USR,ADD,Ashtech,password,SEL,NAN1,NAN2*0E

Comments

- If a user is created with no mount point associated to it, then this user is allowed to connect to all existing mount points.
- If a mount point is created with no user associated to it, then the mount point is accessible to all users (not a protected mount point).

Relevant Query Command $PASHQ,PAR,CST

See Also $PASHS,CST,PAR
$PASHS,CST,USR,DEL

CST,USR,DEL: Deleting an NTRIP Caster User

Function This command is used to delete a user declared as an NTRIP Caster user.

Command Format

Syntax

$PASHS,CST,USR,DEL,s1[*cc]

Parameters

Parameter	Description	Range	Default
s1	Name of the user you want to delete.	32 characters max.	-
*cc	Optional checksum	*00-*FF	

Example

Deleting the “Ashtech” user:

$PASHS,CST,USR,DEL,Ashtech*44

Relevant Query Command $PASHQ,PAR,CST

See Also $PASHS,CST,PAR
$PASHS,CST,USR,ADD

CTS: Handshaking

Function This command enables or disables the RTS/CTS handshaking protocol for the specified port. If no port is specified, the command applies to the port through which the command is routed.

Command Format

Syntax

$PASHS,CTS,[c1],s2[*cc]

Parameters

Parameter	Description	Range	Default
c1	Port ID	A, B, F	
s2	RTS/CTS control	ON, OFF	ON
*cc	Optional checksum	*00-*FF	

Examples

Disabling RTS/CTS on port A:

$PASHS,CTS,A,OFF*3F

Disabling RTS/CTS on the current port:

$PASHS,CTS,,OFF*7E

Relevant Query Command

$PASHQ,CTS

See also

$PASHS,PRT
$PASHS,MDP

DBN,TYP: DBEN Message Type & Output Rate

Function

This command is used in a base to define the type of DBEN message the base should generate (type and rate). Enabling or disabling the output of the DBEN message is made through $PASHS,BAS or $PASHS,BDS.

Command Format

Syntax

$PASHS,DBN,TYP,s1,d2[*cc]

Parameters

Parameter	Description	Range
s1	Message type	See table below
d2	Output rate, in seconds	See table below
*cc	Optional checksum	*00-*FF

Type	Description	Range	Default Output Rate
RPC	Code & phase measurement	0, 0.1-0.9 s and 1-300 s	1
BPS	Reference station position	0-300 s	30

Examples

Selecting DBEN message type “RPC” at 0.5 second:

$PASHS,DBN,TYP,RPC,0.5*26

Selecting DBEN message type “BPS” at 60 seconds:

$PASHS,DBN,TYP,BPS,60*0B

Relevant Query Command

$PASHQ,DBN,MSI

See Also

$PASHS,BAS
$PASHS,BDS

DDN,PAR: Setting the DynDNS Service

Function

This command is used to activate or deactivate a connection to a service ensuring that the receiver hostname will always be associated with the dynamic IP address your Internet Service Provider has last assigned to the receiver.

The successful use of the service requires that you first open an account on this service.

Command Format

Syntax

$PASHS,DDN,PAR[,DYN,d1][,SYS,s2][,USR,s3][,PWD,s4][,HNM,s5][,PER,d6][*cc]

Parameters

Parameter	Description	Range	Default
DYN,d1	Enabling/disabling the use of the service: • 0: Enable • 1: Disable	0, 1	0
SYS,s2	Address of the service used.	100 characters max.	dyndns@dyndns.org
USR,s3	Username you chose when creating your personal account on the DynDNS web site.	32 characters max.	-
PWD,s4	Password you chose when creating your personal account on the DynDNS web site.	32 characters max.	-
HNM,s5	Hostname you declared on the DynDNS web site for the receiver.	100 characters max.	-
PER,d6	Update rate, in seconds	60-3600	600
*cc	Optional checksum	*00-*FF	

Example

Enabling the use of the DynDNS service, for a receiver accessible through hostname “ashtech1”:

$PASHS,DDN,PAR,DYN,1,SYS,dyndns@dyndns.org,USR,psmith,PWD,ashtech,HNM,ashtech1.dyndns.org,PER,600*0C

Comment

- After running this command with d1=1 to enable the service, the receiver will try to connect to the service. If the connection is successful, the receiver will return $PASHR,DDN,OK. If it fails, the receiver will return $PASHR,DDN,FAIL, causing d1 to be reset to “0”.
- Running commands $PASHS,RST and $PASHS,INI will reset d1 to 0 but will keep all other parameters unchanged.

Relevant Query Command

$PASHQ,PAR
$PASHQ,DDN

See Also

$PASHS,ETH,PAR
$PASHS,DDN,SET

DDN,SET: Sending the IP Address Manually to DynDNS

Function

This command is used to force the receiver to send right away its IP address to the DynDNS service. Typically this command may be used when you have noticed that the ISP has just changed the (public) IP address of the receiver. By default, the IP address is sent to the DynDNS server every 10 minutes.

Command Format

Syntax

$PASHS,DDN,SET[*cc]

Parameters

None.

Example

Sending immediately the IP address to the DynDNS service:

$PASHS,DDN,SET*55

Relevant Query Commands

$PASHQ,DDN
$PASHQ,PAR

See Also

$PASHS,DDN,PAR
$PASHS,ETH,PAR

DIP: Server Connection

Function

This command is used to connect the receiver to a base via the base's IP address or host name.

Command Format

Syntax

$PASHS,DIP,RIP,s1,PRT,d2[,LGN,s3,PWD,s4][,IPP,c5][*cc]

Parameters

Parameter	Description	Range
RIP,s1	IP address (xxx.xxx.xxx.xxx) or host name	32 char. max.
PRT,d2	Port number	0-65535
LGN,s3	User name (optional)	32 char. max.
PWD,s4	Password (optional)	32 char. max.
IPP,c5	Internet port used on the receiver to establish the connection with the base (server): • E: Internal modem (default) • P: Ethernet stream 1 • Q: Ethernet stream 2	E, P, Q
*cc	Optional checksum	*00-*FF

Comments

Optional fields s3 and s4 need to be specified when the base used requires a user name and password. In this case, the receiver sends the $GPUID,s2,s4 command to the base right after the IP connection has been established.

Examples

Connecting the receiver to IP address 134.20.2.100 and port number 6666:

$PASHS,DIP,RIP,134.20.2.100,PRT,6666*2C

Connecting the receiver to www.MyRec.com through port 2100:

$PASHS,DIP,RIP,www.MyRec.com,PRT,2100*60

Relevant Query Commands

$PASHQ,MDM
$PASHQ,DIP
$PASHQ,ETH

See also

$PASHS,MDM,...
$PASHS,DIP,ON
$PASHS,DIP,OFF
$PASHS,ETH,...

DIP,OFF: Terminating Direct IP Connection

Function

This command is used to terminate the current IP connection to a server.

Command Format

Syntax

$PASHS,DIP,OFF[,c1][*cc]

Parameters

Parameter	Description	Range
c1	IP port used for the connection to the server: • E: Internal modem • P: Ethernet stream 1 • Q: Ethernet stream 2 When c1 is omitted, the concerned port is the one specified in the last $PASHS,DIP,PAR or $PASHS,DIP command run.	E, P, Q
*cc	Optional checksum	*00-*FF

Examples

Terminating the current connection:

$PASHS,DIP,OFF*4B

Relevant Query Command

$PASHQ,MDM

See also

$PASHS,DIP
$PASHS,DIP,PAR
$PASHS,DIP,ON

DIP,ON: Establishing the Programmed Direct IP Connection

Function

This command is used to establish the programmed Direct IP connection.

Command Format

Syntax

$PASHS,DIP,ON[,c1][*cc]

Parameters

Parameter	Description	Range
c1	IP port used for the connection to the server: • E: Internal modem • P: Ethernet stream 1 • Q: Ethernet stream 2 When c1 is omitted, the concerned port is the one specified in the last $PASHS,DIP,PAR or $PASHS,DIP command run.	E, P, Q
*cc	Optional checksum	*00-*FF

Examples

Establishing the programmed Direct IP connection:

$PASHS,DIP,ON*05

Relevant Query Command

$PASHQ,MDM

See also

$PASHS,DIP
$PASHS,DIP,PAR
$PASHS,DIP,OFF

DIP,PAR: Setting Direct IP Parameters

Function

This command is used to set the different parameters allowing the receiver to perform a Direct IP connection to an external server, typically a base.

Command Format

Syntax

$PASHS,DIP,PAR,ADD,s1,PRT,d2[,LGN,s3,PWD,s4][,IPP,c5][*cc]

Parameters

Parameter	Description	Range	Default
ADD,s1	IP address or host name of external server	32 characters max.	
PRT,d2	IP port of external server	0-65535	
LGN,s3	User name (optional)	32 characters max.	
PWD,s4	Password (optional)	32 characters max.	
IPP,c5	Port used in the receiver to establish the IP connection: • E: Internal modem • P: Ethernet stream 1 • Q: Ethernet stream 2	E, P, Q	E
*cc	Optional checksum	*00-*FF	

Comments

When connecting to the specified server requires a user name and password, then the receiver will send the serial command $GPUID,s3,s4 after the IP connection with the server has been established.

Examples

Entering the parameters of the server the receiver has to connect to (through an IP address):

$PASHS,DIP,PAR,ADD,192.65.54.1,PRT,2100*74

Entering the parameters of the server the receiver has to connect to (through a host name):

$PASHS,DIP,PAR,ADD,www.MyRec.com,PRT,2100*05

Relevant Query Commands

$PASHQ,DIP
$PASHQ,MDM
$PASHQ,ETH

See Also

$PASHS,DIP,ON
$PASHS,DIP,OFF
$PASHS,MDM
$PASHS,ETH,..

DRD: Data Recording Duration

Function

This command sets a duration for all the G-files that the receiver will log (outside of sessions). When a duration is set, the receiver automatically creates a new G-file right after the currently logged G-file has reached the specified duration.

Command Format

Syntax

$PASHS,DRD,d[*cc]

Parameters

Parameter	Description	Range	Default
d	Data recording duration: • 0: Unlimited duration • Other than 0: Duration in minutes	0, 15, 20, 30, (n x 60). Where n is an integer between 1 and 24	0
*cc	Optional checksum	*00-*FF	

Comments

- The command will be NAKed if the ring file buffer is currently active (see $PASHS,RFB).
- The recording of G-files are all started at round hour values of GPS time. This means the first file may be shorter in duration than all those that will follow.

Example

Setting the duration to 15 minutes:

$PASHS,DRD,15*0F

Relevant Query Command

$PASHQ,DRD

See also

$PASHS,REC to start/stop data recording.

DRI: Raw Data Recording Rate

Function

This command sets the recording rate for all raw data logged in the internal or external memory. This rate can be independent of the data output rate on a serial port.

Command Format

Syntax

$PASHS,DRI,f[*cc]

Parameters

Parameter	Description	Range	Default
s	Raw data recording rate. Setting $PASHS,POP to “20” is a prior condition to operating at 0.05 s (20 Hz).	0.05 sec or 0.1-0.4 sec if the [F] option is activated. 0.5-0.9 s 1-999 s	1 s
*cc	Optional checksum	*00-*FF	

Example

Setting the recording rate to 5 seconds:

$PASHS,DRI,5*33

Relevant Query Command

$PASHQ,DRI

See also

$PASHS,ATM
$PASHS,RAW
$PASHS,REC
$PASHS,POP

DST: Data Stream Connection Modes

Function

This command is used to set up the type of TCP/IP connection to be implemented for each available data stream.

Whereas $PASHS,BDS is used to define the type of data available on each Ix port, the present command allows you to define the conditions in which each available data stream can be acquired from a remote equipment through an IP connection. The different connection modes available are described below.

Connection Modes

Server Mode: When a receiver is used in this mode, one or more rovers can connect to it through a specific IP address and port number to acquire the data stream it generates on the specified Ix port.

Client Mode: When a receiver is used in this mode, it can connect to an external server through a specific IP address and port number for sending to this server the data stream it generates on the specified Ix port.

Command Format

Syntax

Disabling a data stream on a given Ix port:

$PASHS,DST,s1,OFF[*cc]

Setting a data stream with the receiver used in server mode:

$PASHS,DST,s1,ON,1,d4,d5[*cc]

Setting a data stream with the receiver used in client mode:

$PASHS,DST,s1,ON,2,d4,d5,s6[*cc]

Parameters

Parameter	Description	Range	Default
s1	Data stream port	I1-I9	
s2	Enable/disable control parameter	ON, OFF	OFF
d3	Connection Modes: • 1: Server • 2: Client	1-2	1
d4	IP mode: • 0: TCP • 1: UDP	0, 1	0
d5	IP port number: • If d3=1 (Server), specify the number of the receiver's internal port used. • If d3=2 (Client), specify the number of the external server's IP port used.	100-65535	1000-1009
s6	IP address or host name: • If d3=2 (Client), specify the external server's IP address.	32 char max.	0.0.0.0.0
*cc	Optional checksum	*00-*FF	

Examples

Disabling data stream on port I3:

$PASHS,DST,I3,OFF*03

Setting data stream on port I5 to be available in server mode:

$PASHS,DST,I5,ON,1,0,2101*64

Setting data stream on port I2 to be available in client mode:

$PASHS,DST,I2,ON,2,0,2102,154.65.43.12*56

Relevant Query Command

$PASHQ,DST

See Also

$PASHS,NME
$PASHS,ATM
$PASHS,BAS
$PASHS,RAW
$PASHS,BDS
$PASHQ,BDS

DSY: Daisy Chain

Function

This command is used to redirect all the characters flowing through a given serial port (source port) to another (destination port), without interpreting the flow of redirected data.

Once the daisy chain mode is on, only the command used to discontinue this mode can be interpreted on the source port.

Redirection can be in both directions, in which case two DSY commands, instead of one, are required to allow bidirectional data flow.

Command Format

Syntax

Redirecting data from a source port to a destination port:

$PASHS,DSY,c1,c2[,d3][*cc]

Discontinuing the daisy chain mode from a specified source port:

$PASHS,DSY,c1,OFF[*cc]

Discontinuing the daisy chain mode for all source ports:

$PASHS,DSY,OFF[*cc]

Parameters

Parameter	Description	Range
c1	Source port ID	A, B, C, D, E, F, G, I, P, Q
c2	Destination port ID	A, B, C, D, E, F, G, I, P, Q
d3	Mode: • 0: Raw (default). Data are sent to the destination port as and when they arrive. • 1: Block. Data are sent to the destination port only after a complete message has arrived.	0,1
*cc	Optional checksum	*00-*FF

Examples

Redirecting port D to port A:

$PASHS,DSY,D,A*3E

Redirecting port D to port A and port A to port D:

$PASHS,DSY,D,A*3E

$PASHS,DSY,A,D*3E

Discontinuing the daisy chain mode from port A:

$PASHS,DSY,A,OFF*35

Discontinuing the daisy chain mode from all source ports:

$PASHS,DSY,OFF*58

DYN: Receiver Dynamics

Function

This command allows you to define the receiver dynamics. The chosen number best represents the receiver motion.

Command Format

Syntax

$PASHS,DYN,d1[*cc]

Parameters

Parameter	Description	Range	Default
d1	Receiver dynamics: • 1: Static • 2: Quasi-static • 3: Walking • 4: Ship • 5: Automobile • 6: Aircraft • 7: Unlimited • 8: Adaptive • 9: User-defined (see also $PASHS,UDP)	1-9	8
*cc	Optional checksum	*00-*FF	

Example

Setting rover dynamics to “Walking”:

$PASHS,DYN,3*39

Comments

In the adaptive mode (8), the receiver analyzes its own motion and automatically chooses one of the dynamic models that is the most suitable. The possible dynamic models are those corresponding to the other choices in the command (i.e. 2 to 7, but not 1 or 9). Using the adaptive mode rejects the possible use of the user-defined dynamic model.

Relevant Query Command $PASHQ,DYN

See Also $PASHS,UDP

ECP,OFF: Powering Off Ports B & F

Function

This command is used to power off communication ports B and F.

Turning off ports B and F may be useful when the receiver is operated from the internal battery. When ports B and F are not used, turning them off will allow you to extend the battery operating time.

Command Format

Syntax

$PASHS,ECP,OFF[*cc]

Parameters

None.

Example

Turning off ports B and F:

$PASHS,ECP,OFF*40

Comments

The command is NAKed if a second GNSS board or/and the extended internal memory is/are used and currently on. See $PASHS,HDB,ON/OFF and $PASHS,EXM,ON/OFF.

Relevant Query Command $PASHQ,ECP

See Also $PASHS,ECP,ON

ECP,ON: Powering On Ports B & F, 2nd GNSS Board and Extended Internal Memory

Function

This command is used to power on communication ports B and F. By default, ports B and F are on.

This command should also be run to power on the second GNSS board or the extended internal memory

Command Format

Syntax

$PASHS,ECP,ON[*cc]

Parameters

None.

Example

Turning on ports B and F:

$PASHS,ECP,ON*0E

Relevant Query Command $PASHQ,ECP

See Also $PASHS,ECP,OFF

EFT,ON: Starting Embedded FTP Server

Function This command starts the embedded FTP server, which is inactive by default.

Command Format

Syntax

$PASHS,EFT,ON[*cc]

Parameters

None.

Example

Starting the embedded FTP server:

$PASHS,EFT,ON*OF

Relevant Query Command $PASHQ,EFT

See Also $PASHS,EFT,OFF
$PASHS,EFT,PAR

EFT,OFF: Stopping Embedded FTP Server

Function

This command stops the embedded FTP server after it has been started. By default, the embedded FTP server is inactive.

Command Format

Syntax

$PASHS,EFT,OFF[*cc]

Parameters

None.

Example

Stopping the embedded FTP server:

$PASHS,EFT,OFF*41

Relevant Query Command

$PASHQ,EFT

See Also

$PASHS,EFT,ON
$PASHS,EFT,PAR

EFT,PAR: Embedded FTP Server Settings

Function

This command is used to enter the different parameters of the embedded FTP server.

Command Format

Syntax

$PASHS,EFT,PAR[,LGN,s1][,PWD,s2][,MEM,d3][,PTH,s4][,PRT,d5][*cc]

Parameters

Parameter	Description	Default	Range
LGN,s1	Administrator login	admin	32 characters max.
PWD,s2	Administrator password	changeme	32 characters max.
MEM,s3	Memory location: • 0: Internal memory • 2: USB key	0	0, 2
PTH,s4	FTP path		255 characters max.
PRT,d5	FTP port	21	0-65535
*cc	Optional checksum		*00-*FF

Example

Setting the embedded FTP server:

$PASHS,EFT,PAR,LGN,Smith,PWD,u7lmyt,MEM,2,PTH,pub,PRT,21*47

Relevant Query Command $PASHQ,EFT

See Also $PASHS,EFT,ON
$PASHS,EFT,PAR
$PASHS,EFT,USR,ADD
$PASHS,EFT,USR,DEL

EFT,USR,ADD: Adding FTP Server User

Function This command is used to add or modify the profile of a user allowed to connect to the embedded FTP server.

Command Format

Syntax

$PASHS,EFT,USR,ADD,s1,s2[*cc]

Parameters

Parameter	Description	Range
s1	User name	32 characters max.
s2	User password	32 characters max.
*cc	Optional checksum	*00-*FF

Example

Setting the embedded FTP server:

$PASHS,EFT,USR,ADD,smith,213lkio5*78

Relevant Query Command $PASHQ,EFT

See Also $PASHS,EFT,USR,DEL

EFT,USR,DEL: Deleting FTP Server User

Function This command is used to delete a registered FTP server user.

Command Format

Syntax

$PASHS,EFT,USR,DEL,s1[*cc]

Parameters

Parameter	Description	Range
s1	User name	32 characters max.
*cc	Optional checksum	*00-*FF

Example

Deleting the user named “Smith”:

$PASHS,EFT,USR,DEL,Smith*5C

Relevant Query Command $PASHQ,EFT

See Also $PASHS,EFT,USR,ADD

ELM: Setting the Elevation Mask for Raw Data Output

Function This command is used to set the minimum satellite elevation for raw data recording, raw data and differential data output.

Command Format

Syntax

$PASHS,ELM,d1[*cc]

Parameters

Parameter	Description	Range	Default
d1	Elevation mask, in degrees.	0-90°	5
*cc	Optional checksum	*00-*FF	

Example

Setting the elevation mask to 10 degrees:

$PASHS,ELM,10*1C

EML,PAR: Email Parameters

Function

This command is used to set the parameters that allow the receiver to send emails.

Command Format

Syntax

$PASHS,EML,PAR[,LVL,d1][,SMT,s2][,PRT,d3][,USR,s4][,PWD,s5][,SND,s6][,ADD,s7][*cc]

Parameters

Parameter	Description	Range	Default
LVL,d1	Notification level: • 0: No notification • 1: Standard notification • 2: Full notification	0-2	0
SMT,s2	SMTP server address or hostname	32 characters max.	1
PRT,d3	SMTP port number	0-65535	25
USR,s4	Username	32 characters max.	Empty
PWD,s5	Password	32 characters max.	Empty
SND,s6	Email address used to return messages to the receiver if the email address of the recipient is not found.	64 characters max.	no-reply@proflex800.com
ADD,s7	Recipient email address to which the receiver sends messages.	64 characters max.	Empty

Parameter	Description	Range	Default
*cc	Optional checksum	*00-*FF	

Comments

With the notification level (d1) set to 1 or 2, the receiver will automatically send emails whenever the receiver is started up or an external power shutdown is detected. The distinction between d1=1 and d1=2 is the following:

- With d1=1, only high-level alarms will trigger an email.
- With d1=2,both high- and medium-level alarms will trigger an email.

Example

Setting email parameters:

$PASHS,EML,PAR,LVL,1,SMT,smtp.gmail.com,
PRT,25,USR,gmail,PWD,gmail,SND,no-reply@proflex800.com,
ADD,johnsmith@ashtech.com*2C

Relevant Query Command

$PASHQ,EML

See Also

$PASHS,EML,TST

EML,TST: Testing Email

Function

This command is used to test the receiver's email function by directly sending an email to the preset recipient. The content of the message is "Test message for email verification".

Command Format

Syntax

$PASHS,EML,TST[*cc]

Parameters

None.

Example

Sending email for test purposes:

$PASHS,EML,TST*4E

Relevant Query Command

$PASHQ,EML

See Also $PASHS,EML,PAR

ETH,OFF: Powering Off the Ethernet Port

Function This command is used to power off the Ethernet port. By default, the Ethernet port is on.

Turning the Ethernet port may be useful when the receiver is operated from the internal battery. When the Ethernet port is not used, turning it off will allow you to extend the battery operating time.

Command Format

Syntax

$PASHS,ETH,OFF[*cc]

Parameters

None.

Example

Turning off the Ethernet port:

$PASHS,ETH,OFF*4F

Relevant Query Command $PASHQ,ETH

See Also $PASHS,ETH,ON
$PASHS,ETH,PAR

ETH,ON: Powering On the Ethernet Port

Function This command is used to power on the Ethernet port. By default, the Ethernet port is on.

Command Format

Syntax

$PASHS,ETH,ON[*cc]

Parameters

None.

Example

Turning on the Ethernet port:

$PASHS,ETH,ON*01

Relevant Query Command $PASHQ,ETH

See Also $PASHS,ETH,OFF
$PASHS,ETH,PAR

ETH,PAR: Ethernet Parameters

Function This command is used to set the Ethernet parameters.

Command Format

Syntax

$PASHS,ETH,PAR[,DHP,s1][,ADD,s2][,MSK,s3][,GTW,s4][,DN1,s5][,DN2,s6][*cc]

Parameters

Parameter	Description	Range	Default
DHP,s1	DHCP mode: 0: Disabled (static IP address) 1: Enabled (dynamic IP address)	0, 1	1
ADD,s2	IP address when s1=0	0.0.0.0-255.255.255.255	192.168.0.1
MSK,s3	Sub-network mask when s1=0	0.0.0.0-255.255.255.255	255.255.255.0
GTW,s4	Gateway IP address when s1=0	0.0.0.0-255.255.255.255	255.255.255.255
DN1,s5	DNS 1 IP address when s1=0	0.0.0.0-255.255.255.255	255.255.255.255
DN2,s6	DNS 2 IP address when s1=0	0.0.0.0-255.255.255.255	255.255.255.255
*cc	Optional checksum	*00-*FF	

Example

Ethernet configuration with DHCP:

$PASHS,ETH,PAR,DHP,1*2E

Ethernet configuration without DHCP (static IP address):

$PASHS,ETH,PAR,DHP,0,ADD,10.20.2.28,MSK,255.255.255.0,GTW,10.20.2.1,DN1,134.20.2.16,DN2,134.20.2.3*5F

Relevant Query Command $PASHQ,ETH

See Also $PASHS,ETH,OFF
$PASHS,ETH,ON

EXM,OFF: Disabling the Extended Internal Memory

Function This command is used to disable the use of the extended internal memory. By default, the use of this memory is enabled.

Disabling the extended internal memory results in having port M re-allocated to the NAND Flash memory.

The receiver will reboot after having received and run this command.

Command Format

Syntax

$PASHS,EXM,OFF[*cc]

Parameters

None.

Example

Disabling the use of the extended internal memory:

$PASHS,EXM,OFF*46

Relevant Query Command $PASHQ,EXM

See Also $PASHS,EXM,ON

EXM,ON: Enabling the Extended Internal Memory

Function This command is used to enable the use of the extended internal memory. (Enabling the use of this memory implies that you have purchased this hardware option.)

The command will be NAKed if the extended internal memory is not detected.

After the command is accepted (memory detected), the receiver is rebooted.

When the use of the extended internal memory is enabled, port M is allocated to this memory.

By default, the use of the extended internal memory is enabled.

Command Format

Syntax

$PASHS,EXM,ON[*cc]

Parameters

None.

Example

Enabling the use of the extended internal memory:

$PASHS,EXM,ON*08

Relevant Query Command

$PASHQ,EXM

See Also

$PASHS,EXM,OFF

FIL,D: Deleting Files

Function

This command allows you to delete files from the selected internal or external memory.

Command Format

Syntax

$PASHS,FIL,D,d[*cc]

Parameters

Parameter	Description	Range
d	File index number: • In the range 0-99: With file index number=n, then file "n+1" will be deleted. Warning! If the deleted file is not the last one in memory, all the files that follow the deleted file will have their index number re-ordered after deletion of the file. The index of a file is as listed when using the $PASHQ,FLS command. • =999: All the files in memory will be deleted, except for the following: G-file in use, D-file in use, ring file buffer, ATL file in use, all directories, all .log files excluding ATL log files not in use.	0-99, 999
*cc	Optional checksum	*00-*FF

Example

Deleting the 6th file from memory:

$PASHS,FIL,D,5*47

Comments

If the file you want to delete is the only file present in the selected memory and this file is currently being used, the "NAK" message is returned to inform you that the file cannot be deleted.

Relevant Query Command

None.

See also

$PASHQ,FLS

$PASHS,MEM to select the memory from which to delete files.

FIL,DEL: Deleting Files and Directories

Function

This command allows you to delete files and directories from the selected internal or external memory.

Command Format

Syntax

$PASHS,FIL,DEL,[d1],[s2],s3[,s4[...,sn]][*cc]

Parameters

Parameter	Description	Range
d1	Memory from which to delete files or directories: • 0: Internal memory. • 2: USB key. If d1 is omitted, files or directories are deleted from the memory specified by the last run $PASHS,MEM command.	0, 2
s2	Path	255 characters max.
s3	Name of the file or directory you want to delete.	255 characters max.
	...	
sn	Name of the file or directory you want to delete.	255 characters max.
*cc	Optional checksum	*00-*FF

Comments

- To delete a file or directory located in a subdirectory, the full path to this file or directory should be specified in the s2 field. You cannot enter a path in the s3 field.
- The “*” character can be used as a wild card to delete several files at the same time. In this case, the complete string should be placed between simple or double quotation marks.

Examples

Deleting a G file:

$PASHS,FIL,DEL,,,GabcdA09.241*69

Deleting three G files:

$PASHS,FIL,DEL,,,GabcdA09.241,GabcdB09.242,GabcdC09.242*68

Deleting a G file from a subdirectory located on the USB key:

$PASHS,FIL,DEL,2,2009/241/,GabcdA09.241*67

Deleting all the files from the USB key:

$PASHS,FIL,DEL,2,,”*.*”*67

Deleting all the files recorded on the USB key on the 241th day of the year:

$PASHS,FIL,DEL,2,,”*.241”*7A

Relevant Query Command None.

See also $PASHQ,FIL,LST
$PASHS,MEM

FTP,OFF: Ending Data Transfer with FTP

Function This command is used to stop the data transfer currently in progress with an FTP server.

Command Format

Syntax

$PASHS,FTP,OFF[*cc]

Parameters

None.

Example

Stop data transfer:

$PASHS,FTP,OFF*54

Relevant Query Command $PASHQ,FTP

See Also $PASHS,FTP,PAR
$PASHS,FTP,PUT

FTP,PAR: FTP Settings

Function This command is used to enter the settings of an external FTP server.

Command Format

Syntax

$PASHS,FTP,PAR[,ADD,s1][PRT,d2][,LGN,s3][,PWD,s4][,PTH,s5][,IPP,c6][*cc]

Parameters

Parameter	Description	Range	Default
ADD,s1	IP address or host name of the FTP server	32 characters max.	-
PRT,d2	FTP server port number	0-65535	21
LGN,s3	FTP server login	32 characters max.	
PWD,s4	FTP server password	32 characters max.	
PTH,s5	Path used on the FTP server	255 characters max.	
IPP,c6	Internet port used for FTP transfer	P	P
*cc	Optional checksum	*00-*FF	

Example

$PASHS,FTP,PAR,ADD,ftp.ashtech.com,PRT,21,LGN,Ashtech,PWD,u6huz8,PTH,/my folder,P*49

Relevant Query Command

$PASHQ,FTP

See Also

$PASHS,FTP,PUT

FTP,PUT: Uploading Files to FTP

Function

This command is used to send files from the receiver's internal memory or USB key to the FTP server, as defined through the $PASHS,FTP,PAR command.

Up to 10 files may be transferred through a single command line.

Command Format

Syntax

$PASHS,FTP,PUT,[d1],[s2],[s3],s4,[s5,]...[,s13][*cc]

Parameters

Parameter	Description	Range	Default
d1	Memory where the files to be transferred can be found: • 0: Receiver's internal memory • 2: USB key • If d1 is missing, the memory selected through $PASHS,MEM is the one where the files should be found.	0,2	-
s2	Subfolder created on the FTP server, in the folder specified in the Path parameter (PTH,s5) of the $PASHS,FTP,PAR command. If s2 is not specified, files are saved directly in the <Path> folder.	255 characters max.	Empty
s3	Remote path on FTP server	255 characters max.	Empty
s4-s13	Names of the files to be uploaded to the FTP server. The "*" character can be used to select several files. In this case, the filename string should be placed between quotation marks (" or ')	255 characters max.	
*cc	Optional checksum	*00-*FF	

Examples

Transferring a single file (G1234A09.134) to the FTP server:

$PASHS,FTP,PUT,,,,G1234A09.134*59

Transferring two files (GabcdA09.134 and GabcB09.134) to the FTP server:

$PASHS,FTP,PUT,0,,,GabcdA09.134,GabcB09.134*11

Transferring all the files from the internal memory to the FTP server:

$PASHS,FTP,PUT,0,,,"*.*"*54

Transferring all the files from the USB key collected on day 65 to the FTP server:

$PASHS,FTP,PUT,2,,,'*.65'*ED

Comments

- Right after submitting a command line, the following response line will be returned if the command syntax is correct:

$PASHR,ACK*3D

- After a successful file transfer, the following response line is returned:

  $PASHR,FTP,OK*1E

- If the file transfer fails, the following response line is returned:

  $PASHR,FTP,FAIL*18

- If you submit a new command while a file transfer sequence is still in progress, your new command is rejected and the following response line is returned:

  $PASHR,FTP,BUSY*07

Relevant Query Command $PASHQ,FTP

See Also $PASHS,FTP,PAR

GAL: Galileo Tracking

Function This command is used to enable or disable Galileo tracking.

Command Format

Syntax

$PASHS,GAL,s1[*cc]

Parameters

Parameter	Description	Range	Default
s1	Enabling/disabling Galileo tracking: • On: Track and use Galileo satellites • Off: Do not track Galileo satellites	ON, OFF	OFF
*cc	Optional checksum	*00-*FF	-

Comments

The command is NAKed if the [O] option is not installed or the receiver does not support Galileo.

Example

Enabling Galileo:

$PASHS,GAL,ON*12

Relevant Query Command $PASHQ,GAL
$PASHQ,PAR

See also $PASHS,CFG
$PASHS,SBA
$PASHS,GPS
$PASHS,GLO

GLO: GLONASS Tracking

Function This command is used to enable or disable GLONASS tracking. The command is valid only if the GLONASS option has been activated in the receiver.

Command Format

Syntax

$PASHS,GLO,s1[*cc]

Parameters

Parameter	Description	Range	Default
s1	Enables (ON) or disables (OFF) GLONASS tracking.	ON, OFF	ON
*cc	Optional checksum	*00-*FF	

Example

Enabling GLONASS:

$PASHS,GLO,ON*1C

Relevant Query Command $PASHQ,GLO

See also $PASHS,SBA
$PASHS,CFG
$PASHS,GPS
$PASHS,GAL

GPS: GPS Tracking

Function

This command is used to enable or disable GPS tracking.

Enabling GPS tracking will power on the corresponding part in the RF section, if not powered on yet.

Conversely, disabling GPS tracking will power off the corresponding part in the RF section, unless Galileo and SBAS reception requires that this part be kept in use.

Important! Combined with $PASHS,CFG, this command makes command $PASHS,GNS,CFG obsolete.

Command Format

Syntax

$PASHS,GPS,ON[,s1[,s2[,s3]]][*cc]
$PASHS,GPS,OFF[*52]

Parameters

Parameter	Description	Range
s1	First Signal: • 1C: Tracking GPS L1 C/A signal	1C
s2	Second Signal: • 2L: Tracking L2CS signal for all GPS SVs • 2W: Tracking L2P signal for all GPS SVs • 2LW: Tracking L2CS signal for L2CS-capable GPS SVs and L2P for others • 5Q: Tracking L5 signal for all GPS SVs • “Blank”: No second signal to be tracked	2L, 2W, 2LW, 5Q or “blank”
s3	Third Signal: • 2L: Tracking L2CS signal for all GPS SVs • 5Q: Tracking L5 signal for all GPS SVs • “Blank”: No third signal to be tracked	2L, 5Q or “blank”
*cc	Optional checksum	*00-*FF

Remember the settings you make with $PASHS,CFG have priority over those made with $PASHS,GPS.

The table below summarizes the interaction between these two commands. Its content should be interpreted as follows:

– If you run one of the $PASHS,GPS,... commands mentioned in the left-hand column,
– and you earlier chose to enable the single, dual- or triple-signal tracking using $PASHS,CFG (headers of 2nd, 3rd, 4th columns),

– then the resulting tracking will be the one specified in the corresponding cell."NAK" means the command will be rejected (NAKed)

If You Run $PASHS,GPS,...:	Single Signal	Dual Signal	Triple Signal
ON	14 GPS	See $PASHS,GPS command, **Common Defaults** table.	See $PASHS,GPS command, **TSL Defaults** table.
ON,1C	14 GPS	Same as Single Signal; Second Signal not tracked.	Same as Single Signal; Second and Third Signals not tracked.
ON,1C,2W	NAK	12 GPS (C/A+P)	Same as Dual Signal; Third Signal not tracked).
ON,1C,2L	NAK	12 GPS (C/A+L2CS)	Same as Dual Signal; Third Signal not tracked).
ON,1C,2LW	NAK	12 GPS (C/A+(P or L2CS))	Same as Dual Signal; Third Signal not tracked).
ON,1C,5Q	NAK	12 GPS (C/A+L5)	Same as Dual Signal; Third Signal not tracked).
ON,1C,2W,2L	NAK	NAK	12 GPS (C/A+P+L2CS)
ON1C,2W,5Q	NAK	NAK	12 GPS (C/A+P+L5)
ON, 1C,2L,5Q	NAK	NAK	12 GPS (C/A+L2CS+L5)
ON,1C,5Q,2L	NAK	NAK	12 GPS (C/A+L5+L2CS)
ON,1C,2LW,5Q	NAK	NAK	12 GPS (C/A+(P or L2CS)+L5)

Example

Enabling GPS reception:

$PASHS,GPS,ON,1C,2W*0B

Relevant Query Command

$PASHQ,GPS
$PASHQ,PAR

See also

$PASHS,CFG
$PASHS,SBA
$PASHS,GLO
$PASHS,GAL

INI: Receiver Initialization

Function

This command resets the receiver memory and then restarts the receiver.

Command Format

Syntax

$PASHS,INI,d1[*cc]

Parameters

Parameter	Description	Range
d1	Init code: • 0: Restarts the receiver without memory reset. • 1: Resets user settings, clears ephemeris, almanac and latest position/time data, and re-starts the receiver. • 2: Resets user settings, formats internal memory and re-starts the receiver. • 3: Resets user settings, formats internal memory, clears ephemeris, almanac and latest position/time data, and restarts the receiver.	0, 1, 2, 3
*cc	Optional checksum	*00-*FF

Example

Resetting all and restarting the receiver:

$PASHS,INI,1*26

Relevant Query Command

None.

See also

$PASHS,RST

LCS: Enabling/Disabling Use of Local Coordinate System

Function

This command is used to enable or disable the use of the local coordinate system in the receiver. Having the receiver using a local coordinate system requires that it receives RTCM 3.1 message type 1021, 1022, 1023 or 1025 from the base.

Command Format

Syntax

$PASHS,LCS,s1[*cc]

Parameters

Parameter	Description	Range	Default
s1	ON: Local coordinate system used if RTCM 3.1 messages received. OFF: Coordinate system used is WGS84.	ON, OFF	OFF
*cc	Optional checksum	*00-*FF	-

Example

Enabling the use of the local coordinate system in the receiver:

$PASHS,LCS,ON*04

Relevant Query Commands

$PASHQ,LCS
$PASHQ,PAR

LOG,DEL: Deleting Log Files

Function

This command is used to delete log files.

Command Format

Syntax

$PASHS,LOG,DEL,d[*cc]

Parameters

Parameter	Description	Range
d	Index of the log file you want to delete. Use the $PASHQ,LOG, LST command to read the index associated with each existing log file. Use d=999 to delete all the log files, but the current one.	0 to no limit
*cc	Optional checksum	*00-*FF

Example

Deleting all log files:

$PASHS,LOG,DEL,999*45

Relevant Query Command $PASHQ,LOG,LST

See Also $PASHQ,LOG

LOG,PAR: Log File Settings

Function This command is used to set the log file. A log file keeps track of the different connections performed in a day (one file created per day).

Command Format

Syntax

$PASHS,LOG,PAR,s1,d2,d3[*cc]

Parameters

Parameter	Description	Range	Default
s1	Enabling/disabling the log file: • ON: Enable • OFF: Disable	ON, OFF	ON
d2	Maximum size, in Mbytes, allowed for a log file.	1-90	1
d3	Number of days during which log files are kept in memory. After this delay, they are automatically deleted.	1-100	10
*cc	Optional checksum	*00-*FF	

Example

Enabling the log file with a maximum size of 2 Mbytes and 10 days of backup:

$PASHS,LOG,PAR,ON,2,10*40

Relevant Query Command $PASHQ,LOG

See Also $PASHS,LOG,DEL
$PASHS,LOG,LST

LTZ: Time Zone

Function

This command is used to set the local time zone.

Command Format

Syntax

$PASHS,LTZ,d1,d2[*cc]

Parameters

Parameter	Description	Range	Default
d1	Local time zone (hours).	-13 to +13	0
d2	Local time zone (minutes)	0-59	0
*cc	Optional checksum	*00-*FF	

Example

Setting local time to UTC+2:

$PASHS,LTZ,2,0*35

Relevant Query Command

$PASHQ,ZDA
$PASHQ,LTZ

See also

$PASHS,ZDA

MDM,INI: Initializing the Modem

Function

This command is used to initialize the modem.

Command Format

Syntax

$PASHS,MDM,INI[*cc]

Parameters

None.

Example

Initializing the modem:

$PASHS,MDM,INI

If modem initialization is successful, you will get the following answer:

$PASHR,MDM,INI,OK*7A

If modem initialization failed, you will get the following answer:

$PASHR,MDM,INI,FAIL*7C

Relevant Query Command $PASHQ,MDM

See also $PASHS,MDM,PAR

MDM,OFF: Powering Off the Internal Modem

Function This command is used to power off the internal modem. By default, the modem is off.

Command Format

Syntax

$PASHS,MDM,OFF[*cc]

Parameters

None.

Example

Turning off the internal modem:

$PASHS,MDM,OFF*52

Relevant Query Command $PASHQ,MDM

See also $PASHS,MDM,ON

MDM,ON: Powering On the Internal Modem

Function This command is used to power on the internal modem. By default, the modem is off.

Command Format

Syntax

$PASHS,MDM,ON[*cc]

Parameters

None.

Example

Turning on the internal modem:

$PASHS,MDM,ON*1C

Relevant Query Command

$PASHQ,MDM

See also

$PASHS,MDM,OFF

MDM,PAR: Setting the Modem Parameters

Function

This command is used to set the modem parameters.

Command Format

Syntax

$PASHS,MDM,PAR[,PWR,s1][,PIN,s2][,APN,s3][,LGN,s4][,PWD,s5][,IPT,d6][,ADL,c7][,RNO,d8][,NET,d9][*cc]

Parameters

Parameter	Description	Range	Default
PWR,s1	Power mode: • AUT: Automatic • MAN: Manual	AUT, MAN	MAN
PIN,s2	PIN code	4-8 digits	Empty
APN,s3	Access Point Name (GPRS)	32 char. max.	Empty
LGN,s4	Login (GPRS)	32 char. max.	Empty
PWD,s5	Password (GPRS)	32 char. max.	Empty
IPT,d6	Internet Protocol: • 0: TCP • 1: UDP	0-1	0
ADL,c7	Auto-dial mode. When this parameter is set to Yes (Y), a connection to the mount point or IP server to which the receiver was last connected will be initiated automatically when the receiver is next turned on.	Y, N	Y
RNO,d8	Maximum number of re-dials	0-15	2

Parameter	Description	Range	Default
NET,d9	2G/3G selection: • 0: Automatic (2G or 3G) • 1: Forced to 2G	0, 1	0
*cc	Optional checksum	*00-*FF	

Example

Setting GPRS Configuration:

$PASHS,MDM,PAR,PWR,AUT,PIN,1234,APN,orange.fr,LGN,orange,PWD,orange,IPT,0,ADL,Y,NET,1*68

Relevant Query Command

$PASHQ,MDM

See also

$PASHS,DIP
$PASHS,NTR
$PASHS,MWD

MDP: Setting Port A to RS232 or RS422

Function

This command is used to set port A as an RS232 or RS422 serial port.

Command Format

Syntax

$PASHS,MDP,A,c[*cc]

Parameters

Parameter	Description	Range	Default
c	Port setting (RS232 or RS422)	232, 422	232
*cc	Optional checksum	*00-*FF	

Example

Setting port A to RS422:

$PASHS,MDP,A,422

Relevant Query Command

$PASHQ,MDP

See also

$PASHS,PRT
$PASHS,CTS

MEM: Selecting Memory Device Used

Function

This command is used to select the memory used by the receiver for data storage.

Command Format

Syntax

$PASHS,MEM,d[*cc]

Parameters

Parameter	Description	Range	Default
d	Memory used: • 0: Internal memory (NAND Flash) • 2: USB mass storage key	0, 2	0
*cc	Optional checksum	*00-*FF	

Example

Selecting internal memory as the memory used by the receiver:

$PASHS,MEM,0*2C

Relevant Query Command

$PASHQ,MEM

See also

$PASHS,FIL,D
$PASHQ,FLS
$PASHQ,FIL,LST

MET,CMD: Trigger String Querying Meteorological Unit

Function

This command is used to define the character string that will query the meteorological unit. The command also specifies the ID of the receiver port used to communicate with the meteorological unit.

The trigger string is in the form "*xxxxxx" and the default one is *0100P9.

Command Format

Syntax

$PASHS,MET,CMD,c1,s2[*cc]

Parameters

Parameter	Description	Range
c1	Receiver serial port connected to the meteo-rological unit.	A, B, F
s2	Trigger string (not including the leading "*" character)	20 characters max.
*cc	Optional checksum	*00-*FF

Example

Setting trigger string to "*0100P9":

$PASHS,MET,CMD,A,0100P9*66

Relevant Query Command

$PASHQ,MET

See Also

$PASHS,MET,INIT
$PASHS,MET,INTVL
$PASHS,OUT,x,MET

MET,INIT: Initialization String for Meteorological Unit

Function

This command is used to define the character string that will initialize the meteorological unit. The command also specifies the ID of the receiver port used to communicate with the meteorological unit.

The initializing string is in the form “*xxxxxx”. There is no initialization string defined by default.

Command Format

Syntax

$PASHS,MET,INIT,c1,s2[*cc]

Parameters

Parameter	Description	Range
c1	Receiver serial port connected to the meteorological unit.	A, B, F
s2	Initialization string (not including the leading “*” character)	20 characters max.
*cc	Optional checksum	*00-*FF

Example

Setting initialization string to “*9900ID”:

$PASHS,MET,INIT,A,9900ID*53

Relevant Query Command

$PASHQ,MET

See Also

$PASHS,MET,CMD
$PASHS,MET,INTVL
$PASHS,OUT,x,MET

MET,INTVL: Query Time Interval for Meteo Data

Function

This command is used to define the time interval through which the receiver will regularly ask the meteorological unit to return the current values of meteo data. The command also specifies the ID of the receiver port used to communicate with the meteorological unit.

By default, the receiver will query the meteorological unit every 5 seconds once the receiver has notified the meteorological unit, through the $PASHS,OUT,x,MET,ON command,to start operating.

Command Format

Syntax

$PASHS,MET,INTVL,c1,d2[*cc]

Parameters

Parameter	Description	Range	Default
c1	Receiver serial port connected to the meteorological unit.	A, B, F	
d2	Query interval, in seconds	5-9999	5
*cc	Optional checksum	*00-*FF	

Example

Setting query interval to 10 seconds:

$PASHS,MET,INTVL,A,10*0C

Relevant Query Command

$PASHQ,MET

See Also

$PASHS,MET,CMD
$PASHS,MET,INIT
$PASHS,OUT,x,MET

MET,PAR: Setting the Meteorological Unit

Function

This command is used to define all the parameters needed to communicate with the meteorological unit.

Following the execution of this command, and then that of $PASHS,OUT,x,MET,ON, the receiver will regularly query the meteorological unit by sending the trigger string every x seconds of query interval.

Command Format

Syntax

$PASHS,MET,PAR,c1,s2,s3,d4[*cc]

Parameters

Parameter	Description	Range	Default
c1	Receiver serial port connected to the meteorological unit.	A, B, F	
s2	Initialization string	20 characters max.	
s3	Trigger string	20 characters max.	
d4	Query interval, in seconds. “0” means no query.	0; 5-9999	5
*cc	Optional checksum	*00-*FF	

Comments

- This command overwrites all the settings previously performed with the following commands:
  – $PASHS,MET,INIT
  – $PASHS,MET,INTVL
  – $PASHS,MET,CMD
- In fact, the $PASHS,MET,PAR command is used for the same purpose as, and is more convenient than, the above three commands, which are maintained only for the sake of compatibility with the Ashtech iCGRS reference station.

Example

Setting the meteorological unit:

$PASHS,MET,PAR,A,*9900ID,*0100P9,5*57

Relevant Query Command

$PASHQ,MET

See Also

$PASHS,MET,CMD
$PASHS,MET,INIT
$PASHS,MET,PAR
$PASHS,OUT,x,MET

MWD: Setting the Modem Timeout

Function

This command is used to set the modem watchdog timeout. This parameter refers to the time during which the modem connection is active but no data is sent or received through the modem port. In case of timeout, the modem will hang up automatically.

Command Format

Syntax

$PASHS,MWD,d[*cc]

Parameters

Parameter	Description	Range	Default
d	Timeout setting: • 1-99: Modem timeout in minutes. • 0: No timeout	0-99	0
*cc	Optional checksum	*00-*FF	

Example

Setting the timeout to 5 minutes:

$PASHS,MWD,5*32

Relevant Query Command

$PASHQ,MWD

See also

$PASHS,MDM,PAR
$PASHQ,FLS

NME: Enabling/Disabling NMEA Messages

Function

This command is used to enable or disable NMEA messages and NMEA-like messages.

Command Format

Syntax

$PASHS,NME,s1,c2,s3[,f4][*cc]

Parameters

Parameter	Description	Range
s1	Data message type	See tables below
c2	• Port routing the message:A, B, F: Serial port • C: Bluetooth • I, P, Q, I1-I9: Ethernet • E: Modem • M, U: Internal memory (M), USB key (U) • R: Automatic recording session	A, B, C, E, F, I, M, P, Q, R, U, I1-I9
s3	Enables (ON) or disables (OFF) the message	ON, OFF
f4	Output rate: • Omitted: The message output rate will be as defined with $PASHS,NME,PER • Setting $PASHS,POP to "20" is a prior condition to operating at 0.05 s (20 Hz). f4 is not applicable to messages TTT, PTT and XDR.	0.05 s or 0.1-0.4 s if [F] option activated. 0.5-0.9 s 1-999 s
*cc	Optional checksum	*00-*FF

NMEA messages:

Data	Description
ALM	GPS almanac data
DTM	Datum Reference
GGA	GPS fix data
GLL	Geographic position - Latitude / Longitude
GMP	GNSS Map Projection Fix Data
GNS	GNSS Fix Data
GRS	GNSS range residual
GSA	GNSS DOP and active satellites
GST	GNSS pseudo-range error statistics
GSV	GNSS satellites in view
RMC	Recommended minimum specific GNSS data

Data	Description
VTG	Course over ground and ground speed
XDR	Transducer measurements
ZDA	Time and date

NMEA-like messages:

Data	Description
ATT	Heading
CRT	Cartesian coordinates
DCR	Delta Cartesian
DDS	Differential decoder status
DPO	Delta position
LTN	Latency
NTS	GNSS network status
POS	Position
PTT	1 PPS time tag
RRE	Residual error
SAT	Satellite status
SGA	Galileo satellite status
SGL	GLONASS satellite status
SGP	GPS, SBAS and QZSS satellite status
TTT	Event marker
USR	User message (see $PASHS,USR,TYP)
VE2	Baseline vector (in RTK+Heading mode)
VEC	Baseline vector

Example

$PASHS,NME,GGA,C,ON,1*01

Comments

- For ALM messages, the f4 parameter can only take an integer value of seconds (by default 3600) and refers to the interval between messages related to the same satellite and with the same content.
- For a given satellite, the ALM messages are therefore renewed every “x” seconds (x=f4), or following a change in the message content (“on change”), whichever occurs first.
- ALM messages cannot be output more than once over a given period of 1 second.

Relevant Query Command

$PASHQ,NMO

See also $PASHS,NME,PER

NME,ALL: Disabling All NMEA and NMEA-Like Messages

Function This command is used to disable all NMEA messages and NMEA-like messages currently enabled on the specified port.

