Hemisphere®

A326 AtlasLink™ Smart Antenna

User Guide

Part No. 875-0352-D Rev. A4

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

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

This product complies with the essential requirements and other relevant provisions of Directive 2014/53/EU. The declaration of conformity may be consulted at https://hemispheregnss.com/About-Us/Quality-Commitment.

Notice to Customers

Contact your local dealer for technical assistance. To find the authorized dealer near you:

Hemisphere GNSS
8515 East Anderson Drive, Suite A
Scottsdale, Arizona, US 85255 Phone:
480-348-6380
Fax: 480-270-5070
precision@hgnss.com www.hgnss.com

Technical Support

If you need technical support contact:

Hemisphere GNSS Technical Support
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Scottsdale, Arizona, US 85255 Phone:
480-348-6380
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Documentation Feedback

Hemisphere GNSS is committed to the quality and continuous improvement of our products and services. We urge you to provide Hemisphere GNSS with any feedback regarding this guide by writing to the following email address: docfeedback@hgnss.com.

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Chapter 1: Introducing AtlasLink Smart Antenna

AtlasLink Overview

Hemisphere GNSS' all-new AtlasLink multi-GNSS, multi-frequency smart antenna is preconfigured to receive corrections from Atlas GNSS global correction service.

*AtlasLink was designed from the ground up to excel in challenging environments and is ideal for use in a variety of applications including precision agriculture, machine control, construction, mining, and marine

* Automotive only for Korea.

Note: Throughout the rest of this manual, AtlasLink Smart Antenna is referred to simply as AtlasLink.

Figure 1-1: AtlasLink Smart Antenna

AtlasLink is a versatile smart antenna with a number of first-class features:

- Utilizes Hemisphere's Athena GNSS engine
- Atlas support over L-Band corrections
- Powerful Atlas web UI portal accessed via Wi-Fi
- Internal memory for data logging, download, and upload
- Environment-proven enclosure for the most aggressive user scenarios

Key Features

Key features of AtlasLink include:

- Centimeter-level accuracy using Atlas* or Athena** technology in a rugged, all-in-one enclosure
  **requires subscription **requires activation*
- Improved GNSS performance—particularly with RTK and/or L-Band applications
- Very fast RTK fix and reacquisition times
- Supports WiFi, CAN, NMEA 0183, NMEA 2000*, for communication with external devices
  **requires NMEA certification*
- WiFi® capability for wireless data transfer and receiver user interface
- Wide operating voltage range of 7-32 VDC, providing high transient protection for any power source
- Integrated 2D tilt sensor enables offset corrections

AtlasLink supports a variety of protocols for communicating with navigation systems, data loggers, CAN systems, and other devices.

Parts List

Table 1-1 provides a description, quantity, and part number for each part in your kit.

Table 1-1: AtlasLink parts list

Part	Qty	Part Number
AtlasLink GNSS Smart Antenna	1	804-0138-0
Mounting adapter, 1” to 5/8” Pole Mount Mounting adapter, Flat Mount *Note: Your kit will include one of the above mounting adapters, depending on your order.*	1 1	710-0130-0 710-0129-0
Surface mount template	1	875-0350-0
The following accessory items are available for purchase separately for your AtlasLink.		
Power/data cable (single DB9), 3 m	1	051-0129-002
Power/data cable (unterminated), 4.6 m	1	051-0169-000
Radio cable, 2 m	1	051-0313-000

Product Support

If you have questions regarding the setup, configuration, or operation of AtlasLink, contact your local dealer. For additional support information see “Technical Support” on page ii (just before the Contents page).

Chapter 2: Installing AtlasLink

Display, Mounting, and Connector

LED Display

Mounting AtlasLink

Selecting the Proper Antenna Location

Routing and Securing the Cables

Mounting Options

Powering AtlasLink

Connecting to AtlasLink Web UI

Display, Mounting, and Connector

All connections and ports are located on the bottom of the unit, as shown in Figure 2-1. Table 2-1 provides additional information about each port/connection.

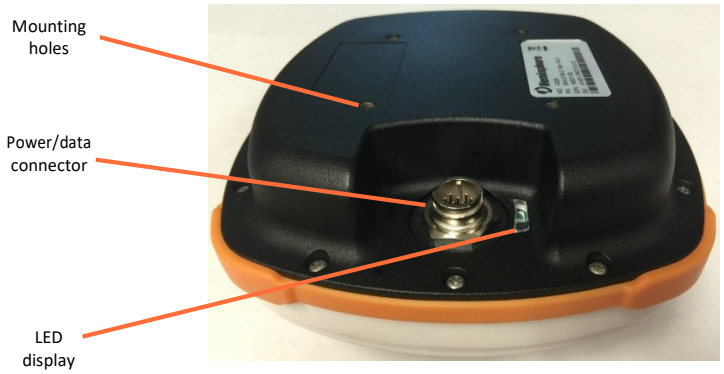


Figure 2-1: AtlasLink

Table 2-1: AtlasLink ports and connections

Port/Connection	Description
Mounting holes	Four off-set mounting holes. Two adapters are available, the first includes a marine 1” standard, adaptable to 5/8”. The second allows for flush mounting the unit.
Power, data port (12-pin)	External power/data cable; allows you to supply power to AtlasLink as well as communicate with external devices via CAN, NMEA 0183 serial, and binary

