STONEX S700A
GNSS Receiver
User Manual

Contents

Introduction

This document is user guide for S700A and it is intended to introduce how to use the receiver correctly.

S700A GNSS receiver is a multiple-frequency receiver and designed for GNSS surveying applications. It is available as a base station, or as a standalone rover, which can be switched freely whenever and wherever, offering maximum versatility in the system configuration to meet your specific requirements. S700A is the entry level RTK GNSS receiver; it's smaller and lighter than the S900 series and it's available with only L1 GNSS upgradeable to L2+L3. At the same time, S700A receiver can upgrade easily to continually meet your new demand.

The integrated design of the receiver makes the S700A only 1.1 kg, which is light and portable. The internal antenna supports all the satellite systems: GPS, GLONASS, Galileo, Beidou, , QZSS, IRNSS. And users no longer have to worry about upgrading RTK hardware to support other satellite systems.

An important feature inside S700A is Atlas reception: Atlas is a differential corrections systems broadcasted on L-Band, allowing increase in position accuracy in area not covered by conventional CORS working under Ntrip Technology (lack of reference stations, lack of GPRS signals, etc). Atlas is broadcasted by satellite systems, so the reception is nearly ensured all over the world. Atlas uses similar technology compared to SBAS, but providing better positioning accuracy.

Another important feature is the new modem GSM. Worldwide LTE, UMTS/HSPA+ and GSM/GPRS/EDGE coverage Multi-constellation GNSS receiver available for applications requiring fast and accurate fixes in any environment. EG25-G is backward-compatible with existing EDGE and GSM/GPRS networks, ensuring that it can be connected even in remote areas devoid of 4G or 3G coverage.

*Atlas&aRTK features are avalable only with L1+L2 version.

This chapter provides basic information to help you get familiar with your GNSS receiver.

Key Features:

- Rugged housing
- Support full constellation satellites
- 4G LTE and Bluetooth / WLAN datalink support
- Easy configuration from Web UI and remote server.
- Intelligent connection
- IP67

1. Receiver appearance

1.1 Front view

Figure 1.1: Receiver front view

The following table contains the description of the receiver front view.

ITEM	DESCRIPTION
1. Satellite indicator	Off: no satellite tracked Flashing red: satellites tracked but not positioned Flashing green: satellites positioned but not fixed Green: fixed solution Flashing green and red alternately: GNSS board abnormal
2. Datalink indicator	Green: datalink setting succeeds Flashing green: data in normal transmission Red: In static mode Flashing red: in static mode, flashing red according to static sampling interval

3. Wi-Fi indicator	Green: Wi-Fi is enabled Off: Wi-Fi is disabled
4. Bluetooth indicator	Blue: Bluetooth has connected Flashing blue: Bluetooth has connected and has data transmission Off: No connection
5. Power button	Switch on/off the receiver; short press to broadcast current operation mode and status. Green: The power supply is enough Flashing green (1s): power in 10%-20% Flashing red (1s): power＜10% Flashing red (3s): The device is charging

1.2 Bottom view

Figure 1.2: Receiver bottom view

The following table contains the description of the receiver bottom view.

ITEM	DESCRIPTION
1. UHF*	TNC, external UHF antenna connector
2. SIM card slot	Nano SIM card interface
3. 5-pin LEMO	Connect the external power supply and external radio
4. Type-C	Power supply and data transfer

*UHF not available for S700A

2. Web Interface

S700A receiver has Web UI functionality. By getting access to its internal hotspot, you can easily manage it on the Web UI. As long as you have a smart phone, PC or handheld with WIFI functionality, you can easily connect to the S700A receiver to view status, download data and configure the receiver.

S700A receiver is default to open WIFI automatically when it's powered on. Use smart phone/PC/handheld to search the receiver hotspot, whose name is its serial number, and connect it. Receiver WIFI only supports getting access to Web UI to check status and set up mode, not for Internet connection.

The WIFI hotspot name is the serial number of the receiver.

Enter the IP address: 192.168.10.1. A window will pop up when the user log in, which need to fill in the user, that is "admin", and password that is "password".

2.1 Status

The status page displays the current state of S700A receiver, including position information, data link status, satellite charts, and instrumentation information. Click on a module to display its details.

2.2 Settings

The Settings page includes working mode, satellite Settings, device configuration, NMEA messages, view logs, and configuration sets. You can set the host mode, satellite system, system parameters, and NMEA message. And you can view and download the logs as well. Also you could upload, download, delete and apply the related configuration. Click on a module to display its details.