Command Format

Syntax

$PASHS,NME,ALL,c1,OFF[*cc]

Parameters

Parameter	Description	Range
c1	Port ID A, B, F: Serial portC: Bluetooth port I, P, Q, I1-I9: Ethernet port E: Modem M, U: Memory R: Data recording through session	A, B, C, E, F, I, M, P, Q, R, U, I1-I9
*cc	Optional checksum	*00-*FF

Example

Disabling all NMEA and NMEA-like messages on port A:

$PASHS,NME,ALL,A,OFF*50

NME,PER: Setting Unique Output Rate for all NMEA Messages

Function This command is used to set the same output rate for all NMEA and NMEA-like messages. This command will overwrite all the output rates set individually for each message type using $PASHS,NME,xxx.

Command Format

Syntax

$PASHS,NME,PER,f[*cc]

Parameters

Parameter	Description	Range	Default
f	Output rate. Setting $PASHS,POP to "20" is a prior condition to operating at 0.05 s (20 Hz).	0.05 s or 0.1-0.4 s with [F] option activated. 0.5-0.9 s 1-999 s	1 s
*cc	Optional checksum	*00-*FF	

Example

Setting the output rate to 1 second:

$PASHS,NME,PER,1*45

Relevant Query Command

$PASHQ,NMO

See also

$PASHS,NME
$PASHS,POP

NPT: Tagging SBAS Differential Positions in NMEA & NMEA-Like Messages

Function

This command allows you to define the code the receiver will insert in each of its NMEA-like or NMEA messages to tell that the position solution inserted in the message is of the SBAS Differential type.

Command Format

Syntax

$PASHS,NPT,d1,d2[*cc]

Parameters

Parameter	Description	Range	Default
d1	Code assigned to SBAS differential position solution in NMEA-like messages (CRT, DCR, DPO, POS, VEC): • 0: Code "1" • 1: Code "9"	0,1	0

Parameter	Description	Range	Default
d2	Code assigned to SBAS differential position solution in NMEA messages (GGA): • 0: Code “2” • 1: Code “9”	0, 1	0
*cc	Optional checksum	*00-*FF	

Example

Tagging SBAS Differential position solutions in NMEA-like and NMEA messages with code “9”:

$PASHS,NPT,1,1*3F

Relevant Query Commands

$PASHQ,NPT
$PASHQ,PAR

NTR,LOD: Loading the NTRIP Caster Source Table

Function

This command is used to load the source table from the NTRIP caster.

Command Format

Syntax

$PASHS,NTR,LOD[,c1][*cc]

Parameters

Parameter	Description	Range
c1	Internet port used to connect to the caster: • E: Internal modem • P: Ethernet stream 1 • Q: Ethernet stream 2 If c1 is omitted, the port used is the port defined through the last $PASHS,NTR,PAR command run.	E, P, Q
*cc	Optional checksum	*00-*FF

Example

Loading the source table:

$PASHS,NTR,LOD

If the source table is downloaded successfully, the following response line will be returned:

$PASHR,NTR,OK*14

If the receiver fails to download the source table, the following response line will be returned:

$PASHR,NTR,FAIL*12

Relevant Query Command

None.

See also

$PASHQ,NTR,TBL
$PASHS,NTR,PAR

NTR,MTP: Connecting Receiver to NTRIP Caster Mount Point

Function

This command allows you to connect the receiver to a NTRIP caster mount point.

Command Format

Syntax

$PASHS,NTR,MTP,s1[,c2][*cc]

Parameters

Parameter	Description	Range
s1	Name of the NTRIP mount point, or OFF command (ending the connection to the current mount point).	100 characters max., or OFF
c2	Internet port used to connect to the caster: • E: Internal modem • P: Ethernet stream 1 • Q: Ethernet stream 2 If c2 is omitted, the port used is the port defined through the last $PASHS,NTR,PAR command run.	E, P, Q
*cc	Optional checksum	*00-*FF

Example

Connecting to mount point MUWFO:

$PASHS,NTR,MTP,MUWF0*4D

If the connection is successful, the following response line will be returned:

$PASHR,NTR,OK*cc

If the connection failed, the following response line will be returned:

$PASHR,NTR,FAIL*12

Relevant Query Command None.

See also $PASHQ,NTR,TBL

NTR,PAR: NTRIP Settings

Function This command allows you to set all the NTRIP parameters.

Command Format

Syntax

$PASHS,NTR,PAR[,ADD,s1][,PRT,d2][,LGN,s3][,PWD,s4][,TYP,d5][,IPP,c6][*cc]

Parameters

Parameter	Description	Range
ADD,s1	Caster IP address or host name	000.000.000.000-255.255.255.255 or www.......
PRT,d2	Caster port number	0-65535
LGN,s3	Login	32 characters max.
PWD,s4	Password	32 characters max.
TYP,d5	Caster type: • 0: Client • 1: Server	0-1
IPP,c6	Internet port used on the receiver to connect it to the caster: • E: Internal modem (default) • P: Ethernet stream 1 • Q: Ethernet stream 2	E, P, Q
*cc	Optional checksum	*00-*FF

Example

Entering NTRIP settings for a client caster by specifying its IP address, port number, login and password:

$PASHS,NTR,PAR,ADD,192.34.76.1,PRT,2100,LGN,Ashtech,PWD,u6huz8,TYP,0*52

Relevant Query Commands $PASHQ,NTR
$PASHQ,PAR

See Also

$PASHS,NTR,MTP
$PASHS,NTR,LOD

OCC: Writing Occupation Data to Raw Data File

Function

This command is used to write information about the current occupation to the raw data file being logged.

Command Format

Syntax

$PASHS,OCC,d1,d2,s3[,s4][*cc]

Parameters

Parameter	Description	Range
d1	Occupation type: • 0: Static • 1: Quasi-static • 2: Dynamic • 3: Event • 4: On kinematic bar, 20 cm long	0-4
d2	Occupation event: • 0: Begin • 1: End	0-1
s3	Occupation name	255 characters max.
s4	Occupation description	255 characters max.
*cc	Optional checksum	*00-*FF

Examples

Starting a static occupation on point “SITE01”:

$PASHS,OCC,0,0,SITE01,Park_Entrance*63

Ending the static occupation on point “SITE01”:

$PASHS,OCC,0,1,SITE01,Park_Entrance*62

Relevant Query Command

$PASHQ,OCC

See also

$PASHS,REC
$PASHS,ATM

OPTION: Receiver Firmware Options

Function

This command is used to install the receiver firmware options that have been purchased after the initial receiver purchase. Options purchased at the time of receiver purchase are factory pre-loaded.

Command Format

Syntax

$PASHS,OPTION,c1,h2[*cc]

Parameters

Parameter	Description	Range
c1	Option ID	K, F, Z, S, P, M, L, N, C, O, Q, R (See table below)
h2	Hexadecimal unlock code	13 characters max.
*cc	Optional checksum	*00-*FF

Option ID	Label	Description
#	REGISTRATION CODE	Depends on the firmware version installed. This is a mandatory code. If absent, all options become invalid.
K	RTK	Enables RTK processing. Corrections generated in RTCM2.3, RTCM3.0, CMR or CMR+ format.
F	FASTOUTPUT	Enables data output at 20 Hz
Z	MODEM	Enables the GSM/GPRS modem
S	GLONASS	Enables GLONASS
P	GNSSL2	Enables L2 tracking
M	RTK2	Enables RTK using proprietary data formats (ATOM, DBEN or LRK)
L	RTK3	Enables limited RTK range
N	STA	Enables RTK base
C	CASTER	Enables the embedded NTRIP caster
R	FLYING RTK	Enables RTK computation (Flying RTK mode only) with RTCM2.3, RTCM3.0, CMR, CMR+, LRK, DBEN, ATOM. Generates RTCM2.3, RTCM3.0, CMR, CMR+, ATOM
O	GALILEO	Enables Galileo tracking
Q	GNSSL5	Enables L5 tracking

NOTE: Options K, M and L are also relevant to a base.

Comments

- When activating GLONASS or GNSSL2, it is essential that you modify the receiver configuration, using $PASHS,GPS and $PASHS,GLO to enable the tracking of the new signals. Alternatively, you can run $PASHS,RST to update the default configuration, taking into account all the activated firmware options.
- Firmware options may be activated for limited periods of time, depending on the type of unlock code generated for each of them. Several validity times are possible:
  - Permanent
  - 6 months
  - 3 months
  - 1 month
  - 30 days
  - 15 days
  - 8 days

Example

Enabling the RTK option:

$PASHS,OPTION,K,878A8874*48

Relevant Query Command

$PASHQ,OPTION

See also

$PASHQ,RID

OUT,x,MET: Starting Meteo Data Acquisition

Function

This command is used to start the data processing in the meteorological unit. The command also specifies the ID of the receiver port used to communicate with the meteorological unit.

By executing the command, the meteorological unit is first initialized, and then the receiver is allowed to send queries at regular intervals of time, based on the preset value of query interval.

Command Format

Syntax

$PASHS,OUT,c1,MET,s2[*cc]

Parameters

Parameter	Description	Range
c1	Receiver serial port connected to the meteorological unit.	A, B, F
s2	Enable/disable processing in meteorological unit	ON, OFF
*cc	Optional checksum	*00-*FF

Example

Starting the meteorological unit connected to port A:

$PASHS,OUT,A,MET,ON*0B

Relevant Query Command

$PASHQ,MET

See Also

$PASHS,MET,CMD
$PASHS,MET,INIT
$PASHS,MET,PAR
$PASHS,MET,INTVL

OUT,x,TLT: Starting Tiltmeter Data Acquisition

Function

This command is used to start the data processing in the tiltmeter. The command also specifies the ID of the receiver port used to communicate with the tiltmeter.

By executing the command, the tiltmeter is first initialized, and then the receiver is allowed to send queries at regular intervals of time, based on the preset value of query interval.

Command Format

Syntax

$PASHS,OUT,c1,TLT,s2[*cc]

Parameters

Parameter	Description	Range
c1	Receiver serial port connected to the tiltmeter.	A, B, F
s2	Enable/disable processing in tiltmeter	ON, OFF
*cc	Optional checksum	*00-*FF

Example

Starting the tiltmeter connected to port A:

$PASHS,OUT,A,TLT,ON*1B

Relevant Query Command

$PASHQ,TLT

See Also

$PASHS,TLT,CMD
$PASHS,TLT,INIT
$PASHS,TLT,PAR
$PASHS,TLT,INTVL

PAR,LOD: Configuring the Receiver From a PAR File

Function

This command configures the receiver in one step, using the data stored in the specified PAR file. The PAR file may have been saved previously to the receiver’s internal memory or on a USB key.

Command Format

Syntax

$PASHS,PAR,LOD[,d1][,s2][*cc]

Parameters

Parameter	Description	Range	Default
d1	Memory where the PAR file can be found: • 0: Internal memory (NAND Flash) • 2: USB key If d1 is omitted, the receiver will assume that the PAR file is on the USB key.	0, 2	2
s2	File name (PF_SSSSS_dddhhmmss.par) where: • SSSSS: Last 5 digits from serial number • ddd: Day number (1.. 366) • hhmmss: Time If s2 is omitted, the receiver checks that only one PAR file is found in the specified memory. If that is the case, the receiver will be configured according to this file. If several PAR files are found, then $PASHR,NAK will be returned and the receiver will keep its current configuration.	-	-
*cc	Optional checksum	*00-*FF	-

Examples

Changing the receiver configuration by loading the PAR file saved on the USB memory:

$PASHS,PAR,LOD*5D

Changing the receiver configuration by loading the PAR file named “PF_95685_145084518.par“ located in the internal memory:

$PASHS,PAR,LOD,0,PF_95685_145084518.par*11

Relevant Query Command

None.

See also

$PASHS,PAR,SAV

PAR,SAV: Saving the Receiver Configuration To a PAR File

Function

This command is used to save the current receiver configuration to a PAR file.

Command Format

Syntax

$PASHS,PAR,SAV[,d1][*cc]

Parameters

Parameter	Description	Range	Default
d1	Memory where the PAR file will be written: • 0: Internal memory (NAND Flash) • 2: USB key If d1 is omitted, the receiver will assume that the PAR file should be saved to the USB key.	0, 2	2
*cc	Optional checksum	*00-*FF	-

Comments

The command will create a PAR file named as follows:

PF_SSSSS_dddhhmmss.par

Where:

- SSSSS: Last 5 digits from receiver serial number
- ddd: Day number (1.. 366)
- hhmmss: Current time

The command will be rejected ($PASHR,NAK) in the following cases:

- No USB key detected and d1=2 or is omitted
- Not enough space available on the specified memory
- The PAR file already exists.

Example

Saving the receiver configuration to the USB key:

$PASHS,PAR,SAV*5E

Relevant Query Command

None.

See also

$PASHS,PAR,LOD

PEM: Setting the Position Elevation Mask

Function

This command is used to set the elevation mask used in the position processing.

Command Format

Syntax

$PASHS,PEM,d1[*cc]

Parameters

Parameter	Description	Range	Default
d1	Elevation mask angle, in degrees	0-90°	5
*cc	Optional checksum	*00-*FF	

Example

Setting the elevation mask for position processing to 15 degrees:

$PASHS,PEM,15*05

Relevant Query Command

$PASHQ,PEM

See also

$PASHS,ELM

PHE: Setting the Active Edge of the Event Marker Pulse

Function

This command is used to set the active edge (rising or falling) of the event marker pulse used in photogrammetry time-tagging.

Command Format

Syntax

$PASHS,PHE,c1[*cc]

Parameters

Parameter	Description	Range	Default
c1	Active edge code: • "R" for rising edge • "F" for falling edge	R, F	R
*cc	Optional checksum	*00-*FF	

Example

Making the falling edge active:

$PASHS,PHE,F*42

Relevant Query Command $PASHQ,PHE

See Also $PASHS,NME,TTT

POP: Setting Internal Update Rate for Measurements and PVT

Function This command allows you to set the updates rate used internally in the measurements and position processing.

Command Format

Syntax

$PASHS,POP,d[*cc]

Parameters

Parameter	Description	Range	Default
d	Internal update rate, in Hz, for measurements and PVT.	10, 20	20
*cc	Optional checksum	*00-*FF	

Example

Setting the update rate to 10 Hz:

$PASHS,POP,20*17

Comments

- Outputting data at 20 Hz through $PASHS,NME, $PASHS,ATM and $PASHS,RAW requires that the present update rate stays at 20 Hz (default value).

- Changing the update rate causes GNSS reception to be reset (the number of received/used satellites drops to 0 straight away and then rapidly comes back to normal).

Relevant Query Command

$PASHQ,POP

See Also

$PASHS,NME
$PASHS,ATM
$PASHS,RAW

POS: Setting the Antenna Position

Function

This command allows you to enter the geographic coordinates of the GNSS antenna. It is usually used to enter the position of a base. If there is no computed position available from the receiver when the command is applied, then the entered position is used to initialize the receiver position in order to speed up satellite tracking.

Depending on the last $PASHS,ANR command applied to the receiver, the antenna position you enter will be either that of the phase center, the ARP or the ground mark.

Command Format

Syntax

$PASHS,POS,m1,c2,m3,c4,f5[*cc]

Parameters

Parameter	Description	Range
m1	Latitude in degrees and minutes with 7 decimal places (ddmm.mmmmmmm)	0-90
c2	North (N) or South (S)	N, S
m3	Longitude in degrees, minutes with 7 decimal places (ddmm.mmmmmmm)	0-180
c4	West (W) or East (E)	W, E
f5	Height in meters	±0-9999.9999
*cc	Optional checksum	*00-*FF

Example

Setting the antenna position to 37°22.2912135’N, 121°59.7998217’W and 15.25 m:

$PASHS,POS,3722.2912135,N,12159.7998217,W,15.25*1F

Relevant Query Command $PASHQ,CPD,POS

See also $PASHS,CPD,MOD,BAS
$PASHS,ANH
$PASHS,ANR

PPS: Setting PPS Pulse Properties

Function This command is used to set the period, offset and GPS synchronized edge (rising or falling) of the PPS pulse.

Command Format

Syntax

$PASHS,PPS,f1,f2,c3[*cc]

Parameters

Parameter	Description	Range	Default
f1	PPS time period, a multiple or fraction of 1 second. • 0: 1 PPS disabled	0 to 1, with 0.1-sec increments1 to 60, with 1-sec increments	0
f2	Time offset in milliseconds.	± 999.9999	0
c3	GPS-synchronized edge code: • “R” for rising edge • “F” for falling edge	R, F	R
*cc	Optional checksum	*00-*FF	

Example

Setting the PPS signal to a period of 2 seconds, with an offset of 500 ms and a GPS-synchronized rising edge:

$PASHS,PPS,2,+500,R*74

Relevant Query Command $PASHQ,PPS

See Also $PASHS,NME (PTT)

PRT: Setting Baud Rates

Function

This command is used to set the baud rate of any of the serial ports used in the receiver (except port C).

Command Format

Syntax

$PASHS,PRT,c1,d2[*cc]

Parameters

Parameter	Description	Range
c1	Port ID	A, B, D, F
d2	Baud rate	0-15 (see table below)
*cc	Optional checksum	*00-*FF

Code	Baud Rate	Code	Baud Rate
0	300	7	38400
1	600	8	57600
2	1200	9	115200
3	2400	10	230400
4	4800	11	480600
5	9600	12	921600
6	19200	13	1428571

Port A can operate in RS422 mode up to 1 428 571 Bd with any particular precaution. For higher speeds, shorter connections should be used. This is also true for all RS232 ports (A, B and F) for speeds higher than 115 200 Bd.

Example

Setting port A to 19200 Bd:

$PASHS,PRT,A,6

Relevant Query Command

$PASHQ,PRT

See also

$PASHS,CTS
$PASHS,MDP

PWR,OFF: Powering Off the Receiver

Function

This command is used to power off the receiver.

Command Format

Syntax

$PASHS,PWR,OFF[*cc]

Parameters

None.

Example

Turning off the receiver:

$PASHS,PWR,OFF*43

Relevant Query Command

None.

PWR,PAR: Power Management

Function

This command is used to set the voltage thresholds triggering low-power alarms and to set the lower and upper limits of power voltage for which the receiver will be powered on or off automatically if the DC voltage applied to the external power input is respectively within or out of these limits (making this second function operational requires that the slide switch located at the bottom of the compartment be pushed to the right).

Command Format

Syntax

$PASHS,PWR,PAR,f1,f2[,[f3],[f4]][*cc]

Parameters

Parameter	Description	Range	Default
f1	Battery voltage threshold, in volts, triggering a low-battery alarm	6.7-8.4	6.8
f2	External power voltage threshold, in volts, triggering a low-power alarm	9.0-28.0	9.1
f3	Lower limit of DC voltage, in volts, controlling automatic power on/off	9.0-36.0	9.0
f4	Upper limit of DC voltage, in volts, controlling automatic power on/off	9.0-36.0	36.0
*cc	Optional checksum	*00-*FF	-

Example

Setting the thresholds to respectively 7 and 9 V:

$PASHS,PWR,PAR,7,9*41

Relevant Query Command $PASHQ,PWR

PWR,SLP: Sleep Mode

Function This command is used to switch the receiver instantly to sleep mode.

Command Format

Syntax

$PASHS,PWR,SLP,m1[*cc]
or
$PASHS,PWR,SLP,d2,m3[*cc]

Parameters

Parameter	Description	Range
m1	Time (hhmm) during which the receiver will stay in sleep mode (min time: 5 minutes). The receiver will be automatically awoken at the end of this time.	0005-9559
d2	Number of day in year when to wake up the receiver.	0-366
m3	Time in day when to wake up the receiver (hhmm).	0000-2359
*cc	Optional checksum	*00-*FF

Examples

Setting the receiver to sleep mode for 5 hours:

$PASHS,PWR,SLP,0500*6A

Setting the receiver to sleep mode and programming it to be woken up on July 1st at 12:00:

$PASHS,PWR,SLP,182,1200*7B

QZS: Enabling/Disabling QZSS Tracking

Function

This command is used to enable or disable QZSS tracking. The QZSS constellation tracking function is off by default.

Command Format

Syntax

$PASHS,QZS,s[*cc]

Parameters

Parameter	Description	Range	Default
s	Programmable pin ID: • ON: QZSS satellites tracked and used • OFF: QZSS satellites not tracked	ON or OFF	OFF
*cc	Optional checksum	*00-*FF	

Example

Enabling QZSS tracking:

$PASHS,QZS,ON

Relevant Query Command

$PASHQ,QZS
$PASHQ,PAR

See Also

$PASHS,CFG
$PASHS,SBA
$PASHS,GPS
$PASHS,GLO
$PASHS,GAL

RAW: Enabling/Disabling Raw Data Messages in Legacy Ashtech Format

Function

This command is used to enable or disable the standard, continuous output of raw data in legacy Ashtech format.

Command Format

Syntax

$PASHS,RAW,s1,c2,s3[,f4][*cc]

Parameters

Parameter	Description	Range	Default
s1	Raw data message type	See table below	
c2	Port routing the raw data message: • Serial ports: A, B, F • Bluetooth port: C • Ethernet port: I, I1-I9 • Memory: M (internal), U (USB) • R: Automatic recording session (internal or external memory)	A, B, C, F, I, M, R, U, I1-I9	-
s3	Enables (ON) or disables (OFF) the raw data message	ON, OFF	OFF
f4	Output rate in seconds. Keeping $PASHS,POP at "20" is the necessary condition to operating at 0.05 s (20 Hz).	0.05 s or 0.1-0.4 s with [F] option activated. 0.5-0.9 s, 1-999 s	1
*cc	Optional checksum	*00-*FF	

Raw data message types:

Data	Description
MPC	GPS/GLONASS/SBAS measurements
DPC	Compact GPS raw data
PBN	Position information
SNV	GPS ephemeris data
SNG	GLONASS ephemeris data
SNW	SBAS ephemeris data
SAL	GPS almanac data
SAG	GLONASS almanac data
SAW	SBAS almanac data
ION	Ionospheric parameters

Data	Description
SBD	SBAS data message

Examples

Enabling output of MPC message type on port A to 1 second:

$PASHS,RAW,MPC,A,ON,1*1E

Enabling output of SNV message type on port A to 300 seconds:

$PASHS,RAW,SNV,A,ON,300*09

Comments

- For each of the SNV, SNG, SNW, SAL, SAG, SAW and ION messages, the f4 parameter can only take an integer value of seconds and refers to the interval between messages related to the same satellite and with the same content.

  For a given satellite, each of these messages is therefore renewed every x seconds (where x=f4), or following a change in the message content ("on change"), whichever occurs first.

  Each of these messages cannot be output more than once over a given period of 1 second.
- By default, f4 is set as follows:

Output message	f4 Default Value
SNV, SNG, ION	900
SAL, SAG	3600
SNW	120
SAW	300

- The SBD message output rate is always 1 second (as decoded). Parameter f4 is ignored.

Relevant Query Command

$PASHQ,RAW
$PASHQ,RWO

See also

$PASHS,RAW,PER
$PASHS,RAW,ALL
$PASHS,POP

RAW,ALL: Disabling All Raw Data Messages

Function

This command is used to disable all the currently active raw data messages on the specified port.

Command Format

Syntax

$PASHS,RAW,ALL,c1,OFF[*cc]

Parameters

Parameter	Description	Range
c1	Port ID • Serial ports: A, B, FBluetooth port: C • Ethernet port: I, I1-I9 • Memory: M, U • R: Data recording through session	A, B, C, F, I, M, U, I1-I9, R
*cc	Optional checksum	*00-*FF

Example

Disabling all raw data messages on port A:

$PASHS,RAW,ALL,A,OFF*52

Relevant Query Command

None.

See Also

$PASHS,RAW

RAW,PER: Setting Unique Output Rate for Raw Data

Function

This command is used to set the same output rate for raw data messages MPC, DPC and PBN. This command will overwrite the output rates set individually for each of these message types using $PASHS,RAW,xxx. Setting this rate does not affect the data recording rate (set with $PASHS,DRI).

Command Format

Syntax

$PASHS,RAW,PER,f[*cc]

Parameters

Parameter	Description	Range	Default
f	Output rate, in seconds. Setting $PASHS,POP to "20" is a prior condition to operating at 0.05 s (20 Hz).	0.05 s or 0.1-0.4 s with [F] option activated. 0.5-0.9 s 1-999 s	1 s
*cc	Optional checksum	*00-*FF	

Example

Setting the data output rate to 2 seconds:

$PASHS,RAW,PER,2*44

Relevant Query Command

$PASHQ,RAW

See also

$PASHS,RAW
$PASHS,RAW,ALL
$PASHS,POP

RCP,GBx: GLONASS Carrier Phase Biases for User-Defined Receiver

Function

This set of two commands is used to define GLONASS carrier phase biases for a given receiver. One command deals with the GLONASS L1 band and the other with the GLONASS L2 band.

Command Format

Syntax

For the L1 band:

$PASHS,RCP,GB1,s1,f2,f3,f4,f5,f6,f7,f8,f9,f10,f11,f12,f13,f14,f15,f16,f17[*cc]

For the L2 band:

$PASHS,RCP,GB2,s1,f2,f3,f4,f5,f6,f7,f8,f9,f10,f11,f12,f13,f14,f15,f16,f17[*cc]

Parameters

Parameter	Description	Range
s1	Name of user-defined receiver for which GLONASS biases must be defined (case sensitive)	31 characters max.

Parameter	Description	Range
f2	When a linear pattern is assumed for GLONASS biases, f2 represents the delta bias between two adjacent GLONASS frequency numbers.	Full range of Real variables allowed
f3-f16	When an arbitrary pattern is assumed for GLONASS biases, f3-f16 represent biases for GLONASS frequency numbers from -7 to 6	Full range of Real variables allowed
f17	Pseudo-range bias (in meters) between GPS and GLONASS constellations	
*cc	Optional checksum	*00-*FF

Comments

- **Only fractional parts of GLONASS carrier phase biases are of practical importance**.
- Running one of these commands on a receiver already stored in the list of user-defined receivers will save all the submitted parameters to backup memory and keep all the others unchanged.
- You may not run the two commands (GB1 and GB2) for a given user-defined receiver. If you run just one of them, then the parameters corresponding to the other command will all be assumed to be invalid (i.e unknown). All user-defined receivers created from this receiver will also inherit these invalid parameters.
- The board will interpret any missing parameter in a command as a parameter for which there is currently no known valid value for this parameter.

RCP,DEL: Deleting User-Defined Receiver Name

Function

This command is used to delete a user-defined receiver name.

Command Format

Syntax

$PASHS,RCP,DEL,s1[*cc]

Parameters

Parameter	Description	Range
s1	Receiver name you want to delete (case sensitive)	31 characters max.
*cc	Optional checksum	*00-*FF

Example

Deleting receiver name “MyReceiver”:

$PASHS,RCP,DEL,MyReceiver*74

Relevant Query Command

$PASHQ,RCP

See Also

$PASHS,RCP,GB1
$PASHS,RCP,GB2

RCP,REF: Naming Reference Receiver

Function

This command is used to enter the reference receiver name.

Command Format

Syntax

$PASHS,RCP,REF,s1[,d2][*cc]

Parameters

Parameter	Description	Range	Default
s1	Receiver name (case-sensitive).	31 characters max.	Empty
d2	Receiver name preference: • 0: s1 is ignored if the incoming reference data contain the reference receiver name • 1: s1 is always used and the decoded reference receiver name is ignored.	0 or 1	0
*cc	Optional checksum	*00-*FF	

Comment

The supported receiver models are listed below (these are case-sensitive names):

ASHTECH
ProMark500
ProMark800
ProFlex500
ProFlex800
MB500
PM5
BP1
MB800

MMapper100
ProMark100
MB100
NOVATEL
TRIMBLE
SEPTENTRIO
TOPCON
JAVAD

Example

Entering "Ashtech" as the name of the reference receiver:

$PASHS,RCP,REF,ASHTECH*25

Relevant Query Commands
$PASHQ,RCP,REF
$PASHQ,RCP

See Also
$PASHS,ANP,REF

RDP,OFF: Powering Off the Internal Radio

Function
This command is used to power off the internal radio.

Command Format

Syntax

$PASHS,RDP,OFF[*cc]

Parameters

None.

Example

Turning off the internal radio:

$PASHS,RDP,OFF*50

Relevant Query Command
$PASHQ,RDP,PAR,D

See also
$PASHS,RDP,ON
$PASHS,RDP,PAR

RDP,ON: Powering On the Internal Radio

Function

This command is used to power on the internal radio.

Command Format

Syntax

$PASHS,RDP,ON[*cc]

Parameters

None.

Example

Turning on the internal radio:

$PASHS,RDP,ON*1E

Relevant Query Command

$PASHQ,RDP,PAR,D

See also

$PASHS,RDP,OFF
$PASHS,RDP,PAR

RDP,PAR: Setting the Radio

Function

This command is used to set the radio connected to the specified port.

Command Format

Syntax

$PASHS,RDP,PAR,c1,s2,d3,[s4],[c5],[d6],[s7],[c8],[c9][s10][*cc]

Parameters

Parameter	Description	Range
c1	ID of the port connected to the radio you want to set.	A, B, D, F

Parameter	Description	Range
s2	Radio Model: • PDL: Pacific Crest PDL HPB/LPB (external, port A, B or F) • ADL: Pacific Crest ADL Vantage (Pro) (external, port A, B or F), Pacific Crest ADL Foundation (internal, port D) • MGL: Radio transmitter P/N 800986 • MDL: U-Link • LFE: License-free radio, Europe (ARF7474B) • LFA: License-free radio, North America (ARF7474A)	PDL, MGL, MDL, LFE, LFA, ADL (port A) PDL, LFE, LFA, ADL (Ports B, F)PDL, MDL, ADL (port D)
d3	Channel number	0-15 (PDL, MDL, MGL) 1-32 (ADL) 0-2 (LFE) 0-49 (LFA)
s4	Power management (if port D is used) • AUT: Automatic • MAN: Manual	AUT, MAN
c5	Protocol used: PDL: • 0: Transparent • 1: TRIMTALK • 2: DSNP MDL: • 0: Transparent • 1: Not used • 2: DSNP ADL: • 0: Transparent (with EOT time out) • 1: TrimTalk 450S • 2: Not used • 3: SATEL • 4: TrimMarkII/IIe • 5: TT450S (HW) • 6: TRIMMARK3 • 7: Transparent FST • 8: U-Link	0-8

Parameter	Description	Range
d6	Air link speed. For PDL: • 4800: 4800 Bd, GMSK modulation • 9600: 9600 Bd, GMSK or four-level FSK modulation • 19200: 19200 Bd, four-level FSK modulation For MDL: 4800, 7600 or 9600 For ADL, 12.5 kHz: • 4800 (GMSK modulation) • 8000 (GMSK modulation) • 9600 (4FSK modulation) For ADL, 25 kHz: • 4800 (GMSK modulation) • 9600 (GMSK modulation) • 16000 (GMSK modulation) • 19200 (4FSK modulation)	4800, 7600, 8000, 9600, 16000, 19200
s7	Radio sensitivity (PDL, ADL and MDL only)	LOW, MED, HIG, OFF
c8	Scrambler (PDL and ADL only): • 0: Off • 1: On	0, 1
c9	Forward Error Correction (PDL and ADL only): • 0: FEC Off • 1: Hamming FEC On	0,1
s10	RF output power: • 0: 100 mW • 1: 500 mW • 2: 1 W • 3: 2 W • 4: 4 W Different meaning for 0-4 in ADL Vantage Pro: • 0: Level 1 (2 W) • 1: Level 2 • 2: Level 3 • 3: Level 4 • 4: Level 5 Use $PASHQ,RDP,PWR to read the real power (in W) for each level)	0, 1, 2 (ADL Foundation) 0-4 (ADL Vantage and ADL Vantage Pro)
*cc	Optional checksum	*00-*FF

Comments

The command will be NAKed if the receiver has not been told the radio is on the port specified by command $PASHS,RDP,TYP.

- The air link speed depends on the type of modulation used (GMSK or 4FSK) as well as the channel spacing used. The tables below summarize the possible combinations.
  – If a PDL radio is used:

		GMSK Modulation, Protocol:			4FSK Modulation, Protocol:
Channel Spacing	**Bit Rate**	Transparent	TRIMTALK	DSNP	Transparent
25 kHz	4800		•	•	
25 kHz	8000				
25 kHz	9600	•	•		
25 kHz	16000				
25 kHz	19200				•
12.5 kHz	4800	•	•	•	
12.5 kHz	8000				
12.5 kHz	9600				•
FEC		FEC1			FEC1

  – If an ADL radio is used:

		GMSK Modulation, Protocol:					4FSK Modulation, Protocol:		
Channel Spacing	**Bit Rate**	Trans-parent	TrimTalk 450S	TT450S (HW)	Trim-MarkII/IIe	TrimMark3	Transparent	SATEL	Transparent FST
25 kHz	4800		•	•	•				
25 kHz	8000								
25 kHz	9600	•	•	•					
25 kHz	16000		•	•					
25 kHz	19200					•	•	•	•
12.5 kHz	4800	•	•	•	•				
12.5 kHz	8000		•	•					
12.5 kHz	9600					•	•	•	•
FEC		FEC1					FEC1	FEC2	FEC2

- If an MDL radio is used and the DSNP protocol is selected, only the 4800 Bd baud rate can be used.
- The relationship between channel number and frequency in an LFE radio is summarized in the table below.

Channel Number	Frequency (MHz)
0	869.450 (manufacturer’s channel 19)
1	869.525 (manufacturer’s channel 84)

Channel Number	Frequency (MHz)
2	869.600 (manufacturer's channel 85)

Examples

Setting the internal Pac Crest radio receiver:

$PASHS,RDP,PAR,D,PDL,2,AUT,0,9600,LOW,0,0*75

Setting the internal U-Link Rx:

$PASHS,RDP,PAR,D,MDL,0,AUT,0,9600,LOW*6A

Setting the external U-Link TRx:

$PASHS,RDP,PAR,A,MGL,1*46

Relevant Query Command

$PASHQ,RDP,PAR

See also

$PASHS,RDP,ON
$PASHS,RDP,OFF
$PASHS,RDP,TYP
$PASHQ,RDP, CHT

RDP,TYP: Defining the Type of Radio Used

Function

This command is used to set manually the type of radio connected to the specified port. Normally, the type of internal radio (typically connected to port D) is detected automatically.

Command Format

Syntax

$PASHS,RDP,TYP,c1,s2[*cc]

Parameters

Parameter	Description	Range
c1	ID of port connected to the radio you want to set.	A, B, D, F
s2	Radio Model: • UNKNOWN: Auto-detection (port D only) • NONE: No radio • PDL: Pacific Crest PDL HPB/LPB (external, port A, B or F) • ADL: Pacific Crest ADL Vantage (Pro) (external, port A, B or F), Pacific Crest ADL Foundation (internal, port D) • MGL: Radio transmitter P/N 800986 • MDL: U-Link • LFE: License-free radio, Europe (ARF7474B) • LFA: License-free radio, North America (ARF7474A)	Port A: NONE, PDL, MGL, MDL, LFE, LFA, ADL. Port D: UNKNOWN, NONE, MDL or ADL. Ports B, F: NONE, PDL, LFE, LFA or ADL.
*cc	Optional checksum	*00-*FF

Examples

Auto-detecting the internal radio receiver:

$PASHS,RDP,TYP,D,UNKNOWN*4E

Setting the external radio as an Ashtech U-Link TRx:

$PASHS,RDP,TYP,A,MGL*45

Relevant Query Command

$PASHQ,RDP,TYP

See also

$PASHS,RDP,PAR
$PASHS,RDP,ON
$PASHQ,RDP, OFF

REC: Enable/Disable, Start/Stop Raw Data Recording

Function

This command allows you to enable, disable, start or stop raw data recording. Raw data is recorded in the memory you selected with the $PASHS,MEM command.

Command Format

Syntax

$PASHS,REC,c[*cc]

Parameters

Parameter	Description	Range
c	Control character: • Y: Yes. The receiver will immediately start recording data. This option also enables data recording at receiver power-up, i.e. recording will start every time you turn the receiver on, even if you stopped recording before the end of the previous session. • N: No. The receiver will immediately stop recording data. This option also disables data recording at receiver power up, i.e. the receiver won't resume data recording when you next turn it on. This is the default mode. • S: Stop. The receiver will immediately stop recording raw data. This option does not affect the way the receiver operates at power-up. • R: Restart. The receiver will immediately start recording raw data. This option does not affect the way the receiver operates at power-up.	Y, N, S, R
*cc	Optional checksum	*00-*FF

Examples

Starting raw data recording:

$PASHS,REC,Y*54

Stopping raw data recording:

$PASHS,REC,N*43

Relevant Query Command

$PASHQ,REC

See also

$PASHS,MEM
$PASHS,ATM

$PASHS,NME
$PASHS,DRD

REF: Enabling/Disabling External Reference Clock

Function

This command is used to enable or disable the external reference clock mode.

Command Format

Syntax

$PASHS,REF,s1[,d2][*cc]

Parameters

Parameter	Description	Range	Default
s1	Enables (ON) or disables (OFF) the external reference clock mode.	ON, OFF	OFF
d2	Frequency, in MHz, of the external reference clock	5, 10, 20	20
*cc	Optional checksum	*00-*FF	-

Examples

Enabling a 20-MHz external reference clock:

$PASHS,REF,ON,20*27

Disabling the external reference clock:

$PASHS,REF,OFF*47

Relevant Query Command

$PASHQ,REF

RFB: Enabling/Disabling Ring File Buffering

Function

This command is used to enable or disable the buffering of the ring file. This means allowing the receiver to continuously feed the ring file buffer with the last “d2” minutes of data available.

Whether the receiver is actually recording the data is still under the control of the $PASHS,REC command or the Log button on the receiver front panel.

Command Format

Syntax

$PASHS,RFB,s1[,d2][*cc]

Parameters

Parameter	Description	Range	Default
s1	Enable/disable command: • Y: Enable ring file buffering • N: Disable ring file buffering	Y, N	N
d2	File duration, in minutes	1-120	5
*cc	Optional checksum	*00-*FF	

Example

Enabling ring file buffering for one hour:

$PASHS,RFB,Y,60*7C

Relevant Query Command

$PASHQ,RFB

See Also

$PASHS,REC
$PASHS,MEM

RFM: Enabling/Disabling Ring File Memory

Function

This command is used to enable or disable the use of the ring file memory.

Enabling the ring file memory allows you to manage the free memory space in the receiver, making sure you can log new raw data files for an unlimited period of time without running out of memory.

Command Format

Syntax

$PASHS,RFM,s1[*cc]

Parameters

Parameter	Description	Range	Default
s1	Enabling or disabling the ring file memory: • Y: Enables the use of the ring file memory: The oldest raw data files will be deleted automatically when only 15 Mbytes of free memory are left in the receiver. • N: Disables the use of the ring file memory: Whether raw data files are logged through sessions, or outside of sessions ($PASHS,REC), the logging of raw data files will stop when there is no free space left in the memory used.	Y, N	N
*cc	Optional checksum	*00-*FF	

Example

Enabling ring file memory:

$PASHS,RFM,Y*59

Relevant Query Command

$PASHQ,RFM

See Also

$PASHS,REC
$PASHS,SES

RFT: Choosing File Format for Meteorological & Tiltmeter Data

Function

This command is used to choose the format in which the meteorological and tiltmeter data files will be recorded.

Command Format

Syntax

$PASHS,RFT,d[*cc]

Parameters

Parameter	Description	Range	Default
d	File format: • 0: G-file • 1: D-file and G-file	0, 1	0
*cc	Optional checksum	*00-*FF	

Comments

D-files are structured as follows:

C <GPS seconds of week>,<GPS week>
$GPXDR,...

Example

Choosing D-file format:

$PASHS,RFT,1*28

Relevant Query Command

$PASHQ,RFT

See Also

$PASHS,REC

RNX,TYP: ATOM RNX Differential Message

Function

This command is used in a receiver used as a base to define the type and output rate of the ATOM RNX message generated by the base.

This command is now used as a replacement to the $PASHS,ATD,TYP command, which was made obsolete in May 2010.

Command Format

Syntax

$PASHS,RNX,TYP,d1,d2[,d3][*cc]

Parameters

Parameter	Description	Range	Default
d1	Scenario number	See table below	4
d2	Output rate for observations, in seconds.	0.1-0.4 if [F] option activated. 0.5-0.9 1-1800	1
d3	Output rate for attributes (receiver and antenna names), in seconds.	0:Disabled 1-1800	31
*cc	Optional checksum	*00-*FF	

Scenario Number	Description
0	All available raw data in full presentation, full computed reference position follows at each epoch. **This scenario is not recommended for use as differential protocol**.
1	L1 pseudo-range and carrier phase in full presentation, extended fixed position follows each 12 epochs.
2	L1 SNR, pseudo-range and carrier phase in full presentation, extended fixed position follows each 12 epochs.
3	L1&L2 pseudo-range and carrier phase in full presentation, extended fixed position follows each 12 epochs.
4	L1 &L2 SNR, pseudo-range and carrier phase in full presentation, extended fixed position follows each 12 epochs.
100	L1&L2 compact pseudo-range and full carrier phase, extended fixed position follows each 12 epochs, all the data are decimated in 5 times compared to L1 carrier phase.
101	L1&L2 compact pseudo-range and compact carrier phase, extended fixed position follows every 12 epochs, all the data are decimated in 5 times compared to L1 carrier phase. **This scenario cannot be used with a moving receiver**.
201	Same as scenario 1, but extended computed reference position follows each epoch.
202	Same as scenario 2, but extended computed reference position follows each epoch.
203	Same as scenario 3, but extended computed reference position follows each epoch.
204	Same as scenario 4, but extended computed reference position follows each epoch.

Scenario Number	Description
300	Same as scenario 100, but extended computed reference position follows each epoch.

Example

Choosing scenario 4 with 1 sec and 30 sec for the output rates:

$PASHS,RNX,TYP,4,1,30*6A

Relevant Query Command

$PASHQ,RNX,MSI

See Also

$PASHS,BAS
$PASHS,CPD,MOD,BAS

RST: Default Settings

Function

This command is used to reset the receiver parameters to their default values.

Command Format

Syntax

$PASHS,RST[*cc]

Parameters

None.

Example

Resetting the receiver:

$PASHS,RST*20

Comments

The following GSM parameters are not affected by the $PASHS,RST command:

- PIN code
- Access Point Name (GPRS)
- Login (GPRS)
- Password (GPRS)
- Net (automatic 2G/3G, or forced to 2G)

The following Ethernet parameters are not affected by the $PASHS,RST command:

- DHCP setting

- IP address
- Sub-network mask
- Gateway IP address
- DNS 1 IP address

DNS 2 IP address**Relevant Query Command**

None.

See also

$PASHS,INI

RTC,MSG: Defining a User Message

Function

This command is used to input a user message that a base will be able to forward to a rover through RTCM message type 16, 36 or 1029. This command can only be applied to a base receiver with message type 16 or 1029 enabled in the receiver.

Command Format

Syntax

$PASHS,RTC,MSG,s[*cc]

Parameters

Parameter	Description	Range
s	User message	90 characters max.
*cc	Optional checksum	*00-*FF

Example

Submitting a user message:

$PASHS,RTC,MSG,<user message 90 characters max>

Relevant Query Command

None.

See also

$PASHS,RTC,TYP
$PASHS,BAS
$PASHS,CPD,MOD,BAS

RTC,TYP: RTCM Message Type

Function

This command is used to choose the RTCM messages type that will be generated and broadcast by a base receiver as well as its output rate. This command can only be applied to a base receiver.

Command Format

Syntax

$PASHS,RTC,TYP,d1,d2[*cc]

Parameters

Parameter	Description	Range
d1	Message type	0-36, 1000-1033, see tables below
d2	Output rate, in seconds, or "0" for message disabled	0, 0.1-0.4 (with [F] option activated 0.5-0.9, 1-1800
*cc	Optional checksum	*00-*FF

RTCM 2.3 messages:

Parameter	Description	Default
0	Disables all RTCM 2.3 messages	-
1	Differential GPS corrections	0
3	GPS reference station parameters	0
9	GPS partial correction set	0
16	GPS special message	0
18	RTK uncorrected carrier phase (18) RTK uncorrected pseudoranges (19)	1
20	RTK carrier phase correction (20) RTK high-accuracy, pseudorange corrections (21)	0
22	Extended reference station parameter	0
23	Antenna type definition record	31 s
24	Antenna reference point	13 s
31	Differential GLONASS corrections	0
32	Differential GLONASS reference station parameters	0
34	GLONASS partial correction set	0
36	GLONASS special message	0

RTCM 3.0 & 3.1 messages:

Parameter	Description	Default
1000	Disables all RTCM 3.0 messages	-

Parameter	Description	Default
1001	L1-only GPS RTK observables	0
1002	Extended L1-only GPS RTK observables	0
1003	L1 & L2 GPS RTK observables	0
1004	Extended L1 & L2 GPS RTK observables	1 s
1005	Stationary RTK reference station ARP	0
1006	Stationary RTK reference station ARP with antenna height	13 s
1007	Antenna descriptor	0
1008	Antenna descriptor & serial number	0
1009	L1-only GLONASS RTK observables	0
1010	Extended L1-only GLONASS RTK observables	0
1011	L1 & L2 GLONASS RTK observables	0
1012	Extended L1 & L2 GLONASS RTK observables	1 s
1013	System parameter	0
1019	GPS ephemeris data	0
1020	GLONASS ephemeris data	0
1029	Unicode text string	0
1033	Receiver and antenna descriptors	31 s

RTCM 3.2 messages:

Parameter	Description	Default
1071	MSM1 - Compact GPS pseudo-ranges	0
1072	MSM2 - Compact GPS phase-ranges	0
1073	MSM3 - Compact GPS pseudo-ranges & phase-ranges	0
1074	MSM4 - Full GPS pseudo-ranges & phase-ranges plus CNR	0
1075	MSM5 - Full GPS pseudo-ranges, phase-ranges, phase-range-rate and CNR	0
1076	MSM6 - Full GPS pseudo-ranges & phase-ranges plus CNR (high resolution)	0
1077	MSM7 - Full GPS pseudo-ranges, phase-ranges, phase-range-rate and CNR (high resolution)	0
1081	MSM1 - Compact GLONASS pseudo-ranges	0
1082	MSM2 - Compact GLONASS phase-ranges	0
1083	MSM3 - Compact GLONASS pseudo-ranges & phase-ranges	0
1084	MSM4 - Full GLONASS pseudo-ranges & phase-ranges plus CNR	0
1085	MSM5 - Full GLONASS pseudo-ranges, phase-ranges, phase-range-rate and CNR	0
1086	MSM6 - Full GLONASS pseudo-ranges & phase-ranges plus CNR (high resolution)	0

Parameter	Description	Default
1087	MSM7 - Full GLONASS pseudo-ranges, phase-ranges, phase-range-rate and CNR (high resolution)	0
1091	MSM1 - Compact GALILEO pseudo-ranges	0
1092	MSM2 - Compact GALILEO phase-ranges	0
1093	MSM3 - Compact GALILEO pseudo-ranges & phase-ranges	0
1094	MSM4 - Full GALILEO pseudo-ranges & phase-ranges plus CNR	0
1095	MSM5 - Full GALILEO pseudo-ranges, phase-ranges, phase-range-rate and CNR	0
1096	MSM6 - Full GALILEO pseudo-ranges & phase-ranges plus CNR (high resolution)	0
1097	MSM7 - Full GALILEO pseudo-ranges, phase-ranges, phase-range-rate and CNR (high resolution)	0
1230	glonass l1 and L2 code-phase biases	0

Examples

Setting RTCM message types 18 and 19 (output rate: 1 s):

$PASHS,RTC,TYP,18,1

Disabling all RTCM 3.x messages:

$PASHS,RTC,TYP,1000*6C

Comments

- RTCM2.3 and RTCM 3.x messages can coexist. The $PASHS,BAS command will finally determine which of the existing messages should be broadcast.
- $PASHS,RTC,TYP,0 will disable all enabled RTCM2.3 messages.
- $PASHS,RTC,TYP,1000 will disable all enabled RTCM3.x messages.

Relevant Query Command

$PASHQ,RTC,MSI

See also

$PASHS,BAS
$PASHS,CPD,MOD,BAS
$PASHS,BDS

RXC,PAR: Embedded RINEX Converter

Function

This command is used to set all the parameters of the RINEX converter. While parameters d1 to s6 in the command define the type of conversion performed by $PASHS,RXC,RUN, parameters s7 to f20 define the different parameters found in the RINEX header of a converted file, following the conversion of this file by $PASHS,RXC,RUN or by sessions.

Command Format

Syntax

$PASHS,RXC,PAR[,VER,d1][,CMP,d2][,PER,d3][,GLO,s4][,SBA,s5][,GAL,s6][,AGY,s7][,OBN,s8][,MNM,s9][,MNB,10][,OBS,s11][,GPN,s12][,GLN,s13][,SBN,s14][,GAN,s15][,MET,s16][,SSM,s17][,SST,s18][,APR,f19][,ATD,f20][,AHR,f21][*cc]

Parameters

Parameter	Description	Range	Default
VER,d1	RINEX version: • 0: RINEX 2.11 • 1: RINEX 2.11-Hatanaka • 2: RINEX 3.01 • 3: RINEX 3.01-Hatanaka	1	0-3
CMP,d2	Compression: • 0: None • 1: TarZ	1	0-1
PER,d3	RINEX measurement period: • 0: Period specified in G-file is used • Other than 0: is the RINEX measurement period actually used, in seconds	0	0-60
GLO,s4	GLONASS conversion: • ON: GLONASS measurements are converted • OFF: GLONASS measurements are ignored	ON	ON, OFF
SBA,s5	SBAS conversion: • ON: SBAS measurements are converted • OFF: SBAS measurements are ignored	ON	ON, OFF
GAL,s6	GALILEO conversion: • ON: Galileo measurements are converted • OFF: Galileo measurements are ignored	OFF	ON, OFF
AGY,s7	Agency name	20 char. max.	
OBN,s8	Observer name	20 char. max.	
MNM,s9	Antenna marker name	60 char. max.	
MNB,s10	Antenna marker number	20 char. max.	
OBS,s11	Observation file comments	255 char. max.	
GPN,s12	GPS Navigation file comments	255 char. max.	
GLN,s13	GLONASS Navigation file comments	255 char. max.	
SBN,s14	SBAS Navigation file comments	255 char. max.	
GAN,s15	GALILEO Navigation file comments	255 char. max.	
MET,s16	Meteo file comments	255 char. max.	
SSM,s17	Sensor model	20 char. max.	
SST,s18	Sensor type	20 char. max.	
APR,f19	Accuracy of PR (pressure in mbar)	0.0-100.0	0.0
ATD,f20	Accuracy of TD (dry temperature in degrees Celsius	0.0-100.0	0.0

Parameter	Description	Range	Default
AHR,f21	Accuracy of HR (relative humidity in percent)	0.0-100.0	0.0
*cc	Optional checksum	*00-*FF	

Comments

The "comments" fields (s11-s16) may consist of several lines each. The line separator in this case is composed of two characters: \n. Each line may contain up to 60 characters.

Example

Setting the RINEX converter to produce RINEX 2.11-Hatanaka, TarZ-compressed files:

$PASHS,RXC,PAR,VER,1,CMP,1,GLO,OFF,SBA,OFF,GAL,OFF,AGY,Ashtech,OBN,Peter Smith,MNM,CARQ,MNB,1005M001*4A

Relevant Query Command

$PASHQ,PAR,RXC

See Also

$PASHS,SES,PAR
$PASHS,RXC,RUN

RXC,RUN: Converting a G-File into RINEX Files

Function

This command is used to convert a G-file into RINEX files.