LED Display

AtlasLink uses a single LED (see Figure 2-1) that provides system information based on the color of the LED as follows:

- Blinking Red - Power on
- Blinking Amber - GNSS position available, including RTK float and Atlas
- Blinking Green - RTK-fixed or Atlas-converged position available
- Blinking any color – Receiver operational

⚠WARNING: If at any time the LED turns to a solid color for an extended period of time, the receiver has malfunctioned

Mounting AtlasLink

This section provides information on where to mount your antenna and the different mounting options available.

Selecting the Proper Antenna Location

Proper antenna placement is critical to positioning accuracy. To select the proper antenna location:

- **Place the antenna with an unobstructed view of the sky.** An obstructed view of the sky may impair system performance. The GNSS engine computes a position based on measurements from each satellite to the internal GNSS receiver.
- **Mount the antenna on, or as close as possible to, the center of your point of measurement.** For example, ideal antenna placement on a vehicle is the center of the cab roof, assuming there is a clear view of the sky.
- **Position the antenna as high as possible.**

Routing and Securing the Cables

Consider the following when routing cables:

- Power/data cable must reach an appropriate power source
- Power/data cable may connect to a data storage device, computer, or other device that accepts GNSS data
- Do not run cables in areas of excessive heat
- Do not expose cables to corrosive chemicals
- Do not crimp or excessively bend cables
- Do not place tension on cables
- Coil up excess cable in the cab of the vehicle or near the antenna
- Secure along the cable route using plastic tie wraps as necessary
- Do not run cables near high voltage or strong RF noise and transmitter sources

⚠WARNING: Improperly installed cables near machinery may cause injury or death.

Mounting Options

AtlasLink allows for the following mounting options:

- Surface mount
- Pole mount

Surface Mount

You can surface-mount AtlasLink with four machine screws (no. 8-32).

Top

Bottom

To surface-mount AtlasLink:

1. Determine the desired location for AtlasLink (see “Selecting the Proper Antenna Location” on page 7).
2. A template of the bottom portion of the AtlasLink surface-mount has been provided to you within the included AtlasLink accessories. Use the outer four holes per your installation.
3. Place the AtlasLink surface mount template on the desired mounting location. (Note: Center hole aligns with antenna's center for measurements.)
4. Use a center punch to mark the hole centers.
5. Drill the mounting holes with a drill bit appropriate for the surface. Suggested imperial drill bit size is 11/64” (close fit) or 6/32” (free fit). Suggested metric drill bit size is drill wire gauge size 17 (close fit, ~4.4mm) or 16 (free fit, ~4.5mm).
6. Use four machine screws (no. 8-32) to attach AtlasLink to the surface mount adapter before securing the complete unit to the intended area.
7. Place AtlasLink surface mount over the mounting holes and insert the mounting screws through the bottom of the mounting surface into AtlasLink surface mount adapter.

⚠WARNING: Hand tighten only. Damage resulting from over-tightening is not covered by the warranty.

Pole Mount

The center thread on the bottom of AtlasLink is 1.” The mounting assembly included with AtlasLink includes an 5/8” adapter compatible with common survey poles. Simply thread the riser/pole into the antenna until snug.

⚠WARNING: Hand tighten only. Damage resulting from over-tightening is not covered by the warranty.

Powering AtlasLink

Power Considerations

AtlasLink accepts an input voltage of 7-32 VDC. For best performance use a clean and continuous power supply. When applying 12 VDC, AtlasLink will draws approximately
4.9 W.

Note: Korea: 12 VDC input voltage is required.

Connecting to a Power Source

AtlasLink uses a single cable for power and data input/output.

Note: A power/data cable is not supplied with AtlasLink but is available as an accessory item. See Table 1-1 on page 4 for a list of accessory items. The following information refers to using the accessory item cables available from Hemisphere GNSS.

The antenna end of the cable is terminated with an environmentally-sealed 12-pin connector and the opposite end is either DB9 or unterminated (requires field stripping and tinning).

To power AtlasLink:

- Connect AtlasLink to a 12 VDC source. Selecting the right power connector will depend on your specific installation requirements.

⚠WARNING: Do not apply a voltage higher than 32 VDC. This will damage the receiver and void the warranty.

AtlasLink features reverse polarity protection to prevent excessive damage if the power leads are accidentally reversed. With the application of power, AtlasLink automatically proceeds through an internal startup sequence; however, it is ready to communicate immediately.

Power/Data Connector

Figure 2-1 shows the 12-pin power/data connector pin-out assignment and Table 2-2 provides the pin-out specifications.