2.2.1 Working mode

You can select different work mode to configure, static, rover and base. In different mode, there are different configuration you can make.

Static Mode

It's possible input the point name, antenna height, PDOP threshold. And the antenna measurement and collect interval. These are all the parameters can be used in static collection.

At last, there are two record options. If you activate auto record, it will collect data automatic when you power on the receiver.

Rover Mode

In rover mode, you can select different datalink. Different datalink also has different options can be edited. The datalink includes Network, External and Bluetooth.

If you select Network, then besides select aRTK timeout and record raw data, the most important is you can input CORS information, such as IP, account.

If you select External, then it can connect to external radio. There is a very important thing, the external serial port band rate, this should be same with external radio.

Then the last it's Bluetooth, after selecting the datalink as Bluetooth, there are little option that you can configure.

Base Mode

Base mode also contains different datalink, most of the parameters are same. The only difference is the base mode has some more options can be edited. For example you can set the base data type, start base and base position and so on.

If you select Network, then besides set the data type, site ID, base position and record raw data, the most important is you can input APN account, APN user and password, connect mode, caster address and port.

2.3 Download

The download page provides downloads of raw data and backup data. Click on a module to display its details.

2.4 Management

In this page, the user can upgrade the firmware, register the device, modify the login password, format the instrument disk, self-check, restore the factory Settings, restart equipment and other operations.

2.4.1 Install new firmware

In the management of the WEB UI page, you can see that "online update", click "browse", select the required to upgrade the firmware, click the "upload document", system will restart to upgrade. After the upgrade, you can view the current "firmware version" on the "instrument information" page.

2.4.2 Device register

The register code consists of 32 digits and letters. You can register the device via WEB UI. The detailed steps are shown as followed.

In management page, you can see "registration". Input register code and click submit, and then registration is done. After registration, you can check the expiration time of current registration in the page.

2.5 Set the language

As you can see, there is language button in the right-up side of WebUI. And the S700A has 7 languages to set up. They are Chinese, English, Korean, Portuguese, Russian, Turkish and Japanese.

3. Basic operation

3.1 Power on receiver

Short-Press the power button, the power indicator will light on and you will hear one beep, then S700A will be powered on.

3.2 Power off receiver

Long press the power button, all indicators interval flashing and the voice prompted "power off". Then short-press the power button to confirm power off.

3.3 Model view and switch

Model view

When receiver is powered on, short press the power button and then it will voice broadcast the current working mode and data link.

Model switch

When the receiver is powered on, connect it with handheld or other instruments so as to set up and switch the working mode of receiver.

3.4 Receiver self-check

Self-check functionality is to check whether every module works normally. When S700A receiver has indicators off or module doesn't work normally, you can use self-check to inspect the receiver. S700A self-check consists of six parts, namely GNSS, network, WIFI and Bluetooth. The self-check results will be voice broadcasted in the process. Self-check operation and result broadcast are as followed:

When receiver is powered on, press power button and hold it until the receiver voice broadcasts "power off". Press it again until the receiver sounds a beep and voice broadcasts "self-check", which means the receiver starts to operate self-check. New receiver is recommended to operate self-check at least once.

In the process of self-check, each module inspection is followed by its inspection result. If the module inspection passes, it will voice broadcast "OK" and module led keeps on until the whole self-check finishes. If the module inspection fails, it will voice broadcast current module inspection fail, keep module led flashing and buzzer sounding until you restart the receiver. Self-check lasts for about 1 minute. If there is self-check failure, please contact local dealer.

If every module indicator is lit with no flashing, and voice broadcast says every module work normally (such as "GPS self-check. OK."), it means all the modules work normally. Receiver starts to work after the whole self-check finishes

3.5 Insert SIM card

If you need to use the SIM card, you should insert the SIM card before you power on the S700A; open the card cover first, then insert the SIM card as the notes in card cover.

4. Accessories

4.1 Carrying case

The external appearance of the transport container is shown in the Figure 4.1.

Figure 4.1: External appearance of container

4.2 Standard accessories

Adaptor

Power adaptor (model: KSA-45P-45W) with 4 plugs (US, UK, AU and EU).

Charging cable

Type C -Type C charging cable (model: CTMM-1.5) 1.5 meter long.

Data cable

Type C -USB cable (model: CUTM-1.5) 1.5 meter long.