Command Format

Syntax

$PASHS,RXC,RUN,[d1],[s2],s3[*cc]

Parameters

Parameter	Description	Range	Default
d1	Memory location: • 0: Internal memory • 2: USB device If d1 is omitted, the receiver looks for the specified file on the memory last selected with $PASHS,MEM.	0 or 2	0
s2	Path on the selected memory where to find the G-file.	255 characters max.	-
s3	File name. No path allowed in this field.	13 characters in the form "GxxxxSyy.ddd"	-
*cc	Optional checksum	*00-*FF	

Comments

- The headers of the RINEX files are built using the information provided through $PASHS,RXC,PAR.
- The resulting RINEX files are stored in the same folder as the one containing the G-file specified in the command.
- $PASHR,NAK is returned if the specified file does not exist, or is not a G-file.
- $PASHR,ACK is returned when the command is accepted, then $PASHR,RXC,OK or $PASHR,RXC,FAILED, depending on whether the conversion respectively succeeded or failed.

Examples

Converting a G-file to Rinex (in the same folder):

$PASHS,RXC,RUN,,,GabcdA09.241*67
$PASHR,ACK*3D
$PASHR,RXC,OK*15

Converting a G-file to Rinex and saving the resulting file in a sub-folder:

$PASHS,RXC,RUN,2,2009/241,GabcdA09.241*46
$PASHR,ACK*3D
$PASHR,RXC,OK*15

Relevant Query Command

None.

See Also

$PASHS,RNX,PAR
$PASHS,MEM

SBA: Enabling/Disabling SBAS Tracking

Function

This command is used to enable or disable SBAS tracking.

Command Format

Syntax

$PASHS,SBA,s1[*cc]

Parameters

Parameter	Description	Range	Default
s1	Enables (ON) or disables (OFF) SBAS tracking	ON, OFF	ON
*cc	Optional checksum	*00-*FF	

Example

Enabling SBAS tracking:

$PASHS,SBA,ON*08

Relevant Query Command

$PASHQ,SBA

See also

$PASHS,GLO

SBA,MAN: Manual Selection of SBAS Satellites

Function

This command is used to select the two SBAS satellites the receiver is only allowed to work with.

You may use $PASHQ,PAR to view the current selection of SBAS satellites.

Command Format

Syntax

Choosing two SBAS satellites:
$PASHS,SBA,MAN,d1,d2[*cc]

Returning to automatic selection of SBAS satellites:
$PASHS,SBA,AUT[*cc

Parameters

Parameter	Description	Range
d1	PRN of first SBAS satellite	33-51
d2	PRN of second SBAS satellite	33-51
*cc	Optional checksum	*00-*FF

Comments

The command syntax is valid only if d1 and d2 are different and both specified.

Example

Choosing SBAS satellites PRN#33 and PRN#37:

$PASHS,SBA,MAN,33,37*4F

SES,AUT: Setting a Series of Sessions Automatically

Function

This command is used to set a series of sessions through an automatic procedure. Sessions will have similar duration and common recording rate. They will take place one after the other with no idle time in between.

Command Format

Syntax

$PASHS,SES,AUT,d1,d2,d3,f4[*cc]

Parameters

Parameter	Description	Range	Default
d1	Session start time (hhmmss)	000000-235959	000000
d2	Number of sessions.	1-96	24
d3	Session duration (hhmm)	0005-2400	0100
f4	Data recording rate used during sessions, in seconds.	0.05 or 0.1-0.4 if [F] option activated. 0.5-0.9 1-999	30
*cc	Optional checksum	*00-*FF	

Comments

- The command is NAKed if the number of sessions multiplied by the session duration is greater than 24 hours.
- The command will overwrite all the previously defined sessions with the new ones.

Example

Setting 24 sessions of one hour each (continuous, round-the-clock operation) with 1-second recording rate:

$PASHS,SES,AUT,000000,24,0100,1*6A

Relevant Query Command

$PASHQ,SES

See Also

$PASHS,SES,PAR
$PASHS,SES,DEL
$PASHS,SES,AUT

SES,DEL: Deleting One or All Sessions

Function

This command is used to delete one or all of the currently defined sessions. Individual deletion of sessions is achieved by specifying the name allotted to the session, according to the session naming convention used.

Command Format

Syntax

$PASHS,SES,DEL,s1[*cc]

Parameters

Parameter	Description	Range
s1	Session name. If s1 is omitted all the sessions are deleted.	A-X (sessions 1-24) AA-XA (sessions 25-48) AB-XB (sessions 49-72) AC-XC (sessions 73-96)
*cc	Optional checksum	*00-*FF

Comments

If the session you want to delete is currently in progress, then in addition to deleting that session, the command will also stop it immediately.

Examples

Deleting all sessions:

$PASHS,SES,DEL*51

Deleting 20th session:

$PASHS,SES,DEL,T*29

Deleting 96th session:

$PASHS,SES,DEL,XC*66

Relevant Query Command

$PASHQ,SES

See Also

$PASHS,SES,SET
$PASHS,SES,AUT

SES,FTP,PAR: Setting FTP Server for Record Files

Function

This command is used to define the parameters of the FTP server where the receiver will automatically upload all the data files recorded during sessions (primary FTP server). A backup FTP server can also be defined through this command.

Command Format

Syntax

$PASHS,SES,FTP,PAR[,ADD,s1][PRT,d2][,LGN,s3][,PWD,s4][,PTH,s5][,SUB,s6][,IPP,c7][,BKP,d8][,AD2,s9][,PR2,d10][,LG2,s11][,PW2,s12][,PT2,s13][*cc]

Parameters

Parameter	Description	Range	Default
ADD,s1	IP address or hostname	32 char. max.	
PRT,d2	Port number	0-65535	21
LGN,s3	Login	32 char. max.	
PWD,s4	Password	32 char. max.	
PTH,s5	Path on FTP server	255 char. max.	
SUB,s6	Subdirectory format, used for automatic uploading. See table below.	14 char. max.	Empty
IPP,c7	Port used for FTP transfer: • E: Internal modem (not supported) • P: Ethernet cable	P	P
BKP,d8	Operating mode assigned to backup FTP server: • 0: Not used • 1: Used only when primary FTP server is inaccessible • 2: Used in parallel to primary FTP	0-2	0
AD2,s9	IP address or hostname of backup FTP server	32 char. max.	
PR2,d10	IP port number of backup FTP server	0-65535	21
LG2,s11	Login	32 char. max.	
PW2,s12	Password	32 char. max.	
PT2,s13	Path on backup FTP server	255 char. max.	
*cc	Optional checksum	*00-*FF	

The following case-sensitive codes should be used to define the subdirectory format (applicable to both primary and backup FTP servers).

Character	Description
S or s	4-character sitename
Y	4-digit year (2010= 2010)
y	2-digit year (10= 2010)
m	2-digit month (01= January)
M	3-character month (Jan= January)
d	2-digit day in month (1-31)
D	3-digit day in year (1-366)
p or P	data_<d> or DATA_<d>, where <d> is the period in seconds

Comments

- When two RINEX files are created with different periods, character "p" or "P" should be used so the receiver can store the two types of RINEX files in different directories.

  If the subdirectory format is "s/Y/D/p" then the files logged at 1 second recording interval, on site "CARQ", on Feb 1, 2012 (day 32) will be pushed to the folder named ".../CARQ/2012/32/data_1" and the files logged at 30 seconds will be moved to the folder ".../CARQ/2012/32/data_30".
- Data files will be uploaded automatically to the FTP server only if the $PASHS,SES,PAR command allows it ("Automatic FTP transfer" must be enabled).
- When data transfer to the FTP server is requested and the receiver fails to perform that transfer, a new attempt is made after 30 seconds of idle time.

  If the transfer fails again, the parameters describing the failed transfer request (file name and path, queried FTP server, FTP login and password) are saved to a rescue file.

  If a backup FTP server has been defined, the receiver will then try to transfer the same file to the backup FTP server. In case of failure, the receiver will try again after an idle time of 30 seconds. If it fails again, and as previously, the parameters describing the failed transfer request (file name and path, queried FTP server, FTP login and password) will be saved to the same rescue file, adding up to the previous failed request.

  Every two minutes, the receiver routinely opens the rescue file (if there is one) and analyzes the older failed transfer request. If that request refers to a file that is no longer in memory (internal or USB) or is older than two days, then the receiver will ignore that request and remove it from the rescue file. If on the contrary, the file is still there and created less than two days ago, the receiver will make a new attempt to transfer the file (in the same conditions as originally (i.e to the same FTP). If the transfer succeeds, the corresponding request will then be removed from the rescue file.

Example

Defining a primary FTP server and a backup FTP server:

$PASHS,SES,FTP,PAR,ADD,MyPrimaryFTP.com,PRT,21,LGN,Myusernam e,PWD,Mypassword,PTH,/Myfolder,SUB,Y/D/s,IPP,P,BKP,1,AD2, MybackupFTP.com,PR2,21,LG2,Myusername2,PW2,Mypassword2, PT2,/Myfolder*6871

Relevant Query Command $PASHQ,SES

See Also $PASHS,SES,PAR

SES,ON: Starting Sessions

Function This command is used to start the execution of the programmed sessions. By default all the sessions are stopped.

Command Format

Syntax

$PASHS,SES,ON[*cc]

Parameters

None.

Example

Starting the programmed sessions:

$PASHS,SES,ON*1D

Relevant Query Command $PASHQ,SES

See also $PASHS,SES,OFF
$PASHS,SES,PAR

SES,OFF: Stopping Sessions

Function This command is used to stop the execution in progress of the programmed sessions. By default all the sessions are stopped.

Command Format

Syntax

$PASHS,SES,OFF[*cc]

Parameters

None.

Example

Stopping the programmed sessions immediately:

$PASHS,SES,OFF*53

Relevant Query Command $PASHQ,SES

See also $PASHS,SES,ON
$PASHS,SES,PAR

SES,PAR: Session Recording Parameters

Function This command is used to define all the parameters you want the receiver to use when running the programmed recording sessions.

Command Format

Syntax

$PASHS,SES,PAR[,DAY,d1][,OFS,d2][,SIT,s3][,MEM,d4][,RNX,d5][,CMP,d6][,DEL,d7][,MOV,d8][,DST,d9][,PTH,s10][,FTP,d11][,SLP,c13][,GLO,s14][,SBA,s15][,GAL,s16][,PER,d17][PE2,d18][*cc]

Parameters

Parameter	Description	Range	Default
DAY,s1	Session reference day	1-366	1
OFS,d2	Session offset (mmss)	0000-5959	0
SIT,s3	Sitename (from which the G-file name is derived)	4 characters	0000
MEM,d4	Memory location: • 0: Internal memory • 2: USB key	0, 2	0
RNX,d5	RINEX conversion: • 0: No conversion • 1: Conversion to RINEX v2.11 • 2: Conversion to RINEX v2.11, Hatanaka • 3: Conversion to RINEX v3.01 • 4: Conversion to RINEX v3.01, Hatanaka RINEX conversion will not take place if the recording rate during sessions is less than 1 second. In this case an alarm will be raised.	0-4	2
CMP,d6	File Compression: • 0: No file compression • 1: tarZ	0-1	1

Parameter	Description	Range	Default
DEL,d7	G-file deletion: • 0: Keep G-file after RINEX conversion • 1: Delete G-file after RINEX conversion	0-1	1
MOV,d8	File moved to subdirectory: • 0: No move • 1: Move converted files only • 2: Move original and converted files	0-2	1
DST,d9	Memory where to move the files: • 0: Internal memory • 2: USB key	0, 2	0
PTH,s10	Format of the subdirectory where files are moved (see comments below).		Y/D
FTP,d11	Automatic FTP transfer • 0: No transfer • 1: Automatic transfer to FTP server • 2: Automatic transfer to FTP server, followed by deletion of the file if d8=1 or 2 See $PASHS,SES,FTP,PAR for FTP settings.	0, 1, 2	0
RFM,c12	Ring file memory management: • N (No): Sessions stopped when memory full • Y (Yes): Oldest file removed when free memory is less than 15 Mbytes.	Y, N	N
SLP,c13	Enable/disable sleep mode: • No: The receiver won't be powered off between sessions • Yes: The receiver will be powered off between sessions. Power will be restored automatically 15 minutes before the next session starts.	Y, N	N
GLO,s14	GLONASS data conversion: • ON: GLONASS measurements will be converted. • OFF: GLONASS measurements will not be converted.	ON, OFF	ON
SBA,s15	SBAS data conversion: • ON: SBAS measurements will be converted. • OFF: SBAS measurements will not be converted.	ON, OFF	ON
GAL,s16	GALILEO data conversion: • ON: GALILEO measurements will be converted. • OFF: GALILEO measurements will not be converted.	ON, OFF	ON
PER,d17	Period of RINEX measurements, in seconds. "0" means the period used is the same as that used in the G-file.	0-60	0

Parameter	Description	Range	Default
PE2,d18	Period of RINEX measurements, in seconds, for the second RINEX file. A second RINEX file will be generated only if the period is defined as different from “0”.	0-60	0
*cc	Optional checksum	*00-*FF	

Comments

- About the **Session Reference Day**: This is a mandatory parameter that determines the start day of data collection through session programming. It is also used with the Offset parameter to modify the session start and end times for a fixed number of minutes per day.

  The Session Reference Day is the three-digit day of the year (DOY) where January 1 is day 001 and December 31 is day 365 (or day 366 in leap years).

  The Session Reference Day must be equal to or less than the current day for session programming to run. For example, if today is day 191 and the Session Reference Day is set to 195, the receiver will not begin activating valid sessions for 4 days, or until the current day is equal to the Session Reference Day.
- About the **Session Offset**: This optional parameter was designed specifically for users who wish to collect data from the identical GPS satellite window every day. The GPS satellite window moves backwards 4 minutes per day. The format of this parameter is in minutes and seconds (mmss), so by setting the Session Offset to 0400, the activated sessions will start and end 4 minutes earlier each day.

  This parameter is used with the Session Reference Day to determine the offset from the given start time. The receiver will multiply the difference between the current day and the Session Reference Day, and multiply this times the Session Offset. The session start and end times will then be moved this amount of time backwards.

  For example, assume the Session Reference Day is set to 201, the current day of the year is 204, and the Session Offset is set to 0400 (4 minutes). The receiver will multiply 3 (days) times 4 (minutes/day), and then subtract 12 minutes from the session start and end times. If the "set" session start time for day 201 is 01:30, then the actual start time on day 204 will be 01:18.
- The command will be NAKED if you attempt to change the memory location (d4) while a session is in progress.

- Parameter s10 defines the naming convention for the subdirectories holding the record files.

  For example if the subdirectory format used is “s/Y/D”, then the files recorded in 2010, the day 125 for the site CARQ will be moved to the selected memory, in the subdirectory named “/CARQ/2010/125/”.

  The following case-sensitive codes should be used to define the subdirectory format.

Character	Description
S or s	4-character sitename
Y	4-digit year (2010= 2010)
y	2-digit year (10= 2010)
m	2-digit month (01= January)
M	3-character month (Jan= January)
d	2-digit day in month (1-31)
D	3-digit day in year (1-365)
p or P	data_<d> or DATA_<d>, where <d> is the period in seconds

Example

$PASHS,SES,PAR,DAY,120,0400,SIT,DD23,MEM,0,RNX,2*54

Relevant Query Command $PASHQ,SES

See Also

$PASHS,SES,ON
$PASHS,SES,OFF
$PASHS,SES,SET
$PASHS,SES,DEL
$PASHS,SES,FTP,PAR

SES,SET: Setting Sessions Manually

Function This command is used to set the duration and recording rate of each session in a day, and taking place every day.

Command Format

Syntax

$PASHS,SES,SET,s1,c2[*cc]
or

$PASHS,SES,SET,s1,c2,d3,d4,f5,d6[*cc]

Parameters

Parameter	Description	Range	Default
s1	Session name	A-X (sessions 1-24) AA-XA (sessions 25-48) AB-XB (sessions 49-72) AC-XC (sessions 73-96)	
c2	Session recording flag: • Y: Recording is allowed during the session. • N: No data recording is allowed during the session.	Y, N	N
d3	Session start time (hhmmss)	000000-235959	000000
d4	Session end time (hhmmss)	000000-235959	000000
f5	Session recording rate, in seconds.	0.05 or 0.1-0.4 if [F] option activated. 0.5-0.9 1-999	30
*cc	Optional checksum	*00-*FF	

Example

Setting 2nd session, with flag on, starting at 10:00 am and finishing at 11:00 am, with a recording rate of 1 second:

$PASHS,SES,SET,B,Y,1000,1100,1*59

Relevant Query Command

$PASHQ,SES

See Also

$PASHS,SES,PAR
$PASHS,SES,DEL
$PASHS,SES,AUT

SIT: Defining a Site Name

Function

This command is used to define a site name that will be used in the naming of the next logged raw data file.

Command Format

Syntax

$PASHS,SIT,s[*cc]

Parameters

Parameter	Description	Range
s	Site name (or site ID), a 4-character string where “*”, “.”, “/” and “\” are not allowed.	
*cc	Optional checksum	*00-*FF

Example

Defining site name “ECC1”:

$PASHS,SIT,ECC1*63

Relevant Query Command $PASHQ,SIT

See also $PASHS,REC

SNM: Signal-To-Noise Ratio Mask

Function This command is used to mask the signal observations that do not meet the minimum C/A code signal-to-noise ratio you specify. This means that only the observations meeting this requirement will be used in the PVT computation (all the others will be rejected).

Command Format

Syntax

$PASHS,SNM,d1[*cc]

Parameters

Parameter	Description	Range	Default
d1	SNR mask, in dB.Hz	0-60	0
*cc	Optional checksum	*00-*FF	

Example

Setting the SNR mask to 45 dB.Hz:

$PASHS,SNM,45*08

Relevant Query Command $PASHQ,SNM

SOM: Masking Signal Observations

Function

The SOM command is used to apply masks on the following data:

- Cumulative tracking time (CTT), in seconds
- Navigation data (NAV)
- Signal-to-Noise Ratio (SNR), in dBHz
- Channel warnings (WRN)

As a result of the presence of these masks, only the signal observations meeting the required level of quality will be made available by the receiver through the relevant output messages.

Command Format

Syntax

$PASHS,SOM,d[*cc]

Parameters

Parameter	Description	Range	Default
d	Observation mask index	See table below.	4
*cc	Optional checksum	*00-*FF	

Observation mask Index	
d	**Description**
0	No masking
1	Reference station
2	Static base
3	Moving base
4	Rover (default)
9	User-defined

Comments

“Masking” signal observations therefore means definitively rejecting those observations not meeting the level of quality requested by the different masks set through the SOM command.

”SOM” stands for “Signal Observations Masks”.

Example

Setting masks for a reference station:

$PASHS,SOM,1*39

Relevant Query Command

$PASHQ,PAR
$PASHQ,SOM

See Also

$PASHS,SOM,SNR
$PASHS,SOM,NAV
$PASHS,SOM,WRN
$PASHS,SOMM,CTT

SOM,CTT: Cumulative Tracking Time Mask

Function

This command is used to mask the signal observations that do not meet the minimum continuous tracking time you specify. This means that only the observations meeting this requirement will be output (all the others will be rejected).

This mask is enabled only after the "User-defined" option (9) has been selected with the $PASHS,SOM command.

Command Format

Syntax

$PASHS,SOM,CTT,d1[,d2][*cc]

Parameters

Parameter	Description	Range	Default
d1	Minimum continuous tracking time for differential data, in seconds. "0" means no mask.	0-255	10
d2	Minimum continuous tracking time for raw data, in seconds. If d2 is omitted, then the receiver will assume d2=d1. "0" means no mask.	0-255	10
*cc	Optional checksum	*00-*FF	

Raw Data Masked by d2	Differential Data Masked by d1
MPC DPC ATM,RNX,SCN,0	All other messages

Comments

- "Continuous" tracking means tracking "without cycle slips".
- This command can only mask some particular signal data. If however at the same time the L1CA data are disabled,

then ALL the satellite observations, and not only the masked ones, will be rejected.

- This command equally affects all GNSS and their signals.

Examples

Setting CTT masks for differential and raw data to 20 s:

$PASHS,SOM,CTT,20*65

Enabling all signal observations to be output regardless of the continuous tracking time requirement (no CTT mask):

$PASHS,SOM,CTT,0*57

Relevant Query Command

$PASHQ,PAR
$PASHQ,SOM,CTT

See Also

$PASHS,SOM
$PASHS,SOM,SNR
$PASHS,SOM,NAV
$PASHS,SOMM,WRN

SOM,NAV: Navigation Data Mask

Function

This command is used to mask the signal observations that are not consistent with the relevant navigation data. This means that only the observations meeting this requirement will be output (all the others will be rejected).

This mask is enabled only after the "User-defined" option (9) has been selected with the $PASHS,SOM command.

Command Format

Syntax

$PASHS,SOM,NAV,s1[,s2][*cc]

Parameters

Parameter	Description	Range	Default
s1	Differential data mask	ON, OFF	ON
s2	Raw data mask. If s2 is omitted, then the receiver will assume s2=s1	ON, OFF	OFF
*cc	Optional checksum	*00-*FF	

Raw Data Masked by s2	Differential Data Masked by s1
MPC DPC ATM,RNX,SCN,0	All other messages

Comments

- Stating that signal observations are consistent with the corresponding navigation data means the following:
  - GNSS time, receiver position and receiver clock offsets are available and valid.
  - L1CA pseudo-range for a given satellite is measured and valid.
  - The corresponding satellite navigation data are available and valid.
  - The L1CA pseudo-range and computed range are in agreement with each other.
  - Elevation and azimuth angles are available and valid.

  If at least one of the above requirements is not met, then signal observations are found to be not consistent with navigation data.
- The $PASHS,SOM,NAV command will mask all signals (all observables) corresponding to a given satellite, even if some other pseudo-ranges (e.g. L2C) can be consistent with the navigation data.
- The $PASHS,SOM,NAV command equally affects all GNSS systems.

Examples

Setting NAV masks for both differential and raw data:

$PASHS,SOM,NAV,ON*7C

Enabling all signal observations to be output regardless of whether they are consistent with navigation data or not (no NAV mask):

$PASHS,SOM,NAV,OFF*32

Relevant Query Command

$PASHQ,PAR
$PASHQ,SOM,NAV

See Also

$PASHS,SOM
$PASHS,SOM,SNR
$PASHS,SOM,CTT
$PASHS,SOM,WRN

SOM,SNR: Signal-to-Noise Ratio Mask

Function

This command is used to mask the signal observations that do not meet the minimum signal-to-noise ratio you specify. This means that only the observations meeting this requirement will be output (all the others will be rejected).

This mask is enabled only after the “User-defined” option (9) has been selected with the $PASHS,SOM command.

Command Format

Syntax

$PASHS,SOM,SNR,f1[,f2][*cc]

Parameters

Parameter	Description	Range	Default
f1	Differential data mask. “0” means no mask.	0-60 dBHz	28
f2	Raw data mask. If s2 is omitted, then the receiver will assume s2=s1. “0” means no mask.	0-60 dBHz	28
*cc	Optional checksum	*00-*FF	

Raw Data Masked by f2	Differential Data Masked by f1
MPC DPC ATM,RNX,SCN,0	All other messages

Comments

- The $PASHS,SOM,SNR command can only mask particular signal data for which the SNR does not meet your requirement. If however at the same time the L1CA data are disabled, then all the satellite observations will also be masked.
- The $PASHS,SOM,SNR command equally affects all GNSS systems and their signals, except GPS L1P(Y) and L2P(Y). For these two signals, a hard-coded SNR threshold is applied.

Examples

Setting SNR masks for both differential and raw data to 30 dBHz:

$PASHS,SOM,SNR,30*68

Enabling all signal observations to be output regardless of the signal-to-noise ratio:

$PASHS,SOM,SNR,0*5B

Relevant Query Command

$PASHQ,PAR
$PASHQ,SOM,SNR

See Also

$PASHS,SOM
$PASHS,SOM,NAV
$PASHS,SOM,CTT
$PASHS,SOMM,WRN

SOM,WRN: Channel Warnings Mask

Function

This command is used to mask the signal observations for those signals flagged with channel warnings (MPC warning bits are counted from 1 to 8). This means that only the observations from non-flagged signals will be output (all the others will be rejected).

This mask is enabled only after the "User-defined" option (9) has been selected with the $PASHS,SOM command.

Command Format

Syntax

$PASHS,SOM,WRN,s1[,s2][*cc]

Parameters

Parameter	Description	Range	Default
s1	Differential data mask	ON, OFF	ON
s2	Raw data mask. If s2 is omitted, then the receiver will assume s2=s1	ON, OFF	OFF
*cc	Optional checksum	*00-*FF	

Raw Data Masked by s2	Differential Data Masked by s1
MPC DPC ATM,RNX,SCN,0	All other messages

Comments

- A signal is considered as flagged in at least one of the following cases:

  - Carrier phase tracking is not stable (Bit 3 of MPC/MCA warning is set).
  - Pseudo-range data quality is bad (Bit 5 of MPC/MCA warning is set).
  - Polarity is not resolved (MPC/MCA Phase Tracking Polarity flag is set to 0).
  - The L1CA pseudo-range and computed range are in agreement with each other.
  - Elevation and azimuth angles are available and valid.
- The $PASHS,SOM,WRN command will mask only some particular signal data (e.g. L1CA or L2P) corresponding to a given satellite. If at the same time the L1CA data are disabled, then ALL the satellite observations, and not only those masked, will be rejected.
- The $PASHS,SOM,WRN command equally affects all GNSS systems.

Examples

Setting WRN masks for both differential and raw data:

$PASHS,SOM,WRN,ON*6E

Enabling all signal observations to be output regardless of whether some signals are flagged or not (no WRN mask):

$PASHS,SOM,WRN,OFF*20

Relevant Query Command

$PASHQ,PAR
$PASHQ,SOM,WRN

See Also

$PASHS,SOM
$PASHS,SOM,SNR
$PASHS,SOM,CTT
$PASHS,SOM,NAV

STI: Defining a Station ID

Function

This command is used to define the station ID the base receiver will broadcast in its differential messages to the rover.

Command Format

Syntax

$PASHS,STI,d[*cc]

Parameters

Parameter	Description	Range
d	Station ID	0-1023 (RTCM 2.3) 0-4095 (RTCM 3.x and ATOM) 0-31 (CMR & CMR+)
*cc	Optional checksum	*00-*FF

Examples

Defining station ID “150” for use in RTCM messages:

$PASHS,STI,150*23

Note

If the chosen station ID is beyond the upper limit in the applicable range, then the value “31” is chosen instead (i.e. “31” instead of “56” for example if CMR/CMR+ messages are broadcast, or “31” instead of “1041” for example if RTCM 2.3 messages are broadcast).

Relevant Query Command

$PASHQ,STI

See also

$PASHS,BAS
$PASHS,MOD,BAS

SVM: Setting the Maximum Number of Observations in the PVT

Function:

This function is used to set the maximum number of code and doppler observations used in the PVT calculation.

Command Format

Syntax

$PASHS,SVM,d1[*cc]

Parameters

Parameter	Description	Range	Default
d1	Maximum number of observations	0-26	14
*cc	Optional checksum	*00-*FF	-

Example

Setting the number of observations to 25:

$PASHS,SVM,25*16

Comments

This setting affects all the positioning modes, except for the time-tagged RTK mode for which this limit is hardware coded and set to 14 satellites.

Relevant Query Command

$PASHQ,SVM
$PASHQ,PAR

TCP,PAR: TCP/IP Server Settings

Function

This command is used to set the TCP/IP server.

Command Format

Syntax

$PASHS,TCP,PAR[,MOD,s1][,LGN,s2][,PWD,s3][,PRT,d4][*cc]

Parameters

Parameter	Description	Range
MOD,s1	TCP/IP connection mode: • 0: Disabled • 1: Enabled with authentication • 2: Enabled without authentication (default)	0-2
LGN,s2	Login	32 characters max.
PWD,s3	Password	32 characters max.
PRT,d4	Port number. Default is “8888”	100-65535
*cc	Optional checksum	*00-*FF

Example

Enabling TCP/IP connection with authentication (login: BX312, password: xwsead):

$PASHS,TCP,PAR,MOD,1,LGN,BX312,PWD,xwsead*1A

Comments

- When the TCP/IP server is enabled (s1=1 or 2) and the receiver is connected to a network via the Ethernet cable, an external device can open the port specified as **d4** and communicate with the receiver. In this case, the current port is port “I” in the receiver.
- When s1=1, the receiver does not accept any incoming data or commands until it receives the login and the password (see $PASHS,TCP,UID). It will however output those messages that are programmed on port “I” even if it has not received authentication yet.
- The default login is “ashtech” and the default password is “password”.
- Both login and password are case sensitive.

Relevant Query Command

$PASHQ,TCP

See also

$PASHS,TCP,UID

$PASHS,ETH

TCP,UID: TCP/IP Authentication

Function This command is used to enter the login and a password allowing a TCP/IP connection (requiring authentication) to be established.

Command Format

Syntax

$PASHS,TCP,UID,s1,s2[*cc]

Parameters

Parameter	Description	Range
s1	Login	32 characters max.
s2	Password	32 characters max.
*cc	Optional checksum	*00-*FF

Example

Entering authentication parameters (login: BX312, password: xwsead):

$PASHS,TCP,UID,BX312,xwsead*70

Comments

- The $PASHS,TCP,UID command should always be sent first every time a user tries to connect to a remote receiver through a secure TCP/IP connection (see $PASHS,TCP). Only after providing authentification parameters will the user be allowed to send commands or data to that receiver.
- When the login and password are correct, or no authentication is required, the receiver will return the following reply:

  $PASHR,TCP,OK*1B

- If authentication is required and the login or password is wrong, the receiver will return the following reply:

  $PASHR,TCP,FAIL*1D

Relevant Query Command None.

See also $PASHS,TCP,PAR

$PASHS,ETH

TLT,CMD: Defining the Trigger String Used to Query the Tiltmeter

Function

This command is used to define the character string that will query the tiltmeter. The command also specifies the ID of the receiver port used to communicate with the tiltmeter.

The trigger string is in the form “*xxxxxx” and the default one is *0100XY.

Command Format

Syntax

$PASHS,TLT,CMD,c1,s2[*cc]

Parameters

Parameter	Description	Range
c1	Receiver serial port connected to the tiltmeter.	A, B, F
s2	Trigger string (not including the leading “*” character)	20 characters max.
*cc	Optional checksum	*00-*FF

Example

Setting trigger string to “*0100XY”, tiltmeter connected to port F:

$PASHS,TLT,CMD,F,0100XY*19

Relevant Query Command

$PASHQ,TLT

See Also

$PASHS,TLT,INIT
$PASHS,TLT,INTVL
$PASHS,OUT,x,TLT

TLT,INIT: Defining the String Used to Initialize the Tiltmeter

Function

This command is used to define the character string that will initialize the tiltmeter. The command also specifies the ID of the receiver port used to communicate with the tiltmeter.

The initializing string is in the form "*xxxxxx". There is no initialization string defined by default.

Command Format

Syntax

$PASHS,TLT,INIT,c1,s2[*cc]

Parameters

Parameter	Description	Range
c1	Receiver serial port connected to the tiltmeter.	A, B, F
s2	Initialization string (not including the leading "*" character)	20 characters max.
*cc	Optional checksum	*00-*FF

Example

Setting initialization string to "*9900ID", tiltmeter connected to port F:

$PASHS,TLT,INIT,F,9900ID*44

Relevant Query Command

$PASHQ,TLT

See Also

$PASHS,TLT,CMD
$PASHS,TLT,INTVL
$PASHS,OUT,x,TLT

TLT,INTVL: Defining the Time Interval to Acquire Tiltmeter Data

Function

This command is used to define the time interval through which the receiver will regularly ask the tiltmeter to return its data. The command also specifies the ID of the receiver port used to communicate with the tiltmeter.

By default, the receiver will query the tiltmeter every second once the receiver has notified the tiltmeter, through the $PASHS,OUT,x,TLT,ON command, to start operating.

Command Format

Syntax

$PASHS,TLT,INTVL,c1,d2[*cc]

Parameters

Parameter	Description	Range	Default
c1	Receiver serial port connected to the tiltmeter.	A, B, F	
d2	Query interval, in seconds	1-86400	1
*cc	Optional checksum	*00-*FF	

Example

Setting query interval to 10 seconds, tiltmeter on port F:

$PASHS,TLT,INTVL,F,10*1B

Relevant Query Command

$PASHQ,TLT

See Also

$PASHS,TLT,CMD
$PASHS,TLT,INIT
$PASHS,OUT,x,TLT

TLT,PAR: Setting the Tiltmeter

Function

This command is used to define all the parameters needed to communicate with the tiltmeter.

Following the execution of this command, and then that of $PASHS,OUT,x,TLT,ON, the receiver will regularly query the tiltmeter by sending the trigger string every x seconds of query interval.

Command Format

Syntax

$PASHS,TLT,PAR,c1,s2,s3,d4[*cc]

Parameters

Parameter	Description	Range	Default
c1	Receiver serial port connected to the tiltmeter.	A, B, F	
s2	Initialization string	20 characters max.	
s3	Trigger string	20 characters max.	0100XY
d4	Query interval, in seconds. “0” means no query.	0; 1-68400	1
*cc	Optional checksum	*00-*FF	

Comments

- This command overwrites all the settings previously performed with the following commands:
  - $PASHS,TLT,INIT
  - $PASHS,TLT,INTVL
  - $PASHS,TLT,CMD
- In fact, the $PASHS,TLT,PAR command is used for the same purpose as, and is more convenient than, the above three commands, which are maintained only for the sake of compatibility with the Ashtech iCGRS reference station.

Example

Setting the tiltmeter connected to port F:

$PASHS,TLT,PAR,F,*9900ID,*0100XY,10*1C

Relevant Query Command

$PASHQ,TLT

See Also $PASHS,OUT,x,TLT

UDP: User-Defined Dynamic Model Parameters

Function

This command is used to set the upper limits of the dynamic model (velocity, acceleration).

Command Format

Syntax

$PASHS,UDP,f1,f2,f3,f4[*cc]

Parameters

Parameter	Description	Range	Default
f1	Maximum expected horizontal velocity in m/s.	0-100 000	100 000
f2	Maximum expected horizontal accelera-tion in m/s/s.	0-100	100
f3	Maximum expected vertical velocity in m/s.	0-100 000	100 000
f4	Maximum expected vertical acceleration in m/s/s.	0-100	100
*cc	Optional checksum	*00-*FF	-

Example

Setting the dynamic model:

$PASHS,UDP,10,1,2,0.5*1D

Comments

The user-defined dynamic model is activated by the $PASHS,DYN,9 command. Note that when the adaptive dynamic mode (DYN,8) is selected, the user-defined model is automatically excluded from the possible models that could best describe the current receiver dynamics.

Relevant Query Command $PASHQ,UDP

See Also $PASHS,DYN

UNT: Distance Unit Used on Display Screen

Function: This function is used to choose the distance unit you want the receiver to use when providing coordinates on its display screen.

Command Format

Syntax

$PASHS,UNT,s1[*cc]

Parameters

Parameter	Description	Range	Default
s1	Desired distance unit: • M: Meters • F: US Survey Feet • IF: International Feet	M, F, IF	M
*cc	Optional checksum	*00-*FF	-

Example

Choosing US Survey Feet:

$PASHS,UNT,F*50

Relevant Query Command $PASHQ,UNT

UPL,PAR: Setting the FTP Server Providing Firmware Upgrades

Function

This command allows you to set the FTP server used to provide the receiver with firmware upgrades.

Command Format

Syntax

$PASHS,UPL,PAR,[,ADD,s1][PRT,d2][,LGN,s3][,PWD,s4][,PTH,s5][*cc]

Parameters

Parameter	Description	Range	Default
ADD,s1	IP address or host name	32 characters max.	
PRT,d2	Port number	0-65535	21
LGN,s3	Login	32 characters max.	
PWD,s4	Password	32 characters max.	
PTH,s5	Path used on the FTP server	255 characters max.	
*cc	Optional checksum	*00-*FF	

Example

**$PASHS,UPL,PAR,ADD,ftp.ashtech.com,PRT,21,LGN,Ashtech,
PWD,u6huz8,PTH,/my folder*1F**

Relevant Query Command

$PASHQ,UPL

See Also

$PASHS,UPL,UPG
$PASHQ,UPL,LST

UPL,UPG: Upgrading the Receiver Firmware from FTP

Function

This command is used to download a firmware upgrade from the FTP server declared with $PASHS,UPL,PAR, and then perform the upgrade.

Command Format

Syntax

$PASHS,UPL,UPG[,s1]*cc

Parameters

Parameter	Description	Range
s1	Name of the upgrade file that will be first downloaded to the receiver and then used to perform the firmware upgrade. • The file name can contain a relative path to the path defined BY $PASHS,UPL,PAR. • If s1 is missing or only consists of a path, then "p_800_upgrade_********.tar.bz2 is downloaded, provided there is only one of these files available on the FTP server, otherwise the command will be NAKed.	255 characters max.
*cc	Optional checksum	*00-*FF

Example

Upgrading from file "p_800_upgrade_S607Gs23.tar.bz2" found on the FTP server:

$PASHS,UPL,UPG,p_800_upgrade_S607Gs23.tar.bz2*0E

After successful completion of the file to the receiver, the following response line is returned:

$PASHR,UPL,UPL,REBOOT,p_800_upgrade_S607Gs23.tar.bz2*29

Then, communication with the receiver is suspended until upgrade installation is complete.

Should the file transfer fail, the following response line will appear:

$PASHR,UPL,FAIL,p_800_upgrade_S607Gs23.tar.bz2*42

Relevant Query Command

$PASHQ,UPL

See Also

$PASHS,UPL,PAR

$PASHQ,UPL,LST

USE: Enabling or Disabling the Tracking of a GNSS Satellite

Function: This function is used to enable or disable the tracking of a particular GNSS satellite.

Command Format

Syntax

$PASHS,s1,USE,[d2],s3[*cc]

Parameters

Parameter	Description	Range	Default
s1	GNSS type: • GPS: GPS • GLO: GLONASS • GAL: GALILEO • SBA: SBAS • QZS: QZSS	GPS, GLO, GAL, SBA, QZS	-
d2	Satellite PRN: • For GPS: 1-32 • For GLONASS: 1-24 • For GALILEO: 1-30 • For SBAS: 1-19 • For QZSS: 1-5 d2 omitted in the command line combined with s3=ON: Re-enables all the satellites you previously disabled.	1-32	-
s3	Tracking status	ON,OFF	ON
*cc	Optional checksum	*00-*FF	-

Comments

- Use the command as many times as the number of satellites you want to disable from tracking.
- The tracking of a given satellite is suspended immediately after disabling it. The satellite is also excluded from the list of searched/tracked satellites.
- Conversely, re-enabling a previously disabled satellite consists of re-inserting it into the list of searched/tracked satellites.
- Be aware that re-enabling the tracking of a satellite shortly after having disabled it does not mean that the receiver will be able to quickly restore the tracking of this satellite.

Examples

Disabling GLONASS satellite PRN 5:

$PASHS,GLO,USE,5,OFF

Disabling all GLONASS satellites:

$PASHS,GLO,USE,,OFF

Enabling all GPS satellites:

$PASHS,GPS,USE,,ON

Relevant Query Command $PASHQ,PAR

USR,POS: Setting Position for User Message Type “GGA”

Function: This function is used to define the position that will be inserted into the “GGA” user message, as defined through $PASHS,NME (command run with s1= USR) and $PASHS,USR,TYP (command run with s= GGA).

Command Format

Syntax

$PASHS,USR,POS,m1,c2,m3,c4,f5[*cc]

Parameters

Parameter	Description	Range
m1	Latitude in degrees and minutes with 7 decimal places (ddmm.mmmmmmm)	0-90
c2	North (N) or South (S)	N, S
m3	Longitude in degrees, minutes with 7 decimal places (ddmm.mmmmmmm)	0-180
c4	West (W) or East (E)	W, E
f5	Height in meters	±0-9999.9999
*cc	Optional checksum	*00-*FF

Example

Setting coordinates of position to 37° 22.2912135’ N, 121° 59.7998217’ W, 15.25 m:

$PASHS,USR,POS,3722.2912135,N,12159.7998217,W,15.25

Relevant Query Command

$PASHQ,USR,POS

See Also

$PASHS,NME
$PASHS,USR,TYP

USR,TYP: Defining User Message Type

Function:

This function is used to set the type of user message the receiver will generate after the “USR” NMEA-like message has been enabled.

Command Format

Syntax

$PASHS,USR,TYP,s[*cc]

Parameters

Parameter	Description	Range	Default
s	Requested user message type: • TXT: text message type. The inserted text is the one you define using command $PASHS,USR,TXT. • GGA: GGA message type. The inserted position is the one you define using command $PASHS,USR,POS.	TXT,GGA	TXT
*cc	Optional checksum	*00-*FF	

Example

Defining a “GGA” user message type:

$PASHS,USR,TYP,GGA

Relevant Query Command

$PASHQ,USR,TYP

See Also

$PASHS,NME
$PASHS,USR,TXT
$PASHS,USR,POS

USR,TXT: Entering text for User Message Type “TXT”

Function: This function is used to enter the text that will be inserted into the “TXT” user message, as defined through $PASHS,NME (command run with s1= USR) and $PASHS,USR,TYP (command run with s= TXT).

Command Format

Syntax

$PASHS,USR,TXT,s[*cc]

Parameters

Parameter	Description	Range
s	User message text	Up to 80 characters between double quotes
*cc	Optional checksum	*00-*FF

Example

$PASHS,USR,TXT,”this the text of the user message”

Relevant Query Command $PASHQ,USR,TXT

See Also $PASHS,NME
$PASHS,USR,TYP

UTS: Synchronizing Onto GPS Time

Function: This function is used to enable or disable a clock steering mechanism that synchronizes measurements and coordinates with the GPS system time rather than with the local (receiver) clock.

Command Format

Syntax

$PASHS,UTS,s1[*cc]

Parameters

Parameter	Description	Range	Default
s1	Enabling (ON) or disabling (OFF) synchronization with GPS time	ON, OFF	ON
*cc	Optional checksum	*00-*FF	-

Example

Enabling synchronization:

$PASHS,UTS,ON*0A

Comments

- All output data, except for legacy MPC, DPC and RPC, are always clock steered.
- Legacy MPC, DPC and RPC data appear as steered or not steered depending on the last $PASHS,UTS command run.
- The PBN message contains internal clock and clock drift estimates when UTS is OFF and reports zeros for these estimates when UTS is ON.
- The ATOM,RNX message with scenario 0 contains original clock and clock drift estimates that can be used on decoding side to restore the original (not steered) observables, if needed.

Relevant Query Command

$PASHQ,UTS
$PASHQ,PAR

VCT: Choosing the Type of Vector Coordinates

Function

This command is used to set the type of coordinates found in the VEC messages.

Command Format

Syntax

$PASHS,VCT,d[*cc]

Parameters

Parameter	Description	Range	Default
d	Type of vector coordinates: • 0: ECEF coordinates • 1: Latitude, longitude, height	0-1	0
*cc	Optional checksum	*00-*FF	

Example

Choosing ECEF coordinates:

$PASHS,VCT,0

Relevant Query Command

$PASHQ,VCT

VEC: Vector Output Mode

Function

This command is used to define the output mode for vector (baseline) estimates. Changing this parameter will affect all the messages providing baseline-related information, but not those providing position information such as POS and GGA (the output of which is controlled by the CPD,FST command).

Command Format

Syntax

$PASHS,VEC,s1[*cc]

Parameters

Parameter	Description	Range	Default
s1	Output mode for baseline parameters: • TT: Time-tagged • FST: Fast	TT, FST	TT
*cc	Optional checksum	*00-*FF	-

Comments

- With Fast output mode selected (s1=FST), the rover receiver can provide a baseline solution at every receiver epoch. Usually, this mode delivers estimates of lesser quality compared to TT. However, they are available at regular intervals of time and with minimum latency.
- With time-tagged output mode selected (s1=TT), the rover receiver can provide a baseline solution only at epochs to which incoming reference (corrections) data are tagged.

This mode delivers the best possible estimates in terms of accuracy. Estimates may however be affected if the data link experiences delays or outages.

Example

Enabling Fast output mode:

$PASHS,VEC,FST*48

WAK: Acknowledging Alarms

Function

This command is used to acknowledge all alarms. This will also turn off the beeper (if previously set to beep on occurrence of an alarm). After sending the command, all alarms will switch from the “current” to the acknowledged (“pending”) status.

Command Format

Syntax

$PASHS,WAK[*cc]

Parameters

None.

Example

Acknowledging all alarms:

$PASHS,WAK*28

Relevant Query Command

$PASHQ,WARN

WEB,OWN: Setting Owner Information

Function

This command is used to define the owner information displayed on the home page of the Web Server.

Command Format

Syntax

$PASHS,WEB,OWN,s1,s2,s3,s4[*cc]

Parameters

Parameter	Description	Range
s1	Company name	255 characters max.
s2	Administrator name	255 characters max.
s3	Administrator email	255 characters max.
s4	Administrator phone number	255 characters max.
*cc	Optional checksum	*00-*FF

Example

**$PASHS,WEB,OWN,Ashtech,Peter Smith,psmith@ashtech.com,
0228093800*5C**

Relevant Query Command $PASHQ,WEB

See Also $PASHS,WEB,PAR

WEB,PAR: Web Server Control & Administrator Profile

Function This command is used to enable or disable the use of the Web Server and define the profile of the receiver administrator. There is necessarily one –and just one– administrator profile per receiver.

Command Format

Syntax

$PASHS,WEB,PAR,s1[,s2,s3[,d4]][*cc]

Parameters

Parameter	Description	Range	Default
s1	Enables (ON) or disables (OFF) the Web Server	ON, OFF	ON
s2	Administrator login	32 characters max.	admin
s3	Administrator password	32 characters max.	changeme
d4	httpd port	0-65535	80
*cc	Optional checksum	*00-*FF	

Comments

- The login and password are set to their default values after the $PASHS,RST or $PASHS,INI command has been run.
- The httpd port is used to access the Web Server through the network.

  If for example the IP address of the receiver is 10.20.2.18 and d4=2500, you should enter the following in the address bar of your web browser to open the Web Server:

  10.20.2.18:2500

Example

Enabling the use of the Web Server with specific login and password on httpd port 2500:

$PASHS,WEB,PAR,ON,Smith,u7lmyt,2500*69

Relevant Query Command $PASHQ,WEB

See Also $PASHS,WEB,PAR

WEB,USR,ADD: Adding/Modifying User Profiles

Function This command is used to add or modify user profiles. A user profile is needed for a user to be able to access and use the receiver status section of the Web Server.

Modifying a user profile means changing its password. This is obtained by simply running the $PASHS,ADD,USR command in which the existing user login is mentioned, followed by the new password.

Command Format

Syntax

$PASHS,WEB,USR,ADD,s1,s2[*cc]

Parameters

Parameter	Description	Range	Default
s1	User login	32 characters max.	user
s2	User password	32 characters max.	pf800
*cc	Optional checksum	*00-*FF	

Examples

Entering a new user profile:

$PASHS,WEB,USR,ADD,smith,213lkio5*7F

Modifying the “smith” user profile:

$PASHS,WEB,USR,ADD,smith,newpassword*38

Comments

There is no limit in the number of user profiles you can create but only five of them can be connected to the receiver at the same time. By default, the receiver contains a single user profile, as defined in the table above (Default column).

Relevant Query Command

$PASHQ,WEB

See Also

$PASHS,WEB,USR,DEL

WEB,USR,DEL: Deleting a User Profile

Function

This command is used to delete user profiles. All the user profiles can be deleted.

Deleting all the user profiles means only the administrator profile, which can’t be deleted, will remain in the receiver

Deleting a user profile will prevent any user, who has been using this profile until now, to log in again as a Web Server user.

Command Format

Syntax

$PASHS,WEB,USR,DEL,s1[*cc]

Parameters

Parameter	Description	Range
s1	User login	32 characters max.
*cc	Optional checksum	*00-*FF

Example

Deleting user profile whose login is “smith”:

$PASHS,WEB,USR,DEL,smith*77

Relevant Query Command

$PASHQ,WEB

See Also

$PASHS,WEB,USR,ADD

ZDA: Setting Date & Time

Function

This command is used to set the date and time in the receiver.

Command Format

Syntax

$PASHS,ZDA,m1,d2,d3,d4[*cc]

Parameters

Parameter	Description	Range
m1	UTC time (hhmmss.ss)	000000.00-235959.99
d2	Current day	01-31
d3	Current month	01-12
d4	Current year	0000-9999
*cc	Optional checksum	*00-*FF

Example

$PASHS,ZDA,151145.00,13,03,2008*0A

Relevant Query Command

$PASHQ,ZDA

See also

$PASHS,LTZ

Chapter 10. Query Command Library

AGB: Reading GLONASS Bias Setting

Function

This command tells you whether L1 & L2 GLONASS carrier biases are currently processed in the receiver or not.

Command Format

Syntax

$PASHQ,AGB[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,AGB,s1*cc

Parameters

Parameter	Description	Range
s1	ON: Processing enabled OFF: Processing disabled	ON, OFF
*cc	Checksum	*00-*FF

Example

$PASHQ,AGB*33
$PASHR,AGB,ON*1D

Relevant Set Command

$PASHS,AGB

ALM: Almanac Message

Function

This command allows you to output the latest GPS almanac data. Each response line describes the almanac data from a given GPS satellite.

Command Format

Syntax

$PASHQ,ALM[*cc]

Response Format

Syntax

$GPALM,d1,d2,d3,d4,h5,h6,h7,h8,h9,h10,h11,h12,h13,h14,h15*cc

Parameters

Parameter	Description	Range
d1	Total number of messages	01-32
d2	Number of this message	01-32
d3	Satellite PRN number	01-32
d4	GPS week	4 digits
h5	SV health (in ASCII hex)	2 bytes
h6	e: Excentricity (in ASCII hex)	4 bytes
h7	toe: Almanac reference time, in seconds (ASCII hex)	2 bytes
h8	Io: Inclination angle, in semicircles (ASCII hex)	4 bytes
h9	OMEGADOT: Rate of ascension, in semicircles/second (ASCII hex)	4 bytes
h10	A1/2: Square root of semi-major axis, in meters 1/2 (ASCII hex)	6 bytes
h11	OMEGA: Argument of perigee, in semicircles (ASCII hex)	6 bytes
h12	OMEGA0: Longitude of ascension mode, in semicircles (ASCII hex)	6 bytes
h13	Mo: Mean anomaly, in semi-circles (ASCII hex)	6 bytes
h14	af0: Clock parameter, in seconds (ASCII hex)	3 bytes
h15	af1: Clock parameter, in seconds/second (ASCII hex)	3 bytes
*cc	Checksum	*00-*FF

Example

$PASHQ,ALM
$GPALM,31,1,01,65535,00,39A8,4E,1FEA,FD65,A10C8C,B777FE,935A86,C994BE,0C6,001*73
$GPALM,31,2,02,65535,00,4830,4E,00D9,FD49,A10D24,64A66D,3B6857,E6F2A3,0BA,001*7A

$GPALM,31,3,03,65535,00,552B,4E,F572,FD3B,A10CE1,20E624,0CD7E1,D10C32,0CA,001*0D
$GPALM,31,4,04,65535,00,4298,4E,0069,FD46,A10D5C,0EE3DC,3C2E3E,51DDF9,FF0,FFF*0A
...

Automatic Output of ALM Messages

This is a reminder on how to output ALM messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,ALM,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output ALM messages on port A at a rate of 15 seconds:

$PASHS,NME,ALM,A,ON,15

ANH: Antenna Height

Function

This command allows you to read the entered antenna height as well as the measurement type used.

Command Format

Syntax

$PASHQ,ANH[*cc]

Response Format

Syntax

$PASHR,ANH,f1,c2*cc

Parameters

Parameter	Description	Range
f1	Antenna height.	0-6.553 m 6.553-100 m
c2	Antenna height measurement type: • V: Vertical measurement • S: Slant measurement	V, S
*cc	Checksum	*00-*FF

Example

$PASHQ,ANH
$PASHR,ANH,1.568,S*44 (slant measurement, H=1.568 m)

Relevant Set Command $PASHS,ANH

See also $PASHQ,ANR

ANP: Antenna Parameters

Function This command allows you to read the antenna parameters of the specified antenna name, or of the complete antenna database if no antenna name is specified.

Command Format

Syntax

$PASHQ,ANP[*cc]
or
$PASHQ,ANP,s1[*cc]

Parameters

Parameter	Description	Range
s1	Antenna name (case sensitive)	31 characters max.
*cc	Optional checksum	*00-*FF

Response Formats (Through examples)

$PASHQ,ANP
LIST OF PREDEFINED ANTENNAS (d1):
ANT1 ANT2
ANT3 ANT4
…
LIST OF USERDEFINED ANTENNAS (d2):
ANT10 ANT11
ANT12 ANT13
…
OWN ANTENNA: MAG990596
OW2 ANTENNA: MAG111402
REFERENCE ANTENNA: UNKNOWN
OUT ANTENNA: NULLANTENNA
RECEIVED ANTENNA: MAG990596

(Where d1 is the number of predefined antennas and d2 is the number of user-defined antennas.)

$PASHQ,ANP,MAG990596
MAG990596

```
L1 N: -000.80 E: -001.40 U: +101.80
L1 PAE:+000.0 +000.9 +001.9 +002.8 +003.7 +004.7 +005.4 +006.0 +006.4
+006.5
        +006.3 +005.8 +004.8 +003.2 +001.1 -001.6 -005.1 +000.0 +000.0
L2 N: +000.80 E: -001.10 U: +086.20
L2 PAE:+000.0 -000.9 -001.1 -000.6 +000.2 +001.1 +002.0 +002.7 +003.0
+003.0
        +002.6 +001.7 +000.5 -001.1 -003.0 -004.9 -006.8 +000.0 +000.0
```

Relevant Set Commands

$PASHS,ANP,OWN
$PASHS,ANP,REF
$PASHS,ANP,PCO

ANP,OUT: Virtual Antenna

Function

This command returns the name of the virtual antenna currently selected in the receiver.

Command Format

Syntax

$PASHQ,ANP,OUT[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,ANP,OUT,s1*cc

Parameters

Parameter	Description	Range
s1	Name of the virtual antenna. If “OFF” is returned, this means no virtual antenna is selected.	31 characters max.
*cc	Checksum	*00-*FF

Example

$PASHQ,ANP,OUT
$PASHR,ANP,OUT,ADVNULLANTENNA*72

Relevant Set Command

$PASHS,ANP,OUT

ANP,OWN: Local Antenna Used

Function

This command returns the name of the GNSS antenna currently used by the receiver.

Command Format

Syntax

$PASHQ,ANP,OWN[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,ANP,OWN,s1,s2,s3*cc

Parameters

Parameter	Description	Range
s1	Name of the local antenna	31 characters max.
s2	Antenna serial number	31 characters max.
	Antenna setup ID	0-255
*cc	Checksum	*00-*FF

Example

$PASHQ,ANP,OWN
$PASHR,ANP,OWN,ASH111661,,*27

Relevant Set Command

$PASHS,ANP,OWN

ANP,REF: Antenna Used at the Base

Function

This command returns the name of the GNSS antenna assumed to be used by the base currently sending data to the interrogated receiver (a rover).

Command Format

Syntax

$PASHQ,ANP,REF[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,ANP,REF,s1,d2*cc

Parameters

Parameter	Description	Range
s1	Name of the antenna used at the base	31 characters max.
d2	Antenna name preference: • 0: s1 is ignored if incoming reference data include base antenna name • 1: s1 is always used; decoded base antenna name is ignored	0, 1
*cc	Checksum	*00-*FF

Example

$PASHQ,ANP,REF
$PASHR,ANP,REF,ASH111661,1*3D

Relevant Set Command

$PASHS,ANP,REF

ANP,RCV: Antenna Name and Offsets of Received Base

Function

This command queries the receiver for the antenna name and offsets of the received base.

Command Format

Syntax

$PASHQ,ANP,RCV[*cc]

Response Format

Syntax

$PASHR,ANP,RCV,s1,f2,f3,f4,f5,f6,f7*cc

Parameters

Parameter	Description
s1	Antenna name, “NONE” if non name received for the base antenna.
f2	L1 North offset, in mm
f3	L1 East offset, in mm
f4	L1 Up offset, in mm
f5	L2 North offset, in mm
f6	L2 East offset, in mm
f7	L2 Up offset, in mm
*cc	Checksum

Example

$PASHQ,ANP,RCV
$PASHR,ANP,RCV,ASH802147,-2.00,0.70,103.00,-3.4,-2.2,103.80*09

ANR: Antenna Reduction Mode

Function

This command is used to read the current setting for the antenna reduction mode. This setting defines the physical location on the system for which the position is computed.

Command Format

Syntax

$PASHQ,ANR[*cc]

Response Format

Syntax

$PASHR,ANR,s1*cc

Parameters

Parameter	Description	Range
s1	Antenna reduction mode: • OFF: The computed position is assumed to be the location of the antenna's L1 phase center. • ON: The computed position is assumed to be the location of the ground mark. • ARP: The computed position is assumed to be the location of the Antenna Reference Plane (ARP).	OFF, ON, ARP
*cc	Checksum	*00-*FF

Example

$PASHQ,ANR
$PASHR,ANR,ON*04

Relevant Set Command

$PASHS,ANR

See also

$PASHS,ANH

ANT: Antenna Height

Function

This command is used to read the current setting for the antenna height.

Command Format

Syntax

$PASHQ,ANT[*cc]

Response Format

Syntax

$PASHR,ANT,f1,f2,f3,m4,f5*cc

Parameters

Parameter	Description	Range
f1	Slant height measurement, from ground mark to antenna edge (SHMP)	0-6.553 m 6.553-100 m
f2	Antenna radius: horizontal distance from the geometrical center to the antenna edge.	0-6.553 m
f3	Antenna vertical offset: • Offset between SHMP and ARP if both slant height measurement and antenna radius are different from zero. • Offset between ground mark and ARP if either slant height measurement or radius is zero.	± 0-6.553 m 6.553-100 m
m4	Horizontal azimuth [dddmm.mm], in degrees, for the horizontal line connecting the ground mark to the surveyed point, measured with respect to the Geographical North. Currently NOT processed.	0-35959.99
f5	Horizontal offset from the ground mark to the surveyed point. Currently NOT processed.	0-6.553 m
*cc	Checksum	*00-*FF

Example

$PASHQ,ANT
$PASHR,ANT,0,0,2.000,0,0*49 (vertical, 2.000 m)

Relevant Set Command

$PASHS,ANT

See also

$PASHQ,ANR
$PASHQ,ANH

ATL: Debug Data Recording

Function

This command queries the receiver for the current status of the data recording function used for debugging.

Command Format

Syntax

$PASHQ,ATL[*cc]

Response Format

Syntax

$PASHR,ATL,s1,d2,c3,f4,d5*cc

Parameters

Parameter	Description	Range
s1	ON/OFF/AUT status: • ON: Debug data recording is enabled but will not re-start after a power cycle. • OFF: Debug data recording is disabled. • AUT: Debug data recording is enabled and will re-start after a power cycle.	ON, OFF, AUT
d2	Indicates which data are recorded: • 0: Only data from GNSS board to system board are recorded. • 1: Only data from system board to GNSS board are recorded. • 2: Data flowing in both directions are recorded.	0-2
c3	Recording status: • R: The receiver is currently recording data for debugging. • S: No debug data currently recorded.	R, S
f4	Output rate, in seconds (default: 1 sec.)	0.05, 0.1, 0.2,0.5, 1
d5	Configuration index	0, 1
*cc	Checksum	*00-*FF

Examples

Data recording disabled:

$PASHQ,ATL*2E
$PASHR,ATL,OFF,0,S,1,0*2C

Data recording enabled and in progress:

$PASHQ,ATL*2E
$PASHR,ATL,ON,0,R,0.5,0*79

Data recording is enabled but for some reason (no SD card, etc.), no data is being recorded:

$PASHQ,ATL*2E
$PASHR,ATL,ON,0,S,0.5,0*78

ATM: ATOM Data Parameters

Function

This command allows you to read the current settings of the ATOM data-related parameters.

Command Format

Syntax

$PASHQ,ATM[*cc]

Response format

Syntax

(Through an example)

$PASHQ,ATM

```
PER:020.00 ELM:10
DRI:001.00 SIT:abcd REC:Y MEM:M
ANH:02.132 ANT:SLANT ANR:ON
ATOM: MES  PVT ATR NAV DAT  EVT BAUD
PRTA:   OFF OFF OFF OFF OFF OFF   6
PRTB:   OFF OFF OFF OFF OFF OFF   6
PRTC:   OFF OFF OFF OFF OFF OFF   1
PRTE:   OFF OFF OFF OFF OFF OFF   1
PRTF:   OFF OFF OFF OFF OFF OFF   6
PRTI:   OFF OFF OFF OFF OFF OFF   1
MEMM: OFF OFF OFF OFF OFF OFF   1
MEMR: OFF OFF OFF OFF OFF OFF   1
MEMU: OFF OFF OFF OFF OFF OFF   0
I1:     OFF OFF OFF OFF OFF OFF   0
I2:     OFF OFF OFF OFF OFF OFF   0
I3:     OFF OFF OFF OFF OFF OFF   0
I4:     OFF OFF OFF OFF OFF OFF   0
I5:     OFF OFF OFF OFF OFF OFF   0
I6:     OFF OFF OFF OFF OFF OFF   0
I7:     OFF OFF OFF OFF OFF OFF   0
I8:     OFF OFF OFF OFF OFF OFF   0
I9:     OFF OFF OFF OFF OFF OFF   0
```

Parameters

Parameter	Description	Range
PER	ATOM output rate	0.00-999.0 s
ELM	Elevation mask used in data recording & data output	0-90
DRI	Recording rate	0.00-999.0 s

Parameter	Description	Range
SIT	Site ID	4 characters
REC	Data recording: • Y: Data recording enabled • N: Data recording disabled • S: Data recording enabled but stopped	Y, N, S
MEM	Selected memory: • M: Internal memory • U: USB memory	M, U
ANH	Antenna height	0.000-99.999
ANT	Height measurement type (slant/vertical)	SLANT, VERT
ANR	Antenna reduction mode	ON, OFF, ARP
ATOM	ATOM message type	PVT, ATR, NAV, DAT, EVT, RNX
PRTA PRTB PRTF	Labels for serial ports A, B and F	ON, OFF
PRTC	Label for Bluetooth	ON, OFF
PRTE	Label for Modem	ON, OFF
PRTI	Label for Ethernet	ON, OFF
MEMM MEMU MEMR	Labels for memories M, U and R	ON, OFF
I1-I9	Data streaming port	ON, OFF
BAUD	If serial port used, then baud rate If memory used, “0” if not available, else “1”	0-15 (see table below)

Code	Baud Rate	Code	Baud Rate
0	300	8	57600
1	600	9	115200
2	1200	10	230400
3	2400	11	480600
4	4800	12	921600
5	9600	13	1428571
6	19200	14	2500000
7	38400	15	5000000

Relevant Set Command $PASHS,ATM

See also $PASHQ,ATM
$PASHQ,ATO

ATO: ATOM Message Output Settings

Function

This command allows you to read the different parameters of the ATOM message, as currently set on the specified port or memory. The receiver will return the response on the port through which the query command is sent.

Command Format

Syntax

$PASHQ,ATO,c[*cc]

Parameters

Parameter	Description	Range
c	Port ID for which you need to know the ATOM message settings: • A, B, F: Serial ports • C: Bluetooth port • I, I1-I9: Ethernet port • E: Modem • M, U: Memory • R: Data recording through session	A, B, C, E, F, I, M, R, U, I1-I9
*cc	Optional checksum	*00-*FF

Response Format

Syntax

$PASHR,ATO,c1,d2,f3,d4,7(s5,f6)*cc

Parameters

Parameter	Description	Range
c1	The port ID mentioned in the query command is replicated in this field.	A, B, C, E, F, I, M, R, U, I1-I9
d2	Baud rate code, 0 if not available	0-15
f3	PER setting	0-999.0
d4	Number of ATOM messages	7
s5	ATOM message type	MES, PVT, ATR, NAV, DAT, EVT, RNX
f6	Output rate (0 if message disabled)	0-999.0
*cc	Checksum	*00-*FF

Example

Querying ATOM message parameters as currently set on port A:

$PASHQ,ATO,A

$PASHR,ATO,A,7,001.00,7,MES,0.00,PVT,0.00,ATR,0.00,NAV,0.00,DAT,0.00,EVT,0.00,RNX,0.00*07

See also $PASHS,ATM
$PASHQ,ATM

ATT: Heading, Roll and Pitch

Function

This command allows you to output the heading, roll and pitch message.

Command Format

Syntax

$PASHQ,ATT[*cc]

Response Format

Syntax

$PASHR,ATT,f1,f2,f3,f4,f5,f6,d7*cc

Parameters

Parameter	Description	Range
f1	Week time in seconds.	000000.00-604799.99
f2	True heading angle in degrees.	000.00-359.99
f3	Pitch angle in degrees.	±90.00
f4	Roll angle in degrees.	±90.00
f5	Carrier measurement RMS error, in meters.	Full range of real variables
f6	Baseline RMS error, in meters.	Full range of real variables
d7	Integer ambiguity is “Fixed” or “Float”: • 0: Fixed • >0: Float	0, >0
*cc	Optional checksum	*00-*FF

Comments

- When baseline parameters are output in time-tagged mode ($PASHS,VEC,TT), the ATT message is generated only for those epochs for which reference data are available. In fast mode ($PASHS,VEC,FST), the ATT message will be generated for each receiver epoch using additional extrapolation algorithms.
- d7=0 does not necessarily mean that the corresponding position message (e.g. POS) includes a “fixed” RTK position solution. When d7>0, the reported attitude is not necessarily wrong. This is because even a float solution

over long baselines can achieve sub-degree accuracy for attitude.

Example

Querying the heading and roll/pitch message on the current port:

$PASHQ,ATT
$PASHR,ATT,310080.0,248.57,+04.22,,0.0027,0.0000,0*2B

Automatic Output of ATT Messages

This is a reminder on how to output ATT messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,ATT,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output ATT messages on port A at a rate of 0.5 second:

$PASHS,NME,ATT,A,ON,0.5

BAS: Differential Data Type

Function

This command is used to list the message types generated and sent by a base.

Command Format

Syntax

$PASHQ,BAS[*cc]

Response Format

Syntax

$PASHR,BAS,c1,s2[,c3,s4]*cc

Parameters

Parameter	Description	Range
c1	First port ID: • A, B, F: Serial port • C: Bluetooth port • D: Internal transmitter • I, P, Q: Ethernet port • E: Modem • M, U: Memory • N: Undefined port	A, B, C, D, E, F, I, P, Q, M, U, N
s2	Differential data type: • RT2: RTCM 2.3 messages • RT3: RTCM 3.0 & 3.1 messages (default) • CMR: CMR messages • CMP: CMR+ messages • ATM: ATOM messages • DBN: DBEN messages • NONE: Undefined	RT2, RT3, CMR, CMP, ATM, DBN, NONE
c3	Second port ID: same as c1 above	A, B, C, D, E, F, I, P, Q, M, U
s4	Differential data type: same as s2 above.	RT2, RT3, CMR, CMP, ATM, DBN, NONE
*cc	Checksum	*00-*FF

Examples

The response line below reports RTCM 3.x messages sent on port A:

$PASHQ,BAS
$PASHR,BAS,A,RT3*50

The response line below reports RTCM 2.3 messages sent on port A and CMR+ messages on port E:

$PASHQ,BAS
$PASHR,BAS,A,RT2,E,CMP*4A

Relevant Set Command

$PASHS,BAS

See also

$PASHQ,CPD,MOD
$PASHQ,RTC
$PASHQ,RNX,MSI
$PASHQ,CMR,MSI
$PASHQ,RTC,MSI

BDS: Differential Data Streaming

Function

This command allows you to list the types of differential data messages currently enabled on the nine I ports (I1-I9).

Command Format

Syntax

$PASHQ,BDS[*cc]

Response format

Syntax

```
DIF:  RT2 RT3 CMR CMP ATM DBN
I1:   ON  OFF OFF  OFF OFF  OFF
I2:   OFF OFF OFF  OFF OFF  OFF
I3:   OFF OFF OFF  OFF OFF  OFF
I4:   OFF OFF OFF  OFF OFF  OFF
I5:   OFF OFF OFF  OFF OFF  OFF
I6:   OFF OFF OFF  OFF OFF  OFF
I7:   OFF OFF OFF  OFF OFF  OFF
I8:   OFF OFF OFF  OFF OFF  OFF
I9:   OFF OFF OFF  OFF OFF  OFF
```

Parameters

Parameter	Description	Range
DIF (heading row)	Type of differential message: • RT2: RTCM 2.3 • RT3: RTCM 3 • CMR: CMR • CMP: CMR+ • ATM: ATOM • DBN: DBEN	RT2, RT3, CMR, CMP, ATM, DBN
Ix (leftmost column)	Data stream port	I1-I9
Message Status cells	Each cell indicates whether the corresponding message type on the corresponding Ix port is currently enabled (ON) or not (OFF)	ON, OFF

Relevant Set Command

$PASHS,BDS

BEEP: Beeper State

Function

This command is used to read the current state of the internal beeper.

Command Format

Syntax

$PASHQ,BEEP[*cc]

Response Format

Syntax

$PASHR,BEEP,s1,d2*cc

Parameters

Parameter	Description	Range
s1	Beeper enabled (ON) or disabled (OFF)	ON, OFF
d2	Timeout, in seconds: • =0: No timeout • >0: Buzzer will go out after thespecified timeout if the alarm has not been acknowledged at the end of that time.	0-99
*cc	Checksum	*00-*FF

Example

$PASHQ,BEEP
$PASHR,BEEP,OFF*05

Relevant Set Command

$PASHS,BEEP

BRD: RTC Bridge

Function

This command allows you to list the current settings of the RTC Bridge function.

Command Format

Syntax

$PASHQ,BRD[*cc]

Response format

Syntax

$PASHR,BRD,s1,d2,c3,c4*cc

Parameters

Parameter	Description	Range
s1	Availability of RTK corrections on the specified output port: • OFF: No RTK corrections forwarded to the output port. • ON: RTK corrections forwarded to the output port.	ON, OFF
d2	Use of RTK corrections in the receiver's position computation. • 0: RTK corrections used • 1: RTK corrections not used	0, 1
c3	Input port ID (port from which RTK corrections are available in the receiver).	E (modem) P (Ethernet) Q (Ethernet)
c4	Output port: • A, B, F: Serial port • D: Internal transmitter	A, B, F, D
*cc	Checksum	*00-*FF

Example

$PASHQ,BRD
$PASHR,BRD,ON,0,E,A*15

Relevant Set Command $PASHS,BRD

BTH: Bluetooth Settings

Function This command is used to read the current Bluetooth settings.

Command Format

Syntax

$PASHQ,BTH[*cc]

Response Format

Syntax

$PASHR,BTH,s1,s2,s3,s4*cc

Parameters

Parameter	Description	Range
s1	Bluetooth address (xx:xx:xx:xx:xx:xx)	17 characters
s2	Bluetooth name	64 characters max.
s3	Bluetooth PIN code	0 to 12 digits max. -1: no PIN code
s4	Bluetooth status	ON, OFF
*cc	Checksum	*00-*FF

Example

$PASHQ,BTH
$PASHR,BTH,00:07:80:83:91:86,PM_743109,-1,ON*68

See also

$PASHS,BTH,NAME
$PASHS,BTH,PIN

CFG: GNSS Tracking Configuration

Function

This command queries the receiver for the type of GNSS tracking currently enabled.

Command Format

Syntax

$PASHQ,CFG[*cc]

Response Format

Syntax

$PASHR,CFG,s1*cc

Parameters

Parameter	Description	Range
s1	GNSS tracking currently enabled: • SSL: Single-signal tracking • DSL: Dual-signal tracking • TSL: Triple-signal tracking	SSL, DSL, TSL
*cc	Checksum	

Example

$PASHQ,CFG
$PASHR,CFG,DSL*1D

See Also

$PASHS,CFG

CMR,MSI: CMR Message Status

Function

This command is used in a base receiver to read the current settings of the CMR messages the base currently generates and outputs.

Command Format

Syntax

$PASHQ,CMR,MSI[*cc]

Response Format

Syntax

$PASHR,CMR,MSI,d1,d2,d3,d4,d5,d6,d7,d8,d9*cc

Parameters

Parameter	Description	Range
d1	Number of CMR messages currently output	4
d2	Message type “0” label	0
d3	Message type “0” output rate, in seconds	0-300
d4	Message type “1” label	1
d5	Message type “1” output rate, in seconds	0-300
d6	Message type “2” label	2
d7	Message type “2” output rate, in seconds	0-300
d8	Message type “3” label	3
d9	Message type “3” output rate, in seconds	0-300
*cc	Checksum	*00-*FF

Example

The response line below reports four enabled CMR messages, type “0” and “3” at 1 second, and types “1” and “2” at 30 seconds:

$PASHQ,CMR,MSI
$PASHR,CMR,MSI,4,0,1.0,1,30.0,2,30.0,3,1.0*50

See also

$PASHS,CMR,TYP
$PASHQ,BAS
$PASHQ,CPD,MOD

CP2,AFP: Ambiguity Fixing Parameter, Second RTK Engine

Function This command is used to read the current setting of the ambiguity fixing parameter used in the second RTK engine.

Command Format

Syntax

$PASHQ,CP2,AFP[*cc]

Response Format

Syntax

$PASHR,CP2,AFP,f*cc

Parameters

Parameter	Description	Range
f	Ambiguity fixing value. “0” means the receiver will stay in Float mode.	0, 95.0, 99.0, 99.9
*cc	Checksum	*00-*FF

Example

$PASHQ,CP2,AFP
$PASHR,CP2,AFP,99.0*1C

See also $PASHS,CP2,AFP

CPD,AFP: Ambiguity Fixing Parameter

Function This command is used to read the current setting for the ambiguity fixing parameter.

Command Format

Syntax

$PASHQ,CPD,AFP[*cc]

Response Format

Syntax

$PASHR,CPD,AFP,f*cc

Parameters

Parameter	Description	Range
f	Ambiguity fixing value. “0” means the receiver will stay in Float mode.	0, 95.0, 99.0, 99.9
*cc	Checksum	*00-*FF

Example

$PASHQ,CPD,AFP
$PASHR,CPD,AFP,99.0*6A

See also $PASHS,CPD,AFP

CPD,ANT: Base Antenna Height

Function

This command is used to read the current parameters of the base antenna height, as received by the rover.

Command Format

Syntax

$PASHQ,CPD,ANT[*cc]

Response Format

Syntax

$PASHR,CPD,ANT,f1,f2,f3,m4,f5*cc

Parameters

Parameter	Description	Range
f1	Antenna height, in meters	0-99.999
f2	Antenna radius, in meters	0-9.9999
f3	Vertical offset, in meters	0-99.999
m4	Horizontal azimuth, in degrees, minutes (dddmm.mm)	0-35959.99
f5	Horizontal distance, in meters	0-99.999
*cc	Checksum	*00-*FF

Example

$PASHQ,CPD,ANT
$PASHR,CPD,ANT,1.893,0.0980,0.040,0.0000,0.000*50

See also

$PASHS,ANH
$PASHS,ANR
$PASHQ,CPD,POS

CPD,FST: Fast RTK Output Mode

Function

This command is used to read the current setting for fast RTK output mode.

Command Format

Syntax

$PASHQ,CPD,FST[*cc]

Response Format

Syntax

$PASHR,CPD,FST,s*cc

Parameters

Parameter	Description	Range
s	Fast RTK mode (fast CPD)	ON, OFF
*cc	Checksum	*00-*FF

Example

$PASHQ,CPD,FST
$PASHR,CPD,FST,ON*63

Relevant Set Command

$PASHS,CPD,FST

See also

$PASHQ,CPD

CPD,MOD: Base/Rover/Backup Mode

Function

This command is used to query the operating mode of the receiver, and the satellite constellations used if the receiver is operated as a base.

Command Format

Syntax

$PASHQ,CPD,MOD[*cc]

Response Format

Syntax

$PASHR,CPD,MOD,s1,d2,d3,c4*cc

Parameters

Parameter	Description	Range
s1	Current operating mode: • BAS: Base • ROV: Rover • BKP: "Hot Standby RTK", also called "Backup mode" (rover computing two RTK positions)	BAS, ROV, BKP
d2	Constellations currently used if the receiver is defined as a base: • 0: GPS, GLONASS, SBAS (default mode) • 1: Only GPS and SBAS • 2: Only GPS and GLONASS • 3: Only GPS	0-3
d3	Position mode. If BAS is the selected operating mode: • 0: Static position • 1: Moving position If ROV is the selected operating mode: • 0: means rover works with a static base • 1: means rover works with a moving base	0-1
c4	Input port for backup mode: • A, B, F: Serial ports • C: Bluetooth port • D: Radio • E: Modem • I, P, Q: Ethernet port	A, B, C, D, E, F, I, P, Q
*cc	Checksum	*00-*FF

Example

The response line below indicates that the receiver is configured as a base, uses the GPS and GLONASS constellations, and the base has a static position:

$PASHQ,CPD,MOD
$PASHR,CPD,MOD,BAS,2,0,A*5A

Relevant Set Command

$PASHS,CPD,MOD

See also

$PASHQ,CPD

CPD,NET: RTK Network Operation Mode

Function

This command is used to read the current setting of the RTK network operation mode.

Command Format

Syntax

$PASHQ,CPD,NET[*cc]

Response Format

Syntax

$PASHR,CPD,NET,d1,d2*cc

Parameters

Parameter	Description	Range
d1	RTK network operating mode relative to GPS corrections (default: 1): • 0: GPS corrections from network are not used. • 1: FKP/MAC GPS corrections from network are used when available and healthy, otherwise they are rejected.	0-1
d2	RTK network operating mode relative to GLONASS corrections (default: 1): • 0: GLONASS corrections from network are not used. • 1: FKP/MAC GLONASS corrections from network are used when available and healthy, otherwise they are rejected.	0-1
*cc	Checksum	*00-*FF

Example

$PASHQ,CPD,NET
$PASHR,CPD,NET,1,0*51

The response line reports that the receiver will process network corrections, if available and healthy.

Relevant Set Command

$PASHS,CPD,NET

See also

$PASHQ,CPD

CPD,POS: Base Position

Function

If applied to a base, this command allows you to read the geographic coordinates previously entered for the base position.

Depending on the last $PASHS,ANR command applied to the base, the position you get will be either that of the phase center, the ARP or the ground mark.

If applied to a rover, this command allows you to read the position of the base the rover receives from the base. The coordinates will all be “0” if the rover does not receive the base position.

Command Format

Syntax

$PASHQ,CPD,POS[*cc]

Response Format

Syntax

$PASHR,CPD,POS,m1,c2,m3,c4,f5*cc

Parameters

Parameter	Description	Range
m1	Latitude in degrees and minutes with 7 decimal places (ddmm.mmmmmmm)	0-90
c2	North (N) or South (S)	N, S
m3	Longitude in degrees, minutes with 7 decimal places (ddmm.mmmmmmm)	0-180
c4	West (W) or East (E)	W, E
f5	Height in meters	±9999.9999
*cc	Checksum	*00-*FF

Examples

$PASHQ,CPD,POS
$PASHR,CPD,POS,4717.959483,N,00130.500968,W,70.229*59

$PASHQ,CPD,POS
$PASHR,CPD,POS,0000.000000,N,00000.000000,E,00.000*7A

See also

$PASHS,POS
$PASHQ,CPD,ANT
$PASHQ,ANR
$PASHQ,ANH

CPD,REM: Differential Data Port

Function

This command allows you to read the port IDs that route differential data to a rover as well as the port selection mode.

Command Format

Syntax

$PASHQ,CPD,REM[*cc]

Response Format

Syntax

$PASHR,CPD,REM,s1[,c2][,c3]*cc

Parameters

Parameter	Description	Range
s1	Reception mode: • AUT: Automatic (default) • MAN: Manual	AUT, MAN
c2	Input port #1: • A, B, F: Serial port • C: Bluetooth port • I, P, Q: Ethernet port • E: Modem • D: Radio	A, B, C, D, E, F, I, P, Q
c3	Input port #2: • A, B, F: Serial port • C: Bluetooth port • I, P, Q: Ethernet port • E: Modem • D: Radio	A, B, C, D, E, F, I, P, Q
*cc	Checksum	*00-*FF

Examples

(Automatic selection of the input port:)

$PASHQ,CPD,REM
$PASHR,CPD,REM,AUT*39

(Manual selection, port D (radio) expected to receive the data:)

$PASHQ,CPD,REM
$PASHR,CPD,REM,MAN,D*53

(Manual selection, ports D and E (radio + GSM) expected to receive the data:)

$PASHQ,CPD,REM
$PASHR,CPD,REM,MAN,D,E*3A

Relevant Set Command $PASHS,CPD,REM

See also $PASHQ,CPD,MOD

CPD,VRS: VRS Assumption Mode

Function This command allows you to read the current setting of the VRS assumption mode.

Command Format

Syntax

$PASHQ,CPD,VRS[*cc]

Response format

Syntax

$PASHR,CPD,VRS,d*cc

Parameters

Parameter	Description	Range
d	VRS assumption mode: • 0: Automatic detection • 1: Compulsory VRS mode • 2: Never switches to VRS mode	0-2
*cc	Optional checksum	*00-*FF

Example

$PASHQ,CPD,VRS
$PASHR,CPD,VRS,1*45

Relevant Set Command $PASHS,CPD,VRS

CRT: Cartesian Coordinates of Position

Function This command allows you to get the message containing the absolute ECEF coordinates of the last computed position as well as other information on the position solution.

Command Format

Syntax

$PASHQ,CRT[*cc]

Response Format

Syntax

$PASHR,CRT,d1,d2,m3,f4,f5,f6,f7,f8,f9,f10,f11,f12,f13,f14,f15,s16*cc

Parameters

Parameter	Description	Range
d1	Position mode: • 0: Autonomous • 1: RTCM (or SBAS differential) • 2: RTK float • 3: RTK fixed • 9: SBAS Differential. See comment.	0-3, 9
d2	Count of SVs used in position computation	3-27
m3	UTC time (hhmmss.ss)	000000.00-235959.99
f4	ECEF X coordinate, in meters	±9999999.999
f5	ECEF Y coordinate, in meters	±9999999.999
f6	ECEF Z coordinate, in meters	±9999999.999
f7	Receiver clock offset, in meters	±300000
f8	Velocity vector, X component, in m/s	±9.999
f9	Velocity vector, Y component, in m/s	±9.999
f10	Velocity vector, Z component, in m/s	±9.999
f11	Receiver clock drift, in m/s	± 2000
f12	PDOP	0.0-99.9
f13	HDOP	0.0-99.9
f14	VDOP	0.0-99.9
f15	TDOP	0.0-99.9
s16	Firmware version ID (GNSS board fw)	4-char string
*cc	Checksum	*00-*FF

Example

$PASHQ,CRT
$PASHR,CRT,3,07,130452.50,4331844.177,-114063.156,4664458.677,
-0.023,-0.002,0.002,0.001,-0.023,2.1,1.2,1.7,1.3,G010*6C

Comment

The code allotted to a position solution of the SBAS differential type is either “1” or “9”, depending on the last $PASHS,NPT command run.

See also

$PASHS,NME
$PASHS,NPT

CST: NTRIP Caster Parameters

Function

This command is used to query the receiver for the current NTRIP caster settings.

Command Format

Syntax

$PASHQ,CST[*cc]

Response Format

Syntax

$PASHR,CST,s1,s2,d3,s4,d5,s6,s7,s8,f9,f10,s11,d12,s13,s14,c15,s16,s17,s18[*cc]

Parameters

Parameter	Description	Range
s1	NTRIP caster status	ON, OFF
s2	IP address of the NTRIP caster.	100 characters max.
d3	IP port number of the NTRIP caster	100-65535
s4	NTRIP caster password. This password is used by NTRIP servers (data sources) to connect to the NTRIP caster.	32 characters max.
d5	Number of simultaneaous connections per user.	1-100
s6	NTRIP caster identifier. Use this field to provide more information describing/identifying the NTRIP caster.	100 characters max.
s7	NTRIP caster operator: Name of the institution, agency or company running the caster.	100 characters max.
s8	Country code	3 characters
f9	Latitude in degrees.	±90.00
f10	Longitude in degrees.	0.00 to 359.99
s11	Fallback caster IP address. (Fallback caster: the caster where to connect to in case this one breaks down).	128 characters max
d12	Fallback caster IP port number	100-65535
s13	Network identifier, e.g. name of a network of GNSS permanent stations.	100 characters max
s14	Network operator: Name of the institution, agency or company running the network.	100 characters max
c15	Fee indicator: • Y: Usage is charged • N: No user fee	Y, N

Parameter	Description	Range
s16	Web address where network information can be found.	100 characters max
s17	Web address where data stream information can be found.	100 characters max
s18	Web or email address where registration information can be found.	100 characters max
*cc	Optional checksum	*00-*FF

Example

$PASHQ,CST
$PASHS,CST,ON,124.65.65.12,2102,NTRIP Caster ProFlex800, Ashtech,FRA,47.10,-1.00,123.12.132.12,2101,My Network,Ashtech, Y,www.ashtech.com, www.ashtech.com, proflex800@ashtech.com*53

See also

$PASHS,CST
$PASHS,CST,USR,ADD
$PASHS,CST,USR,DEL

CTS: Handshaking

Function

This command allows you to query the handshaking (RTS/CTS) protocol status. If no port is specified in the command, the response message is sent back to the port that issued the query command.

Command Format

Syntax

$PASHQ,CTS[,s1][*cc]

Response Format

Syntax

$PASHR,CTS,s1,s2*cc

Parameters

Parameter	Description	Range
s1	Queried port	A, B, F
s2	Current status of RTS/CTS handshaking protocol	ON, OFF
*cc	Checksum	*00-*FF

Example

$PASHQ,CTS
$PASHR,CTS,ON*1D

Relevant Set Command $PASHS,CTS

See also $PASHQ,PRT
$PASHQ,MDP

DBN,MSI: DBEN Message Status

Function This command is used in a base receiver to read the current settings of the DBEN messages the base currently generates and outputs.

Command Format

Syntax

$PASHQ,DBN,MSI[*cc]

Response Format

Syntax

$PASHR,DBN,MSI,d1,RPC,d2,BPS,d3*cc

Parameters

Parameter	Description	Range
d1	Number of DBEN messages currently output (always 2)	2
RPC,d2	“RPC” message type output rate, in seconds	0-300
BPS,d3	“BPS” message type output rate, in seconds	0-300
*cc	Checksum	*00-*FF

Example

$PASHQ,DBN,MSI
$PASHR,DBN,MSI,2,RPC,1.0,BPS,30.0*6B

See also $PASHS,DBN,TYP
$PASHQ,BAS
$PASHQ,CPD,MOD

DCR: Cartesian Coordinates of Baseline

Function This command allows you to output the DCR message containing the ECEF components of the baseline for the last computed position as well as other information on the position solution.

Command Format

Syntax

$PASHQ,DCR[*cc]

Response Format

Syntax

$PASHR,DCR,d1,d2,m3,f4,f5,f6,f7,f8,f9,f10,f11,f12,f13,f14,f15,s16*cc

Parameters

Parameter	Description	Range
d1	Position mode: • 0: Autonomous • 1: RTCM (or SBAS differential) • 2: RTK float • 3: RTK fixed • 9: SBAS Differential. See comment.	0-3, 9
d2	Count of SVs used in position computation	3-27
m3	UTC time (hhmmss.ss)	000000.00-235959.99
f4	ECEF X component of baseline, in meters	± 99999.999
f5	ECEF Y component of baseline, in meters	±99999.999
f6	ECEF Z component of baseline, in meters	±9999.999
f7	Receiver clock offset, in meters	±300000.000
f8	Velocity vector, X component, in m/s	±9.999
f9	Velocity vector, Y component, in m/s	±9.999
f10	Velocity vector, Z component, in m/s	±9.999
f11	Receiver clock drift, in m/s	±2000.000
f12	PDOP	0.0-99.9
f13	HDOP	0.0-99.9
f14	VDOP	0.0-99.9
f15	TDOP	0.0-99.9
s16	Firmware version ID (GNSS board fw)	4-char string
*cc	Checksum	*00-*FF

Example

$PASHQ,DCR
$PASHR,DCR,3,09,130924.00,-37.683,55.081,17.925,0.109,0.001,
0.002,0.001,0.047,1.9,1.0,1.6,1.1,G010*71

Comment

The code allotted to a position solution of the SBAS differential type is either “1” or “9”, depending on the last $PASHS,NPT command run.

The f4 to f6 cordinates will be empty with the heading mode activated.

See also

$PASHS,NME
$PASHS,NPT

DDN: DynDNS Parameters

Function

This command is used to query the receiver for the current DynDNS settings.

Command Format

Syntax

$PASHQ,DDN[*cc]

Response Format

Syntax

$PASHR,DDN,DYN=d1,SYS=s2,USR=s3,PWD=s4,HNM=s5,PER=d6*cc

Parameters

Parameter	Description	Range
DYN=d1	Current DynDNS service status: • d1=0: Enabled • d1=1: Disabled	0, 1
SYS=s2	Address of the free service used.	100 characters max.
USR=s3	Username chosen when creating an account on the DynDNS web site.	32 characters max.
PWD=s4	Password chosen when creating an account on the DynDNS web site.	32 characters max.
HNM=s5	Hostname declared on the DynDNS web site for the receiver.	100 characters max.
PER=d6	Update rate, in seconds.	60-3600
*cc	Optional checksum	*00-*FF

Example

$PASHQ,DDN
$PASHR,DDN,DYN=1,SYS=dyndns@dyndns.org,USR=psmith,PWD=ashtec
h,HNM=ashtech1.dyndns.org,PER=600*62

See also

$PASHS,DDN,PAR

DDS: Differential Decoder Status

Function

This command allows you to output a message providing status data on the corrections received.

Command Format

Syntax

$PASHQ,DDS[*cc]

Response Format

Syntax

$PASHR,DDS,d1,m2,d3,c4,s5,c6,d7,d8,d9,d10,d11,f12,f13,d14,n(d15,f16,f17)*cc

Parameters

Parameter	Description	Range
d1	Differential decoder number	1-3
m2	GNSS (output) time tag	000000.00-235959.99
d3	Cumulative counter of stream change	0-255
c4	ID of port from which corrections are received	A, C, D, E, F, I, P, Q
s5	Protocol detected (empty means “no data”)	RT2, RT3, CMR, DBN, TPZ, ATM
d6	Time window, in seconds: • “0” if not defined or just initialized • “255” means equal to or greater than 255	0-255
d7	Percentage of estimated overall data link quality/availability. Empty if not defined.	0-100
d8	Percentage of deselected information. Empty if not defined.	0-100
d9	CRC percentage. Empty if not defined.	0-100
d10	Standard of latency, in milli-seconds	0-16383
d11	Mean latency, in milli-seconds	0-16383
f12	Mean epoch interval, in seconds	0.00-163.86
f13	Min epoch interval, in seconds	0.00-20.47
d14	Number (n) of different messages detected since last stream change	0-63

Parameter	Description	Range
d15	Message type	RT2: 1-63 RT3: 1001-4094 CMR: 0(obs), 1(loc), 2(desc), 3(glo), 12(cmr+) DBN: 10(RPC), 11(BPS) TPZ: 0 only ATM: 0-15
f16	Interval of last message, in seconds	0.000-1023.000
f17	Age of last message, in seconds	0.000-1023.000
*cc	Checksum	

Example

$PASHQ,DDS
$PASHR,DDS,1,140235.33,A,RT3,200,100,0,100,5,50,1.05,1.00,3,1004,1.00
0,0.500,1005,30.000,18.000,1006,30.000,18.000*49

See Also $PASHS,NME

DIP: Direct IP Parameters

Function

This command is used to query the parameters used for a Direct IP connection. When c6 is omitted in the query command, the returned Direct IP settings are those for the port defined through the $PASHS,DIP,PAR or $PASHS,DIP command last run.

Command Format

Syntax

$PASHQ,DIP[,c6][*cc]

Response Format

Syntax

$PASHR,DIP,RIP,s1,PRT,d2[,LGN,s3,PWD,s4],IPP,c6*cc

Parameters

Parameter	Description	Range
RIP,s1	IP address (xxx.xxx.xxx.xxx) or host name	IP address: 000.000.000.000 to 255.255.255.255 or host name
PRT,d2	Port number	0-65535
LGN,s3	User name (optional)	20 char. max.
PWD,s4	Password (optional)	20 chars max.
IPP,c6	Internet port used on the receiver to establish the connection with the base (server): • E: Internal modem (default) • P: Ethernet stream 1 • Q: Ethernet stream 2	E, P, Q
*cc	Checksum	*00-*FF

Examples

$PASHQ,DIP
$PASHR,DIP,RIP,192.65.54.1,PRT,80,IPP,P*xx

$PASHQ,DIP
$PASHR,DIP,RIP,www.ashtech.com,PRT,8080,IPP,Q*xx

Relevant Set Command $PASHS,DIP

See also $PASHQ,MDM

DPO: Delta Position

Function This command is used to output a DPO message containing the components of the last computed vector (baseline) as well as other information about the position solution.

Command Format

Syntax

$PASHQ,DPO[*cc]

Response Format

Syntax

$PASHR,DPO,d1,d2,m3,f4,c5,f6,c7,f8,c9,f10,f11,f12,f13,f14,f15,f16,s17*cc

Parameters

Parameter	Description	Range
d1	Position mode: • 0: Autonomous • 1: RTCM (or SBAS differential) • 2: RTK float • 3: RTK fixed • 9: SBAS Differential. See comment.	0-3, 9
d2	Count of SVs used in position computation	3-27
m3	UTC time (hhmmss.ss)	000000.00-235959.99
f4	Northing coordinate difference, in meters	±9999999.999
c5	North label	N
f6	Easting coordinate difference, in meters	± 9999999.999
c7	East label	E
f8	Ellipsoid height difference, in meters	± 99999.999
c9	Reserved	±9.999
f10	COG: Course Over Ground, in degrees	0-359.9
f11	SOG: Speed Over Ground, in m/s	0-9.999
f12	Vertical velocity, in m/s	± 999.9
f13	PDOP	0.0-99.9
f14	HDOP	0.0-99.9
f15	VDOP	0.0-99.9
f16	TDOP	0.0-99.9
s17	Firmware version ID	4-character string
*cc	Checksum	*00-*FF

Example

$PASHQ,DPO
$PASHR,DPO,3,09,131143.50,40.910,N,54.072,E,-13.363,,0.0,0.0,-0.0,1.9,
1.0,1.6,1.2,G010*5B

Comment

The code allotted to a position solution of the SBAS differential type is either “1” or “9”, depending on the last $PASHS,NPT command run.

The f4, c5, f6, c7 and f8 cordinates will be empty with the heading mode activated.

See also

$PASHS,NME
$PASHS,NPT

DRD: Data Recording Duration

Function

This command returns the duration that was last set for all the G-files that the receiver will be recording.

Command Format

Syntax

$PASHQ,DRD[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,DRD,d1*cc

Parameters

Parameter	Description	Range
d1	Duration of data recording held in one G-file, in seconds	15-1440
*cc	Checksum	*00-*FF

Example

$PASHQ,DRD
$PASHR,DRD,60*0C

Relevant Set Command

$PASHS,DRD

DRI: Raw Data Recording Rate

Function

This command queries the current recording rate for all raw data logged in the internal or external memory.

Command Format

Syntax

$PASHQ,DRI[*cc]

Response Format

Syntax

$PASHR,DRI,f1*cc

Parameters

Parameter	Description	Range
f1	Current raw data recording rate	0.05 s 0.1-0.9 s 1-999 s
*cc	Checksum	*00-*FF

Example

$PASHQ,DRI
$PASHR,DRI,1.00*18

Relevant Set Command $PASHS,DRI

See also $PASHQ,ATM
$PASHQ,REC

DST: Connection Modes for the Different Data Streams Available

Function This command allows you to read the current settings for each of the Ix ports on which data streams have potentially been enabled.

Command Format

Syntax

$PASHQ,DST[,s][*cc]

Parameters

Parameter	Description	Range
s	Interrogated data stream port. If s is omitted, the current settings of all the ports are listed.	I1-I9
*cc	Optional checksum	*00-*FF

Response format

Syntax

$PASHQ,DST,d1,s2,s3,d4,d5,d6,s7*cc

Parameters

Parameter	Description	Range
d1	Number of data streaming ports	9

Parameter	Description	Range
s2	Data stream port	I1-I9
s3	Enable/disable control parameter	ON, OFF
d4	Connection Modes: • 1: Server • 2: Client	1-5
d5	IP mode (needed if d4=1 or 2): • 0: TCP • 1: UDP	0, 1
d6	IP port number (needed if d4=1, 2) • If d4=1 (Server), specify the number of the receiver's internal port used. • If d4=2 (Client), specify the number of the external server's IP port used.	1000-1009
s7	IP address or host name (needed if d4=2) • If d4=2 (Client), specify the external server's IP address.	32 char max.
*cc	Optional checksum	*00-*FF

Example

Querying port I2 for its current settings:

$PASHQ,DST,I2*63

$PASHR,DST,9,I2,ON,1,0,1002,*5A

Relevant Set Command $PASHS,DST

DST,STS: Data Stream Port Status

Function

This command allows you to read the status of each of the data stream ports (Ix), as well as the status of port E (modem) and ports P, Q and I (Ethernet).

Command Format

Syntax

$PASHQ,DST,STS[,s][*cc]

Parameters

Parameter	Description	Range
s	Interrogated data stream port. If s is omitted, the current statuses for more ports (i.e. ports Ix but also ports E, P, Q and I) are listed.	I1-I9, E, P, Q, I
*cc	Optional checksum	*00-*FF

Response format

Syntax

Through an example:

```
Stream I1-Off
Stream I2-Server  2 connection(s)  client:125.32.47.12 Start:02-02-2011 15:12:02
Stream I2-Server  2 connection(s) client:154.32.25.14 start:02-02-2011 15:15:30
Stream I3-Client Connected Start: 02-02-2011 15:15:30
Stream I4-Client Disconnected
Stream I5-Off
Stream I6-Off
Stream I7-Off
Stream I8-Off
Stream I9-Off
Port E-Direct IP Connected to 12.32.254.32:2101 Start:02-02-2011 15:12:02
Port P-NTRIP client Connected to NAN2 Start:02-02-2011 15:12:02
Port Q-NTRIP client Connected to NAN3 Start:02-02-2011 15:12:02
Port I-Server 1 connection(s) client:123.36.32.1 Start:02-02-2011 15:12:02
```

Parameters

- Each response line describes one currently active connection to a given port, hence several response lines are returned if several connections to the same port are currently active. For an inactive port, the "Off" status is reported.
- Ports I1to I9 are labeled "Stream I1" to "Stream "I9". The statuses of Ports E, P, Q and I are provided at the end of the list.
- The next parameter indicates the type of connection (server or client) for the active connection.
- Then, for a connection in server mode, the following parameters are listed:
  - Number of clients
  - Client IP address
  - Connection start time
- or, for a connection in client mode:
  - Status: "Connected" or "Disconnected"
  - Connection start time

Example

Querying port I2 for its current settings:

$PASHQ,DST,STS,I2*1B

$PASHR,DST,9,I2,ON,5,2,1002,165.65.76.12*2C

Relevant Set Command $PASHS,DST

DSY: Daisy Chain Status

Function This command queries the receiver for the status of the daisy chain function.

Command Format

Syntax

$PASHQ,DSY[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,DSY,OFF*59
or
$PASHR,DSY,c1,c2,d3*cc

Parameters

Parameter	Description	Range
c1	Source port: • A, B, F: Serial ports • C: Bluetooth port • D: Radio • E: Modem • H: Second GNSS board • I, P, Q: Ethernet port	A-I, P, Q
c2	Destination port: • A, B, F: Serial ports • C: Bluetooth port • D: Radio • E: Modem • H: Second GNSS board • I, P, Q: Ethernet port	A-I, P, Q
d3	Mode: • 0: Raw (default) • 1: Block	0,1
*cc	Checksum	*00-*FF

Example

Command reporting data on port A forwarded to port C:

$PASHQ,DSY
$PASHR,DSY,A,C*38

Relevant Set Command $PASHS,DSY

DTM: Datum Reference

Function This command asks the receiver to output the content of the NMEA DTM message.

Command Format

Syntax

$PASHQ,DTM[*cc]

Parameters

None.

Response Format

Syntax

$GPDTM,s1,,f2,c3,f4,c5,f6,s7*cc

Parameters

Parameter	Description	Range
s1	Local datum code: • W84: WGS84 used as local datum • 999: Local datum computed using the parameters provided by the RTCM3.1 data stream.	W84, 999
f2	Latitude offset, in meters	0-59.999999
c3	Direction of latitude	N, S
f4	Longitude offset, in meters	0-59.999999
c5	Direction of longitude	E, W
f6	Altitude offset, in meters	±0-99.999
s7	Reference datum code	W84
*cc	Checksum	*00-*FF

Example

$PASHQ,DTM
$GPDTM,999,2.324525,N,1.499476,W,1.365,W84*37

See Also $PASHS,NME

Automatic Output of DTM Messages

This is a reminder on how to output DTM messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,DTM,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output DTM messages on port A at a rate of 2 seconds:

$PASHS,NME,DTM,A,ON,2

DYN: Receiver Dynamics

Function

This command allows you to query the current setting for the receiver dynamics.

Command Format

Syntax

$PASHQ,DYN[*cc]

Response Format

Syntax

$PASHR,DYN,d*cc

Parameters

Parameter	Description	Range
d	Receiver dynamics: • 1: Static • 2: Quasi-static • 3: Walking • 4: Ship • 5: Automobile • 6: Aircraft • 7: Unlimited • 8: Adaptive • 9: User-defined	1-9
*cc	Checksum	*00-*FF

Example

$PASHQ,DYN
$PASHR,DYN,8*33

Relevant Set Command $PASHS,DYN

See also $PASHS,UDP

ECP: Power Status of Extended Communication Port

Function This command allows you to query the current power status of the extended communication port (a circuit that controls all the receiver ports, both internal and external).