5. Technical specification

RECEIVER

Satellite tracked	GPS: L1 C/A, L1C, L1P, L2C, L2P, L5
	GLONASS: G1, G2, G3
	BEIDOU: B1, B2, B3, ACEBOC
	GALILEO: E1, E5a, E5b, ALTBOC, E6
	QZSS: L1 C/A, L1C, L2C, L5, L6
	IRNSS: L5
	SBAS: 3-channel, parallel tracking
L-Band	ATLAS H10 / H30 / Basic
Channels	700
Position rate	5 Hz, optional 20 Hz[5]
Signal reacquisition	< 1 sec
RTK signal initialization	Typically < 10 s
Hot start	Typically < 15 sec
Initialization reliability	> 99.9%
Internal memory	8 Gb

POSITIONING[1]

HIGH PRECISION STATIC SURVEYING	
Horizontal	2.50 mm + 1 ppm RMS
Vertical	5.00 mm + 1 ppm RMS
CODE DIFFERENTIAL POSITIONING	
Horizontal	<0.5 m RMS
Vertical	<1.0 m RMS
SBAS POSITIONING[2]	
Horizontal	<0.6 m RMS
Vertical	<1.2 m RMS
REAL TIME KINEMATIC (< 30 Km) – NETWORK SURVEYING[3]	
Fixed RTK Horizontal	8 mm + 1 ppm RMS
Fixed RTK Vertical	15 mm + 2 ppm RMS

INTEGRATED GNSS ANTENNA

High accuracy four constellation micro-strip antenna, zero phase center, with internal multipath suppressive board

INTERNAL MODEM

GSM integrated	EG25-G
Band	LTE FDD: B1/B2/B3/B4/B5/B7/B8/B12/ B13/B18/B19/B20/B25/B26/B28 LTE TDD: B38/B39/B40/B41 UMTS: B1/B2/B4/B5/B6/B8/B19 GSM: B2/B3/B5/B8 Nano SIM card

COMMUNICATION

I/O connectors	5 pins Lemo, connect the external power supply and external radio Type-C, for receiver power supply and data transfer
Bluetooth	V2.1 + EDR /4.0 LE
Wi-Fi	802.11 b/g
Web UI	To upgrade the software, manage the status and settings, data download, etc. via smart phone, tablet or other internet enabled electronic device
Reference outputs	RTCM 2.3, 3.2 ,CMR, CMR+, ROX
Navigation outputs	NMEA 0183

POWER SUPPLY

Battery	Rechargeable 7.2 V – 6.900 mAh
Voltage	9 to 28 V DC external power input with over-voltage protection (5 pins Lemo)
Working time	Up to 9 hours
Charge time	4 Hours

PHYSICAL SPECIFICATION

Dimensions	140 mm × 140 mm × 71 mm
Weight	1.10 Kg

Operating temperature	30°C to 65°C (-22°F to 149°F)
Storage temperature	-40°C to 80°C (-40°F to 176°F)
Waterproof/ Dustproof	IP67
Shock resistance	Designed to endure to a 2 m pole drop on concrete floor with no damage
Vibration	Vibration resistant

Specifications are subject to change without notice

1.Accuracy and reliability are generally subject to satellite geometry DOPs), multipath, atmospheric conditions and obstructions. In static mode they are subject even to occupation times, the longer is the baseline, the longer must be the occupation time.

2.Depends on SBAS system performance.

3.Network RTK precision depends on the network performances and are referenced to the closest physical base station.

4.Varies with the operating environment and with electromagnetic pollution.

5. Optional, it can be activated via firmware.

Appendix 1: Copyrights, warranty and environmental recycling

Copyrights and trademarks

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Bluetooth is a trademark owned by Bluetooth SIG, Inc. and licensed to Trimble Navigation Limited. All other trademarks are the property of their respective owners.

Release Notice

This is the January 2020 release of the STONEX® S700A GNSS new model receiver user guide.

The following limited warranties give you specific legal rights. You may have others, which vary from state/jurisdiction to state/jurisdiction.

Standard Limited Warranty

Version 2020

The terms and conditions of this Limited Warranty constitute the complete and exclusive warranty agreement between The Customer or Dealer and STONEX® for the Product and supersedes any prior agreement or representation made in any STONEX® sales document or advice that may be provided to Customer by any STONEX® representative in connection with Customer's purchase of the Product. No change to the conditions of this Limited Warranty is valid unless it is made in written form and signed by an authorized STONEX® supervisor.

STONEX® warrants that its Products:

(1) are free from defects in materials or workmanship for generally 1 year (accessories or specific parts for which different limited warranty period shall apply).