Command Format

Syntax

$PASHQ,ECP[*cc]

Response Format

Syntax

$PASHR,ECP,s*cc

Parameters

Parameter	Description	Range
s	Power status	ON, OFF
*cc	Checksum	*00-*FF

Example

$PASHQ,ECP
$PASHR,ECP,ON*1D

Relevant Set Commands $PASHS,ECP,ON
$PASHS,ECP,OFF

EFT: Embedded FTP Server

Function This command allows you to read the current settings of the embedded FTP server.

Command Format

Syntax

$PASHQ,EFT[*cc]

Response Format

Syntax

In free form, as shown in the example below.

Example

$PASHQ,EFT
EMBEDDED FTP SERVER: ON
PORT: 21
MEMORY: 0
PATH: pub
ADMINISTRATOR USERNAME: smith
ADMINISTRATOR PASSWORD: 255kj631
USERNAME: Andrew
PASSWORD: 25ml55
USERNAME: Yves
PASSWORD: 25ml55

See Also

$PASHS,EFT,OWN
$PASHS,EFT,PAR
$PASHS,EFT,USR,ADD

ELM: Elevation Mask

Function

This command is used to read the current value of the elevation mask. The elevation mask impacts data recording, data output and satellite reception at the base.

Command Format

Syntax

$PASHQ,ELM[*cc]

Response Format

Syntax

$PASHR,ELM,d1*cc

Parameters

Parameter	Description	Range
d1	Current value of elevation mask, in degrees	0-90
*cc	Checksum	*00-*FF

Example

$PASHQ,ELM
$PASHR,ELM,5*29

Relevant Set Command $PASHS,ELM

See also $PASHQ,PEM

EML: Email Settings

Function This command allows you to read the current email settings.

Command Format

Syntax

$PASHQ,EML[*cc]

Response Format

Syntax

$PASHR,EML,LVL=d1,SMT=s2,PRT=d3,USR=s4,PWD=s5,SND=s6, ADD=s7,IPP=c8 *cc

Parameters

Parameter	Description	Range
LVL,d1	Notification level: • 0: No notification • 1: Standard notification • 2: Full notification	0-2
SMT,s2	SMTP server address or hostname	32 characters max.
PRT,d3	SMTP port number	0-65535
USR,s4	Username	32 characters max.
PWD,s5	Password	32 characters max.
SND,s6	Email address used to return messages to the receiver if the email address of the recipient is not found.	64 characters max.
ADD,s7	Recipient email address to which the receiver sends messages.	64 characters max.
IPP,c8	Internet port used (always P)	P
*cc	Checksum	*00-*FF

Example

$PASHQ,EML
$PASHR,EML,LVL=1,SMT=smtp.gmail.com,PRT=25,USR=gmail,
PWD=gmail,SND=no-reply@proflex800.com,ADD=johnsmith@ashtech.com,
IPP=P*5B

See Also $PASHS,EML,PAR
$PASHS,EML,TST

ETH: Ethernet Status and Parameters

Function

This command is used to read the current status of the Ethernet port as well as all the parameters relevant to this port.

Command Format

Syntax

$PASHQ,ETH[*cc]

Response Format

Syntax

$PASHR,ETH,c1,s2,s3,s4,DHP=s5,ADD=s6,MSK=s7,GTW=s8,DN1=s9,DN2=s10*cc

Parameters

Parameter	Description	Range
c1	Ethernet port (TCP/IP server)	I
s2	Ethernet status	OFF, ON
s3	MAC address (xx:xx:xx:xx:xx:xx)	17 characters
s4	Current IP address (=s6 when DHCP disabled)	0.0.0.0-255.255.255.25
DHP=s5	DHCP mode (0: disabled; 1: enabled)	0, 1
ADD=s6	Static IP address assigned to the receiver when DHCP is disabled	0.0.0.0-255.255.255.255
MSK=s7	Sub-network mask	0.0.0.0-255.255.255.255
GTW=s8	Gateway IP address	0.0.0.0-255.255.255.255
DN1=s9	DNS 1 IP address	0.0.0.0-255.255.255.255
DN2=s10	DNS 2 IP address	0.0.0.0-255.255.255.255
*cc	Checksum	*00-*FF

Parameters s6, s7, s8, s9, s10 are the Ethernet parameters used when the DHCP mode is disabled. In that case, s4=s6.

Example

$PASHQ,ETH
$PASHR,ETH,I,ON,02:03:04:85:06:07,10.20.2.74,DHP=1,ADD=10.20.2.28,
MSK=255.255.255.0,GTW=10.20.2.1,DN1=134.20.2.16,DN2=134.20.2.3*57

See also

$PASHS,ETH,PAR
$PASHS,ETH

EXM: Status of Extended Internal Memory

Function This command returns the status of the extended internal memory.

Command Format

Syntax

$PASHQ,EXM[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,EXM,s1*cc

Parameters

Parameter	Description	Range
s1	Status of the extended internal memory	ON, OFF
*cc	Checksum	*00-*FF

Example

$PASHQ,EXM
$PASHR,EXM,OFF*47

See Also

$PASHS,EXM,OFF
$PASHS,EXM,ON

FIL,CUR: Information On G-File Being Recorded

Function This command allows you to read information about the G-file currently being recorded.

Command Format

Syntax

$PASHQ,FIL,CUR[*cc]

Response Format

Syntax

General form:

$PASHR,FIL,CUR,s1,d2,s3,s4,d5*cc

If no G-file recording is in progress:

$PASHR,FIL,CUR,NONE*79

Parameters

Parameter	Description	Range
s1	Filename (including path)	255 characters max.
d2	Size in bytes	0-134217728
s3	Date (ddmmyyyy)	
s4	Time (hhmmss)	000000-235959
d5	Memory location: • 0: Internal memory. • 2: USB key.	0, 2
*cc	Checksum	*00-*FF

Example

$PASHQ,FIL,CUR
$PASHR,FIL,CUR,GazerA09.123,1769897,14032009,130850,0*63

See Also

$PASHS,REC
$PASHS,MEM

FIL,LST: Listing Files in Receiver Memory or USB Key

Function

This command allows you to list the names of the files stored in the receiver's internal memory or on the USB key connected to the receiver.

Command Format

Syntax

$PASHQ,FIL,LST[,c][,s][*cc]

Parameters

Parameter	Description	Range
c	Memory type: • c=0 (or c omitted): Internal memory • c omitted: Memory is as defined with $PASHS,MEM • c=2: USB key	0, 2
s	Path name	
*cc	Optional checksum	*00-*FF

Response format

Syntax

$PASHR,FIL,LST,d1,d2,s3,d4,s5,s6[,c7]*cc

Parameters

Parameter	Description	Range
d1	Number of files	
d2	File index	
s3	File name or directory name	255 characters max.
d4	Size in bytes	0-134217728
s5	Date (ddmmyyyy)	
s6	Time (hhmmss)	000000-235959
c7	=D when s3 is a directory name	D
*cc	Optional checksum	*00-*FF

Example

$PASHQ,FIL,LST*53
$PASHR,FIL,LST,4,0,GazerA09.123,1769897,14032009,130850*74
$PASHR,FIL,LST,4,1,GazerB09.123,1769876,10032009,110952*7C
$PASHR,FIL,LST,4,2,GazerC09.123,1769787,01032009,181856*72
$PASHR,FIL,LST,4,3,GazerD09.123,1769787,01032009,181856*74

See Also

$PASHS,REC
$PASHS,MEM
$PASHQ,FLS

FLS: List of Raw Data Files

Function

This command is used to list the raw data files stored in the selected memory (cf. $PASHS,MEM). An index number is used in the command fomat to limit the number of listed files. Files are listed in blocks of 10 files.

Command Format

Syntax

$PASHQ,FLS,d[*cc]

Parameters

Parameter	Description	Range
d	File index number ("0" for 1st file, "1" for 2nd file, etc.). All files with index number equal to or greater than this number will be listed. If d is greater than the highest file index number, the command is "NAKed".	0-999
*cc	Optional checksum	*00-*FF

Response Format

Syntax

$PASHR,FLS,d1,d2,d3,n(s4,m5,d6)*cc

Parameters

Parameter	Description	Range
d1	Free memory space, in kbytes, in the selected memory	000000-999999
d2	Total number of files currently stored in the selected memory	000-999
d3	Number of files listed corresponding to those matching the command criterion	00-10
s4	Site name assigned to the file	4 characters
m5	File time in the "wwwwdhhmm" format where: • wwww: GPS week number • d: Day in week • hh: Time (hours) • mm: Time (minutes)	 0000-9999 1-7 00-23 00-59
d6	File size in kbytes	0-999999
*cc	Checksum	*00-*FF

Example

Listing the files from index number "10":

$PASHQ,FLS,10
$PASHR,FLS,65240,012,02,sit3,146821321,7,sit3,146821321,4*06

See also

$PASHS,REC
$PASHS,FIL,D
$PASHS,MEM

FTP: FTP Status and Settings

Function

This command is used to query the status and settings of the FTP server used to upload files from the receiver.

Command Format

Syntax

$PASHQ,FTP[*cc]

Parameters

None.

Response format

Syntax

$PASHR,FTP,s1,d2,d3,s4,d5,d6,ADD=s7,PRT=d8,LGN=s9,PWD=s10,
PTH=s11,IPP=c12*cc

Parameters

Parameter	Description	Range
s1	File transfer status: • NONE: no transfer to FTP • PUT: File being uploaded to FTP	NONE, PUT
d2	Number of files to be transferred	0-255
d3	Number of files already transferred	0-255
s4	Name of the file being transferred	255 characters max.
d5	Size, in bytes, of the file being transferred	0-134217728
d6	Percentage of data already transferred for the file transfer currently in progress.	0-100
ADD=s7	FTP server IP address or host name	
PRT=d8	FTP server port number	0-65535
LGN=s9	FTP server login	32 characters max.
PWD=s10	FTP server password	32 characters max.
PTH=s11	Path used on the FTP server	255 characters max.
IPP=c12	Internet port used for FTP transfer: • E: Internal modem • P: Ethernet cable	E, P
*cc	Checksum	*00-*FF

Example

$PASHQ,FTP*35

$PASHR,FTP,PUT,10,3,GabcdA9.145,1769897,56,ADD=ftp.ashtech.com,
PRT=21,LGN=Ashtech,PWD=u6huz8,PTH=/my folder,IPP=P*19*11

See Also $PASHS,FTP,PAR
$PASHS,FTP,PUT

GAL: GALILEO Tracking Status

Function This command queries the receiver for the current GALILEO tracking status.

Command Format

Syntax

$PASHQ,GAL[*cc]

Response Format

Syntax

$PASHR,GAL,s1*cc

Parameters

Parameter	Description	Range
s1	Differential decoder number • ON: GALILEO satellites currently tracked and used • OFF (default): GALILEO satellites not currently tracked	ON, OFF
*cc	Checksum	

Example

$PASHQ,GAL
$PASHR,GAL,ON*1D

See Also $PASHS,GAL

GGA: GNSS Position Message

Function This command is used to output a GGA message containing the last computed position. If no position is computed, the message will be output anyway, but with some blank fields.

Command Format

Syntax

$PASHQ,GGA[*cc]

Response Format

Syntax

$GPGGA,m1,m2,c3,m4,c5,d6,d7,f8,f9,M,f10,M,f11,d12*cc

Parameters

Parameter	Description	Range
m1	Current UTC time of position (hhmmss.ss)	000000.00-235959.99
m2	Latitude of position (ddmm.mmmmmm)	0-90 0-59.999999
c3	Direction of latitude	N, S
m4	Longitude of position (dddmm.mmmmmm)	0-180 0-59.999999
c5	Direction of longitude	E,W
d6	Position type: • 0: Position not available or invalid • 1: Autonomous position • 2: RTCM Differential (or SBAS Differential) • 3: Not used • 4: RTK fixed • 5: RTK float • 9: SBAS Differential. See comment.	0-5, 9
d7	Number of GNSS Satellites being used in the position computation	3-26
f8	HDOP	0-99.9
f9,M	Altitude, in meters, above mean seal level. "M" for meters	± 99999.999,M
f10,M	Geoidal separation in meters. "M" for meters. Based on the official NATO's standard mean-sea-level algorithm (5-degree grid of height).	± 999.999,M
f11	Age of differential corrections, in seconds	0-999
d12	Base station ID (RTCM only)	0-4095
*cc	Checksum	*00-*FF

Example

$PASHQ,GGA
$GPGGA,131745.00,4717.960847,N,00130.499476,W,4,10,0.8,35.655,M,
47.290,M,3.0,1000*61

Comment

The code allotted to a position solution of the SBAS differential type is either "2" or "9", depending on the last $PASHS,NPT command run.

See also

$PASHS,NME
$PASHS,NPT

Automatic Output of GGA Messages

This is a reminder on how to output GGA messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,GGA,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output GGA messages on port A at a rate of 0.5 second:

$PASHS,NME,GGA,A,ON,0.5

GLL: Geographic Position - Latitude/Longitude

Function

This command is used to output a GLL message containing the last computed position. The message is output on the port on which the query is made. If no position is computed, the message will be output anyway, but all position-related fields will be blank.

Command Format

Syntax

$PASHQ,GLL[*cc]

Response Format

Syntax

$GPGLL,m1,c2,m3,c4,m5,c6,c7*cc

Parameters

Parameter	Description	Range
m1	Latitude of position (ddmm.mmmmmm)	0-90 0-59.999999
c2	Direction of latitude	N, S
m3	Longitude of position (dddmm.mmmmmm)	0-180 0-59.999999
c4	Direction of longitude	E,W
m5	Current UTC time of position (hhmmss.ss)	000000.00- 235959.99
c6	Status • A: Data valid • V: Data not valid	A, V

Parameter	Description	Range
c7	Mode indicator: • A: Autonomous mode • D: Differential mode • N: Data not valid	A, D, N
*cc	Checksum	*00-*FF

Example

$PASHQ,GLL
$GPGLL,4717.960853,N,00130.499473,W,132331.00,A,D*7D

See also

$PASHS,NME

Automatic Output of GLL Messages

This is a reminder on how to output GLL messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,GLL,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output GLL messages on port A at a rate of 0.5 second:

$PASHS,NME,GLL,A,ON,0.5

GLO: GLONASS Tracking Status

Function

This command is used to query the GLONASS tracking status.

Command Format

Syntax

$PASHQ,GLO[*cc]

Response Format

Syntax

$PASHR,GLO,s*cc

Parameters

Parameter	Description	Range
s	ON: GLONASS satellites currently tracked and used. OFF: GLONASS satellites not tracked.	ON, OFF
*cc	Checksum	*00-*FF

Example

$PASHQ,GLO
$PASHR,GLO,ON*1D

Relevant Set Command $PASHS,GLO

GMP: GNSS Map Projection Fix Data

Function This command is used to output a GMP message containing the last computed position. If no position is computed, the message will be output anyway, but with some blank fields.

Command Format

Syntax

$PASHQ,GMP[*cc]

Parameters

None.

Response Format

Syntax

$--GMP,m1,s2,s3,f4,f5,s6,d7,f8,f9,f10,f11,d12*cc

Parameters

Parameter	Description	Range
"$--GMP" Header	$GPGMP: Only GPS satellites are used. $GLGMP: Only GLONASS satellites are used. $GNGMP: Several constellations (GPS, SBAS, GLONASS) are used.	$GPGMP, $GLGMP, $GNGMP
m1	Current UTC time of position (hhmmss.ss)	000000.00-235959.99

Parameter	Description	Range
s2	Map projection identification RTCM3.1 - message 1024: • LOC: Local coordinate system RTCM3.1 - message 1025, 1026 or 1027: • TM: Transverse Mercator • TMS: Transverse Mercator (West orientated) • LCC1SP: Lambert Conic Conformal (1SP) • LCC2SP: Lambert Conic Conformal (2SP) • LCCW: Lambert Conic Conformal (West orientated) • CS: Cassini-Soldner • OM: Oblique Mercator • OS: Oblique Stereographic • MC: Mercator • PS: Polar Stereographic • DS: Double Stereographic	LOC, TM, TMS, LCC1SP, LCC2SP, LCCW, CS, OM, OS, MC, PS, DS
s3	Map zone (RTCM3.1: empty)	
f4	X (Northern) component of grid (or local) coordinate, in meters	±999999999.999
f5	Y (Eastern) component of grid (or local) coordinate, in meters	±999999999.999
s6	Mode indicator: • N: No fix • A: Autonomous • D: Differential • R: Fixed RTK • F: Float RTK	N, A, D, R, F
d7	Number of GNSS Satellites being used in the position computation	3-26
f8	HDOP	0-99.9
f9	Altitude above mean seal level, or local altitude, in meters.	± 99999.999,M
f10	Geoidal separation in meters.	± 999.999,M
f11	Age of differential corrections, in seconds	0-999.9
d12	Base station ID	0-4095
*cc	Checksum	*00-*FF

Example

$PASHQ,GMP

$GPGMP,131745.00,LOC,,45215.125,14587.298,R,11,1.5,125.221,5.214,1.5,
454*xx

See also

$PASHS,NME

Automatic Output of GMP Messages

This is a reminder on how to output GMP messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,GMP,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output GMP messages on port A at a rate of 0.5 second:

$PASHS,NME,GMP,A,ON,0.5

GNS: GNSS Fix Data

Function

This command allows you to output the standard NMEA GNS message.

If there is no computed position available when you request the message, the message will nonetheless be output, but with all the position-related fields left blank.

Command Format

Syntax

$PASHQ,GNS[*cc]

Response Format

Syntax

$--GNS,m1,m2,c3,m4,c5,s6,d7,f8,f9,f10,f11,d12*cc

If the receiver is configured in GPS mode only, then the message header is $GPGNS.If it's configured in GPS/ GLONASS mode, then the message header is $GNGNS.

Parameters

Parameter	Description	Range
m1	Current UTC time of position (hhmmss.ss)	000000.00-235959.99
m2	Latitude of position (ddmm.mmmmmm)	0-90 0-59.999999
c3	Direction of latitude	N, S
m4	Longitude of position (dddmm.mmmmmm)	0-180 0-59.999999
c5	Direction of longitude	E, W

Parameter	Description	Range
s6	Mode indicator (1 character by constellation): • N: No fix • A: Autonomous position • D: Differential • R: RTK Fixed • F: RTK Float	N, A, D, R, F
d7	Number of GNSS satellites being used in the position computation.	3-26
f8	HDOP	0-99.9
f9	Altitude above mean sea level.	±99999.999
f10	Geoidal separation, in meters	±999.999
f11	Age of differential corrections, in s	0-999
d12	Base station ID (RTCM only)	0-4095
*cc	Checksum	

Example

$PASHQ,GNS
$GNGNS,131745.00,4717.960847,N,00130.499476,W,RR,10,0.8,35.655,47.290,3.0,1000*61

See Also

$PASHS,NME

Automatic Output of GNS Messages

This is a reminder on how to output GNS messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,GNS,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output GNS messages on port A at a rate of 10 seconds:

$PASHS,NME,GNS,A,ON,10

GPS: GPS Tracking Status

Function

This command queries the receiver for the current GPS tracking status.

Command Format

Syntax

$PASHQ,GPS[*cc]

Response Format

Syntax

$PASHR,GPS,s1[,s2[,s3[,s4]]]*ccc

Parameters

Parameter	Description	Range
s1	GPS tracking status: • ON: GPS satellites currently tracked and used • OFF: GPS satellites not currently tracked	ON, OFF
s2	First Signal: • 1C: Tracking GPS L1 C/A signal	1C
s3	Second Signal: • 2L: Tracking L2CS signal for all GPS SVs • 2W: Tracking L2P signal for all GPS SVs • 2LW: Tracking L2CS signal for L2CS-capable GPS SVs and L2P for others • 5Q: Tracking L5 signal for all GPS SVs • “Blank”: No second signal to be tracked	2L, 2W, 2LW, 5Q or “blank”
s4	Third Signal: • 2L: Tracking L2CS signal for all GPS SVs • 5Q: Tracking L5 signal for all GPS SVs • “Blank”: No third signal to be tracked	2L, 5Q or “blank”
*cc	Optional checksum	*00-*FF

Example

$PASHQ,GPS
$PASHR,GPS,ON,1C,2W*1D

Relevant Set Command

$PASHS,GPS

GRS: GNSS Range Residuals

Function

This command is used to output a GRS message containing the satellite range residuals. The message is output on the port on which the query is made. No message will be output until a position is computed.

Command Format

Syntax

$PASHQ,GRS[*cc]

Response Format

Syntax

$--GRS,m1,d2,n(f3)*cc

Parameters

Parameter	Description	Range
"$--GRS" Header	$GPGRS: Only GPS satellites are used. $GLGRS: Only GLONASS satellites are used. $GNGRS: Several constellations (GPS, SBAS, GLONASS) are used.	$GPGRS, $GLGRS, $GNGRS
m1	Current UTC time of GGAposition (hhmmss.ss)	000000.00-235959.99
d2	Mode used to compute range residuals	Always "1"
f3	Range residual for satellite used in position computation (repeated "n" times, where n is the number of satellites used in position computation). Residuals are listed in the same order as the satellites in the GSA message so that each residual provided can easily be associated with the right satellite.	±999.999
*cc	Checksum	*00-*FF

Example

$PASHQ,GRS
$GNGRS,141003.50,1,1.14,-0.48,0.26,0.20,-0.94,-0.28,-1.18*61
$GNGRS,141003.50,1,-0.20*4F

See also

$PASHS,NME

Automatic Output of GRS Messages

This is a reminder on how to output GRS messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,GRS,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output GRS messages on port A at a rate of 0.5 second:

$PASHS,NME,GRS,A,ON,0.5

GSA: GNSS DOP and Active Satellites

Function

This command is used to output a GSA message containing data related to DOP values and satellites used in the position solution.

Where applicable, one response line per constellation used is returned. In this case, the returned DOP values are the same in all response lines.

Command Format

Syntax

$PASHQ,GSA[*cc]

Response Format

Syntax

$--GSA,c1,d2,d3,d4,d5,d6,d7,d8,d9,d10,d11,d12,d13,d14,f15,f16,f17*cc

Parameters

Parameter	Description	Range
"$--GSA" Header	$GPGSA: Only GPS satellites are used. $GLGSA: Only GLONASS sats are used. $GNGSA: Several constellations (GPS, SBAS, GLONASS) are used.	$GPGSA, $GLGSA, $GNGSA
c1	Output mode: • M: Manual • A: Automatic	M, A
d2	Position indicator: • 1: No position available • 2: 2D position • 3: 3D position	1-3
d3-d14	Satellites used in the position solution (blank fields for unused channels)	GPS: 1-32 GLONASS: 65-96 SBAS: 33-64 GALILEO: 97-126 GIOVE-A/B: 127-128 QZSS: 193-197
f15	PDOP	0-9.9
f16	HDOP	0-9.9
f17	VDOP	0-9.9
*cc	Checksum	*00-*FF

Example

$PASHQ,GSA
$GNGSA,A,3,20,11,13,23,17,04,31,,,,,,1.6,0.9,1.3*21
$GNGSA,A,3,81,83,68,,,,,,,,,,1.6,0.9,1.3*2C

See also $PASHS,NME

Automatic Output of GSA Messages

This is a reminder on how to output GSA messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,GSA,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output GSA messages on port A at a rate of 0.5 second:

$PASHS,NME,GSA,A,ON,0.5

GST: GNSS Pseudo-Range Error Statistics

Function

This command is used to output a GST message containing standard deviations relevant to the position solution.

Command Format

Syntax

$PASHQ,GST[*cc]

Response Format

Syntax

$--GST,m1,f2,f3,f4,f5,f6,f7,f8*cc

Parameters

Parameter	Description	Range
"$--GST" Header	$GPGST: Only GPS satellites are used. $GLGST: Only GLONASS satellites are used. $GNGST: Several constellations (GPS, SBAS, GLONASS) are used.	$GPGST, $GLGST, $GNGST
m1	Current UTC time of position (hhmmss.ss)	000000.00-235959.99
f2	RMS value of standard deviation of range inputs (DGNSS corrections included), in meters	0.000-99.999
f3	Standard deviation of semi-major axis of error ellipse, in meters	0.000-99.999
f4	Standard deviation of semi-minor axis of error ellipse, in meters	0.000-99.999
f5	Orientation of semi-major axis of error ellipse, in degrees from true North	0.000-99.999
f6	Standard deviation of latitude error, in meters	0.000-99.999
f7	Standard deviation of longitude error, in meters	0.000-99.999
f8	Standard deviation of altitude error, in meters	0.000-99.999
*cc	Checksum	*00-*FF

Example

$PASHQ,GST
$GNGST,154013.80,0.642,1.746,1.303,27.197,1.663,1.407,2.456*79

See also

$PASHS,NME

Automatic Output of GST Messages

This is a reminder on how to output GST messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,GST,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output GST messages on port A at a rate of 0.5 second:

$PASHS,NME,GST,A,ON,0.5

GSV: GNSS Satellites in View

Function

This command is used to output a GSV message containing information on the satellites in view.

Command Format

Syntax

$PASHQ,GSV[*cc]

Response Format

Syntax

$--GSV,d1,d2,d3,n(d4,d5,d6,f7)*cc

The set of parameters (d4,d5,d6,f7) can be repeated up to 4 times in a single response line, corresponding to the description of 4 different satellites. The number of response lines is therefore dependent on the number of satellites in view (e.g. three response lines if between 9 and 12 satellites are visible).

Parameters

Parameter	Description	Range
"$--GSV" Header	$GPGSV: GPS and SBAS satellites. $GLGSV: GLONASS satellites $GAGSV: GALILEO satellites	$GPGSV, $GLGSV $GAGSV
d1	Total number of messages	1-4
d2	Message number	1-4
d3	Total number of satellites in view	1-15
d4	Satellite PRN	GPS: 1-32 GLONASS: 65-96 SBAS: 33-64 GALILEO: 97-126 QZSS: 193-197
d5	Elevation in degrees	0-90
d6	Azimuth in degrees	0-359
f7	SNR in dB.Hz	30.0-60.0
*cc	Checksum	*00-*FF

GPS PRN number is d4
SBAS PRN number is d4+87
GLONASS slot number is d4-64
GALILEO PRN number is d4-96
QZSS PRN number is d4-192

Example

$PASHQ,GSV
$GPGSV,2,1,07,20,61,066,50,11,30,146,36,13,41,200,50,23,73,134,52*7C
$GPGSV,2,2,07,33,34,198,42,17,40,242,50,04,37,304,48*47
$GLGSV,1,1,04,77,29,098,46,84,19,332,46,83,49,276,52,68,57,300,52*67

See also

$PASHS,NME

Automatic Output of GSV Messages

This is a reminder on how to output GSV messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,GSV,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output GSV messages on port A at a rate of 10 seconds:

$PASHS,NME,GSV,A,ON,10

HDT: True Heading

Function

This command is used to output an HDT message (last computed true heading in degrees).

Command Format

Syntax

$PASHQ,HDT[*cc]

Response Format

Syntax

$GPHDT,f1,T*cc
$GPTHS,f1,T*cc

Parameters

Parameter	Description	Range
f1,T	Last computed heading value, in degrees “T” for “True”.	0-359.9°
*cc	Checksum	*00-*FF

Comments

- When baseline parameters are output in time-tagged mode ($PASHS,VEC,TT), the HDT message is generated only for those epochs for which reference data are available. In fast mode ($PASHS,VEC,FST), the HDT message will be generated for each receiver epoch using additional extrapolation algorithms.

Example

$PASHQ,HDT
$GPHDT,121.2,T*35

See Also $PASHS,NME

Automatic Output of HDT Messages

This is a reminder on how to output HDT messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,HDT,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output HDT messages on port A at a rate of 1 second:

$PASHS,NME,HDT,A,ON,1

LCS: Local Coordinate System Status

Function

This command asks the receiver to indicate the coordinate system it currently uses to deliver its position solution. A local coordinate system may be used provided its characteristics are received through the appropriate RTCM 3.1 message (1021, 1022, 1023 or 1025) from the base used.

Command Format

Syntax

$PASHQ,LCS[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,LCS,s*cc

Parameters

Parameter	Description	Range
s	Status: • ON: Local coordinate system used when available • OFF: Coordinate system used is WGS84 necessarily.	ON, OFF
*cc	Checksum	*00-*FF

Example

$PASHQ,LCS
$PASHR,LCS,ON*05

Relevant Set Command

$PASHS,LCS

LOG: Editing a Log File

Function

This command is used to edit the specified or current log file. A log file lists all events related to IP connections with the receiver.

Command Format

Syntax

$PASHQ,LOG[,d][*cc]

Parameters

Parameter	Description	Range
d	Index number of the log file you want to edit. If d is omitted, the current log file is edited.	0-900
*cc	Optional checksum	*00-*FF

Response format

Syntax

The response is formatted as follows:

Date: <Year>-<Month>-<Day>
Maximum size: x Mb Duration: xx days
hh:mm:ss: <message 1>
hh:mm:ss: <message 2>
...
hh:mm:ss: <message n>

Parameters

- The first line contains the date when the log file was created.
- The second line indicates the maximum size (in Mb) permitted for the file as well as the time, in days, during which it is kept in memory.
- Each of the lines that follow contains a message that describes a connection event (time of event, beginning or end of connection, type of connection, identification of the connected device).

Example

$PASHQ,LOG*33
Date: 2009-04-08
Maximum size: 1 Mb Duration: 20 days
14:12:34: connect server,stream=I1,port=1001,IP=12.34.87.22
14:15:33: connect client,stream=I2,IP=23.33.43.12,port=7721

15:36:12: disconnect server,stream=I1,port=1001,IP=12.34.87.22

See Also

$PASHS,LOG,PAR
$PASHS,LOG,DEL
$PASHQ,LOG,LST

LOG,LST: Listing Log Files

Function

This command is used to read the list of log files present in the receiver.

Command Format

Syntax

$PASHQ,LOG,LST[*cc]

Parameters

None.

Response format

Syntax

$PASHR,LOG,LST,d1,d2,s3,d4*cc

Parameters

Parameter	Description	Range
d1	Current number of log files in the receiver	0-900
d2	File index	0-900
s3	Filename	255 characters max.
d4	Size, in bytes	0-134217728
*cc	Optional checksum	*00-*FF

Example

$PASHQ,LOG,LST*54
$PASHR,LOG,LST,4,0,20090408.log,1769897*01
$PASHR,LOG,LST,4,1,20090407.log,1769876*00
$PASHR,LOG,LST,4,2,20090406.log,1769787*03
$PASHR,LOG,LST,4,3,20090405.log,1769787*01

Relevant Set Command

$PASHS,LOG,PAR
$PASHS,LOG,DEL
$PASHQ,LOG

LOG,PAR: Log File Settings

Function

This command is used to read the settings of any new log file created in the receiver.

Command Format

Syntax

$PASHQ,LOG,PAR[*cc]

Parameters

None.

Response format

Syntax

$PASHR,LOG,PAR,s1,d2,d3*cc

Parameters

Parameter	Description	Range
s1	Log file control parameter: • ON: Generation of log files enabled • OFF: Generation of log files disabled	ON, OFF
d2	Maximum size, in Mbytes	1-90
d3	Number of days during which a log file is kept in memory.	1-100
*cc	Optional checksum	*00-*FF

Example

$PASHQ,LOG,PAR*5C
$PASHR,LOG,PAR,OFF,1,20*0F

Relevant Set Command

$PASHS,LOG,PAR

LTZ: Local Time Zone

Function

This command queries the receiver for the local time zone currently used.

Command Format

Syntax

$PASHQ,LTZ[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,LTZ,d1,d2*cc

Parameters

Parameter	Description	Range
d1	Local time zone, in hours	-13 to +13
d2	Local time zone, in minutes	0-59
*cc	Checksum	*00-*FF

Example

$PASHQ,LTZ
$PASHR,LTZ,-5,8*xx

Relevant Set Command

$PASHS,LTZ

MDM: Modem Status and Parameters

Function

This command is used to query the modem parameters.

Command Format

Syntax

$PASHQ,MDM[*cc]

Response Format

Syntax

$PASHR,MDM,c1,d2,s3,PWR=s4,PIN=s5,BND=d6,PTC=d7,CBS=d8,APN=s9,LGN=s10,PWD=s11,IPT=d12,PHN=s13,ADL=c14,RNO=d15,MOD=s16,NET=d17*cc

Parameters

Parameter	Description	Range
c1	Modem port	E
d2	Modem baud rate	9
s3	Modem state “NONE” means that the modem option [Z] is not valid.	OFF, ON, INIT, DIALING, ONLINE, NONE

Parameter	Description	Range
PWR=s4	Power mode: • AUT: Automatic • MAN: Manual	AUT, MAN
PIN=s5	PIN code	4-8 digits
BND=d6	Not used	
PTC=d7	Protocol: • 1: GPRS	1
CBS=d8	Not used	
APN=s9	Access Point Name (GPRS)	32 char. max.
LGN=s10	Login (GPRS)	32 char. max.
PWD=s11	Password (GPRS)	32 char. max.
IPT=d12	Internet Protocol: • 0: TCP • 1: UDP	0-1
PHN=s13	Not used	
ADL=c14	Auto-dial mode	Y, N
RNO=d15	Maximum number of re-dials	0-15
MOD=s16	Modem model (empty if unknown)	Q2687, Q26 Extreme
NET=d17	2G/3G selection mode: • 0: Automatic (2G or 3G) • Forced to operate in 2G	0-1
*cc	Checksum	*00-*FF

Example

$PASHQ,MDM
$PASHR,MDM,E,9,ONLINE,PWR=MAN,PIN=,BND=1,PTC=1,CBS=1,
APN=a2bouygtel.com,LGN=,PWD=,IPT=0,PHN=,ADL=Y,RNO=2,
MOD=Q26 Extreme,NET=1*47

Relevant Set Command

$PASHS,MDM

See also

$PASHQ,MDM,LVL
$PASHQ,MWD
$PASHS,NTR
$PASHS,DIP
$PASHS,MDM,DAL

MDM,LVL: Modem Signal Level

Function

This command is used to query the current level of the modem signal.

Command Format

Syntax

$PASHQ,MDM,LVL[*cc]

Response Format

Syntax

$PASHR,MDM,LVL,d*cc

Parameters

Parameter	Description	Range
d	Current signal level: • 0-100: Signal level. The higher the number, the higher the signal level. • "-1": No signal available.	0 to 100 -1
*cc	Checksum	*00-*FF

Example

$PASHQ,MDM
$PASHR,MDM,LVL,-1*7A

See also $PASHQ,MDM

MDM,STS: Modem Status

Function This command queries the receiver for the current status of the internal modem.

Command Format

Syntax

$PASHQ,MDM,STS[*cc]

Response Format

Syntax

$PASHR,MDM,STS,s1,s2,s3,d4*cc

Parameters

Parameter	Description	Range
s1	Modem status. "NONE" means that the [Z] option (MODEM) is not valid.	OFF, ON, INIT, DIALING, ONLINE, NONE
s2	Name of the network currently used	-
s3	Network type currently used (2G or 3G)	2G, 3G

Parameter	Description	Range
d4	Signal level. "-1" means the indication of signal level is not available.	-1; 0-100
*cc	Optional checksum	*00-*FF

Example

$PASHQ,MDM,STS
$PASHR,MDM,STS,INIT,"Orange F",2G,60*77

See Also $PASHQ,MDM

MDP: Port A Setting

Function This command is used to read the current setting of port A.

Command Format

Syntax

$PASHQ,MDP[*cc]

Response Format

Syntax

$PASHR,MDP,A,s*cc

Parameters

Parameter	Description	Range
s	Current port setting (RS232 or RS422)	232, 422
*cc	Checksum	*00-*FF

Example

$PASHQ,MDP
$PASHR,MDP,A,RS232*5E

Relevant Set Command $PASHS,MDP

See also $PASHQ,CTS

MEM: Selected Memory Device

Function
This command is used to query the memory device used by the receiver.

Command Format

Syntax

$PASHQ,MEM[*cc]

Response Format

Syntax

$PASHR,MEM,d[*cc]

Parameters

Parameter	Description	Range
d	Memory used: • 0: Internal memory (NAND Flash) or extended internal memory • 2: USB mass storage key	0, 2
*cc	Checksum	*00-*FF

Example

$PASHQ,MEM
$PASHR,MEM,0*2D

Relevant Set Command
$PASHS,MEM

See also
$PASHQ,FLS

MET: Meteorological Unit Settings

Function
This command allows you to read the current settings on each serial port allowing the receiver to query the meteorological unit.

Command Format

Syntax

$PASHQ,MET[*cc]

Response Format

Syntax

In free form, as shown in the example below.

Example

$PASHQ,MET
MET PARAMETERS SETTINGS
PRTA:OFF INIT_STR:NO TRIG_CMD:*0100P9 INTVL:0005
PRTB:OFF INIT_STR:NO TRIG_CMD:*0100P9 INTVL:0005
PRTF:OFF INIT_STR:NO TRIG_CMD:*0100P9 INTVL:0005

See Also

$PASHS,MET,PAR
$PASHS,MET,INIT
$PASHS,MET,CMD
$PASHS,MET,INTVL

MWD: Modem Watchdog Timeout

Function

This command is used to query the current setting for the modem watchdog timeout.

If no data is received or sent through its port over a period of time equal to this timeout, the modem will automatically hang up.

Command Format

Syntax

$PASHQ,MWD[*cc]

Response Format

Syntax

$PASHR,MWD,d1,d2*cc

Parameters

Parameter	Description	Range	Default
d1	Current timeout setting: • 1-99: Modem timeout in minutes. • 0: No timeout	0-99	0
d2	Current idle time for modem, in minutes.	0-99	
*cc	Checksum	*00-*FF	

Example

$PASHQ,MWD
$PASHR,MWD,0*36

Relevant Set Command $PASHS,MWD

See also $PASHQ,MDM

NMO: NMEA Message Output Settings

Function This command is used to query the types of NMEA messages currently enabled on the specified port.

Command Format

Syntax

$PASHQ,NMO,c[*cc]

Parameters

Parameter	Description	Range
c	Queried port ID: • A, B, F: Serial port • C: Bluetooth port • I, P, Q, I1-I9: Ethernet port • E: Modem • M, U: Memory • R: Automatic recording session	A, B, C, E, F, I, M, P, Q, R, U, I1-I9
*cc	Optional checksum	*00-*FF

Response Format

Syntax

$PASHR,NMO,c1,d2,f3,d4,n(s5,f6)*cc
(n=18)

Parameters

Parameter	Description	Range
c1	Queried port ID: • A, B, F: Serial port • C: Bluetooth port • I, P, Q, I1-I9: Ethernet port • E: Modem • M, U: Memory • R: Automatic recording session	A, B, C, E, F, I, M, P, Q, R, U, I1-I9
d2	Baud rate code	0-15 (A, B, F) 0, 1 (C, E, I, M, P, Q, U, I1-I9)

Parameter	Description	Range
f3	Output rate as defined by the last $PASHS,NME,PER command run.	0-999.0
d4	Number of NMEA messages listed in the response line	34
s5	NMEA message type	ALM, AT2, DTM, GGA, GLL, GMP, GNS, GRS, GSA, GST, GSV, HDT, HD2, RMC, VTG, ZDA, ATT, CRT, DCR, DDS, DPO, LTN, POS, RRE, SAT, SGA, SGL, SGP USR, VEC, VE2, XDR, PTT, TTT
f6	Output rate: • 0.05 or 0.1 to 0.9 or 1-999: Output rate in seconds • 0: Message disabled	0-999.00 s
*cc	Checksum	*00-*FF

Example

$PASHQ,NMO,P

$PASHR,NMO,P,0,001.00,26,ALM,0.00,DTM,0.00,GGA,0.00,GLL,0.00,GRS,0.00,GSA,0.00,GST,0.00,GSV,0.00,HDT,0.00,RMC,0.00,VTG,0.00,XDR,0,ZDA,0.00,ATT,0.00,CRT,0.00,DCR,0.00,DPO,0.00,POS,0.00,RRE,0.00,SAT,0.00,SGL,0.00,SGP,0.00,VEC,0.00,LTN,0.00,PTT,0,TTT,0*6C

See also $PASHS,NME

NPT: Tagging of SBAS Differential Positions in NMEA & NMEA-Like Messages

Function This command is used to query the receiver for the current tagging of all SBAS differential positions solutions in NMEA-like and NMEA messages the receiver generates.

Command Format

Syntax

$PASHQ,NPT[*cc]

Response Format

Syntax

$PASHR,NPT,d1,d2*cc

Parameters

Parameter	Description	Range
d1	Code assigned to SBAS differential position solution in NMEA-like messages (CRT, DCR, DPO, POS, VEC): • 0: Code "1" • 1: Code "9"	0,1
d2	Code assigned to SBAS differential position solution in NMEA messages (GGA): • 0: Code "2" • 1: Code "9"	0, 1
*cc	Optional checksum	*00-*FF

Example

$PASHQ,NPT
$PASHR,NPT,0,0*3E

Relevant Set Command

$PASHS,NPT

NTR: NTRIP Settings

Function

This command is used to read the current NTRIP settings. When c6 is omitted in the query command, the returned NTRIP settings are those for the port defined through the $PASHS,NTR,PAR command last run.

Command Format

Syntax

$PASHQ,NTR[,c6][*cc]

Response Format

Syntax

$PASHR,NTR,ADD=s1,PRT=d2,LGN=s3,PWD=s4,TYP=d5,IPP=c6*cc

Parameters

Parameter	Description	Range
s1	Caster IP address or host name	000.000.000.000-255.255.255.255 or host name
d2	Caster port number	0-65535
s3	Login	32 characters max.
s4	Password	32 characters max.
d5	Caster type: • 0: Client • 1: Server	0-1
c6	Internet port used to connect to the caster: • E: Internal modem (default) • P: Ethernet stream 1 • Q: Ethernet stream 2	E, P, Q
*cc	Checksum	*00-*FF

Example

$PASHQ,NTR
$PASHR,NTR,ADD=192.34.76.1,PRT=2100,LGN=Ashtech,PWD=u6huz8,
TYP=0*2D

See also

$PASHS,NTR,PAR
$PASHQ,NTR,TBL

NTR,MTP: Connection to Mount Point

Function

This command is used to read the current NTRIP mount point to which the specified Internet port is connected.

Command Format

Syntax

$PASHQ,NTR,MTP[,c1][*cc]

Parameters

Parameter	Description	Range
c1	Internet port used for the connection to the embedded NTRIP caster. • E: Internal modem • P: Ethernet stream 1 • Q: Ethernet stream 2 If c1 is omitted, the receiver will return the mount point name corresponding to the port last defined through the $PASHS,NTR,PAR command.	E, P, Q
*cc	Checksum	*00-*FF

Response Format

Syntax

$PASHR,NTR,MTP,s1*cc

Parameters

Parameter	Description	Range
s1	NTRIP mount point name If “OFF”, the port is not connected to any NTRIP caster mount point.	100 characters max. or “OFF”
*cc	Checksum	*00-*FF

Example

$PASHQ,NTR,MTP,P
$PASHR,NTR,MTP,NAN2*06

Relevant Set Command

$PASHS,NTR,MTP

NTR,TBL: Source Table

Function

This command is used to read the source table stored in the receiver.

Command Format

Syntax

$PASHQ,NTR,TBL[*cc]

Response Format

Syntax

$PASHR,NTR,TBL
SOURCETABLE 200 OK
<source table as specified in the RTCM standard>

ENDSOURCETABLE

Parameters

Source table as defined in the NTRIP standard.

Example

$PASHQ,NTR,TBL
$PASHR,NTR,TBL
SOURCETABLE 200 OK
Content-Type: text/plain
Content-Length: 7864
CAS;129.217.182.51;80;ICD;BKG;0;GER;51.5;7.5;Trial Broadcaster
NET;GREF;BKG;B;N;http://igs.ifag.deGREF.htm;none;
denise.dettmering@bkg.bund.de;none
NET;IGSIGLOS;BKG;B;N;http://igscb.jpl.nasa.gov/projects/rtwg
;none;denise.dettmering@bkg.bund.de;none
STR;FFMJ2;Frankfurt;RTCM2.0;1(1),3(19),16(59);0;GPS;GREF;GER;50.12;8
.68;0;1;GPSNetV1.9;none;N;N;560;DemoSTR;FFMJ1;Frankfurt;RTCM
2.1;3(19),16(59),18(1),19(1);2;GPS;GREF;GER;50.09;8.66;0;0;GPSNet
V1.9;none;N;N;2800;Demo
STR;FFMJ0;Frankfurt;RAW;Compact(1);2;GPS+GLO;IGSIGLOS;
GER;50.09;8.66;0;0;Javad Legacy E;none;N;N;3600;Demo
STR;LEIJ0;Leipzig;RAW;Compact(1);2;GPS+GLO;IGSIGLOS;
GER;51.33;12.37;0;0;Javad Legacy E;none;B;N;3600;none
STR;WTZJ0;Wettzell;RAW;Compact(1);2;GPS+GLO;IGSIGLOS;
GER;49.13;12.88;0;0;Javad Legacy E;none;B;N;3600;none
STR;HELJ0;Helgoland;RAW;Compact(1);2;GPS+GLO;IGSIGLOS;
GER;54.18;7.88;0;0;Javad Legacy E;none;B;N;3600;none
STR;TITZ0;Titz;RAW;Compact(1);2;GPS+GLO;IGSIGLOS;
GER;51.00;6.42;0;0;Javad Legacy E;none;B;N;3600;none
STR;HUEG0;Huegelheim;RAW;Compact(1);2;GPS+GLO;IGSIGLOS;
GER;47.82;7.62;0;0;Javad Legacy E;none;B;N;3600;none
STR;DREJ0;Dresden;RAW;Compact(1);2;GPS+GLO;IGSIGLOS;
GER;51.05;13.73;0;0;Javad Legacy E;none;B;N;3600;none
STR;SASS0;Sassnitz;RAW;Compact(1);2;GPS+GLO;IGSIGLOS;
GER;54.51;13.64;0;0;Javad Legacy E;none;B;N;3600;none
STR;KARJ0;Karlsruhe;RAW;Compact(1);2;GPS+GLO;IGSIGLOS;
GER;49.01;8.41;0;0;Javad Legacy E;none;B;N;3600;none
STR;WILH0;Wilhelmshaven;RTCM
2.0;1(1),3(19),16(59);0;GPS;GREF;GER;53.52;8.10;0;1;GPSNet
V1.9;none;B;N;560;VRS
ENDSOURCETABLE

See also

$PASHS,NTR,LOD
$PASHS,NTR,PAR
$PASHS,NTR,MTP

OCC: Ocupation State and Parameters

Function

This command is used to read the current occupation settings.

Command Format

Syntax

$PASHQ,OCC[*cc]

Response Format

Syntax

$PASHR,OCC,d1,d2[,s3,s4]*cc

Parameters

Parameter	Description	Range
d1	Occupation type: • 0: Static • 1: Quasi-static • 2: Dynamic • 4: On kinematic bar, 20 cm long	0-2, 4
d2	Occupation state: • 0: Occupation in progress • 1: No occupation in progress	0-1
s3	Occupation name	255 characters max.
s4	Occupation description	255 characters max.
*cc	Checksum	*00-*FF

Examples

$PASHQ,OCC
$PASHR,OCC,2,1*38

Relevant Set Command

$PASHS,OCC

OPTION: Installed Receiver Firmware Options

Function

This command is used to list the firmware options currently installed in the receiver. The returned message includes one response line per installed option.

Command Format

Syntax

$PASHQ,OPTION[*cc]

Response Format

Syntax

$PASHR,OPTION,c1,s2,h3*cc

Parameters

Parameter	Description	Range
c1	Option ID	(See table below)
s2	Option label	
h3	Hexadecimal unlock code	13 characters max.
*cc	Checksum	*00-*FF

Option ID	Label	Description
#	REGISTRATION CODE	Registration code, depends on the firmware version, required to activate the options. Without this code, all the options below become invalid.
K	RTK	RTK processing enabled. Corrections generated in RTCM2.3, RTCM3.0, CMR or CMR+ format.
F	FASTOUTPUT	20-Hz data output rate enabled
Z	MODEM	GSM/GPRS modem enabled
S	GLONASS	GLONASS enabled
P	GNSSL2	L2 tracking enabled
M	RTK2	RTK using a proprietary data format (ATOM, DBEN or LRK) enabled. Required for a base only generating data in ATOM proprietary format.
L	RTK3	Limited RTK range enabled for a rover. Also gives full RTK capability for a base.
N	STA	RTK base enabled
C	CASTER	Embedded NTRIP Caster
R	FLYING RTK	RTK computation (Flying RTK mode only) with RTCM2.3, RTCM3.0, CMR, CMR+, LRK, DBEN, ATOM. Generates RTCM2.3, RTCM3.0, CMR, CMR+, ATOM messages.
O	GALILEO	Galileo tracking enabled
Q	GNSSL5	L5 tracking enabled

Example

$PASHQ,OPTION
$PASHR,OPTION,0,SERIAL,NUMBER,200751223*7A
$APSHR,OPTION,#,REGISTRATION CODE,057743D104182*07
$PASHR,OPTION,K,RTK,6756975c71766*36
$PASHR,OPTION,S,GLONASS,6756945714671*7B

If the registration code is incorrect, the command returns the following:

$PASHQ,OPTION
$PASHR,OPTION,0,SERIAL,NUMBER,200751223*7A
$APSHR,OPTION,#,REGISTRATION CODE,-------------*07

Relevant Set Command $PASHS,OPTION

PAR: Receiver Parameters

Function This command lists the currently used parameters for the specified type of receiver settings. The response is returned on the port routing the query command.

Command Format **Syntax**

$PASHQ,PAR[,s1][*cc]

Parameters

Parameter	Description	Range
s1	Type of receiver settings. If s1 is omitted, the response lists the parameters for all types of settings, one after the other.	See table below.
*cc	Optional checksum	*00-*FF

Type	Description
STA	Status information
RCV	Receiver settings.
RTK	RTK and ARROW settings.
PRT	Port information
MEM	Memory information
SES	Session information
RXC	RINEX converter information
ETH	Ethernet information
CST	NTRIP caster information
RDP	Radio information
MDM	Modem information
NET	Network information
XDR	External sensor information
OUT	Output information.

Response Format

Examples

$PASHQ,PAR,STA

```
==============================+================================
 STATUS INFORMATION           |
------------------------------|
 STORED POSITION              | 5539.380104,N,03731.554854,E,270.416   Computed posi
COMPUTED
 DATE [dd.mm.yyyy]            | 05.09.2008
 UTC TIME [hhmmss.ms]         | 083017.00
 GPS TIME SCALE               | 1495:462631000
 GLO TIME SCALE               | 10475:41417000
 SVS TRACKED                  | 18 (GPS:10 SBA:2 GLO:6 GAL:0 QZS:0)
 SVS USED                     | 13 (GPS:9 SBA   GLO:4 GAL:0 QZS:0)     $PASHQ,POS
 SOLUTION STATUS              | 0
 COORDINATE SYSTEM            | WGS84
==============================+================================
```

$PASHQ,PAR,OUT

```
=============================+================================
 OUTPUT INFORMATION          |
-----------------------------|

RAW:------------------------------------------------------------------
---------
    MPC DPC PBN SNV SAL ION SBD SNW SAW SNG SAG
A:  .05 OFF .05 001 OFF OFF ON  001 OFF 001 OFF
B:  OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
C:  OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
F:  OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
I:  OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
M:  OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
R:  OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
U:  OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
I1: OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
I2: OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
I3: OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
I4: OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
I5: OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
I6: OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
I7: OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
I8: OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
I9: OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF

ATM: -----------------------------------------------------------------
---------
    MES PVT ATR NAV DAT  EV   RNX  ANT
A:  OFF OFF OFF OFF OFF  OFF  OFF   1
B:  OFF OFF OFF OFF OFF  OFF  OFF   1
C:  OFF OFF OFF OFF OFF  OFF  OFF   1
F:  OFF OFF OFF OFF OFF  OFF  OFF   1
I:  OFF OFF OFF OFF OFF  OFF  OFF   1
```

etc.

The parameters returned by $PASHQ,PAR,OUT should be interpreted as follows:

- "OFF" means the message is currently not output.
- "ON" means it is currently output with the default output rate.
- A specified output rate means this rate has been user-set through the appropriate command.

PEM: Position Elevation Mask

Function This command is used to read the current value of the elevation mask used in the position processing.

Command Format

Syntax

$PASHQ,PEM[*cc]

Response Format

Syntax

$PASHR,PEM,d1*cc

Parameters

Parameter	Description	Range
d1	Elevation mask angle	0-90°
*cc	Checksum	*00-*FF

Example

$PASHQ,PEM
$PASHR,PEM,9*39

Relevant Set Command $PASHS,PEM

See also $PASHQ,ELM

PHE: Active Edge of Event Marker Pulse

Function This command is used to read the current choice of active edge for the event marker pulse (photogrammetry).

Command Format

Syntax

$PASHQ,PHE[*cc]

Response Format

Syntax

$PASHR,PHE,c*cc

Parameters

Parameter	Description	Range
c	Active edge: • R: Rising • F: Falling	R, F
*cc	Checksum	*00-*FF

Example

$PASHQ,PHE
$PASHR,PHE,R*57

Relevant Set Command $PASHS,PHE

See also $PASHS,NME,TTT

POP: Reading Internal Update Rate

Function

This command is used to read the internal update rate currently used for measurements and PVT process.

Command Format

Syntax

$PASHQ,POP[*cc]

Parameters

None.

Response format

Syntax

$PASHR,POP,d*cc

Parameters

Parameter	Description	Range
d	Current update rate, in Hz. Default is 20 Hz.	10, 20
*cc	Optional checksum	*00-*FF

Example

$PASHQ,POP*38
$PASHR,POP,10*16

Relevant Set Command $PASHS,POP

POS: Computed Position Data

Function

This command allows you to query the computed position.

Command Format

Syntax

$PASHQ,POS[*cc]

Response Format

Syntax

$PASHR,POS,d1,d2,m3,m4,c5,m6,c7,f8,f9,f10,f11,f12,f13,f14,f15,f16,s17*cc

Parameters

Parameter	Description	Range
d1	Position mode: • 0: Autonomous • 1: RTCM code differential (or SBAS differential) • 2: RTK float • 3: RTK fixed • 9: SBAS Differential. See comment.	0-3, 9
d2	Count of satellites used in position computation	3-27
m3	Current UTC time of position (hhmmss.ss)	000000.00-235959.99
m4	Latitude of position (ddmm.mmmmmm)	0-90° 00-59.999999 minutes
c5	North (N) or South (S)	N, S
m6	Longitude of position (ddmm.mmmmmm)	0-180° 00--59.999999 minutes
c7	East (E) or West (W)	E, W
f8	Altitude above the WGS84 ellipsoid	±9999.000
f9	Age of differential corrections, in seconds	0-999
f10	True Track/Course Over Ground, in degrees	0.0-359.9
f11	Speed Over Ground, in knots	0.0-999.9
f12	Vertical velocity in dm/s	±999.9
f13	PDOP	0-99.9
f14	HDOP	0-99.9
f15	VDOP	0-99.9
f16	TDOP	0-99.9
s17	Firmware version ID	4-char. string
*cc	Checksum	*00-*FF

Example

$PASHQ,POS
$PASHR,POS,3,10,151858.00,4717.960848,N,00130.499487,W,82.972,,0.0,0.0,-0.0,2.0,1.1,1.7,1.3,G010*49

Comment

The code allotted to a position solution of the SBAS differential type is either “1” or “9”, depending on the last $PASHS,NPT command run.

Relevant Set Command

$PASHS,POS

See also $PASHS,NME
$PASHS,NPT

Automatic Output of POS Messages

This is a reminder on how to output POS messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,POS,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output POS messages on port A at a rate of 0.2 second:

$PASHS,NME,POS,A,ON,0.2

PPS: PPS Settings

Function

This command is used to read the current settings (signal period, offset and valid edge) of the PPS signal.

Command Format

Syntax

$PASHQ,PPS[*cc]

Response Format

Syntax

$PASHR,PPS,f1,f2,c3*cc

Parameters

Parameter	Description	Default	Range
f1	Period, in seconds	0	0.0-0.9; 1-60
f2	Offset in milliseconds	0	±999.9999
c3	Active edge: • R: Rising • F: Falling	R	R, F
*cc	Checksum		*00-*FF

Example

$PASHQ,PPS
$PASHR,PPS,1,500,R*5D

Relevant Set Command $PASHS,PPS

PRT: Baud Rate Settings

Function This command is used to query the baud rate setting for any of the serial ports used in the receiver.

Command Format

Syntax

$PASHQ,PRT[,c1][*cc]

Parameters

Parameter	Description	Range
c1	Port ID	A, B, C, D, F
*cc	Optional checksum	*00-*FF

Response Format

Syntax

$PASHR,PRT,c1,d2*cc

Parameters

Parameter	Description	Range
c1	ID of port for which baud rate setting is returned.	A, B, C, D, F
d2	Baud rate code	0-15 (see table below)
*cc	Checksum	*00-*FF

Code	Baud Rate	Code	Baud Rate
0	300	7	38400
1	600	8	57600
2	1200	9	115200
3	2400	10	230400
4	4800	11	460800
5	9600	12	921600
6	19200	13	1428571

Example

$PASHQ,PRT,A
$PASHR,PRT,A,6*55

Relevant Set Command $PASHS,PRT

See also $PASHQ,CTS
$PASHQ,MDP

PTT: PPS Time Tag

Function This command asks for the PPS time tag message to be output on the specified port, or on the port on which the query is made if no port is specified.

Command Format

Syntax

$PASHQ,PTT[,c1][*cc]

Parameters

Parameter	Description	Range
c1	Port ID	A, B, C, E, F, I
*cc	Optional checksum	*00-*FF

Response Format

Syntax

$PASHR,PTT,d1,m2*cc

Parameters

Parameter	Description	Range
d1	Day of week: • 1: Sunday • 7: Saturday	1-7
m2	GPS time tag in hours, minutes, seconds	0-23:59:59.9999999
*cc	Checksum	*00-*FF

Example

Enabling the receiver to output the PTT message on port A:

$PASHS,NME,PTT,A,ON

Generating the PPS time tag message on port A:

$PASHQ,PTT,A
$PASHR,PTT,6,20:41:02.0000000*2D

Comments

- The response to this command will be sent out once, right after the next PPS pulse is generated.
- The response contains the GPS time at which the PPS pulse was sent, including the offset if an offset was set when the PPS pulse was enabled.
- Being set to a periodical output by the $PASHS,NME,PTT command, this message is independent of the NMEA period. It is only linked to the PPS period.

PWR: Power Status

Function

This command is used to query the power status of the receiver.

Command Format

Syntax

$PASHQ,PWR[*cc]

Response Format

Syntax

$PASHR,PWR,PAR,f1,f2,d3,[f4],[d5],[f6],[d7],d8[,f9,f10]*cc

Parameters

Parameter	Description	Range
f1	Battery voltage threshold, in volts, triggering a low-battery alarm	6.7-8.4
f2	External power voltage threshold, in volts, triggering a low-power alarm	9.0-28
d3	Power source: • 0: Internal battery • 1: External battery • 2: External DC source	0-2
f4	Battery DC output voltage, in volts	0.0-12.0
d5	Percentage of remaining battery energy	0-100
f6	DC input voltage from external power, in volts	0.0-30.0
d7	Battery charging status: • 0: Charging • 1: Discharging • 2: Fully charged	0-2
d8	Internal temperature, in °Celsius	
f9	Lower limit of DC voltage, in volts, controlling automatic power on/off	9.0-36.0
f10	Upper limit of DC voltage, in volts, controlling automatic power on/off	9.0-36.0
*cc	Checksum	*00-*FF

Comments

With no internal battery in, fields f4, d5 and d7 are all empty. With no external power source applied, field f6 is empty.

The lower and upper limits of power voltage (f9, f10) control the mechanism through which the receiver will be powered on or off automatically if the DC voltage applied to the power input is respectively within or out of these limits (making this mechanism operational requires that the slide switch located at the bottom of the compartment be pushed to the right).

Example

$PASHQ,PWR
$PASHR,PWR,6.8,9.1,2,,,11.6,,44*0D

Relevant Set Command

$PASHS,PWR,PAR

QZS: QZSS Tracking Status

Function

This command is used to read the current status of QZSS tracking.

Command Format

Syntax

$PASHQ,QZS[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,QZS,s*cc

Parameters

Parameter	Description	Range
s	QZSS tracking status: • ON: QZSS satellites tracked and used • OFF: QZSS satellites not tracked	ON or OFF
*cc	Optional checksum	*00-*FF

Example

Reading QZSS tracking:

$PASHQ,QZS

$PASHR,QZS,OFF*xx

Relevant Set Command

$PASHS,QZS

RAW: Raw Data Logging Settings

Function

This command is used to query the raw data recording parameters.

Command Format

Syntax

$PASHQ,RAW[*cc]

Response Format

Syntax

(Through an example):

```
PER:020.00 ELM:10
RAW:    MPC DPC PBN SNV SNG SNW SAL SAG SAW ION SBD BAUD
PRTA:   ON  OFF  OFF OFF OFF  OFF  OFF OFF OFF  OFF OFF  6
PRTB:   ON  OFF  OFF OFF OFF  OFF  OFF OFF OFF  OFF OFF  6
PRTC:   OFF OFF  OFF OFF OFF  OFF  OFF OFF OFF  OFF OFF  1
PRTF:   ON  OFF  OFF OFF OFF  OFF  OFF OFF  OFF  OFF OFF 6
PRTI:   ON  OFF  OFF OFF OFF  OFF  OFF OFF  OFF  OFF OFF 1
MEMM: OFF  OFF  OFF OFF OFF  OFF  OFF OFF  OFF  OFF OFF 1
MEMR: OFF  OFF  OFF OFF OFF  OFF  OFF OFF  OFF  OFF  OFF 1
MEMU: OFF  OFF  OFF OFF OFF  OFF  OFF OFF  OFF  OFF  OFF 0
I1:     OFF  OFF  OFF OFF OFF  OFF  OFF OFF  OFF OFF  OFF 0
I2:     OFF  OFF  OFF OFF OFF  OFF  OFF OFF  OFF OFF  OFF 0
I3:     OFF  OFF  OFF OFF OFF  OFF  OFF OFF  OFF OFF  OFF 0
I4:     OFF  OFF  OFF OFF OFF  OFF  OFF OFF  OFF OFF  OFF 0
I5:     OFF  OFF  OFF OFF OFF  OFF  OFF OFF  OFF OFF  OFF 0
I6:     OFF  OFF  OFF OFF OFF  OFF  OFF OFF  OFF OFF  OFF 0
I7:     OFF  OFF  OFF OFF OFF  OFF  OFF OFF  OFF OFF  OFF 0
I8:     OFF  OFF  OFF OFF OFF  OFF  OFF OFF  OFF OFF  OFF 0
I9:     OFF  OFF  OFF OFF OFF  OFF  OFF OFF  OFF OFF  OFF 0
```

Parameters

Parameter	Description	Range
PER	Output rate, in seconds	0.00-999.00
ELM	Elevation mask used in data recording & data output	0-90
RAW	Raw data type	MPC, DPC, PBN, SNV, SNG, SNW, SAL, SAG, SAW, ION, SBD
PRTA PRTB PRTF	Serial port	ON, OFF
PRTC	Bluetooth	ON, OFF
PRTI	Ethernet	ON, OFF
MEMM MEMR MEMU	Labels for memories M (MEMM: internal memory), R (MEMR: automatic recording session) and U (MEMU: USB key)	ON-OFF
I1-I9	Data streaming port	ON, OFF
BAUD	For serial port: Baud rate code For other devices, “0” if not available, else “1”	0-15 (see table below)

Code	Baud Rate	Code	Baud Rate
0	300	7	38400
1	600	8	57600

Code	Baud Rate	Code	Baud Rate
2	1200	9	115200
3	2400	10	230400
4	4800	11	460800
5	9600	12	921600
6	19200	13	1428571

Relevant Set Command

$PASHS,RAW

RCP: Receiver Parameters

Function

This command returns the list of pre-defined receiver names, and for user-defined receivers, their GLONASS carrier phase biases.

Command Format

Syntax

$PASHQ,RCP[*cc]
or
$PASHQ,RCP,s1[*cc]

Parameters

Parameter	Description	Range
s1	Name of the receiver (case sensitive). If s1 is omitted, the parameters for all the receivers described in the database are listed.	31 characters max.
*cc	Checksum	*00-*FF

Response Format

The response is in user-readable form.**$PASHQ,RCP**
PREDEFINED RECEIVER LIST (d1):
ASHTECH ProMark800
ProFlex800 MB500
PM5 MMapper100
ProMark100 ProMark200
MB100 NOVATEL
TRIMBLE SEPTENTRIO
TOPCON
USERDEFINED RECEIVER LIST (d2):
RCV10 RCV11
RCV12 RCV13
...
OWN RECEIVER: ProFlex800
REFERENCE RECEIVER:
RECEIVED RECEIVER:

Where:
- d1 is the number of pre-defined receivers
- d2 is the number of user-defined receivers
- “Own receiver” refers to the name of the receiver
- “Reference receiver” provides the name of the base receiver, as set through the command $PASHS,RCP,REF
- “Received receiver” provides the name of the base receiver, as received through the differential data stream.

$PASHQ,RCP,s1 provides the GLONASS carrier phase biases for the specified, user-defined receiver.

```
$PASHQ,RCP,MyReceiver
MyReceiver:
L1 BIAS: +0.059,+0.613 +0.671 +0.729 +0.786 +0.829 +0.898 +0.949
         +0.000 +0.059 +0.112 +0.182 +0.253 +0.312 +0.373
L2 BIAS: +0.049,+0.667 +0.714 +0.761 +0.808 +0.849 +0.893 +0.947
         +0.000 +0.044 +0.102 +0.153 +0.201 +0.254 +0.292
```

See Also

$PASHS,RCP,REF
$PASHS,RCP,GB1
$PASHS,RCP,GB2

RCP,OWN: Receiver Name

Function

This command is used to read the name assigned to the receiver.

Command Format

Syntax

$PASHQ,RCP,OWN[*cc]

Parameters

None.

Response format

Syntax

$PASHR,RCP,OWN,s1*cc

Parameters

Parameter	Description	Range
s1	Receiver name	ProFlex800

Parameter	Description	Range
*cc	Optional checksum	*00-*FF

Example

$PASHQ,RCP,OWN*4C
$PASHR,RCP,OWN,PROFLEX800*01

RCP,REF: Reference Receiver Name

Function

This command is used to query the receiver for the name assigned locally to the base receiver from which the differential stream is received.

Command Format

Syntax

$PASHQ,RCP,REF[*cc]

Parameters

None.

Response format

Syntax

$PASHR,RCP,REF,s1,d2*cc

Parameters

Parameter	Description	Range
s1	Reference receiver name	
d2	Receiver name preference: • 0: s1 is ignored if the incoming reference data contain the reference receiver name • 1: s1 is always used and the decoded reference receiver name is ignored.	0, 1
*cc	Optional checksum	*00-*FF

Example

$PASHQ,RCP,REF*4B
$PASHR,RCP,REF,ASHTECH,0*38

RDP,CHT: Radio Channel Table

Function

This command is used to read the radio channel settings.

Command Format

Syntax

$PASHQ,RDP,CHT,c1[*cc]

Parameters

Parameter	Description	Range
c1	Serial port used to communicate with the radio (A, B or F for external radio, D for internal radio)	A, B, F, D
*cc	Optional checksum	*00-*FF

Response Format

Syntax

$PASHR,RDP,CHT,s1,d2,n(d3,f4,f5)*cc
Or, if the channel table does not exist: $PASHR,RDP,CHT,s1,0
(Here n=d2)

Parameters

Parameter	Description	Range
s1	Radio Model: • PDL: Pacific Crest PDL HPB/LPB (external, port A, B or F) • ADL: Pacific Crest ADL Vantage (Pro) (external, port A, B or F), Pacific Crest ADL Foundation (internal, port D) • MGL: Radio transmitter P/N 800986 • MDL: U-Link • LFE: License-free radio, Europe (ARF7474B) • LFA: License-free radio, North America (ARF7474A)	PDL, MGL, MDL, LFE, LFA, ADL (port A) PDL, LFE, LFA, ADL (Ports B, F)PDL, MDL, ADL (port D)
d2	Total number of available channels	0-16 (0-32 for ADL)
d3	Channel index	0-15 (1-32 for ADL)
f4	Receive frequency	410-470 MHz
f5	Transmit frequency	410-470 MHz
*cc	Checksum	*00-*FF

Comments

- The number of (d3,f4,f5) data sets in the response line is equal to the number of channels (d2).
- The US model of license-free radio (LFA) cannot be interrogated through this command.

Examples

$PASHQ,RDP,CHT,D
$PASHR,RDP,CHT,PDL,7,0,446.7750,446.7750,1,444.1000,444.1000,2,445.1000,445.1000,3,446.1000,446.1000,4,447.1000,447.1000,5,448.1000,448.1000,6,449.1000,449.1000*35

$PASHQ,RDP,CHT,A
$PASHR,RDP,CHT,NONE,0*7B

See also $PASHS,RDP,TYP
$PASHQ,RDP, PAR

RDP,LVL: Reading the Radio Reception Level

Function

This command is used to read the current level of signal at the radio receiver input. Only U-Link Rx and license-free radio receivers can return the current value of this parameter.

Command Format

Syntax

$PASHQ,RDP,LVL,c[*cc]

Parameters

Parameter	Description	Range
c	Identification of the port to which the internal radio receiver is connected.	A, B, D, F
*cc	Optional checksum	*00-*FF

Response format

Syntax

$PASHR,RDP,LVL,d1*cc

Parameters

Parameter	Description	Range
d1	Signal level, in dBm	
*cc	Optional checksum	*00-*FF

Example

With U-Link Rx as the internal radio connected to port D:

$PASHQ,RDP,LVL,D*23
$PASHR,RDP,LVL,D,-100*10

See Also

$PASHS,RDP,PAR
$PASHS,RDP,TYP

RDP,PAR: Radio Parameters

Function

This command allows you to query the radio settings relevant to the port used to communicate with the radio.

Command Format

Syntax

$PASHQ,RDP,PAR,c1[*cc]

Parameters

Parameter	Description	Range
c1	Serial port used to communicate with the radio	A, B, D, F
*cc	Optional checksum	*00-*FF

Response Format

Syntax

$PASHR,RDP,PAR,c1,s2,s3,c4,s5,c6,c7,s8,f9,f10,c11,s12,s13[,f14][,c15][,c16][,s17][,s18][,s19][,d20][,d21]*cc

Parameters

Parameter	Description	Range
c1	The port ID you specified in the command is replicated in this field	A, B, D, F
s2	Radio Model: • PDL: Pacific Crest PDL HPB/LPB (external, port A, B or F) • ADL: Pacific Crest ADL Vantage (Pro) (external, port A, B or F), Pacific Crest ADL Foundation (internal, port D) • MGL: Radio transmitter P/N 800986 • MDL: U-Link • LFE: License-free radio, Europe (ARF7474B) • LFA: License-free radio, North America (ARF7474A)	PDL, MGL, MDL, LFE, LFA, ADL, XDL (port A) PDL, LFE, LFA, ADL, XDL (Ports B, F)PDL, MDL, ADL (port D)
s3	Radio state (if port D is queried)	ON, OFF
c4	Channel number	0-15 (PDL, MGL, MDL) 1-32 (ADL, XDL) 0-2 (LFE) 0-49 (LFA)
s5	Power management (if port D is queried) • AUT: Automatic • MAN: Manual	AUT, MAN

Parameter	Description	Range
c6	Protocol used: PDL: • 0: Transparent • 1: TRIMTALK • 2: DSNP MDL: • 0: Transparent • 1: Not used • 2: DSNP ADL, XDL: • 0: Transparent (with EOT time out) • 1: TrimTalk 450S • 2: Not used • 3: SATEL • 4: TrimMarkII/IIe • 5: TT450S (HW) • 6: TRIMMARK3 • 7: Transparent FST • 8: U-Link (ADL only)	0-7
c7	Air link speed For PDL: • 4800: 4800 Bd, GMSK modulation • 9600: 9600 Bd, GMSK or four-level FSK modulation • 19200: 19200 Bd, four-level FSK modulation For MDL: 4800, 7600 or 9600 For ADL, 12.5 kHz: • 4800 (GMSK modulation) • 8000 (GMSK modulation) • 9600 (4FSK modulation) For ADL, 25 kHz: • 4800 (GMSK modulation) • 9600 (GMSK modulation) • 16000 (GMSK modulation) • 19200 (4FSK modulation)	4800, 7600, 8000, 9600, 16000, 19200
s8	Radio sensitivity (for PDL, ADL, XDL and MDL)	LOW, MED, HIG, OFF
f9	Receive frequency, in MHz	410-470
f10	Transmit frequency, in MHz	410-470
c11	Channel spacing, in kHz: • MGL, XDL and MDL: 12.5 only • PDL: 12.5 or 25 • ADL: 12.5 or 25	12.5, 25
s12	RF band, in MHz (for PDL and ADL only)	410-430, 430-450, 450-470

Parameter	Description	Range
s13	Firmware version	
f14	Central frequency setting (MDL only)	410-470 MHz
c15	Scrambler status (PDL, ADL and XDL): • 0: Off • 1: On	0, 1
c16	Forward Error Correction status (PDL, ADL and XDL): • 0: FEC Off • 1: Hamming FEC On	0, 1
s17	RF output power (ADL, LFE, LFA)	LFE, LFA: 100 mW, 200 mW 500 mW 1 W, 2 W, 4 W ADL Vantage: 100 mW, 500 mW 1 W, 2 W, 4 W ADL Vantage Pro: 2 - 35 W ADL Foundation: 01 - 0.5 W
s18	Maximum output power (ADL only)	100, 500 mW 1, 2, 4, 35 W
s19	Modulation format (PDL and ADL only)	4FSK, GMSK
d20	Model ID for ADL radios: • 0: ADL RXO • 1: ADL Foundation • 2: ADL Vantage • 3: ADL Vantage Pro • 4: XDL (ADL Micro)	0-4

Parameter	Description	Range
d21	Current output power (index)(ADL only): • ADL Foundation: – 0: 100 mW – 1: 500 mW – 2: 1 W • ADL Vantage: – 0: 100 mW – 1: 500 mW – 2: 1 W – 3: 2 W – 4: 4 W • ADL Vantage Pro: – 0: Level 1 (2 W) – 1: Level 2 – 2: Level 3 – 3: Level 4 – 4: Level 5 See command $PASHQ,RDP,PWR to read the current power setting (expressed in Watts)	0-4
*cc	Checksum	*00-*FF

Examples

If an internal PDL radio receiver is used:

$PASHQ,RDP,PAR,D
$PASHR,RDP,PAR,D,PDL,ON,0,AUT,0,4800,MED,444.5500,446.7750,12.5,430-450,V02.58,,0,0*03

If an internal U-Link Rx is used:

$PASHQ,RDP,PAR,D
$PASHR,RDP,PAR,D,MDL,ON,4,AUT,0,9600,MED,447.1000,447.1000,12.5,,V01.00,445.5500*20

If an external radio transmitter P/N 800986 is used:

$PASHQ,RDP,PAR,D
$PASHR,RDP,PAR,D,MGL,,1,,,,,0.0000,447.1000,,,TD20-EUHFV10300*01

Comments

The command will be NAKed if the receiver has not been told the radio is on the specified port using command $PASHS,RDP,TYP.

Relevant Set Command

$PASHS,RDP,PAR

See also

$PASHS,RDP,TYP

RDP,PWR: Reading Radio Type Used and Radiated Power

Function

This command queries the receiver for the radio connected to the specified port.

The set of returned data is called “power table” describing the type of radio used, the number of channels and the radiated power.

If there’s no power table existing for the specified port, the response will be:

$PASHR,RDP,PWR,s1,0

Command Format

Syntax

$PASHQ,RDP,PWR,c1[*cc]

Parameters

Parameter	Description	Range
c1	Port for which you want the radio power table.	A, B, D, F
*cc	Optional checksum	*00-*FF

Response Format

Syntax

$PASHR,RDP,PWR,s1,d2,n(d3,f4)*cc

Parameters

Parameter	Description	Range
s1	Radio type: • NONE: No radio • ADL: ADL Foundation, ADL Vantage or ADL Vantage Pro	ADL, XDL, NONE
d2	Total number of available channels	1-5 for ADL
n	n designates the number of (d3, f4) pairs returned in the response; n= d2	n=d2
d3	Channel index	0-4 for ADL
f4	Power, in watts	2-35
*cc	Checksum	*00-*FF

Examples

Reading radio power table for port A:

$PASHQ,RDP,PWR,A

$PASHR,RDP,PWR,ADL,5,0,2,1,8,2,16,3,25,4,35*35

$PASHQ,RDP,PWR,A
$PASHR,RDP,PWR,NONE,0*7B

RDP,TYP: Radio Type Used

Function

This command is used to query the type of radio used on the specified port.

Command Format

Syntax

$PASHQ,RDP,TYP,c1[*cc]

Parameters

Parameter	Description	Range
c1	Serial port used to communicate with the radio	A, B, D, F
*cc	Optional checksum	*00-*FF

Response Format

Syntax

$PASHR,RDP,TYP,c1,s2*cc

Parameters

Parameter	Description	Range
c1	The port ID you specified in the command is replicated in this field	A, B, D, F
s2	Radio Model: • UNKNOWN: Auto-detection (port D only) • NONE: No radio • PDL: Pacific Crest PDL HPB/LPB (external, port A, B or F) • ADL: Pacific Crest ADL Vantage (Pro) (external, port A, B or F), Pacific Crest ADL Foundation (internal, port D) • MGL: Radio transmitter P/N 800986 • MDL: U-Link • LFE: License-free radio, Europe (ARF7474B) • LFA: License-free radio, North America (ARF7474A)	Port A: NONE, PDL, MGL, MDL, LFE, LFA, ADL, XDL. Port D: UNKNOWN, NONE, MDL or ADL. Ports B, F: NONE, PDL, XDL, LFE, LFA or ADL.
*cc	Checksum	*00-*FF

Examples

If an external radio transmitter P/N800986 is used:

$PASHQ,RDP,TYP,A
$PASHR,RDP,TYP,A,MGL*44

If an internal PDL radio receiver is used:

$PASHQ,RDP,TYP,D
$PASHR,RDP,TYP,D,PDL*5F

Relevant Set Command $PASHS,RDP,TYP

REC: Raw Data Recording Status

Function This command allows you to read the current raw data recording status.

Command Format

Syntax

$PASHQ,REC[*cc]

Response Format

Syntax

$PASHR,REC,c*cc

Parameters

Parameter	Description	Range
c	Control character: • Y: Yes. Data recording in progress. Receiver will start recording data automatically when you next turn it on. • N: No. No data recording in progress. Receiver will not start recording data automatically when you next turn it on. • S: Stop. No data recording in progress but the receiver will start recording data automatically when you next turn it on. • R: Record. Data recording in progress but the receiver will not start recording data automatically when you next turn it on.	Y, N, S, R
*cc	Checksum	*00-*FF

Example

$PASHQ,REC
$PASHR,REC,N*42

Relevant Set Command $PASHS,REC

REF: External Reference Clock

Function This command is used to read the current status of the external reference clock mode.

Command Format

Syntax

$PASHQ,REF[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,REF,s1,d2*cc

Parameters

Parameter	Description	Range
s1	Status of external reference clock input: • ON: External reference clock enabled • OFF: External reference clock disabled	ON, OFF
d2	Frequency, in MHz, of external reference clock.	5, 10, 20
*cc	Checksum	*00-*FF

Example

$PASHQ,REF
$PASHR,REF,ON,20*26

Relevant Set Command $PASHS,REF

RFB: Ring File Buffering

Function This command is used to read the current status of the ring file buffer.

Command Format

Syntax

$PASHQ,RFB[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,RFB,s1,d2,d3*cc

Parameters

Parameter	Description	Range
s1	Status: • Y: Ring file buffering enabled • N: Ring file buffering disabled	Y, N
d2	File duration, in minutes	1-120
d3	Size of the ring buffer, in kbytes	
*cc	Checksum	*00-*FF

Example

$PASHQ,RFB
$PASHR,RFB,Y,5*4E

Relevant Set Command

$PASHS,RFB

RFM: Ring File Memory

Function

This command returns the status of the ring file memory.

Command Format

Syntax

$PASHQ,RFM[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,RFM,s1*cc

Parameters

Parameter	Description	Range
s1	Status of the ring file memory: • Y: Use of ring file memory enabled: The oldest raw data files will be deleted automatically when only 15 Mbytes of free memory are left in the receiver. • N: Use of ring file memory disabled: Whether raw data files are logged through sessions, or outside of sessions ($PASHS,REC), the logging of raw data files will stop when there is no free space left in the memory used.	ON, OFF
*cc	Checksum	*00-*FF

Example

$PASHQ,RFM
$PASHR,RFM,Y*58

Relevant Set Command

$PASHS,RFM

RFT: Record File Type for Meteo & Tiltmeter Data

Function

This command allows you to read the file format used when collecting meteorological and tiltmeter data.

Command Format

Syntax

$PASHQ,RFT[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,RFT,d*cc

Parameters

Parameter	Description	Range
d	File format used: • 0: G-file only • 1: D-file and G-file	0, 1
*cc	Checksum	*00-*FF

Example

$PASHQ,RFT
$PASHR,RFT,0*28

Relevant Set Command $PASHS,RFT

RID: Receiver Identification

Function This command allows you to read the receiver identification parameters.

Command Format

Syntax

$PASHQ,RID[*cc]

Response Format

Syntax

$PASHR,RID,s1,d2,s3,s4,s5,s6*cc

Parameters

Parameter	Description	Range
s1	Receiver type	PF (for ProFlex 800)
d2	Not used	30
s3	Firmware version	8 characters

Parameter	Description	Range
s4	Receiver option. When an option is valid, a letter is displayed, else a dash is displayed. The options are: • K: RTK (Unlimited RTK) • F: FASTOUTPUT • Z: MODEM • S: GLONASS • P: GNSSL2 • M: RTK2 (RTK using proprietary formats) • L: RTK3 (Limited RTK range) • N: STA (RTK base) • C: CASTER • R: FLYING RTK • O: GALILEO • Q: GNSSL5	12 characters
s5	Not used	
s6	Serial number	9 characters
*cc	Checksum	*00-*FF

Example

$PASHQ,RID*28

$PASHR,RID,PF,30,S020G010,KFZS----,,200751223*1F

See also $PASHQ,VERSION
$PASHQ,OPTION

RMC: Recommended Minimum Specific GNSS Data

Function This command is used to output an RMC message containing the last computed position as well as navigation-related data.

Command Format

Syntax

$PASHQ,RMC[*cc]

Response Format

Syntax

$GPRMC,m1,c2,m3,c4,m5,c6,f7,f8,d9,f10,c11,c12*cc

Parameters

Parameter	Description	Range
m1	Current UTC time of position (hhmmss.ss)	000000.00-235959.99

Parameter	Description	Range
c2	Status • A: Data valid • V: Navigation receiver warning	A, V
m3	Latitude of position (ddmm.mmmmmm)	0-90 0-59.999999
c4	Direction of latitude	N, S
m5	Longitude of position (dddmm.mmmmmm)	0-180 0-59.999999
c6	Direction of longitude	E,W
f7	Speed Over Ground, in knots	000.0-999.9
f8	Course Over Ground, in degrees (true)	000.0-359.9
d9	Date (ddmmyy)	010100-311299
f10	Magnetic variation, in degrees	0.00-99.9
c11	Direction of variation	E, W
c12	Mode indicator: • A: Autonomous mode • D: Differential mode • N: Data not valid	A, D, N
*cc	Checksum	*00-*FF

Example

$PASHQ,RMC
$GPRMC,160324.50,A,4717.959275,N,00130.500805,W,0.0,0.0,250208,1.9,W,A*3D

See also

$PASHS,NME

Automatic Output of RMC Messages

This is a reminder on how to output RMC messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,RMC,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output RMC messages on port A at a rate of 0.5 second:

$PASHS,NME,RMC,A,ON,0.5

RNX,MSI: ATOM RNX Differential Message

Function This command allows you to read the current settings of the ATOM RNX message.

Command Format

Syntax

$PASHQ,RNX,MSI[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,RNX,MSI,d1,d2,d3*cc

Parameters

Parameter	Description	Range
d1	Scenario number	0-4, 101, 201-204, 300
d2	Output rate for observations, in seconds.	0.1-0.4 if [F] option activated. 0.5-0.9 1-1800
d3	Output rate for attributes (receiver and antenna names), in seconds.	0:Disabled 1-1800
*cc	Checksum	*00-*FF

Example

$PASHQ,RNX,MSI
$PASHR,RNX,MSI,4,1.0,31*7E

Relevant Set Command $PASHS,RNX,TYP

RRE: Residual Error

Function This command is used to output a range residual message. The message is not output until a position solution is computed.

Command Format

Syntax

$PASHQ,RRE[*cc]

Response Format **Syntax**

$PASHR,RRE,d1,n(d2,f3),f4,f5*cc

Parameters

Parameter	Description	Range
d1	Number of satellites used to compute the position	3-27
d2	Satellite number	GPS: 1-32 SBAS: 33-64 GLONASS: 65-96
f3	Range residual	±999.9 m
f4	RMS horizontal position error	0-9999.9 m
f5	RMS vertical position error	0-9999.9 m
*cc	Checksum	*00-*FF

Example

$PASHQ,RRE
$PASHR,RRE,12,20,0.5,13,0.4,23,-0.4,17,-0.6,25,-0.3,04,-0.1,02,0.5,77,
-0.0,84,0.0,83,0.0,78,0.0,68,0.1,1.2,2.3*34

See also $PASHS,NME

RTC: RTCM Status

Function

This command queries the current status of the RTCM. The return message is in free-form format.

Command Format **Syntax**

$PASHQ,RTC[*cc]

Response Format **Syntax**

(Through an example)

```
STATUS:
SYNC:* VER:V2.3 STID:0000 STHE:0
AGE:+0000 TYPE:18/19
MSG:
SETUP:
MODE:BAS PORT:A,E VER:V3,V2.3
STI:0000
TYP: 1  3   9  16  18  19  20  21  22
FRQ: 0  30  0   1   1   0   0  30
TYP: 23 24  31  32  34  36
FRQ: 0  0   0   0   0
```

```
TYP: 1001 1002 1003 1004 1005 1006 1007 1008
FRQ:    0    0    0    1    0   30    0    0
TYP: 1009 1010 1011 1012 1013 1019 1020 1029 1033
FRQ:    0    0    0    1   30    0    0    0   31
TYP: 1071 1072 1072 1074 1075 1076 1077 1081 1082 1083 1084 1085 10..
FRQ:    0    0    0    0    0    0    0    0    0    0    0    0
TYP: 1091 1092 1093 1094 1095 1096 1097 1230
FRQ:    0    0    0    0    0    0    0    0
```

Parameters

Status:

Parameter	Description	Range
SYNC	RTCM status: • *: Corrections from base received in rover in due time. • <space>: No corrections are received that would be compatible with the" maximum age of corrections" requirement.	*, <space>
VER	RTCM version	V2.3, V3
STID	Station ID received from the base	0-4095
STHE	Station health index received from the base	0-7 (RTCM2.3)
AGE	Age of last message received	0-999
TYPE	RTCM message being received or sent	1, 18/19, 20/21, 31, 1001, 1002, 1003, 1004, 1009, 1010, 1011, 1012
MSG	User message received in message type 16, 36 or 1029	90 characters max.

Setup:

Parameter	Description	Range
MODE	RTCM Base/Rover mode: • ROV: If the receiver is a rover. • BAS: If the receiver is a base and the selected differential data type is RT2 or RT3.	ROV, BAS, OFF
PORT	Communication port: • AUT, in rover mode, when the differential reception mode is "AUT" (see $PASHS,CPD,REM). • One or two ports, in rover mode, when the differential reception mode is "MAN" (see $PASHS,CPD,REM) • One or two ports, in base mode (see $PASHS,BAS). Only if RT2 or RT3 is used.	A, B, C, D, E, F, I, AUT

Parameter	Description	Range
VER	RTCM version	V2.3, V3
STI	Station ID	0-4095
TYP	Type of RTCM message the receiver generates (base receiver only)	
FRQ	Transmit rate of RTCM message, in seconds	0-1800
MSG	User message sent through message type 16, 36 or 1029	90 characters max.

See also

$PASHS,RTC,TYP
$PASHS,BAS
$PASHS,CPD,REM

RTC,MSI: RTCM Message Status

Function

This command queries a base receiver for the current RTCM message status.

Command Format

Syntax

$PASHQ,RTC,MSI[*cc]

Response Format

Syntax

$PASHR,RTC,MSI,d1,n(d2,d3)*cc

Parameters

Parameter	Description	Range
d1	Number of RTCM message types in the RTCM output message	32
d2	RTCM message type	1, 3, 9, 16, 18-24, 31, 32, 34, 1001-1013, 1019, 1020, 1029, 1033, 1071-1077, 1081-1087, 1091-1097, 1230
d3	Message output rate in seconds	0-1800
*cc	Checksum	*00-*FF

Example

$PASHQ,RTC,MSI

$PASHR,RTC,MSI,32,1,0.0,3,30.0,9,0.0,16,0.0,18,1.0,19,1.0,20,0.0,21,0.0,22,30.0,23,0.0,24,0.0,31,0.0,32,0.0,34,0.0,36,0.0,1001,0.0,1002,0.0,1003,0.0,1004,1.0,1005,0.0,1006,13.0,1007,0.0,1008,0.0,1009,0.0,1010,0.0,1011,0.0,1012,1.0,1013,0.0,1019,0.0,1020,0.0,1029,0.0,1033,31.0*5C

See also $PASHS,RTC,TYP

RWO: Raw Data Output Settings

Function This command is used to query the raw data output parameters on the specified port.

Command Format

Syntax

$PASHQ,RWO,c[*cc]

Parameters

Parameter	Description	Range
c	Port ID the command refers to	A, B, C, F, I, M, R, U, I1-I9
*cc	Optional checksum	*00-*FF

Response Format

Syntax

$PASHR,RWO,c1,d2,f3,d4,n(s5,f6,c7)*cc
Where n=8

Parameters

Parameter	Description	Range
c1	The port ID specified in the command is reminded in this field: • A, B, F: Serial port • C: Bluetooth port • I, I1-I9: Ethernet port • M, U: Memory • R: Automatic record session (internal or external memory)	A, B, C, F, I, M, R, U, I1-I9
d2	Baud rate code for serial port. For other devices, “0” if not available, else “1”	0-9 (A, B, F). See table below 0-1 (C, M, U, R, I)
f3	Output rate defined by the last $PASHS,RAW,PER command run	0-999.9
d4	Number of raw data messages	11
s5	Raw data message types	MPC, DPC, PBN, SNV, SNG, SNW, SAL, SAG, SAW, ION, SBD
f6	Output rate 0: Message disabled	0-999.00

Parameter	Description	Range
c7	ASCII/Binary setting. Always binary	B
*cc	Checksum	*00-*FF

Code	Baud Rate	Code	Baud Rate
0	300	5	9600
1	600	6	19200
2	1200	7	38400
3	2400	8	57600
4	4800	9	115200

Example

$PASHQ,RWO,A

$PASHR,RWO,A,9,001.00,11,MPC,0.00,B,DPC,0.00,B,PBN,0.00,B,SNV,0.00,B,SNG,0.00,B,SNW,0.00,B,SAL,0.00,B,SAG,0.00,B,SAW,0.00,B,ION,0.00,B,SBD,0.00,B *6D

See also $PASHQ,RAW

SAT: Satellites Status

Function This command allows you to read the status of the different satellite constellations used.

Command Format

Syntax

$PASHQ,SAT[*cc]

Response Format

Syntax

$PASHR,SAT,d1,n(d2,d3,d4,f5,c6)*cc

Parameters

Parameter	Description	Range
d1	Number of satellites locked	1-27
d2	SV PRN number	1-32: GPS 33-64: SBAS 65-96: GLONASS 97-126: GALILEO 193-197: QZSS
d3	SV azimuth, in degrees	0-359
d4	SV elevation angle, in degrees	0-90
f5	SV signal-noise ratio, in dB.Hz	30.0-60.0
c6	SV used in computation or not • U: SV used • -: SV not used	U, -
*cc	Checksum	*00-*FF

The GPS PRN number is d2.
The EGNOS PRN number is d2 plus 87.
The GLONASS slot number is d2 minus 64.
The GALILEO PRN number is d2 minus 96.
The QZSS PRN number is d2 minus 192.

Example

$PASHQ,SAT

$PASHR,SAT,13,20,092,32,44.0,U,13,206,78,50.0,U,23,056,55,48.0,U,33,198,34,44.0,-,17,218,13,42.0,U,25,152,34,38.0,U,04,276,65,50.0,U,02,308,31,48.0,U,77,052,37,48.0,U,84,294,33,48.0,U,83,234,23,48.0,U,78,124,42,46.0,U,68,034,65,48.0,U*35

See also

$PASHS,NME

Automatic Output of SAT Messages

This is a reminder on how to output SAT messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,SAT,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output SAT messages on port A at a rate of 60 seconds:

$PASHS,NME,SAT,A,ON,60

SBA: SBAS Tracking Status

Function

This command is used to query the SBAS tracking status.

Command Format

Syntax

$PASHQ,SBA[*cc]

Response Format

Syntax

$PASHR,SBA,s*cc

Parameters

Parameter	Description	Range
s	ON: SBAS satellites are being tracked and used OFF: SBAS satellites not tracked	ON, OFF
*cc	Checksum	*00-*FF

Example

$PASHQ,SBA
$PASHR,SBA,ON*09

Relevant Set Command

$PASHS,SBA

SES: Session Programming

Function

This command allows you to list the sessions programmed in the receiver.

Command Format

Syntax

$PASHQ,SES[*cc]

Parameters

None.

Response Format

Syntax

The message returned by this command is described through the example below:

$PASHQ,SES
START END INT

```
A   Y   00:00:00   01:00:00   030.00
B   Y   01:00:00   02:00:00   030.00
C   Y   02:00:00   03:00:00   030.00
D   Y   03:00:00   04:00:00   030.00
E   Y   04:00:00   05:00:00   030.00
F   Y   05:00:00   06:00:00   030.00
G   Y   06:00:00   07:00:00   030.00
H   Y   07:00:00   08:00:00   030.00
I   Y   08:00:00   09:00:00   030.00
J   Y   09:00:00   10:00:00   030.00
K   Y   10:00:00   11:00:00   030.00
L   Y   11:00:00   12:00:00   030.00
M   Y   12:00:00   13:00:00   030.00
N   Y   13:00:00   14:00:00   030.00
O   Y   14:00:00   15:00:00   030.00
P   Y   15:00:00   16:00:00   030.00
Q*  Y   16:00:00   17:00:00   030.00
R   Y   17:00:00   18:00:00   030.00
S   Y   18:00:00   19:00:00   030.00
T   Y   19:00:00   20:00:00   030.00
U   Y   20:00:00   21:00:00   030.00
V   Y   21:00:00   22:00:00   030.00
W   Y   22:00:00   23:00:00   030.00
X   Y   23:00:00   00:00:00   030.00
NUMBER:24   INUSE:Y     REF:001    OFFSET:00:00    TODAY:210
MEM:M         SITE:0000   COMPRESS:N    DELETE:Y
SLEEP:N       MOVE:N      MEM:U       SUBDIR:s/Y/D
FTP TRANSFER: Y
AUTOFTP:N   FTP:ftp.ashtech.com PRT:21 LGN:proflex PWD:125uK
IPP:P   PATH:rawdata SUBDIR:s/Y/D
BACKUP FTP TRANSFER:  0
FTP:ftp.ashtech2.com PRT:21 LGN:proflex PWD:125uK
PATH:rawdata
RINEX CONVERSION: 2.11
GLONASS: ON   SBAS: ON    GALILEO: ON
PERIOD1: 1       PERIOD2: 30
```

The “*” symbol placed after the session name indicates the session currently in progress.

Parameters

Parameter	Description	Range
1st column	Session name. The “*” symbol after the session name means the session is in progress.	A-X, AA-XA, AB-XB, AC-XC
2nd column	Session recording flag: • Y: Recording is allowed during the session. • N: No data recording is allowed during the session.	Y, N

Parameter	Description	Range
3rd column	Session start time (hh:mm:ss)	00:00:00-23-59-59
4th column	Session end time (hh:mm:ss)	00:00:00-23-59-59
5th column	Session recording rate, in seconds	0.05-999
NUMBER	Number of sessions	0-96
IN USE	Recording enabled during session	Y, N
REF	Session reference day	1-366
OFFSET	Session time offset (mm:ss)	00:00-59:59
TODAY	Day in year	1-366
MEM	Memory location: • M: Internal memory • U: USB key	M, U
SITE	Site name	4 letters
COMPRESS	Compression: • N: No compression • TARZ: tarZ compression	N, TARZ
DELETE	G-file deletion after RINEX conversion	N, Y
SLEEP	Sleep mode	N, Y
MOVE	Moving files: • N: No file is moved • Y: Only the converted files are moved • ALL: All files are moved	N, Y, ALL
MEM	Memory where files are moved: • M: Internal memory • U: USB key	M, U
SUBDIR	Subdirectory format	
FTP TRANS-FER	Automatic file transfer to FTP: • N: No file transferred • Y: Files are transferred but not deleted from receiver memory • YD: Files are transferred, then deleted from receiver memory.	N, Y, YD
RING	Ring file memory	Y, N
FTP	FTP server address	
PRT	FTP port	0-65535
LGN	FTP login	
PWD	FTP password	
IPP	Port used for FTP transfer: • E: Internal modem • P: Ethernet cable	E, P
PATH	Path used on FTP server	
SUBDIR	Subdirectory format on FTP server	

Parameter	Description	Range
BACKUP FTP TRANS-FER	Operating mode assigned to backup FTP server: • 0: Not used • 1: Used only when primary FTP server is inaccessible • 2: Used in parallel to primary FTP	0-2
FTP	Backup FTP server address	
PRT	Backup FTP port	0-65535
LGN	Backup FTP login	
PWD	Backup FTP password	
PATH	Path used on backup FTP server	
RINEX CON-VERSION	RINEX conversion: • N: No RINEX conversion • 2.11: Conversion to RINEX 2.11 • 2.11H: Conversion to RINEX 2.11Ha-tanaka • 3.01: Conversion to RINEX 3.01 • 3.01H: Conversion to RINEX 3.01Ha-tanaka	N, 2.11, 2.11H, 3.01, 3.01H
GLONASS	GLONASS data conversion: • ON: GLONASS measurements converted. • OFF: GLONASS measurements not con-verted.	ON, OFF
SBAS	SBAS data conversion: • ON: SBAS measurements converted. • OFF: SBAS measurements not converted.	ON, OFF
GALILEO	GALILEO data conversion: • ON: GALILEO measurements converted. • OFF: GALILEO measurements not con-verted.	ON, OFF
PERIOD1	Period of RINEX measurements, in seconds. “0” means the period used is the same as that used in the G-file.	0-60
PERIOD2	Period of RINEX measurements, in seconds, for the second RINEX file. A second RINEX file is generated only if the period is defined as different from “0”.	0-60
*cc	Checksum	*00-*FF

See Also

$PASHS,SES,PAR
$PASHS,SES,SET
$PASHS,SES,AUT

SGA: GALILEO Satellites Status

Function

This command is used to read the status of each GALILEO satellite received.

Command Format

Syntax

$PASHQ,SGA[*cc]

Response Format

Syntax

$PASHR,SGA,d1,n(d2,d3,d4,f5,,f7,d8,d9)*cc

Parameters

Parameter	Description	Range
d1	Number of satellites locked	1-27
d2	SV PRN number (96+satellite slot number)	97-126
d3	SV azimuth in degrees	0-359
d4	SV elevation angle in degrees	0-90
f5	SV E1 signal/noise in dB.Hz	30.0-60.0
f6	Not used	-
f7	SV E5a signal/noise in dB.Hz	30.0-60.0
d8	Satellite usage status (see table below)	0-31
d9	Satellite correcting status (see table below)	0-15
*cc	Checksum	*00-*FF

Fields f5 and f7 are empty is the corresponding signal is not tracked.

Satellite Usage Status:

Status	Description
0	Satellite not tracked
1	Code and carrier/Doppler data used
2	Code-only data used
3	Carrier/Doppler-only data used
4-14	Reserved
15	Unknown usage status
16	No navigation data for this satellite
17	Satellite below elevation mask
18	Satellite declared as unhealthy in ephemeris
19	Computed coordinates of satellite are invalid
20	Satellite has been disabled by a $PASH command

Status	Description
21	URA in ephemeris is not acceptable
22	SV is unhealthy according to almanac
23	Too low SNR
24	Suspected of being a ghost satellite
25	Because of too many Satellites used in the PVT, this satellite has been deselected
26-30	Reserved for future causes of rejection
31	Other cause

Satellite Correcting Status:

Status	
0	Satellite is not tracked
1	Satellite is not corrected
2	SBAS is corrected
3	DGPS is corrected
4	L1 RTK is corrected
5	L1&L2 RTK is corrected
6-14	Reserved
15	Unknown correcting status

Example

$PASHQ,SGA
$PASHR,SGA,2,128,092,32,44.0,,35.0,2,4,…

See also

$PASHS,NME

Automatic Output of SGA Messages

This is a reminder on how to output SGA messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,SGA,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output SGA messages on port A at a rate of 10 seconds:

$PASHS,NME,SGA,A,ON,10

SGL: GLONASS Satellites Status

Function

This command is used to read the status of each GLONASS satellite received.

Command Format

Syntax

$PASHQ,SGL[*cc]

Response Format

Syntax

$PASHR,SGL,d1,n(d2,d3,d4,f5,f6,,d8,d9)*cc

Parameters

Parameter	Description	Range
d1	Number of satellites locked	1-27
d2	SV PRN number (64+satellite slot number)	65-96
d3	SV azimuth in degrees	0-359
d4	SV elevation angle in degrees	0-90
f5	SV L1 signal/noise in dB.Hz	30.0-60.0
f6	SV L2 signal/noise in dB.Hz	30.0-60.0
f7	Not used	
d8	Satellite usage status (see table below)	0-31
d9	Satellite correcting status (see table below)	0-15
*cc	Checksum	*00-*FF

Fields f5 and f6 are empty is the corresponding signal is not tracked.