(2) have been tested/calibrated in proper working status prior to shipment.

The warranty period starts from date of first sale of the instruments. At its sole discretion, under the warranty period, STONEX® will repair the product or send parts for replacement at its expense. STONEX® agrees to repair or replace the defected instrument within thirty (30) days only if STONEX® Europe recognizes that the defects of the instrument are not caused by human factors or no obvious damage to its surface is visible. STONEX® warrants any new replaced parts or products are warranted to be free from defects in materials and workmanship for thirty (30) days or for the remainder of the Limited Warranty Period of the Product in which they are installed, whichever is longer. Faulty Parts or Products replaced under this Limited Warranty shall become property of STONEX®. All products that have to be repaired have to be returned to our technical representative office location via any delivery company the customer prefers, nevertheless STONEX® is not accountable for the unlikely event that the Products gets lost in transit. Any damage inflicted by the customer or by third party after the products has been delivered to the customer is excluded from the limited warranty as well any damage arising from an improper use, from any action or use not provided for in the enclosed user guides and/or manuals.

Shipping policy

The Customer or the dealer is required to pay for the charges for shipping of fault parts or instruments to STONEX® representative office and STONEX® is providing the shipping for return. Dealers need to follow STONEX® repair/service procedure to achieve a better and prompt service result.

Return policy Dead On Arrival instruments

All returned products have to be shipped to STONEX® representative office.

The original Purchaser has a period of seven (7) days starting from date of purchasing to signal the existence of a defect in the instrument for a full refund (less shipping and handling), provided the merchandise is in new, resalable condition and returned in the original, undamaged packaging.

Customer has to pay for both the return and the original freight fees, regardless of the original freight paid by the Company. All warranty books, instruction manuals, parts and accessories must be included as well as the original box in which the item was shipped. We recommend placing the original carton inside another box, to avoid any additional damage to the carton itself. In some cases, returns of special items will require a re-stock fee. Acceptance of returned merchandise is final only after inspection by STONEX®.

Above terms and policies shall apply as for hardware. Dealers need to follow STONEX® repair/service procedure to achieve a better and prompt service result.

Firmware/Software warranty

Stonex doesn't warrant that operation of Firmware/Software on any instruments will be uninterrupted or error-free, or that functions contained in Firmware/Software will operate to meet your requirements.

Stonex will forward the Software/Firmware Fix to the dealer or customer. Firmware/software Fix means an error correction or other update created to fix a previous firmware version that substantially doesn't conform to the instruments specification.

Over Warranty repair(s) policy

Customer shall pay the standard repair fees for any service (whether part replacement or repairs) and performed by STONEX® under request and explicit authorization of the customer itself. In this case the customer is charged for return shipment's fees as well.

Disclaimer and Limitation of Remedy

All other express and implied warranties for this product, including the implied warranties of merchantability and fitness for a particular purpose and/or non-infringement of any third party's rights, are hereby disclaimed. Stonex® expressly disclaims all warranties not stated in this limited warranty. Any implied warranties that may be imposed by law are limited in duration to the term of this limited warranty. Some jurisdictions do not allow the

exclusion of implied warranties or limitations on how long an implied warranty lasts, so the above exclusions or limitations may not apply to customer. Customer must read and follow all set-up and usage instructions in the applicable user guides and/or manuals enclosed. If customer fails to do so, this product may not function properly and may be damaged. Customer may lose data or sustain personal injuries. Stonex®, its affiliates and suppliers do not warrant that operation of this product will be uninterrupted or error free; as do all electronics at times. If this product fails to work as warranted above, customer's sole and exclusive remedy shall be repair or replacement. In no event will Stonex®, its affiliates or suppliers be liable to customer or any third party for any damage in excess of the purchase price of the product. This limitation applies to damages of any kind whatsoever including (1) damage to, or loss or corruption of, customer's records, programs, data or removable storage media, or (2) any direct or indirect damages, lost profits, lost savings or other special, incidental, exemplary or consequential damages, whether for breach of warranty, contract, tort or otherwise, or whether arising out of the use of or inability to use the product and/or the enclosed user guides and/or manuals, even if Stonex, or an authorized Stonex® representative, authorized service provider or reseller has been advised of the possibility of such damages or of any claim by any other party. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages for some products, so the exclusions or limitations may not apply to customer. This limited warranty gives customer specific legal rights, and customer may also have other rights which vary from country/state/jurisdiction to country/state.

Instruments

One (1) year on STONEX® Products:

GNSS receiver: S700A GNSS Series

Accessories

Accessories and specific parts warranty

For accessories provided by Stonex with the instruments S700A GNSS the following general warranty time is for reference:

Power Adaptor, cables: 2 years.

Environmental recycling

The cardboard box, the plastic in the package and the various parts of this product have to be recycled and disposed of in accordance with the current legislation of your Country.

For countries in the European Union (EU)

The disposal of electric and electronic device as solid urban waste is strictly prohibited: they must be collected separately.

Contact Local Authorities to obtain practical information about correct handling of the waste, location and times of waste collection centre. When you buy a new device of ours, you can give back to our dealer a used similar device.

The dumping of these devices at unequipped or unauthorized places may have hazardous effects on health and environment.

The crossed dustbin symbol means that the device must be taken to authorize collection centres and must be handled separately from solid urban waste.

For countries outside European Union (EU)

The treatment, recycling, collection and disposal of electric and electronic devices may vary in accordance with the laws in force in the Country in question.

Appendix 2: Safety Recommendations

Warnings and Cautions

An absence of specific alerts does not mean that there are no safety risks involved in the use of this equipment.

Always follow the instructions that accompany a Warning or Caution, reported in this.

This information is intended to minimize the risk of personal injury and/or damage to propriety. In particular, observe safety instructions that are presented in the following form:

WARNING - A Warning alerts about risk for health and/or damage to the propriety. A warning identifies the nature of the risk and the extent the possible injury and/or damage. It also describes how to protect yourself and/or the equipment from this risk.

CAUTION - A Caution alerts about a possible risk of damage to the equipment and/or loss of data, but no risk for human safety.

Wireless Module Approval

The receivers use internal wireless modules or can be connected to an external data communications UHF radio. Regulations regarding the use of the radio-modems vary greatly from country to country. In some countries, the unit can be used without obtaining an approval license. Other countries require specific approval or auto certification by the set maker.

Before using this instrument, check if authorization to operate the receiver is required in your country. It is the responsibility of the importer to verify if it is necessary a certification or license for the equipment in the country of use.

Instrument Approval

Covers technical features of the equipment relatives to electromagnetic emissions that can cause interference and disturbances to other instruments (note like emc compatibility) or generate not correct functionalities of the instrument itself. Approval is granted by the manufacturer of the equipment. Some countries have unique technical requirements for operation in particular frequency bands. To comply with those requirements, Stonex srl may modified the equipment to be subjected to grant.

Unauthorized modification of the units voids already got approvals, the warranty time and the operational licenses of the instrument.

Bluetooth/WiFi radio Module

The radiated output power of the internal Bluetooth module of this equipment is far below the FCC and EU radio frequency exposure limits. In any case, be sure to use the equipment with the radio far at least 20 cm from the human body. The Bluetooth module match the guidelines found in radio frequency "safety standards and recommendations "published by Scientific organizations.

Stonex srl therefore believes the internal wireless radio is safe for use by end users. The level of energy emitted is far less than the electromagnetic energy emitted by wireless devices such as UMTS phones. However, the use of Bluetooth/WiFi may be restricted in some special situations or place, like aircraft , hospital ,etc. If you are unsure of existence of restrictions, you should ask for authorization before switching on the Bluetooth radio.

Rechargeable Lithium-ion batteries

These receivers use a rechargeable Lithium-ion battery.

WARNING

- Avoid direct contact with the rechargeable Lithium-ion battery if it appears damage. Battery liquids are corrosive and, and contact with it can result in personal injury or damage to proprieties.

To prevent injury or damage:

– If the battery leaks, avoid contact with the battery fluid.

– If battery fluid gets into your eyes, immediately rinse your eyes with clean water and seek medical attention. Do not rub your eyes!

– If battery fluid gets onto your skin or clothing, immediately use clean water to wash off the battery fluid.

WARNING

- Do not creates damage at the rechargeable Lithium-ion battery.

A damaged battery can cause an explosion, with risk or fire, and can result in personal injury and/or property damage.

To prevent injury or damage:

– Do not use or charge the battery if it appears to be damaged. Signs of damage are discoloration, warping, leaks of liquids.

– Do not expose the battery to fire, high temperature, or direct strong sunlight.

– Do not introduce the battery in water or liquid substance , in general.

– Do not use or store the battery in very hot ambient.

– Do not drop or puncture the battery.

– Do not open the battery and do not put in short-circuit its electrical contacts.