Satellite Usage Status:

Status	Description
0	Satellite not tracked
1	Code and carrier/Doppler data used
2	Code-only data used
3	Carrier/Doppler-only data used
4-14	Reserved
15	Unknown usage status
16	No navigation data for this satellite
17	Satellite below elevation mask
18	Satellite declared as unhealthy in ephemeris
19	Computed coordinates of satellite are invalid

Status	Description
20	Satellite has been disabled by a $PASH command
21	URA in ephemeris is not acceptable
22	SV is unhealthy according to almanac
23	Too low SNR
24	Suspected of being a ghost satellite
25	Because of too many Satellites used in the PVT, this satellite has been deselected
26-30	Reserved for future causes of rejection
31	Other cause

Satellite Correcting Status:

Status	
0	Satellite is not tracked
1	Satellite is not corrected
2	SBAS is corrected
3	DGPS is corrected
4	L1 RTK is corrected
5	L1&L2 RTK is corrected
6-14	Reserved
15	Unknown correcting status

Example

$PASHQ,SGL
$PASHR,SGL,08,65,316,38,49.0,38.0,,01,15,71,122,32,47.0,39.0,,01,15,72,066,77,53.0,48.0,,01,15,73,036,31,48.0,43.0,,01,15,74,100,75,52.0,41.0,,01,15,75,192,34,45.0,36.0,,01,15,81,332,13,40.0,33.0,,01,15,88,282,08,37.0,32.0,,25,15*0D

See also

$PASHS,NME

Automatic Output of SGL Messages

This is a reminder on how to output SGL messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,SGL,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output SGL messages on port A at a rate of 10 seconds:

$PASHS,NME,SGL,A,ON,10

SGP: GPS, SBAS & QZSS Satellites Status

Function

This command is used to read the status of each GPS, SBAS and QZSS satellite received.

Command Format

Syntax

$PASHQ,SGP[*cc]

Response Format

Syntax

$PASHR,SGP,d1,n(d2,d3,d4,f5,f6,f7,d8,d9)*cc

Parameters

Parameter	Description	Range
d1	Number of satellites locked	1-27
d2	SV PRN number (64+satellite slot number)	GPS: 1-32 SBAS: 33-64 QZSS: 193-197
d3	SV azimuth in degrees	0-359
d4	SV elevation angle in degrees	0-90
f5	SV L1 signal/noise in dB.Hz	30.0-60.0
f6	SV L2 signal/noise in dB.Hz	30.0-60.0
f7	SV L5 signal/noise in dB.Hz	30.0-60.0
d8	Satellite usage status (see table below)	0-31
d9	Satellite correcting status (see table below)	0-15
*cc	Checksum	*00-*FF

Fields f5-f7 are empty is the corresponding signal is not tracked.

Satellite Usage Status:

Status	Description
0	Satellite not tracked
1	Code and carrier/Doppler data used
2	Code-only data used
3	Carrier/Doppler-only data used
4-14	Reserved
15	Unknown usage status
16	No navigation data for this satellite
17	Satellite below elevation mask
18	Satellite declared as unhealthy in ephemeris
19	Computed coordinates of satellite are invalid

Status	Description
20	Satellite has been disabled by a $PASH command
21	URA in ephemeris is not acceptable
22	SV is unhealthy according to almanac
23	Too low SNR
24	Suspected of being a ghost satellite
25	Because of too many Satellites used in the PVT, this satellite has been deselected
26-30	Reserved for future causes of rejection
31	Other cause

Satellite Correcting Status:

Status	
0	Satellite is not tracked
1	Satellite is not corrected
2	SBAS is corrected
3	DGPS is corrected
4	L1 RTK is corrected
5	L1&L2 RTK is corrected
6-14	Reserved
15	Unknown correcting status

Example

$PASHQ,SGP

$PASHR,SGP,13,02,216,22,42.0,25.0,,01,15,04,188,03,34.0,0.0,,17,15,05,284,71,51.0,44.0,,01,15,07,058,50,50.0,39.0,,01,15,08,116,77,51.0,41.0,,01,15,10,148,53,50.0,38.0,,01,15,13,080,13,38.0,15.0,,25,15,15,272,03,37.0,0.0,,17,15,21,332,04,37.0,0.0,,17,15,26,276,39,47.0,33.0,,01,15,28,142,20,41.0,20.0,,01,15,33,200,34,41.0,,,16,15,39,146,32,41.0,,,16,15*16

See also

$PASHS,NME

Automatic Output of SGP Messages

This is a reminder on how to output SGP messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,SGP,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output SGP messages on port A at a rate of 10 seconds:

$PASHS,NME,SGP,A,ON,10

SIT: Site Name

Function

This command is used to read the name of the site on which data is currently being logged.

Command Format

Syntax

$PASHQ,SIT[*cc]

Response Format

Syntax

$PASHR,SIT,s*cc

Parameters

Parameter	Description	Range
s	Site name	4 characters max.
*cc	Checksum	*00-*FF

Example

$PASHQ,SIT
$PASHR,SIT,SITE*1D

Relevant Set Command

$PASHS,SIT

See also

$PASHQ,FLS

SNM: Signal-to-Noise Ratio Mask

Function

This command returns the current value assigned to the signal-to-noise ratio (SNR) mask. Any satellite received with an SNR value for the C/A code signal less than this mask will be rejected from the PVT computation.

Command Format

Syntax

$PASHQ,SNM[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,SNM,d1*cc

Parameters

Parameter	Description	Range
d1	Signal-to-Noise ratio mask, in dB.Hz	0-60
*cc	Checksum	*00-*FF

Example

$PASHQ,SNM
$PASHR,SNM,45*09

Relevant Set Command

$PASHS,SNM

SOM: Signal Observations Masking

Function

This command is used to read the type of mask currently applied to signal observations.

Command Format

Syntax

$PASHQ,SOM[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,SOM,d*cc

Parameters

Parameter	Description	Range
s	Mask type: • 0: No masking • 1: Reference station • 2: Static base • 3: Moving base • 4: Rover • 9: User-defined	0-4, 9
*cc	Checksum	*00-*FF

Example

$PASHQ,SOM
$PASHR,SOM,4*3D

Relevant Set Command $PASHS,SOM

SOM,CTT: Cumulative Tracking Time Mask

Function This command is used to read the current setting of the cumulative tracking time mask applied to signal observations. This mask is active only when applying masks to signal observations has been set to be user defined (see $PASHS,SOM).

Command Format

Syntax

$PASHQ,SOM,CTT[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,SOM,CTT,d1,d2*cc

Parameters

Parameter	Description	Range	Default
d1	Mask applied to differential data, in seconds	0-255	10
d2	Mask applied to raw data, in seconds	0-255	10
*cc	Checksum	*00-*FF	

Example

$PASHQ,SOM,CTT
$PASHR,SOM,CTT,10*67

Relevant Set Command $PASHS,SOM,CTT

See Also $PASHS,SOM

SOM,NAV: Navigation Data Mask

Function This command is used to read the current setting of the navigation data mask applied to signal observations. This mask is active only when applying masks to signal observations has been set to be user defined (see $PASHS,SOM).

Command Format

Syntax

$PASHQ,SOM,NAV[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,SOM,NAV,s1,s2*cc

Parameters

Parameter	Description	Range	Default
s1	Mask applied to differential data	ON, OFF	ON
s2	Mask applied to raw data	ON, OFF	OFF
*cc	Checksum	*00-*FF	

Example

$PASHQ,SOM,NAV
$PASHR,SOM,NAV,ON,ON*50

Relevant Set Command
$PASHS,SOM,NAV

See Also
$PASHS,SOM

SOM,SNR: Signal-to-Noise Ratio Mask

Function
This command is used to read the current setting of the signal-to-noise ratio mask applied to signal observations. This mask is active only when applying masks to signal observations has been set to be user defined (see $PASHS,SOM).

Command Format

Syntax

$PASHQ,SOM,SNR[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,SOM,SNR,d1,d2*cc

Parameters

Parameter	Description	Range	Default
d1	Mask applied to differential data, in dBHz	0-60	28
d2	Mask applied to raw data, in dBHz	0-60	28
*cc	Checksum	*00-*FF	

Example

$PASHQ,SOM,SNR
$PASHR,SOM,SNR,28,28*46

Relevant Set Command $PASHS,SOM,SNR

See Also $PASHS,SOM

SOM,WRN: Channel Warnings Mask

Function This command is used to read the current setting of the channel warnings mask applied to signal observations. This mask is active only when applying masks to signal observations has been set to be user defined (see $PASHS,SOM).

Command Format

Syntax

$PASHQ,SOM,WRN[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,SOM,WRN,s1,s2*cc

Parameters

Parameter	Description	Range	Default
s1	Mask applied to differential data	ON, OFF	ON
s2	Mask applied to raw data	ON, OFF	OFF
*cc	Checksum	*00-*FF	

Example

$PASHQ,SOM,WRN
$PASHR,SOM,WRN,ON,ON*42

Relevant Set Command $PASHS,SOM,WRN

See Also $PASHS,SOM

STI: Station ID

Function This command is used to query the receiver for the station ID it transmits to the rover through the corrections message.

Command Format

Syntax

$PASHQ,STI[*cc]

Response Format

Syntax

$PASHR,STI,d*cc

Parameters

Parameter	Description	Range
d	Station ID	0-1023 (RTCM 2.3) 0-4095 (RTCM 3.x)/ATOM 0-31 (CMR & CMR+)
*cc	Checksum	*00-*FF

Example

$PASHQ,STI
$PASHR,STI,817*28

Relevant Set Command $PASHS,STI

SVM: Satellite Use Mask

Function

This command is used to read the current setting of the satellite use mask defining the maximum number of code or Doppler observations used in the PVT calculation.

Command Format

Syntax

$PASHQ,SVM[*cc]

Parameters

None.

Response Format

Syntax

$PASHR,SVM,d1*cc

Parameters

Parameter	Description	Range	Default
d1	Maximum number of code/Doppler observations used in PVT.	0-26	14
*cc	Checksum	*00-*FF	*00-*FF

Example

$PASHQ,SVM
$PASHR,SVM,25*17

Relevant Set Command

$PASHS,SVM

TCP: TCP/IP Server Settings

Function

This command is used to query the settings of the TCP/IP server.

Command Format

Syntax

$PASHQ,TCP[*cc]

Response Format

Syntax

$PASHR,TCP,MOD=s1,LGN=s2,PWD=s3,ADD=s4 ,PRT=d5*cc

Parameters

Parameter	Description	Range
s1	TCP/IP connection mode: • 0: Disabled • 1: Enabled with authentication • 2: Enabled without authentication (default)	0-2
s2	Login	32 characters max.
s3	Password	32 characters max.
s4	IP address	0.0.0.0-255.255.255.255
d5	Port number	0-655535
*cc	Checksum	*00-*FF

Example

$PASHQ,TCP
$PASHR,TCP,MOD=1,LGN=Magellan,PWD=u6huz8,ADD=192.34.76.1,
PRT=8888*7A

See Also

$PASHS,TCP,PAR
$PASHS,ETH,PAR

TLT: Tiltmeter Setup

Function

This command is used to query the tiltmeter for its setup data.

Command Format

Syntax

$PASHQ,TLT[*cc]

Parameters

None.

Response Format

Syntax

Through an example:

$PASHQ,TLT
TILTMETER PARAMETERS SETTINGS
PRTA:OFF INIT_STR:NO TRIG_CMD:*0100P9 INTVL:0005
PRTB:OFF INIT_STR:NO TRIG_CMD:*0100P9 INTVL:0005
PRTF:OFF INIT_STR:NO TRIG_CMD:*0100P9 INTVL:0005

See Also

$PASHS,TLT,CMD

$PASHS,TLT,INIT
$PASHS,TLT,INTVL
$PASHS,TLT,PAR

UDP: User-Defined Dynamic Model

Function

This command is used to query the parameters of the user-defined dynamic model.

Command Format

Syntax

$PASHQ,UDP[*cc]

Response Format

Syntax

$PASHR,UDP,f1,f2,f3,f4*cc

Parameters

Parameter	Description	Range	Default
f1	Maximum expected horizontal velocity, in m/s	0-100 000	100 000
f2	Maximum expected horizontal acceleration, in m/s²	0-100	100
f3	Maximum expected vertical velocity, in m/s	0-100 000	100 000
f4	Maximum expected vertical acceleration, in m/s²	0-100	100
*cc	Checksum	*00-*FF	

Example

$PASHQ,UDP
$PASHR,UDP,100000.00,100.00,100000.00,100.00*35

Relevant Set Command

$PASHS,UDP

See Also

$PASHS,DYN

UNT: Distance Unit Used on Display Screen

Function

This command allows you to know which distance unit is currently used on the receiver display screen to express the coordinates of the computed position.

Command Format

Syntax

$PASHQ,UNT[*cc]

Response Format

Syntax

$PASHR,UNT,s*cc

Parameters

Parameter	Description	Range
s	Distance unit used: • M: Meters • F: US Survey Feet • IF: International Feet	M, F, IF
*cc	Checksum	*00-*FF

Example

$PASHQ,UNT
$PASHR,UNT,M*5A

Relevant Set Command

$PASHS,UNT

UPL: FTP Server Providing Firmware Upgrades

Function

This command is used to read the status and settings of the FTP server used to perform firmware upgrades.

Command Format

Syntax

$PASHQ,UPL[*cc]

Parameters

None.

Response format

Syntax

$PASHR,UPL,s1,s2,d3,d4,ADD=s5,PRT=d6,LGN=s7,PWD=s8,PTH=s9*cc

Parameters

Parameter	Description	Range
s1	FTP data transfer status: • NONE: No data transfer in progress • GET: Firmware upgrade being downloaded from FTP	NONE, GET
s2	Name of the file being transferred	255 char max.
d3	Size, in bytes, of the file being transferred	0-134217728
d4	Percentage of the file transferred so far	0-100
ADD=s5	FTP server IP address or host name	
PRT=d6	FTP server port number	0-65535
LGN=s7	FTP server log in	32 char max.
PWD=s8	FTP server password	32 char max.
PTH=s9	Path used on FTP server to access the upgrade file	255 char max.
*cc	Optional checksum	*00-*FF

Example

$PASHQ,UPL*3E
$PASHR,UPL,GET,pf800_upgrade_V227Ga21.tar.bz2,1769897,56,
ADD=ftp.ashtech.com,PRT=21,LGN=Ashtech,PWD=u6huz8,
PTH=/my folder*7D

See Also

$PASHS,UPL,PAR
$PASHS,UPL,UPG
$PASHQ,UPL,LST

UPL,LOG: Editing the Firmware Upgrade Log File

Function

This command is used to edit the firmware upgrade log file. This file logs all the actions performed during a firmware upgrade routine.

Command Format

Syntax

$PASHQ,UPL,LOG[,d][*cc]

Parameters

None.

Response format

Syntax

The response is formatted as follows:

```
$PASHR,UPL,LOG
Starting script at  <Day> <Month> <Time> UTC <Year>
Programming tool is /usr/local/bin/dataflash_tool
…
```

Example

$PASHQ,UPL,LOG*56

```
$PASHR,UPL,LOG
Starting script at  Mon Mar 16 14:40:05 UTC 2009
Programming tool is /usr/local/bin/dataflash_tool
Archive tool is /bin/tar
Print tool is /usr/local/bin/oled_print
-rwxr-xr-x    1 root     root      7259586 Mar 16 13:59 /mnt/usbdisk/
pf800_upgrade_V227Ga21.tar.bz2
Uncompressing archive file '/mnt/usbdisk/pf800_upgrade_V227Ga21.tar.bz2 '
-rwx------    1 root     root      1775055 Mar 13 09:40 /mnt/usbdisk/pf800_upgrade-
gnss-0.0.a21.tar.bz2
-rwx------    1 root     root      5451979 Mar 16 11:00 /mnt/usbdisk/pf800_upgrade-
main-0.0.227.tar.bz2
Valid upgrade file found. Processing...
Target is 'main', version is '0.0.227'
Processing file pf800_upgrade-main-0.0.227.tar.bz2
Uncompressing archive file '/mnt/usbdisk/pf800_upgrade-main-0.0.227.tar.bz2
'
File: ramdisk.img.gz, Address: 0x0040A400
Programming file 'ramdisk.img.gz' at address 0x0040A400
/usr/local/bin/dataflash_tool -d /dev/mtd3 -a 0x0040A400 -i /mnt/usbdisk/
tmp_df_1269/ramdisk.img.gz
File: u-boot.env, Address: 0x00035000
Programming file 'u-boot.env' at address 0x00035000
/usr/local/bin/dataflash_tool -d /dev/mtd3 -a 0x00035000 -i /mnt/usbdisk/
tmp_df_1269/u-boot.env
/usr/local/bin/dataflash_tool -d /dev/mtd3 -a 0x00035000 --data=D69F0C2B
File: uImage-pm4-rd, Address: 0x00041000
Programming file 'uImage-pm4-rd' at address 0x00041000
/usr/local/bin/dataflash_tool -d /dev/mtd3 -a 0x00041000 -i /mnt/usbdisk/
tmp_df_1269/uImage-pm4-rd
Uncompressing archive file '/mnt/usbdisk/pf800_upgrade-gnss-0.0.a21.tar.bz2
'
pm4loader 0.25
com_open for /dev/ttyS2 returned 3
FW section found at 0x10008000
PFLD   CRC: 0x78b8025e PASSED.
Options not found
Set number: 0
Slave's FW found: NONE
FW     CRC: 0x310005c5 PASSED.
Set number: 1
```

```
Slave's FW found: Elcano1 Elcano2 TMS
FW    CRC: 0x59ceea46 PASSED.
FW    CRC: 0x3d208b13 PASSED.
FW    CRC: 0xc8713d9b PASSED.
Set number: 2
Slave's FW found: Elcano1 Elcano2 TMS
Set number: 3
Slave's FW found: Elcano1 Elcano2 Elcano3 Elcano4 TMS
FW    CRC: 0xb355ec6d PASSED.
Set number: 4
Slave's FW found: Elcano1 Elcano2 Elcano3 Elcano4 TMS
FW    CRC: 0x390961b7 PASSED.
FW    CRC: 0x5b0ca4fa PASSED.
Set number: 5
Slave's FW found: Elcano1 Elcano2 TMS
Set number: 6
Slave's FW found: Elcano1 Elcano2 Elcano3 Elcano4 TMS
Set number: 7
Slave's FW found: Elcano1 Elcano2 Elcano3 Elcano4 TMS
FW    CRC: 0xdb3a34e3 PASSED.
FW    CRC: 0x66b000d4 PASSED.
FW    CRC: 0x8156b3a0 PASSED.
ALL FW CRC: 0x78050c8f PASSED.
SFLD image not found.
Ask PFLD version.
PFLD_NadiaIIv1.23
Wait for REC_WAIT_CODE.
Uploading SFL...
Complete.
Wait for SFLD
SFL is running:
Baudrate accepted by SFL.
LOADING FW...
Secondary Firmware Loader v00.08 (Nadia II protected)
TypeID:1 (1F 01 C8 00)
PFL v01.23 in FLASH, PFL v01.23 in imagefile
PFL versions are equal, PFL programming will be skipped
Erasing FLASH...
Writing to FLASH...
FW upload into board N 1 complete.
Board 1: OK
Skipped
OK
Ending script at  Mon Mar 16 15:01:38 UTC 2009
Exit code is 0
```

See Also $PASHS,UPL,LOG

UPL,LST: Listing the Firmware Upgrades Available on FTP

Function

This command is used to list the upgrade files and/or upgrade directories found on the FTP server.

Command Format

Syntax

$PASHQ,UPL,LST[,s][*cc]

Parameters

Parameter	Description	Range
s	Path that extends the one defined with $PASHS,UPL,PAR. If s is omitted, the command lists the content of the default directory (i.e. as defined with $PASHS,UPL,PAR).	255 characters max.
*cc	Optional checksum	*00-*FF

Response format

Syntax

$PASHR,UPL,LST,d1,d2,s3,s4,d5,s6,s7*cc

Parameters

Parameter	Description	Range
d1	Number of listed files or subdirectories	
d2	Index of file or subdirectory	
s3	Indicates whether the listed item is a file or a directory: • DIR: Directory • FIL: File	DIR,FIL
s4	Name of the file or subdirectory	255 characters max.
d5	Size, in bytes	0-134217728
s6	Date of creation (ddmmyyyy)	
s7	Time of creation (hhmmss)	000000-235959
*cc	Optional checksum	*00-*FF

Example

$PASHQ,UPL,LST*59
$PASHR,UPL,LST,4,0,FIL,pf800_upgrade_V227Ga21.tar.bz2,1769897,
14032009,130850*76
$PASHR,UPL,LST,4,1,FIL,pf800_upgrade_V226Ga21.tar.bz2,1769876,
10032009,110952*7C
$PASHR,UPL,LST,4,2,FIL,pf800_upgrade_V225Ga21.tar.bz2,1769787,01032
009,181856*70

$PASHR,UPL,LST,4,3,DIR,my directory,1769787,01032009,181856*68

See Also $PASHS,UPL,PAR
$PASHS,UPL,UPG

USR,POS: Reading Position Defined for User Message Type “GGA”

Function This command is used to query the position entered to be inserted into the user message of the “GGA” type.

Command Format

Syntax

$PASHQ,USR,POS[*cc]

Response Format

Syntax

$PASHR,USR,POS,m1,c2,m3,c4,f5*cc

Parameters

Parameter	Description	Range
m1	Latitude in degrees and minutes with 7 decimal places (ddmm.mmmmmmm)	0-90
c2	North (N) or South (S)	N, S
m3	Longitude in degrees, minutes with 7 decimal places (ddmm.mmmmmmm)	0-180
c4	West (W) or East (E)	W, E
f5	Height in meters	±0-9999.9999
*cc	Checksum	*00-*FF

Example

$PASHQ,USR,POS
$PASHR,USR,POS,GGA4717.959483,N,00130.500968,W,70.229*xx

Relevant Set Command $PASHS,USR,POS

USR,TXT: Reading Text Defined for User Message Type “TXT”

Function This command is used to query the text entered to be inserted into the user message of the “TXT” type.

Command Format

Syntax

$PASHQ,USR,TXT[*cc]

Response Format

Syntax

$PASHR,USR,TXT,s*cc

Parameters

Parameter	Description	Range
s	User message text	Up to 80 characters between double quotes
*cc	Optional checksum	*00-*FF

Example

$PASHQ,USR,TXT
$PASHR,USR,TXT,"this is the text of the user message*xx

Relevant Set Command

$PASHS,USR,TXT

USR,TYP: Reading Currently Defined User Message Type

Function

This command is used to query the type of user message currently set in the receiver.

Command Format

Syntax

$PASHQ,USR,TYP[*cc]

Response Format

Syntax

$PASHR,USR,TYP,s*cc

Parameters

Parameter	Description	Range
s	User message type currently set: • TXT: text message type. The inserted text is the one you define using command $PASHS,USR,TXT. • GGA: GGA message type. The inserted position is the one you define using command $PASHS,USR,POS.	TXT,GGA
*cc	Optional checksum	*00-*FF

Example

$PASHQ,USR,TYP

$PASHR,USR,TYP,GGA*xx

Relevant Set Command $PASHS,USR,TYP

UTS: GPS Time Synchronization Status

Function This command gives the status of the GPS time synchronization process. When enabled, this process allows all measurements and coordinates to be synchronized with GPS time, and not with the local clock.

Command Format

Syntax

$PASHQ,UTS[*cc]

Response Format

Syntax

$PASHR,UTS,s*cc

Parameters

Parameter	Description	Range
s	GPS time synchronization status	ON, OFF
*cc	Checksum	*00-*FF

Example

$PASHQ,UTS
$PASHR,UTS,ON*0B

Relevant Set Command $PASHS,UTS

VCT: Type of Vector Coordinates

Function This command is used to read the type of vector coordinates the receiver is currently using when outputting VEC/VE2 messages.

Command Format

Syntax

$PASHQ,VCT[*cc]

Response Format

Syntax

$PASHR,VCT,d,s*cc

Parameters

Parameter	Description	Range	Default
d	Type of vector coordinates: • 0: ECEF coordinates • 1: Latitude, longitude, height	0-1	0
*cc	Checksum	*00-*FF	

Example

$PASHQ,VCT
$PASHR,VCT,1*4D

Relevant Set Command

$PASHS,VCT

VEC: Vector & Accuracy Data

Function

This command is used to query the receiver for vector and accuracy data.

Command Format

Syntax

$PASHQ,VEC[*cc]

Response Format

Syntax

$PASHR,VEC,c1,d2,m3,f4,f5,f6,f7,f8,f9,f10,f11,f12,d13*cc

Parameters

Parameter	Description	Range
c1	Position mode: • 0: Autonomous • 1: RTCM (or SBAS Differential) • 2: RTK float • 3: RTK fixed • 9: SBAS Differential. See comment.	0-3, 9
d2	Number of SVs used in position computation	3-27
m3	UTC time (hhmmss.ss)	000000.00-235959.99
f4	Vector coordinate in meters (ECEF X coordinate or latitude)	±99999.999
f5	Vector coordinate in meters (ECEF Y coordinate or longitude)	±99999.999
f6	Vector coordinate in meters (ECEF Z coordinate or height)	±9999.999
f7	X component standard deviation	99.999
f8	Y component standard deviation	99.999
f9	Z component standard deviation	99.999
f10	XY correlation	±9.999999
f11	XZ correlation	±9.999999
f12	YZ correlation	±9.999999
d13	Base station ID (RTCM only)	0-4095
*cc	Checksum	*00-*FF

f4-f6: Use $PASHS,VCT to define the type of vector coordinates you wish to output.

f7-f12: Quality matrix expressed in latitude, longitude, height.

Example

$PASHQ,VEC
$PASHR,VEC,3,09,130924.00,-37.683,55.081,-17.925,0.016,0.012,0.026,
0.234765,0.098765,0.098763,0001*71

Comment

The code allotted to a position solution of the SBAS differential type is either “1” or “9”, depending on the last $PASHS,NPT command run.

See Also

$PASHS,NME
$PASHS,NPT

Automatic Output of VEC Messages

This is a reminder on how to output VEC messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,VEC,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output VEC messages on port A at a rate of 0.2 second:

$PASHS,NME,VEC,A,ON,0.2

VE2: Vector & Accuracy Data

Function

This command is used to query the receiver for vector and accuracy data (VE2 message). The VE2 message provides the coordinates of the vector relevant to the external heading mode when used.

Command Format

Syntax

$PASHQ,VE2[*cc]

Response Format

Syntax

$PASHR,VE2,c1,d2,m3,f4,f5,f6,f7,f8,f9,f10,f11,f12,d13*cc

Parameters

Parameter	Description	Range
c1	Position mode: • 0: Autonomous • 1: RTCM (or SBAS Differential) • 2: RTK float • 3: RTK fixed • 9: SBAS Differential. See comment.	0-3, 9
d2	Number of SVs used in position computation	3-27
m3	UTC time (hhmmss.ss)	000000.00-235959.99
f4	Vector coordinate in meters (ECEF X coordinate or latitude)	±99999.999
f5	Vector coordinate in meters (ECEF Y coordinate or longitude)	±99999.999
f6	Vector coordinate in meters (ECEF Z coordinate or height)	±9999.999
f7	X component standard deviation	99.999
f8	Y component standard deviation	99.999
f9	Z component standard deviation	99.999
f10	XY correlation	±9.999999
f11	XZ correlation	±9.999999
f12	YZ correlation	±9.999999
d13	Base station ID (RTCM only)	0-4095
*cc	Checksum	*00-*FF

Example

$PASHQ,VE2
$PASHR,VE2,3,09,130924.00,-37.683,55.081,-17.925,0.016,0.012,0.026,
0.234765,0.098765,0.098763,0001*71

Comment

- The code allotted to a position solution of the SBAS differential type is either “1” or “9”, depending on the last $PASHS,NPT command run.
- Use $PASHS,VCT to define the type of vector coordinates you wish to output through fields f4-f6.
- The “f7-f12” quality matrix is expressed in latitude, longitude, height.

See Also

$PASHS,NME
$PASHS,NPT

Automatic Output of VE2 Messages

This is a reminder on how to output VE2 messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,VE2,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output VE2 messages on port A at a rate of 0.2 second:

$PASHS,NME,VE2,A,ON,0.2

VERSION: Firmware Version

Function

This command is used to list the firmware versions installed in the receiver, including those of the modem and internal radio.

Command Format

Syntax

$PASHQ,VERSION[*cc]

Response Format

Syntax

(Through an example)

$PASHQ,VERSION
RECEIVER VERSION: S712Ko24
SYS fw: S107
GNSS fw: Ko24 / Ho24
KERNEL: 2.6.19-pm4 #204 Fri Apr 3 14:29:24
RESCUE: 2.6.19-rescue
BOOT LOADER: 1.1.5.9
PMU: 2.31.0
API: 1.222
BSP: 1.0-200
GNSS S/N: 702465A011230226 / 702452A110603040
GNSS Options: WJKLEYGSVHCPIQFAOD / 5JKLEYGSVHCPI-FA-D
RFS: 712
GSM Q26 Extreme: R.7.4 IMEI : 351919030173211 stack IP :
Internal Radio: ADL V03.02(2250)
CAN controller: VB04VA04
Web Service: 041
NTRIP Caster: 1.0.9
EXTRA: OK
PF_PMU: 17940202

Comments In the GSM: information line, the GSM version will appear only after the modem has been turned on. The stack IP version will appear only after a GPRS connection has been established.

See also $PASHQ,RID

VTG: Course Over Ground and Ground Speed

Function This command is used to output a VTG message. The message is not output until a valid position is computed.

Command Format

Syntax

$PASHQ,VTG[*cc]

Response Format

Syntax

$GPVTG,f1,T,f2,M,f3,N,f4,K,c5*cc

Parameters

Parameter	Description	Range
f1,T	COG (with respect to True North) T for "True" North: COG orientation	000.00-359.99
f2,M	COG (with respect to Magnetic North) M for "Magnetic" North: COG orientation	000.00-359.99
f3,N	SOG (Speed Over Ground) N for "knots": SOG unit	000.00-999.99
f4,K	SOG (Speed Over Ground) K for "km/hr": SOG unit	000.00-999-99
c5	Mode indicator: • A: Autonomous mode • D: Differential mode • N: Data not valid	A, D, N
*cc	Checksum	*00-*FF

Comments The magnetic table used is the WMM-2005 (published Dec 2004), which is the standard model of the US Department of Defense (WMM for "World Magnetic Model").

Example

$PASHQ,VTG

$GPVTG,128.00,T,129.92,M,0.17,N,0.31,K,A*2D

See also $PASHS,NME

Automatic Output of VTG Messages

This is a reminder on how to output VTG messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,VTG,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output VTG messages on port A at a rate of 0.5 second:

$PASHS,NME,VTG,A,ON,0.5

WARN: Warning Messages

Function

This command is used to list the possible warning messages stored in the receiver.

Command Format

Syntax

$PASHQ,WARN[*cc]

Response Format

Syntax

$PASHR,WARN,s1,s2*cc

Parameters

Parameter	Description	Range
s1	Warning message label NONE: No warning message	See *List of Alarms on page 701*.
s2	Status: • Pending: Alarm acknowledged • Current: Alarm not acknowledged yet • Occurred: An error condition was detected earlier but has vanished since then	PENDING, CURRENT, OCCURRED
*cc	Checksum	*00-*FF

Example

$PASHQ,WARN
$PASHR,WARN,connect. to GPRS failed,PENDING*7F

See also $PASHS,WAK

WEB: Web Server Control, Owner Data & Connection Profiles

Function This command is used to list the Web Server settings, including control flag, owner information and connection profiles. It can be sent to the receiver only through its port A, B or F.

Command Format

Syntax

$PASHQ,WEB[*cc]

Parameters

None.

Response format

Syntax

Through an example:

$PASHQ,WEB*27
WEB INTERFACE: ON
HTTPD PORT: 80
COMPANY: Ashtech
ADMINISTRATOR NAME: Peter Smith
ADMINISTRATOR EMAIL: psmisth@ashtech.com
ADMINISTRATOR PHONE: 0228093838
ADMINISTRATOR LOGIN: smith
ADMINISTRATOR PASSWORD: 255kj631
USER LOGIN: Andrew
USER PASSWORD: 25ml55
USER LOGIN: Yves
USER PASSWORD: 25ml55

See Also $PASHS,WEB,OWN
$PASHS,WEB,PAR
$PASHS,WEB,USR,ADD

XDR: Transducer Measurements

Function This command is used to read the last measurements made by the connected transducer(s).

Command Format

Syntax

$PASHQ,XDR[*cc]

Parameters

None.

Response Format

Syntax

$GPXDR,c1,f2,c3,s4,…,n(c1,f2,c3,s4)*cc

The response uses the same format as the one used at the input of the transducer ($WIXDR and $YXXDR).

The data set from each transducer is in the form c1, f2, c3, s4. Data sets from several transducers can be sent through a single message as long as the total number of characters in the data string does not exceed 180 characters.

Parameters

Parameter	Description	Range
c1	Transducer type: • A: Angular displacement • C: Temperature • D: Linear displacement • F: Frequency • G: Generic • H: Humidity • I: Current • N: Force • P: Pressure • R: Flow rate • S: Switch or valve • T: Tachometer • U: Voltage • V: Volume	A, C, D, F, G, H, I, N, P, R, S, T, U, V
f2	Transducer value	±x.x
c3	Transducer unit: • D: Degrees (type A) • C: Celsius (type C) • M: Meter or cubic meter (type D or V) • H: Hertz (type F) • P: Percent (type H) • A: Amperes (type I) • N: Newton (type N) • B: Bars (type P) • L: Liters (type R) • R: RPM (type T) • V: Volts (type U) • Empty (types G and S)	D, C, M, H, P, A, N, B, L, R, V, M

Parameter	Description	Range
s4	Transducer ID	80 characters max.
*cc	Checksum	*00-*FF

Example

$PASHQ,XDR
$GPXDR,P,1.018719,B,DQ75136,C,23.33,C,DQRHT212,H,34.7,P,
DQRHT212*58

Relevant Set Command

None.

See Also

$PASHS,NME

ZDA: Time & Date

Function

This command returns the receiver date & time.

Command Format

Syntax

$PASHQ,ZDA[*cc]

Response Format

Syntax

$GPZDA,ZDA,m1,d2,d3,d4,d5,d6*cc

Parameters

Parameter	Description	Range
m1	UTC time (hhmmss.ss)	000000.00-235959.99
d2	Current day	01-31
d3	Current month	01-12
d4	Current year	0000-9999
d5	Local zone offset from UTC time (hour)	-13 to +13
d6	Local zone offset from UTC time (minutes)	00-59
*cc	Checksum	*00-*FF

Example

$PASHQ,ZDA
$GPZDA,162256.27,25,02,2008,+00,00*43

NOTE: The time offset is always reported as null (d5= d6= 0).

Relevant Set Command $PASHS,ZDA

See also $PASHS,LTZ
$PASHS,NME

Automatic Output of ZDA Messages

This is a reminder on how to output ZDA messages at regular intervals of time: Use the $PASHS,NME command with the syntax below:

$PASHS,NME,ZDA,<port_ID>,ON,<Rate>

For more details on the $PASHS,NME command, refer to the *Set Command Library* Chapter.

As an example, the command below will output ZDA messages on port A at a rate of 60 seconds:

$PASHS,NME,ZDA,A,ON,60

Chapter 11. Data Output

DPC: Compact GPS Measurements

This message contains the L1/L2 measurements from all tracked GPS satellites for one epoch.

The message is as follows:

$PASHR,DPC,<structure>

The message's binary structure is described in the table below.

Type*	Size in bits	Resolution	Contents
Unsigned short	16		Message length. Number of bytes in the <packed data> section.
PACKED DATA			
Double	32	1 msec	Receiver time in GPS milliseconds of week
Char[4]	32		Receiver's four-character ID
Unsigned long	32		Mask representing satellites that are contributors to the message content. This is a bitwise indication: Starting from the least significant bit, bit1 corresponds to SV PRN#1, bit2 corresponds to SV PRN#2, and so on. Bit value "1" for a given SV PRN means the corresponding satellite is a data contributor to this message, "0" otherwise.
The data that follow are repeated for each satellite presented in the satellite mask			
Unsigned char	1		Satellite health ("0" means Sat is unhealthy)
Unsigned char	7	1 degree	Satellite elevation
Unsigned char	1		RAIM status (always zero)
Unsigned char	7	1 dBHz	SNR of L1CA observation
#L1 Data Block (L1CA in all cases)			
Double	31	0.1 nsec	Raw range in 0.1 nsec (range is smoothed by carrier). "0" means bad raw range data.
Unsigned char	1		Warning flag ("1" means bad carrier phase with possible cycle slips)
Unsigned char	1		Sign of total carrier phase ("1": negative; "0":positive)
Double	28	1 cycle	Integer part of total carrier phase in cycles
Double	11	0.0005 cycles	Fractional part of phase in 0.0005 cycles
Double	24	0.002 Hz	Doppler in units of 0.002 Hz
#L2 Data Block (L2P for CFG,2&4 and L2C for CFG,3&5) Content and data packing scheme is the same as for L1 Data			
CHECKSUM			
Unsigned short	16		Cumulative unsigned short sum of the <packed data>, after <message length> and before <checksum>

The data in this message are packed in bits rather than bytes. So the presented types of fields are just for the sake of giving a meaningful description of the original data packing.

NOTES:

- Most of the fields found in the DPC and DBEN data outputs are similar.
- DPC will not be generated if the [K] option (RTK Base) is missing.
- DPC data are affected by the last $PASHS,UTS command run. By default, this command is set to “ON”.
- DPC data are affected by the last $PASHS,ANP,OUT command run.
- DPC data can be made available on several ports simultaneously.
- DPC data can be output at a rate of up to 20 Hz, but the throughput compared to RTCM-3, CMR and ATOM may be quite higher.
- DPC pseudo-ranges are smoothed by L1 & L2 carriers.
- L2 data are always L2P(Y) data (RINEX code W). To output complete DPC data, the receiver must be configured accordingly (see $PASHS,GPS).

Reminder on How to Output DPC Messages

Use the $PASHS,RAW command with the syntax below:

$PASHS,RAW,DPC,<port_ID>,ON,<Rate>

For more details on the $PASHS,RAW command, refer to the *Set Command Library* Chapter.

As an example, the command below will output DPC messages on port A at a rate of 1 second:

$PASHS,RAW,DPC,A,ON,1

ION: Ionosphere Parameters

This message contains the ionosphere and GPS-to-UTC data conversion parameters.

The message is as follows:

$PASHR,ION,<structure>

The message's binary structure is described in the table below.

Type	Name	Size	Contents
Float	a0	4	Ionospheric parameter (seconds)
Float	a1	4	Ionospheric parameter (seconds/semi-circle)
Float	a2	4	Ionospheric parameter (seconds/semi-circle)
Float	a3	4	Ionospheric parameter (seconds/semi-circle)
Float	b0	4	Ionospheric parameter (seconds)
Float	b1	4	Ionospheric parameter (seconds/semi-circle)
Float	b2	4	Ionospheric parameter (seconds/semi-circle)
Float	b3	4	Ionospheric parameter (seconds/semi-circle)
Double	A1	8	First order terms of polynomial
Double	A0	8	Constant terms of polynomial
Unsigned long	Tot	4	Reference time for UTC data
Short	Wnt	4	UTC reference week number
Short	DtLS	2	GPS-UTC differences at reference time
Short	WnLSF	2	Week number when leap second became effective
Short	DN	2	Day number when leap second became effective
Short	DtLSF	2	Delta time between GPS and UTC after correction
Short	Wn	2	GPS week number
Unsigned long	Tow	4	Time of the week (in seconds)
Short	bulwn	2	GPS week number when message was read
Unsigned long	bultow	4	Time of the week when message was read
Unsigned short	Check-sum	2	The checksum is computed by breaking the structure into 37 unsigned shorts, adding them together, and taking the least significant 16 bits of the result.
Total		76	

The GPS broadcast ionosphere model (Klobuchar) is used.

Reminder on How to Output ION Messages

Use the $PASHS,RAW command with the syntax below:

$PASHS,RAW,ION,<port_ID>,ON,<Rate>

For more details on the $PASHS,RAW command, refer to the *Set Command Library* Chapter.

As an example, the command below will output ION messages on port A at a rate of 5 seconds:

$PASHS,RAW,ION,A,ON,5

LTN: Latency

Content

This message contains the current value of latency. It is generated in automatic mode using the $PASHS,NME,LTN command.

The message is as follows:

$PASHR,LTN,d1*cc

d1 is described in the table below.

Parameter	Description	Range
d1	Latency in milliseconds.	0-10000
*cc	Optional checksum	*00-*FF

Example

$PASHR,LTN,60*2C

Comments

Latency refers to the time it takes for the receiver to compute a position from the measurement time tag and prepare data to be transmitted through the serial port. The value of latency depends on the number of locked satellites.

In time-tagged mode, the value of latency also includes the time required for the correction stream to go through the data communication link before arriving at the receiver.

See Also

$PASHS,NME

MPC: GNSS Measurements

This message contains the GPS/GLONASS/SBAS L1 C/A, L2P data of one satellite for one epoch.

The message is as follows:

$PASHR,MPC,<structure>

The message's binary structure is described in the table below.

Type	Size	Contents
Unsigned short	2	Sequence tag (unit: 50 ms) modulo 30 minutes. See NOTE 1 below.
Unsigned char	1	Number of remaining structure to be sent for current epoch
Unsigned char	1	Satellite index number GPS: 1-32 SBAS: 33-51 GLONASS: 65-88
Unsigned char	1	Satellite elevation angle (degree)
Unsigned char	1	Satellite azimuth angle (2-degree increments)
Unsigned char	1	Channel ID not duplicated for the current epoch
	29	**C/A code data** block (29 bytes)
Unsigned char	1	Warning flag Bit1, Bit2: 0,0: Code and/or carrier phase measured but measurement was not used to compute position. 1,0: Code and/or carrier phase measured, navigation message was obtained and measurement was used to compute position but position wasn't finally computed. 0,1: Code and/or carrier phase measured, navigation message was obtained, measurement was used to compute position and position was computed successfully. Bit3: Carrier phase questionable Bit4: Code phase (range) questionable Bit5: Range not precise (code phase loop not settled) Bit6: Z tracking mode Bit7: Possible cycle slip Bit8: Loss of lock since last epoch
Unsigned char	1	Indicates quality of the position measurement (good/bad) 0: Measurement not available and no additional data will be sent.

Type	Size	Contents
		23: Code and/or carrier phase measured, navigation message was obtained and measurement was used to compute position but position wasn't finally computed. 24: Code and/or carrier phase measured, navigation message was obtained, measurement was used to compute position and position was computed successfully. Other state: measurement was not used to compute position.
Unsigned char	1	Polarity of the phase tracking 0: Polarity unknown 5: Polarity known
Unsigned char	1	Signal-to-noise ratio for satellite observation (db.Hz)
Unsigned char	1	Always 0. Not used.
Double	8	Full carrier phase measurements in cycles
Double	8	Raw range to SV (in seconds), i.e. receive time - raw range = transit time See NOTE 1 below.
Long	4	Doppler (10^{-4} Hz)
Long	4	Smoothing Bits 0-22: magnitude of smooth correction in centimeters Bit 23: sign of smooth correction Bits 24-31: smooth count, unsigned, as follows: 0=unsmoothed 1=least smoothed 255=most smoothed
	29	**L1 block**, same format as C/A code data block (see NOTE 2 below)
	29	**L2 block**, same format as C/A code data block (see NOTE 3 below)
Unsigned char	1	Checksum, a bytewise exclusive OR (XOR)
Total of bytes	95	

NOTES:

1. The specifics of the MPC message content in relation to $PASHS,PGS are detailed in the table below.

	PGS,GPS	PGS,GLO
Sequence Tag	Refers to GPS time for GPS satellites and GLONASS time for GLONASSS satellites, in spite of the setting you make with $PASHS,PGS.	
Raw Range for GPS Satellites	Actual pseudo-range	Actual pseudo-range – UTC offset

	PGS,GPS	PGS,GLO
Raw Range for GLONASS Satellites	Actual pseudo-range + UTC offset	Actual pseudo-range

2. In case of GPS L1/L2P tracking mode, the **L1 block** contains L1P data. In case of GPS L2CS tracking mode, the **L1 block** contains zero data. In case of GLONASS-M satellites, the **L1 block** contains zero data.
3. In case of GPS L1/L2P, the **L2 block** contains L2P data. In case of GPS L2CS tracking mode, the **L2 block** contains L2CS data. In case of GLONASS-M satellites, the **L2 block** contains C/A data on the L2 frequency.

Reminder on How to Output MPC Messages

Use the $PASHS,RAW command with the syntax below:

$PASHS,RAW,MPC,<port_ID>,ON,<Rate>

For more details on the $PASHS,RAW command, refer to the *Set Command Library* Chapter.

As an example, the command below will output MPC messages on port A at a rate of 1 second:

$PASHS,RAW,MPC,A,ON,1

PBN: Position Information

This message contains position information in binary format.

The message is as follows:

$PASHR,PBN,<structure>

The message's binary structure is described in the table below.

Type	Name	Size	Contents
Long	pbentime	4	GPS or GLONASS time when data was received (ms of week). See NOTE below.
Char	sitename	4	Site name
Double	navx	8	Station position: ECEF-X (m)
Double	navy	8	Station position: ECEF-Y (m)
Double	navz	8	Station position: ECEF-Z (m)
Float	navt	4	Clock offset (m)
Float	navxdot	4	Velocity in ECEF-X (m/s)
Float	navydot	4	Velocity in ECEF-Y (m/s)
Float	navzdot	4	Velocity in ECEF-Z (m/s)
Float	navtdot	4	Clock drift (m/s)
Unsigned short	pdop	2	PDOP multiplied by 100
Unsigned short	checksum	2	The checksum is computed by breaking the structure into 27 unsigned shorts, adding them together, and taking the least significant 16 bits of the result.
Total of bytes		56	

When for example after a cold start, the receiver has no correct time tag, the PBN message is output with a fixed "zero" time tag.

Unlike all the other position messages, the position provided in a PBN message *cannot* be an RTK position. It can only be a standalone, SBAS or DGNSS position.

NOTE: GPS time is used when GPS is defined as the primary system, and GLONASS time is used when GLONASS is defined as the primary system.

Reminder on How to Output PBN Messages

Use the $PASHS,RAW command with the syntax below:

$PASHS,RAW,PBN,<port_ID>,ON,<Rate>

For more details on the $PASHS,RAW command, refer to the *Set Command Library* Chapter.

As an example, the command below will output PBN messages on port A at a rate of 1 second:

$PASHS,RAW,PBN,A,ON,1

SBA,DAT: SBAS Data Message

Provided the command below has been run beforehand,

$PASHS,RAW,SBD,<port_ID>,ON

... the SBA,DAT message is output in response to:

$PASHQ,SBD, <port_ID>

...and is in the form:

$PASHR,SBA,DAT,d1,m2,d3,d4,s5*cc

Where:

Parameter	Description	Range
d1	SBAS SV ID number	33-51
m2	Time tag: hhmmss.hh The SBA,DAT message contains the time tag of the beginning of WAAS message transmission (WAAS message transmission time is 1 second)	000000.00-235959.99
d3	RTCA message ID	0-63
d4	Error flags (in HEX): bit0-preamble error, bit1-parity error	0-2
s5	RTCA message: 250 bit in 63 HEX numbers. The data lie from left to right and from high-order to low-order bits. The two low-order bits in the 63rd number are not used.	
*cc	Checksum, computed by “exclusive-ORing” all of the bytes in the message between, but not including, the “$” and the “*”. The result is “*cc” where c is a hexadecimal character.	*00-*FF

SAL: GPS Almanac Data

This message contains almanac data for one GPS satellite. The message is as follows:

$PASHR,SAL,<structure>

The message's binary structure is described in the table below.

Type	Name	Size	Contents
Short	prn	2	Satellite PRN number minus 1 (0-31)
Short	health	2	Satellite health
Float	e	4	Eccentricity
Long	toe	4	Reference time for orbit (sec)
Float	i0	4	Inclination angle at reference time (semi-circles)
Float	w dot	4	Rate of right ascension (semi-circles/sec)
Double	A1/2	8	Square root of semi-major axis (meters1/2)
Double	w0	8	Longitude of ascending node (semicircles)
Double	w	8	Argument of perigee (semicircles)
Double	M0	8	Mean anomaly at reference time (semi-circle)
Float	Af0	4	Clock correction (sec)
Float	Af1	4	Clock correction (sec/sec)
Short	wna	2	Almanac week number
Short	wn	2	GPS week number
Long		4	Seconds of GPS week
Unsigned short	Check-sum	2	The checksum is computed by breaking the structure into 34 unsigned shorts, adding them together, and taking the least significant 16 bits of the result.
Total		70	

Reminder on How to Output SAL Messages

Use the $PASHS,RAW command with the syntax below:

$PASHS,RAW,SAL,<port_ID>,ON,<Rate>

For more details on the $PASHS,RAW command, refer to the *Set Command Library* Chapter.

As an example, the command below will output SAL messages on port A at a rate of 15 seconds:

$PASHS,RAW,SAL,A,ON,15

SAG: GLONASS Almanac Data

This message contains almanac data for one GLONASS satellite.

The message is as follows:

$PASHR,SAG,<structure>

The message's binary structure is described in the table below.

Type	Name	Size	Contents
Short	prn	2	Satellite number 1-24
Short	frq	2	Satellite GLONASS frequency number [-7,...,6]
Short	health	2	Satellite health 0=bad, 1=good
Float	e	4	Eccentricity
Long		4	Reference day number (days in range 1 to 1461)
Float		4	Correction to inclination (semicircles)
Float	w0	4	Longitude of first ascending node (semicircles)
Float		4	Reference time of longitude of first node (seconds)
w	Float	4	Argument of perigee (semicircles)
Float	Af0	4	Correction to mean value (43200 s) of Draconic period
Float	Af1	4	Af1=d(Af0)/dt(sec/sec)
Float		4	Satellite clock offset (seconds)
Unsigned short	Checksum	2	The checksum is computed by breaking the structure into 21 unsigned shorts, adding them together, and taking the least significant 16 bits of the result.
Total		44	

Reminder on How to Output SAG Messages

Use the $PASHS,RAW command with the syntax below:

$PASHS,RAW,SAG,<port_ID>,ON,<Rate>

For more details on the $PASHS,RAW command, refer to the *Set Command Library* Chapter.

As an example, the command below will output SAG messages on port A at a rate of 15 seconds:

$PASHS,RAW,SAG,A,ON,15

SAW: SBAS Almanac Data

This message contains almanac data for one SBAS satellite. The message is as follows:

$PASHR,SAW,<structure>

The message's binary structure is described in the table below.

Type	Name	Size	Contents
char	Id	1	Data ID
char	Health	1	Satellite Health&Status bitwise meaning is: Bit0 – Ranging On(0), Off(1) Bit1 – Corrections On(0), Off(1) Bit2 – Broadcast Integrity On(0), Off(1) Bit3 – Reserved Bit4-7 – SBAS provider ID (0-15): 0 – WAAS, 1 – EGNOS, 2 – MSAS, 3-13 – Not assigned yet, 14-15 – Reserved
long	T0	4	Almanac data reference time within the day expressed in the SBAS time scale (seconds)
float		3*4	Satellite ECEF X,Y,Z coordinates (meters)
float		3*4	Satellite ECEF velocity X', Y', Z' coordinates (m/s)
long	Tow	4	Time within week in GPS time scale when SBAS almanac was received
char	Wn	1	Week number in GPS time scale modulo 256 when SBAS almanac was received
char	Prn	1	Satellite number (33 to 51)
Unsigned short	Check-sum	2	The checksum is computed by breaking the structure into 18 unsigned shorts, adding them together, and taking the least significant 16 bits of the result.
Total		38	

Reminder on How to Output SAW Messages

Use the $PASHS,RAW command with the syntax below:

$PASHS,RAW,SAW,<port_ID>,ON,<Rate>

For more details on the $PASHS,RAW command, refer to the *Set Command Library* Chapter.

As an example, the command below will output SAW messages on port A at a rate of 15 seconds:

$PASHS,RAW,SAW,A,ON,15

SNG: GLONASS Ephemeris Data

This message contains the GLONASS ephemeris data for one satellite.

The message is as follows:

$PASHR,SNG,<structure>

The message's binary structure is described in the table below.

Type	Name	Size	Contents
Long		4	Start time of 30-second frame in satellite time scale tk from which the ephemeris data is derived; time modulo one day (seconds)
Short		2	Day number of 30-second frame; modulo four-year period counting from beginning of last leap year, which corresponds to parameter tb (tb is set within this day number). This parameter varies within the range 1 to 1461. If day number=0, the day number is unknown (absent in navigation frame)
Long		4	Ephemeris data reference time within the day expressed in GLONASS system time scale = UTC + 3 hours (seconds)
Float		4	Frequency offset gh of the on-board frequency standard at tb (dimensionless)
Float		4	Bias tn between satellite time scale and GLONASS system time scale at tb (seconds)
Double		3*8	Satellite ECEF (PZ-90) X, Y, Z coordinates (km)
Float		3*4	Satellite ECEF (PZ-90) velocity X', Y', Z' (km/sec)
Float		3*4	Satellite perturbation acceleration X", Y", Z" due to moon and sun (km/sec/sec).
Double		8	Bias between GLONASS system time scale and UTC + 3 hours time scale tc (seconds)
Char		1	Age of ephemeris parameter En (interval from moment when ephemeris data was last uploaded to tb)
Char		1	Combined 3-bit flag (contains Ï1, Ï 2, Ï 3)
Char		1	Satellite health status flag (0=good, 1=bad)
Char		1	Satellite frequency channel number [-7,…,6]
Short		2	Satellite system number (satellite number [1,…,24])

Type	Name	Size	Contents
Unsigned short	Check-sum	2	The checksum is computed by breaking the structure into 40 unsigned shorts, adding them together, and taking the least significant 16 bits of the result.
Total		82	

Reminder on How to Output SNG Messages

Use the $PASHS,RAW command with the syntax below:

$PASHS,RAW,SNG,<port_ID>,ON,<Rate>

For more details on the $PASHS,RAW command, refer to the *Set Command Library* Chapter.

As an example, the command below will output SNG messages on port A at a rate of 15 seconds:

$PASHS,RAW,SNG,A,ON,15

SNV: GPS Ephemeris Data

This message contains the GPS ephemeris data for one satellite.

The message is as follows:

$PASHR,SNV,<structure>

The message's binary structure is described in the table below.

Type	Name	Size	Contents
Short	Wn	2	GPS week number
Long	Two	4	Seconds in GPS week
Float	Tgd	4	Group delay (sec)
Long	Aodc	4	Clock data issue
Long	Toc	4	Clock data reference time (sec)
Float	af2	4	Clock correction (sec/sec^2)
Float	af1	4	Clock correction (sec/sec)
Float	af0	4	Clock correction (sec)
Long	Aode	4	Orbit data issue
Float	Dn	4	Mean anomaly correction (semicircles/sec)
Double	M0	8	Mean anomaly at reference time (semicircles)
Double	e	8	Eccentricity
Double	$A^{1/2}$	8	Square root of semi-major axis (meters $^{1/2}$)
Long	toe	4	Reference time for orbit (sec)
Float	cic	4	Harmonic correction term (radians)
Float	crc	4	Harmonic correction term (meters)
Float	cis	4	Harmonic correction term (radians)
Float	crs	4	Harmonic correction term (meters)
Float	cuc	4	Harmonic correction term (radians)
Float	cus	4	Harmonic correction term (meters)
Double	omega0	8	Longitude of ascending node (semicircles)
Double	omega	8	Argument of perigee (semicircles)
Double	i0	8	Inclination angle (semicircles)
Float	omega dot	4	Rate of right ascension (semicircles/sec)
Float	I dot	4	Rate of inclination (semicircles/sec)
Short	Accuracy	2	User range accuracy
Short	Health	2	Satellite health
Short	fit	2	Curve fit interval
Char	prn	1	Satellite PRN number minus 1 (0-31)
Char		1	Reserved byte

Type	Name	Size	Contents
Unsigned short	Checksum	2	The checksum is computed by breaking the structure into 37 unsigned shorts, adding them together, and taking the least significant 16 bits of the result.
Total		76	

Reminder on How to Output SNV Messages

Use the $PASHS,RAW command with the syntax below:

$PASHS,RAW,SNV,<port_ID>,ON,<Rate>

For more details on the $PASHS,RAW command, refer to the *Set Command Library* Chapter.

As an example, the command below will output SNV messages on port A at a rate of 15 seconds:

$PASHS,RAW,SNV,A,ON,15

SNW: SBAS Ephemeris Data

This message contains the SBAS ephemeris data for one satellite.

The message is as follows:

$PASHR,SNW,<structure>

The message's binary structure is described in the table below.

Type	Name	Size	Contents
char	-	1	Spare field
char	accuracy	1	Accuracy
long	T0	4	Ephemeris data reference time within the day expressed in the SBAS time scale (seconds)
double		3*8	Satellite ECEF X,Y,Z coordinates (meters)
float		3*4	Satellite ECEF velocity X', Y', Z' coordinates (m/s)
float		3*4	Satellite ECEF acceleration X",Y",Z" (m/s2)
float	aGf0	4	Time offset between satellite time scale and SBAS system time scale (seconds)
float	aGf1	4	Time drift between satellite time scale and SBAS system time scale (seconds)
long	tow	4	Time within week in GPS time scale when SBAS ephemeris was received
char	wn	1	Week number in GPS time scale when SBAS ephemeris was received
char	prn	1	Satellite number (33 to 51)
Unsigned short	Checksum	2	The checksum is computed by breaking the structure into 34 unsigned shorts, adding them together, and taking the least significant 16 bits of the result.
Total		70	

Reminder on How to Output SNW Messages

Use the $PASHS,RAW command with the syntax below:

$PASHS,RAW,SNW,<port_ID>,ON,<Rate>

For more details on the $PASHS,RAW command, refer to the *Set Command Library* Chapter.

As an example, the command below will output SNW messages on port A at a rate of 15 seconds:

$PASHS,RAW,SNW,A,ON,15

TTT: Event Marker

Content This message delivers the exact GPS time, to within 1 µsecond, when an external event is detected.

The message is sent through port B, where the event marker input pin is located, and not through the port specified by the $PASHS, NME command.

The message is therefore independent of the NMEA output rate. It can be output at a faster or slower rate than the NMEA rate, depending on the recurrence of the event.

The message is as follows:

```
$PASHR,TTT,d1,m2*cc
```

d1 and m2 are described in the table below.

Parameter	Description	Range
d1	Day in week (1: Sunday; 7: Saturday)	1-7
m2	GPS time tag, in hours, minutes and seconds	0-23:59:59.9999999
*cc	Checksum	*00-*FF

Example

```
$PASHR,TTT,3,18:01:33.1200417*AC
```

See Also $PASHS,NME,TTT

Chapter 12. Troubleshooting

Receiver is Not Tracking Satellites

	RTK Base	RTK Rover	PP Base	PP Rover
Relevant to	•	•	•	•

Step 1. Has the Receiver Been Powered Up?

To determine if the receiver is powered up, examine the power LED on the front panel of the receiver. If the LED is on, the receiver is on.

1. **If the receiver is not powered up**, turn on the receiver by pressing and holding the power key on the front panel. The button must be held for a few seconds since there is a delay in power on. You will see the power LED turn on and the display will show the logo followed by the message “Starting...”.
2. **If the receiver does not power up**, check the power source. The receiver supports both internal (battery) and external power sources.

   If using the internal power source, make sure the internal battery has been fully charged before it was inserted in the receiver. A too low battery will prevent the receiver from powering up.

   If using external power, check to ensure the power cable is properly connected to both the external battery and the receiver.

   - If the cable is properly connected, check the power level of the external power source. If low, replace the battery with a charged battery and turn on the receiver.
   - If the external power source is good and the cable is connected to both the receiver and the power source, there may be a problem with the cable. If available, try a different power cable. If the new cable works, the old cable is malfunctioning. Call your local dealer or email Ashtech technical support to have the cable repaired.

3. **If the receiver is now powered up**, go to step 2.

Step 2. Does the Number of Tracked Satellites Stay Abnormally Low?

1. **Check the information displayed on the receiver front panel**. In the upper line, starting from the left, the first number displayed should gradually rise from 0 to 8 or more. This information represents the number of tracked satellites. In the same time, the last number in the same line should increase as well, in the same proportion. This information represents the number of satellites actually used by the receiver, and should be equal to, or slightly less than, the first number in the line.
2. **If the receiver fails to track any satellites** after a few minutes of operation, see if you can improve this by moving the receiver to a better place (a more open-sky area) where there can't be any doubt on the possibility for a receiver to track satellites.
3. **If the receiver still fails to track any satellites**, a component may be malfunctioning. Call your local dealer or email Ashtech technical support for assistance.

Receiver is Not Logging Data

	RTK Base	RTK Rover	PP Base	PP Rover
Relevant to	•	•	•	•

Raw Data Logging Icon:

The Raw Data Logging icon on the front panel of the receiver will be animated when data logging is in progress.

Examining the General Status screen, you determine that the receiver is not logging data to memory. Follow the procedures below to determine the cause of this problem.

Step 1. Has Data Logging Been Started?

At receiver power up, data logging is disabled in the receiver (default setting). To start data logging, press the Log button on the front panel, or use FAST Survey's **Log Raw GPS** function from the **Survey** menu (tap the **Start File** button to start data logging). By default, raw data is written to the receiver's internal memory.

1. **If the Raw Data Logging icon starts blinking** (animated icon), then the problem is solved. **Warning!** The Raw Data Logging icon may blink throughout a logging session, but

if not a single satellite is received during this time, then your raw data file will be empty.

2. **If the problem is not yet resolved**, go to step 2.

Step 2. Is the Currently Selected Memory Usable?

The receiver logs raw data to the internal memory (recommended) or to a USB stick. With the default settings, the selected memory is the internal memory. Changing the storage medium can only be made through $PASH,MEM or using FAST Survey. You can determine which memory is currently selected by reading the memory screens. The "*" symbol indicates the currently selected storage medium.

If the USB stick is the currently selected memory, there is no USB stick connected and you are using the receiver without FAST Survey, then the receiver won't start data logging when you press the Log button.

1. **If you are using the receiver alone** and the currently selected memory is the USB stick, do one of the following:
   - Connect a USB stick to the receiver through the USB device cable provided and press the Log button again.
   - Restore the default settings (by pressing the Log+Scroll+Power buttons simultaneously) in order to make the internal memory the active memory. Press the Log button again.

   If neither of these two actions resolves your problem, go to step 3.
2. **If you are using FAST Survey to control the receiver**, select the **Survey** menu. Tap on the **Log Raw GPS** button and then on the **File Manager** button. Select the memory where you want the raw data file to be created (Internal Mem or USB Mem Stick). Come back to the previous screen and tap on the **Start File** button. If the problem is not yet resolved, go to step 3.

Step 3. Is the Currently Used Memory Full?

Data logging will stop automatically or won't start if the storage medium used (internal memory or USB stick) is full. On the General Status screen, read the remaining percentage of free memory (second line, last number in the line).

1. **If "0%" is displayed**, then the memory used is full. Do one of the following:
   - Change the storage medium
   - Using $PASHS,FIL,D or FAST Survey, empty the memory or delete the files you don't need anymore.

If neither of these two actions resolves your problem, you may have a malfunctioning receiver. Contact your local dealer or email Ashtech Technical Support for assistance.

2. **If the memory is not full** (>0%), you may have a malfunctioning receiver. Contact your local dealer or email Ashtech Technical Support for assistance.

Radio Data Link Fails to Provide Base Corrections to Rover

	RTK Base	RTK Rover	PP Base	PP Rover
Relevant to		•		

The Data Link icon is displayed on the rover's General Status screen when base corrections are received and a float or fixed solution is available. Next to it is the age of corrections, a value which should not normally exceed a few seconds when the data link operates smoothly.

After examining the General Status screen, you determine that the rover is not receiving data. Follow the outline below to troubleshoot this problem.

Step 1. Is the Receiver Fitted with the Appropriate Radio Module?

The radio module used should be compatible with the radio transmitter used at the base. Several sub-bands and channel bandwidths are available for the radio (see *Optional Accessories on page 6*).

1. **If you are using the right module**, go to step 2.
2. **If you are not using the right module**, turn off the receiver and replace the module with the right one. You then need to restore the default settings in the receiver (by pressing the **Reset Factory Defaults** button in FAST Survey's **Equip>GPS Utilities** or pressing the Log+ Scroll+ Power buttons simultaneously on the front panel) so the receiver can recognize and use the new module. If using the right module does resolve the problem, go to step 2.

   NOTE: There is no particular action required to power up the radio module other than to power up the receiver. This automatically applies power to the radio module.

Step 2. Is the Radio Antenna Connected to the Radio Module?

The radio module cannot operate properly without an antenna. Make sure the antenna is connected to the radio module.

1. **If the antenna is not connected**, connect the radio antenna (provided in the radio receiver kit) to the radio module. Ensure that the connection is secure. If the problem is not yet resolved, go to step 3
2. **If the antenna is connected**, ensure the connection to the radio module is secure. If the problem is not yet resolved, go to step 3.

Step 3. Are the Rover Radio Settings Compatible with those of the Base Radio?

The rover radio must use settings that are compatible with those of the base radio, in order for the rover to receive corrections from the base. (This means you are supposed to know the currently used base radio settings.)

1. **Check the radio settings in the rover**:

   Use $PASHQ,RDP,PAR or FAST Survey (**Equip** menu>**GPS Rover**>**RTK** Tab, **Device** field, ) to check the frequency, protocol and “Over the Air” baud rate used.
2. **If the rover radio is set properly**, go to step 4.

Step 4. Is the Line of Sight Between the Base and the Rover Antennas Obstructed?

Although radios are fairly robust, an excessive amount of obstructions can block out the signal.

1. **If the line of sight is not obstructed**, go to step 5 below.
2. **If the line of sight is obstructed**:
   - Move to a less obstructed location. In order to test if the system is functioning properly, move to a location that does not have an obstructed view between the base and rover radio antennas.
   - If this is not possible, move to higher ground or a location where there is less obstruction.
   - If, after moving, the rover radio begins to receive data from the base, then the previous location is too obstructed from the base. You will need to either raise the base radio antenna higher, or move the base to a location with less obstruction between the base and rover radio antennas.
3. If the problem is not yet resolved, go to step 5.

Step 5. Are you Within Range Specifications of Your Radio System?

The range within which your radio system will function varies greatly with the conditions under which the system is being used. With clear line of sight between the base and rover radio antennas, and no interference on the frequencies you are working on, a UHF system can function with tens of miles of separation. Unfortunately, these are ideal situations seldom found. In most situations, the range of UHF radio will be between 5 and 10 miles.

1. **If you are not within range specifications**, move within range. Either move closer to the base, or move the base closer to you. If the problem is not yet resolved, go to step 6.
2. **If you are within range specifications**, move closer to the base to test the system. Since radio range is difficult to predict due the varying effects of local conditions, try moving closer to the base in an attempt to resolve the problem.

   If by moving closer you find that the rover radio begins to receive data, the previous location is out-of-range of the radio system. You will need to elevate the base radio antenna or move the base to a location closer to you to solve the problem. If the problem is not yet resolved, go to step 6.

Step 6. Is the Radio Being Jammed?

When working with UHF radios, it is possible that the frequency you are using is being shared with other people in your vicinity. Traffic on this frequency can interfere with the rover's ability to receive data from the base. The effect may be no reception of base data or intermittent reception of data. Both are detrimental to proper operation of the RTK system. Interference can be a problem with UHF radios.

There are two methods to determine if there is traffic on the frequencies you wish to use. The best method is to acquire a handheld scanner and to listen for traffic on the frequency you plan to use. The second method is to observe the Data Link icon the rover's General Status screen. The base and rover radio will receive any traffic on the frequency they are set to causing this icon to appear. This is best done before setting up the base to transmit data. Any appearance of the Data Link icon indicates some traffic on your frequency.

1. **If there is no jamming**, your radio module or radio antenna may be malfunctioning. There is no way to further isolate this problem unless you have spares for these components. Call your local dealer or email Ashtech technical support for assistance.

2. **If there is jamming**:
   - Lower the sensitivity of the rover radio. FAST Survey lets you change the sensitivity of the rover radio, and you can also lower the sensitivity of the PDL radio via the front panel display.

     Lower the sensitivity of the rover to medium or low. If the traffic on your frequency is not strong in power, lowering the sensitivity of the rover radio may cause the radio to ignore the traffic. This will not help if the traffic is caused by a nearby or very high powered radio.

     The disadvantage of lowering the sensitivity is a reduction in the range of your radio system. A lower sensitivity at the rover may cause the rover to not hear the base transmissions as the rover moves farther away from the base.
   - Try another frequency. If you are licensed to operate on more than one frequency, move to a different frequency in hopes that the new frequency has less traffic.

     If you have a license for only one frequency, you may need to find another frequency in your area that is clear of traffic in order for the system to function reliably and acquire a license for this frequency if possible.

Data Link Okay but No Fixed Position Computed

	RTK Base	RTK Rover	PP Base	PP Rover
Relevant to		•		

Once the receiver is set to function in RTK (i.e. RTK firmware option has been enabled), it will compute RTK quality positions. In order to accomplish this, the rover must collect raw satellite data at its position and also receive RTK correction data transmitted by the base. Without these two components, the rover will not be able to fix RTK position solutions.

To determine if the rover is computing a fixed position, you can read the General Status screen (2nd parameter in upper line), or use FAST Survey (**Equip** tab, **Monitor Skyplot** function).

Using either the display screen or FAST Survey, you have determined that the rover system is not computing a "Fixed" position. Follow the steps outlined below to troubleshoot this problem.

Step 1. Is the Radio Receiving Base Data?

To determine if the rover is receiving base data, examine the 2nd line on the General Status screen. The Data Link icon should be visible. Refer to *Radio Data Link Fails to Provide Base Corrections to Rover on page 692* if you need to fix this problem, and then come back to this procedure.

Step 2. Is the Receiver Tracking satellites?

Use either the front panel of the receiver or FAST Survey running on the field terminal to determine if the rover is tracking satellites.

- **If the receiver is not tracking satellites**, refer to *Receiver is Not Tracking Satellites on page 689* and then come back to this procedure.
- **If the receiver is tracking satellites**, go to step 3 below.

Step 3. Are The Base and Rover Tracking at least 5 Common Satellites?

In order for the rover to compute an RTK position, the base and rover must observe data from at least 5 common healthy satellites simultaneously. Without this common data, the rover cannot compute an RTK position.

Use the receiver front panel or FAST Survey's Monitor/Skyplot function to determine if the base and rover are indeed tracking at least 5 common healthy satellites.

1. **If the base and rover are not tracking at least 5 common satellites**:
   - Check satellite availability. Use the Mission Planning utility from GNSS Solutions to check satellite availability for your current location and time. Look for the number of satellites available higher than 5° above the horizon. Ensure at least 5 healthy satellites are available. If not, you will need to perform your survey at another time.

     If the problem is not yet resolved and at least 5 satellites are now tracked and used, your rover may be malfunctioning. Contact your local dealer or email Ashtech technical support for assistance.

- Move the base or rover if sites have satellite obstructions. If your base or rover site has any obstructions 5° above the horizon, the obstructions may be blocking essential satellites. If obstructions exist at the base or the rover, move the system to an open area.

  If the problem is not yet resolved and at least 5 satellites are now tracked and used, your rover may be malfunctioning. Contact your local dealer or email Ashtech technical support for assistance.

2. **If the base and rover are tracking at least 5 common satellites**, your rover may be malfunctioning. Contact your local dealer or email Ashtech technical support for assistance.

Rover is Computing Positions with High Uncertainties

	RTK Base	RTK Rover	PP Base	PP Rover
Relevant to		•		

You find that the rover is computing a position but the uncertainties (HRMS, VRMS) assigned to the position are unacceptably high. Follow the steps outlined below to troubleshoot this problem.

Step 1. Is the Receiver Set to Function as an RTK Rover?

The rover must be set to function in RTK rover mode in order for it to compute accurate RTK positions. If the rover is not set in RTK rover mode, the receiver will compute autonomous positions which could contain about 10 meters or more of error. This is probably the problem if HRMS and VRMS values are in the 10s of meters. Check that the system is configured as an RTK rover. For example, with FAST Survey:

- **If the receiver is not set to function as an RTK rover**, go to the **Equip** menu>**GPS Rover**>**RTK** tab and set the different parameters to match your application.
- **If the receiver is set to function as an RTK rover**, go to step 2.

Step 2. Are the Base and Rover Tracking at least 5 common Satellites?

Although the rover is capable of computing a position with only 4 common healthy satellites with the base, the rover will not attempt to fix ambiguities unless 5 common healthy satellites are observed. Fixing ambiguities is a required process for the rover to compute highly precise RTK positions. The receiver will inform you if you currently have a fixed ambiguity solution or a float ambiguity solution. Your field application software will also inform you which satellites are being tracked by the base and which are being tracked by the rover and whether or not these satellites are healthy. If you find that your solution will not fix, look to determine if the base and rover are indeed tracking at least 5 common healthy satellites.

1. **If the base and rover are not tracking at least 5 satellites**:
   - Check satellite availability. Use the Mission Planning utility from GNSS Solutions to check satellite availability for your current location and time. Look for the number of satellites higher than 5° above the horizon. Ensure at least 5 healthy satellites are available. If not, you will need to perform your survey at another time.

     Go to step 3 below if the problem is not yet resolved.
   - Move the base or rover if sites have satellite obstruction. If your base or rover site has any obstructions higher than 5° above the horizon, the obstructions may be blocking essential satellites. If obstructions exist at the base or rover, move the system to an open area.

     Go to step 3 below if the problem is not yet resolved.
2. **If the base and rover are tracking at least 5 satellites**, go to step 3 below.

Step 3. Are HDOP & VDOP Values Too High for Precision Requirements?

Dilution of Precision (DOP) values give a quality indication of the satellite geometry at any given time. Satellite geometry is important to the precision of an RTK solution.

In fact, the DOP value is used as a multiplier in the computation of position precision. For example, in the computation of horizontal RMS (HRMS), an estimated precision value is multiplied by the HDOP at that given time to produce HRMS. The larger the HDOP value, the larger the HRMS value. The same relationship holds for VDOP and VRMS.

Therefore, poor satellite geometry will result in poor solution precision. The smaller the DOP value, the better the geometry and solution precision.

FAST Survey can view current DOP values. If your precision estimates (HRMS, VRMS) do not meet expected values, use this feature to examine the current DOP values.

1. **If DOP values are too high**, look for a satellite window with more suitable DOP values to perform the survey:

   Use the Mission Planning utility from GNSS Solutions to examine expected DOP values for periods during which you would like to perform your survey. Avoid surveying during periods where DOP values are above 4. For the highest level of accuracy, limit surveying to periods where DOP values are between 1 and 2.

   Remember that obstructions to line of sight between the GPS antenna and the satellites will block out satellite signals. Every time a satellite is lost due to obstructions, DOP values will be adversely affected. An obstructed area may not be suitable to meet your precision needs due to the adverse effect on satellite geometry.
2. **If DOP values are not too high**, go to step 4 below.

Step 4. Are Precision Requirements Too Stringent for RTK?

If the RTK system is not delivering the precision requirements you need for your specific task, it is possible that your precision requirements are too stringent for the RTK system. Review your system documentation to determine the precision specifications for the RTK system.

- If the precision is not beyond capability, then the rover may be malfunctioning. Contact your local dealer or email Ashtech technical support for assistance.
- If the precision is beyond capability, your precision requirements are not attainable through RTK surveying. You will need to find some other measurement system to perform your survey.

This concludes the troubleshooting section. If the tips given here did not help you to resolve your problem with your system, please call your local dealer or email Ashtech Technical Support for assistance.

Logging Data for RTK Troubleshooting Purposes - Reporting a Problem to Ashtech Tech Support

Logging the data received, processed and output by the receiver may help Ashtech isolate RTK malfunction when none of the available troubleshooting procedures has allowed you to solve the problem.

This procedure is based on the capability of the receiver to execute serial commands from a text file stored on a USB key.

You can create by yourself the text file required to launch this process. Create the text file with the following content, making sure the four commands are typed in that order:

$PASHS,MEM,2
$PASHS,ATL,ON
(Press the ENTER key after typing the last command. This is mandatory.)

Save the file as “autoconfig.cmd” and copy it to the USB key. By naming the file that way, the receiver will automatically prompt you to run the script when you connect the USB key to the receiver.

Then follow the instructions below:

- Check that the receiver is not currently logging data. If it is logging data, press the Log button to stop data logging.
- Connect the USB key to the receiver. Wait until the USB logo appears on the receiver screen and a message is prompted (**Upload Script?**).
- Accept the request by pressing the Log button. The receiver will then run the script from the text file, and then will start logging the data, as indicated by the blinking diskette icon on the receiver screen.
- After enough data has been recorded, firmly press the Log button once, then wait until the diskette icon on the screen stops blinking. When this happens, this means data recording has been stopped.
- Turn off the receiver.
- Remove the USB key and read the content of the USB key on your computer.
- Send the collected data file (ATL_yymmdd_hhmmss.log) to Ashtech for further diagnosis.

When reporting a problem to Ashtech Technical Support, please attach to your email the response of your receiver to the following commands:

$PASHQ,RID

$PASHQ,VERSION
$PASHQ,OPTION
$PASHQ,PAR

Log these responses in Terminal mode (with Hyperterminal for example) at a speed of 19600 Bd in a text file (*.txt).

List of Alarms

Alarms are reported on the receiver display screen. A blinking warning sign appears on the status screen prompting you to press the Scroll button so you can read the alarm label.

To acknowledge an alarm message once the alarm label is displayed on the screen, press the Scroll button again. If several alarm messages are reported, press the Scroll button as many times. This will acknowledge each message, one after the other.

If the reason for raising an alarm persists, you won't be able to acknowledge the alarm until you correct the problem.

Some of the alarms listed below can only be the result of a bad serial command submitted to the receiver (in command mode). Serial commands can be applied to the receiver in different ways, from the field terminal running your field software, or from a PC's terminal window (through a serial connection).

#	Rank	Alarm Label	Symptoms & Remedies
0	Medium	Software error	Receiver detected an internal error due to software. If persisting, 2nd-level maintenance is required for the receiver.
1	Medium	Unknown command	Unknown serial command received. Correct syntax and re-send command.
2	Medium	Bad parameter	Not well-formatted parameter in the command sent. Correct syntax and re-send command.
3	Medium	Bad command checksum	Serial command received with bad checksum. Correct checksum and re-send command.
4	Medium	File open error	Receiver failed to open the raw data file. Restart the receiver an try again. If error persists and selected storage medium is USB, change USB key and try again. If error persists and selected storage medium is internal memory, re-format internal memory using command $PASHS,INI,2 (configuration will be lost).

#	Rank	Alarm Label	Symptoms & Remedies
5	Medium	File close error	Receiver failed to close the raw data file. Try again. If still unsuccessful, turn off the receiver and try again.
6	Medium	File write error	Receiver failed to write data into the raw data file.If the alarm persists, close the file and resume data logging. If error persists and selected storage medium is USB, check that it's not in read-only (remove lock). Else, change USB key and try again. If error persists and selected storage medium is internal memory, reformat internal memory using command $PASHS,INI,2 (configuration will be lost).
7	Medium	File read error	Receiver failed to read the number of files in the selected storage medium.If error still occurs, change the USB key or re-format the internal memory (see Alarm 4).
8	Medium	File system mount error	Receiver failed to detect the USB key. Remove USB key and re-insert it. If still unsuccessful, use a new USB key.
12	Medium	GSM connection failed	GSM connection has been lost. Try again. Most of the time, the server ends the connection for one of the following reasons: - User name and/or password is incorrect (contact your provider) - Server is faulty (contact provider) - You are outside the area covered by the NTRIP or Direct IP server.
14	Medium	GSM initialization failed	Receiver failed to initialize GSM modem. Check the GSM status icon on the display screen (should indicate Modem is powered on). If error persists, contact your GPRS provider for assistance.
16	Medium	GSM data write error	Receiver failed to write data on the GSM port. Try again. If error persists, restart the receiver. If error persists, call your local dealer or email technical support for assistance.
19	Medium	GSM power error	Receiver failed to power on the modem or action required from modem while it is off. If error persists, call your local dealer or email technical support for assistance.
21	High	USB removed while file opened	User error. USB key should not be removed while data is being logged to this key. Data file in progress will be entirely lost.
22	High	File transfer Error	Receiver failed to transfer data from the internal memory to the USB key. Change the USB key and try again. If error persists, restart receiver. If error still persists, call your local dealer or email technical support for assistance.
23	High	Transfer to USB failed	Receiver failed to transfer data from the internal memory to the USB key because the key is full. Empty the key or insert a new one and then try again.
24	Low	RTC send error	Receiver has detected a task not running properly. Restart receiver. If error still persists, call your local dealer or email technical support for assistance
25	Medium	Bad radio settings	Bad $PASHS,RDP,PAR command received. Consider the following: -Settings may be incompatible with the type of radio used -Settings may have been rejected by the radio Correct command syntax and/or parameters and re-send command.

#	Rank	Alarm Label	Symptoms & Remedies
26	Medium	No radio detected	Receiver fails to communicate with the external or internal radio device, or radio does not respond to your command. Check to see if radio is present (internal radio) or connected and powered on (external radio). Then send your command again.
27	Medium	Radio settings corrupted	Receiver failed to interpret data received from Pacific Crest receiver or transmitter. Check baud rate and retry.
28	Medium	Bad radio response	Receiver failed to interpret data received from transmitter. Check baud rate and retry.
29	Medium	Bad radio channel	Bad $PASHS,RDP,PAR command received (contains invalid channel number). Consider the following: -Submitted channel number may be absent from channel table -Submitted channel number rejected by radio. Check channel table and send the command again.
30	Medium	No GNSS detected	GNSS board found missing. Restart receiver. If error persists, call your local dealer or email technical support for assistance.
31	Low	Bad PVT received	Bad position data delivered by GNSS board. If error persists, call your local dealer or email technical support for assistance.
32	Low	Bad PVT decoded	Bad position data delivered by GNSS board. If error persists, call your local dealer or email technical support for assistance.
33	Low	PVT multiflag	If error persists, call your local dealer or email technical support for assistance.
34	Medium	Unknown option code	OPTION command received includes invalid option code. Check command syntax/parameters and send the command again.
35	Medium	C3 code checksum is bad	Option codes are corrupted at power-on. Re-install receiver options.
36	High	Option has expired	At receiver power-on, all installed firmware options are tested for validity. This alarm is activated if at least one option has expired. Need to purchase option if no longer available.
37	High	All attempts failed	Number of tries exceeded. Check phone number. Resume the connection procedure from the beginning. If error persists, call your local dealer or email technical support for assistance
38	High	Memory full	Data memory full. Data logging stopped or impossible. You need to empty memory partially or entirely before data logging can be resumed.
39	Low	Spy too long	A Debug command. Apart from acknowledging the alarm, no particular action required.
40	Medium	GSM already in DIP Mode	Source table requested whereas GSM already used in DIP mode. End DIP connection before requesting the source table.
41	Medium	GSM currently in NTRIP Mode	Source table requested whereas GSM already used in NTRIP mode. End NTRIP connection before requesting the source table.
43	Medium	Invalid mount point	You are trying to connect the receiver to an invalid mount point. Correct mount point parameters and try again.
44	Low	Input buffer full	If error persists, call your local dealer or email technical support for assistance.
45	Medium	GSM Pin code invalid	Correct pin code and try again. If error persists, contact GPRS provider to fix the problem.
46	Medium	GSM band error	Correct GSM band and try again. If error persists, call your local dealer or email technical support for assistance.

#	Rank	Alarm Label	Symptoms & Remedies
47	Medium	GSM protocol error	Correct protocol used and try again. If error persists, call your local dealer or email technical support for assistance.
48	Medium	GSM CSD mode error	Problem configuring the modem in CSD mode. Try again. If error persists, call your local dealer or email technical support for assistance.
49	Medium	APN error	Problem configuring the APN. If error persists, contact GPRS provider to fix the problem.
51	Medium	GPRS login error	Check GPRS login. If error persists, contact GPRS provider to fix the problem.
53	Medium	GPRS password error	Check GPRS password. If error persists, contact GPRS provider to fix the problem.
54	Medium	GPRS connection failed	Receiver failed to connect to GPRS. Check GSM antenna. Check GPRS parameters and reception level and try again.
56	Medium	Invalid caster hostname	Correct caster hostname and try again.
57	Medium	Invalid caster port	Receiver failed to access the caster through the port mentioned. Check caster port number.
60	Medium	Disconnect. from GPRS failed	Receiver failed to disconnect from GPRS. Try again. If still unsuccessful, shut down the receiver.
61	Medium	Connect. to DIP failed	Receiver failed to connect to the specified DIP address. Check DIP parameters and access rights and try again.
62	Medium	CSD dial error	Receiver failed to dial the specified phone number.
63	Medium	CSD hangup error	Receiver failed to hang up. Shut down the receiver.
66	Medium	Auto pickup error	Receiver failed to set “auto pickup” in GSM modem
67	Medium	No SIM card detected	Receiver needs SIM card to operate in requested mode. Install SIM card or check that the installed SIM card has been inserted correctly. If still unsuccessful, call your GPRS provider to make sure the SIM card holds the information to make it usable.
69	High	Too many files	Up to 96 files (index A to Z) can be logged per day, based on the same site name. To log more files on the same day, change the site name.
70	High	Low battery	Battery output voltage below lower limit defined by $PASHS,PWR,PAR.
71	High	Low voltage	External DC source voltage below lower limit defined by $PASHS,PWR,PAR.
72	Medium	Storage overflow	Storage overflow. This can be solved by reducing the data recording rate.
90	Medium	BTH Name Rejected	Bluetooth name rejected. Try another one.
91	Medium	BTH PIN Rejected	Bluetooth pin rejected. Try another one.
108	High	Option K has expired	The use of the [K] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.
109	High	Option F has expired	The use of the [F] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.
110	High	Option Z has expired	The use of the [Z] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.

#	Rank	Alarm Label	Symptoms & Remedies
111	High	Option S has expired	The use of the [S] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.
112	High	Option P has expired	The use of the [P] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.
113	High	Option G has expired	The use of the [G] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.
114	High	Option M has expired	The use of the [M] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.
115	High	Option L has expired	The use of the [L] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.
116	High	Option N has expired	The use of the [N] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.
117	High	Option C has expired	The use of the [C] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.
118	High	Option R has expired	The use of the [R] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.
192	Medium	Baseline Out of Range	The receiver won't use the received corrections data because the distance to the base station is greater than 3 kilometers. Work with a closer station or buy the [K] firmware option (full RTK).
193	Medium	Extend Memory not available	Trying to power on the extended memory, but found missing or undetected.
194	Medium	Option O has expired	The use of the [O] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.
195	Medium	Option Q has expired	The use of the [Q] firmware option was granted to you for a limited period of time, which has now expired. Please contact to renew the use of this option.
196	Medium	Current Power not allowed	You are trying to assign a value of radiated power which the radio is not allowed to transmit. Choose a lower value.
197	Medium	Not enough space left	Not enough room to save the configuration file. Make room by deleting unnecessary files.
198	Medium	Config file already exists	You are trying to save a configuration file that already exists in memory. Move the existing file to another location before trying again.
199	Medium	File not found	The receiver could not find the file you specified. Make sure the receiver can find the configuration file it is expected to use.
200	Medium	Incompatible Config File	The configuration file you want the receiver to run does not contain the expected data. Upload a correct configuration file and delete the bad one.

#	Rank	Alarm Label	Symptoms & Remedies
201	Medium	Invalid Radio Type	You are trying to set a radio type that does not match the radio currently used by the receiver. Find the right type and try again.
202	Medium	Invalid link speed	You are trying to set a baud rate that is not appropriate. Find which baud rate should be used and try again.
203	Medium	Invalid FEC mode	You are trying to set a FEC mode that is not appropriate. Check that you are asking for a valid one.
204	Medium	Too many config files (*.par)	The receiver is trying to use a configuration file but does not know which one to use. Make sure there's only one file available and it is the one you want the receiver to use.
205	Medium	Invalid registration code => No registration code	No registration code entered for the receiver. Contact Technical Support.
206	Medium	Invalid registration code => Bad registration code	The receiver detects an incorrect registration code. Contact Technical Support.
207	Medium	Invalid Position => Position from $PASHS,POS	The receiver detects an incorrect position assigned to its location. Use $PASHS,POS to enter the right position.
208	Medium	GSM already in FTP mode	You are trying to assign a function to the modem while it's already used in a network connection using the FTP protocol. See what you want the modem to do and then take the necessary steps to use it as desired.
209	Medium	ADL Radio Power is reduced	The receiver detects that the radiated power level set in the radio used was intentionally lowered. This is because the radio is powered from the internal battery, not from an external power source.
210	Medium	Radio Protocol not supported	You are trying to set a protocol that does not match the type of radio used. Choose a suitable protocol and try again.
213	Medium	Bad Base Position => In Rover mode, base position received	The receiver detects a bad base position received from the base. Check base position and correct it at the base.
214	Medium	Bad Base Position => In Base mode, base position sent	The receiver detects a bad base position assigned to the base. Check base position and correct it.
215	Medium	GNSS in Boot mode	Contact Technical Support.
218	Medium	Corrupted USB	A corrupted directory ("Found.*") has been detected on the USB. The key can still be used out of this directory. Re-formatting should be envisioned.
219	Medium	USB directory overflow	One directory has more than 500 files. The USB key is unmounted automatically..

Chapter 13. Other Procedures & Memos

Special Button Combinations Summary

Button Combination	Receiver State	Function
Power+Log+Scroll	OFF	Restores Factory Settings.
Power+Scroll	OFF	Initiates firmware update from USB key.

Refer to *Special Button Combinations on page 15* for more information.

Reset Procedure

The receiver may be reset to the default settings using the Log+Scroll+Power button combination. Release the three buttons only after the logo is displayed.

The reset procedure is also used to poll the radio module. If a new module is detected, the receiver will update its database so it can successfully communicate with the new module.

The default settings can also be restored using the $PASHS,INI command. With this command, you can ask more than a simple "restore default settings". See *INI: Receiver Initialization on page 393*.

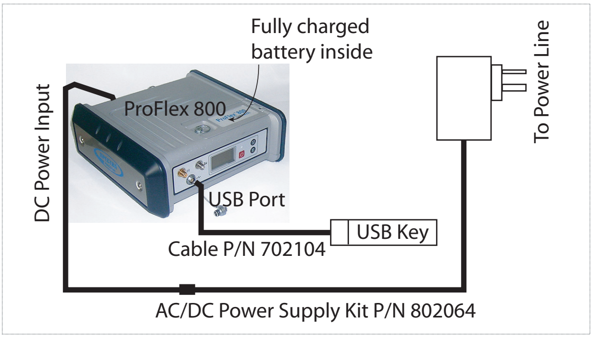
Firmware Upgrade Procedure

Firmware upgrades can be downloaded from the Spectra Precision website as one or more compressed ".tar.bz2" files. The file(s) provided, as well a the step-by step upgrade procedure are given in the relevant *Release Note*.

Completing a firmware upgrade procedure may take up to 30 minutes. For this reason, it must be run with the receiver powered from both a fully charged internal battery and the AC/DC power supply kit. You also need a USB key to make the upgrade files available to the receiver.

Follow the instructions below to complete the upgrade of your receiver:

1. Check that the USB key used for the upgrade is not write-protected and then connect it to your computer.
2. Using Windows Explorer, copy the ".tar.bz2" file(s) to the root directory of the USB key.
3. Check that there is at least 10 Mbytes of free memory left on the USB key. The free memory will be used during the upgrade for decompressing data.
4. Disconnect the USB key from the computer (after taking the usual safety precautions related to the USB standard).
5. Make sure the receiver you want to upgrade is OFF and ready for upgrade (i.e. internal battery present and external AC/DC power supply connected and on).



6. Connect the USB key now containing the upgrade files to the receiver's USB connector through cable P/N 702104 (provided).
7. Hold down the Scroll button and then press the Power button for about 10 seconds. After about 30 seconds, the Ashtech logo on the screen is replaced with the "Upgrade in progress" message, meaning that the upgrade procedure has now started.
8. Let the receiver proceed with the upgrade. **Take care not to turn off the receiver while the upgrade is in progress**.

   The receiver screen will display successively:

   Upgrade in progress.
   Writing xx%
   ramdisk.img.gz
   ...

uboot
uimage_pm4_rd
Upgrading GNSS
...
Erasing partitions
Creating Backing file
Creating partition
Config
Starting...

9. Follow the instructions provided in the *Release Note* to complete the upgrade. The receiver is automatically re-started at the end of the procedure.
10. Disconnect the USB key and its cable from the receiver.
11. Check that the new firmware is installed (read the second line on the Receiver Identification Screen).

Time-tagged RTK vs. FAST RTK Position Output

Your receiver can deliver RTK positions either in Time-Tagged or Fast RTK mode. The default mode is Fast RTK.

If you wish your receiver to operate in Time-Tagged mode, use the appropiate serial command to switch into that mode (see *CPD,FST: RTK Output Mode on page 345*).

In its standard version, the receiver features a Fast RTK mode with an output rate of 2 Hz. With the FASTOUTPUT firmware option, the output rate is 20 Hz. After purchasing this option, use the $PASHS,OPTION command to install it. See *OPTION: Receiver Firmware Options on page 414*).

ATOM File Naming Conventions

Raw data files in ATOM format are named using the following syntax:

G<Site><Index><Year>.<Day>

Where:

Item in Filename	Description
G	Header indicative of a file containing ATOM data.
<Site>	A 4-character string recalling the name of the site where data was collected (a point name in static, a trajectory name in kinematic, or name of last surveyed point in stop & go). The default string is four underscores (“____”).

Item in Filename	Description
<Index>	Order number of file being recorded (in the form “A” to “Z” for the first 26 files logged in the same day, then “AA” to “ZZ” for the next ones recorded in the same day, starting from the 27th file).
<Year>	Last two figures of current year (e.g. “08” for 2008) for up to26 files recorded in the same day, then only the last figure of current year for the 27th and next files.
.<Day>	File extension: a three-figure number representing the current day number in year (1.. 365).

Example of first file logged on May 6th 2008 on point 584V:

G584VAA8.127

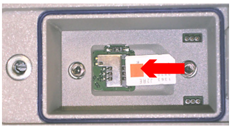
Changing the Radio Module

This operation requires special technical skills. It should be performed by a certified dealer. Opening the receiver case without been authorized will automatically cancel the guarantee.

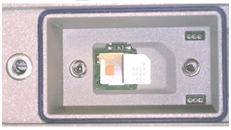
Installing a SIM Card

- Open the battery compartment by turning the quarter-turn finger screw anticlockwise.
- Remove the battery.
- Insert the SIM card as shown below.

1



2



- Put the battery back in the compartement and close the trap door.

Configuring Serial Port A

- Set up your equipment in such a way that it can successfully receive and process a serial command sent from outside the equipment. See *Applying Commands Through Bluetooth or a Serial Port on page 292* in this manual to know how this can be done.
- Use the $PASHS,MDP serial command to configure serial port A as an RS232 or RS422 port. Refer to *MDP: Setting Port A to RS232 or RS422 on page 399* in this manual to learn how to use this command.
- Use the $PASHS,CTS command to enable/disable hardware handshaking. Refer to *MDP: Setting Port A to RS232 or RS422 on page 399*.

NOTE: A Bluetooth connection is also possible between a Bluetooth-enabled computer and the receiver.

Enabling a Firmware Option

- Set up your equipment in such a way that it can successfully receive and process a serial command sent from outside the equipment. See *Applying Commands Through Bluetooth or a Serial Port on page 292* in this manual to know how this can be done.
- Use the $PASHS,OPTION serial command to enable the firmware option. Refer to *OPTION: Receiver Firmware Options on page 414* in this manual to learn how to use this command.

  Through this command, you will enter the code provided by Spectra Precision after you purchased the option. Entering this code into the receiver will unlock the option.

Enabling or Disabling the External Reference Clock

Using an external reference clock as a frequency pilot for the receiver requires the purchase and installation of the External Reference Clock Input option (P/N 802097).

Use the $PASHS,REF and $PASHQ,REF command to control the use of this input and specify the signal frequency.

Input specifications:

- Signal amplitude: 0.5 to 3 V, peak to peak
- Input impedance: 50 Ω

- Nominal frequency: 5, 10 or 20 MHz
- Permitted deviation around nominal frequency: ± 1 ppm

Decoding an NTRIP Source Table

The NtripCaster maintains a source table containing information on available NtripSources, networks of NtripSources, and NtripCasters, to be sent to an NtripClient on request.

Source-table records are dedicated to one of the following:

- Data STReams (record type STR)
- CASters (record type CAS)
- NETworks of data streams (record type NET)

All data fields in the source-table records are separated using the semicolon character (;), as a field delimiter. When a semicolon is part of the content, it is quoted (“;”)

Source Table Header

```
Server: <NtripCasterIdentifier>/<NtripVersion><CR><LF>
Content-Type: text/plain<CR><LF>
Content-Length: <Content-Length><CR><LF>
<CR><LF>
```

<Content-Length> gives the total size of the source-table records (a decimal number of bytes).

The actual source-table records follow the header fields.

Data STReam Record

Below is an example of a data stream record. The table below describes the syntax used.

STR;BRUS0;Brussels;RTCM2.0;1(1),3(60),16;0;GPS;Misc;BEL;50.80;4.36;0;0;Ashtech UZ-12;none;B;N;500;ROB

Record Parameter	Meaning	Format
STR	Header for “data stream”	3 characters
BRUS0	Caster mountpoint	100 characters max.
Brussels	Source identifier, e.g. name of city next to source location	Undefined number of characters
RTCM2.0	Data format	Undefined number of characters
1(1),3(60)	RTCM message types or raw data format. Update periods in parenthesis, in seconds	Undefined number of characters

Record Parameter	Meaning	Format
0	Data stream contains carrier phase information: 0=No 1=Yes, L1 2=Yes, L1 & L2	Integer: "0", "1" or "2"
GPS	Navigation system(s)	Undefined number of characters
Misc	Header for "miscellaneous information".	3 characters
BEL	Country code in ISO 3166	3 characters
50.80	Station latitude or approximate rover latitude if client requested to send NMEA message (see below)	Floating point number, with two decimal places
4.36	Station longitude or approximate rover longitude if client requested to send NMEA message (see below)	Floating point number, with two decimal places
0	Necessity for client to send NMEA message with approximate position to caster: 0=NMEA message not required 1=NMEA message required	Integer: "0" or "1"
0	Stream generated from single reference station or from networked reference stations: 0=Single base 1=Network	Integer: "0" or "1"
Ashtech UZ-12	Hardware or software generating the data stream.	Undefined number of characters
none	Compression/encryption algorithm applied.	Undefined number of characters
B	Authentication required (access protection): N=None B=Basic D=Digest	1 character: "N", "B" or "D"
N	User fee: N=No user fee Y=Usage is charged	1 character: "Y" or "N"
500	Bit rate (bps)	Integer
ROB	Miscellaneous information	

CASter Record

Below is an example of a caster record. The table below describes the syntax used.

CAS;129.217.182.51;80;EUREF;BKG;0;DEU;51.5;7.5;http://igs.ifag.de/index_ntrip_cast.htm

Record Parameter	Meaning	Format
CAS	Header for "caster"	3 characters
129.217.182.51	Caster Internet host domain name or IP address	128 characters max.

Record Parameter	Meaning	Format
80	Port number	Integer
EUREF	Caster identifier, e.g. name of provider	Undefined number of characters
BKG	Name of institution, agency or company operating the caster	Undefined number of characters
0	Capability of caster to receive NMEA message with approximate position from client: 0=NMEA message not handled 1=NMEA message handled	Integer: “0” or “1”
DEU	Country code in ISO 3166	3 characters
51.5	Station latitude	Floating point number, with two decimal places
7.5	Station longitude	Floating point number, with two decimal places
http://igs.ifag.de/index-_ntrip_cast.htm	Fallback caster IP address No fallback: 0.0.0.0	128 characters max.
	Fallback caster port number	Integer
	Misc Header (for “miscellaneous information”)	3 characters

NETwork Record

Below is an example of a network record. The table below describes the syntax used.

NET;ascos;Ruhrgas AG;B;N;http://www.ascos.de;none;http://igs.ifag.de/root_ftp/software/NtripRegister.doc;none

Record Parameter	Meaning	Format
NET	Header for “network of data streams”	3 characters
ascos	Network identifier, e.g. name of a network of GNSS permanent reference stations	Undefined number of characters
Ruhrgas AG	Name of institution, agency or company operating the network	Undefined number of characters
B	Authentication required (access protection): N=None B=Basic D=Digest	1 character: “N”, “B” or “D”
N	User fee: N=No user fee Y=Usage is charged	1 character: “Y” or “N”
http://www.ascos.de	Web address for stream information	Undefined number of characters
ttp://igs.ifag.de/root_ftp/software/NtripRegister.doc	Web address or mail address for registration	Undefined number of characters

Record Parameter	Meaning	Format
none	Miscellaneous information	Undefined number of characters

Logging Raw Data

Starting/Stopping Raw Data Logging

You simply need to use the Log button to start and stop raw data logging. Later, you will however need to do the following manually:

1. Downloading phase (if appropriate, rename the raw data files collected on each site).
2. Post-processing phase: Manually correct all computed elevations for the antenna height.

By default, raw data is logged to the receiver's internal memory. The Raw Data Logging icon on the General Status screen will start flashing when a raw data file is open for logging.

Downloading Raw Data

Use a USB mass storage device as a transit storage medium to download raw data files from the receiver's internal memory to your office computer.

Important! During a download operation, files are not deleted from the receiver but simply copied to the USB mass storage device.

After downloading the files to this device, connect the USB device to your computer and use your usual browser to copy the files to the project folder.

Using a USB Mass Storage Device

- Connect the USB mass storage device to the receiver via the short USB Host-to-Device cable provided (P/N 702104).

  If raw data files are present in the receiver's internal memory, the following icons will automatically appear on the display screen:

- To confirm the file transfer, press the Log button. The General status screen will re-appear after the file transfer is complete.
- To cancel the file transfer, press the Scroll button.
- If you do not press any button within the next 10 seconds, the download procedure will be canceled automatically and the screen will come back to the previous display.

Using the USB Cable Provided

- Connect the USB cable provided (P/N 702103) between the office computer and the receiver’s USB port. The receiver is then seen as a USB device from the office computer
- Using Windows Explorer on your office computer, browse the receiver’s internal memory for the raw data files.
- Copy/paste the files to your project folder.

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ProFlex™ 800

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