Note: *The Wire Color column in Table 2-2 refers to the color of the wires at the unterminated end of accessory item 051-0169-000 (4.6 m unterminated power/data cable).*

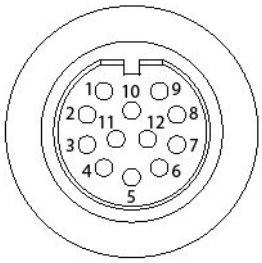


Figure 2-2: Pin out assignments

Table 2-2: Pin out Specifications

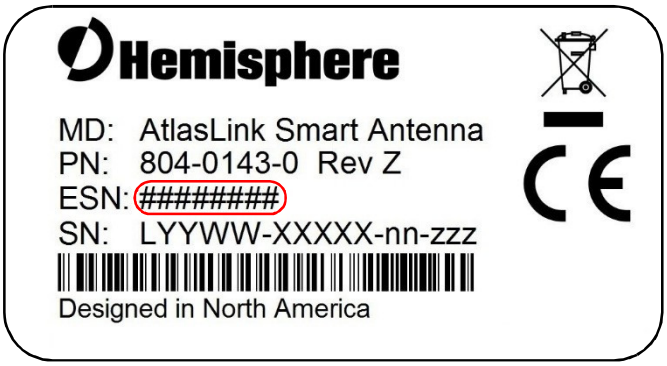
Pin	Description	Wire Color
1	Manual mark in	White
2	Port B TX	Brown
3	Port B Rx	Blue
4	CAN high	Orange
5	Signal ground	Yellow
6	Port A TX	Violet
7	1 PPS	Gray
8	Port A Rx	Pink
9	CAN low	Tan
10	Power in (12 V)	Red
11	Power ground	Black
12	Speed out	Green

Note: For successful communication, the baud rate of the AtlasLink serial ports (Port A and Port B) must be set to match that of the devices to which they are connected.

Connecting to AtlasLink Web UI

In order to access the AtlasLink smart antenna's web UI, you must connect to its WiFi access point using a computer, tablet, or phone. By default, the access point will be named "atlaslink_########" where ######## is replaced by the ESN (Electronic Serial Number) of your unit. The default password for accessing it is "hgnss1234."

You can find your AtlasLink smart antenna's ESN on a label on its base (see below).



Once connected to the access point, the web UI may be accessed using a web browser pointed to the URLs http://atlaslink or http://192.168.100.1. Both will load a web page similar to the following screenshot, with various menu options to access features of the user interface.

The default WiFi settings mentioned above can be changed (see the "Configuration – WiFi" section), and we recommend you change this password from the default one at your earliest convenience.

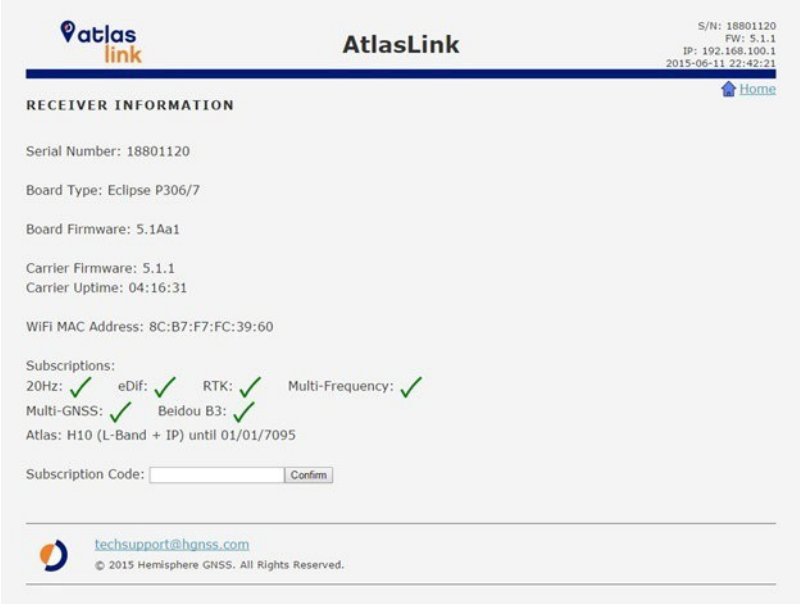
AtlasLink Web UI Pages

From the Main Menu pictured above, you can access the various pages of the user interface. On each page you can click the “Home” button in the top-right corner to return to the main menu, or use the usual back/forward navigation in your web browser.

Status Pages

Status - Receiver Information

The Receiver Information page can be accessed from the “RX Info” subheading of the main menu, under “Status”. This page shows some general information about the GNSS receiver such as serial number, firmware versions, how long the smart antenna has been running, and subscription information.



In addition, you can also give the receiver new subscription codes from this menu. Once you receive a subscription code from Hemisphere, you can copy and paste it into the subscription code field in the web UI, then click the “Confirm” button. The page will reload with the new subscription information shown. If the subscription information is not updated immediately after the page reloads, the subscription code may have been entered incorrectly or is an invalid code.

Status – Position

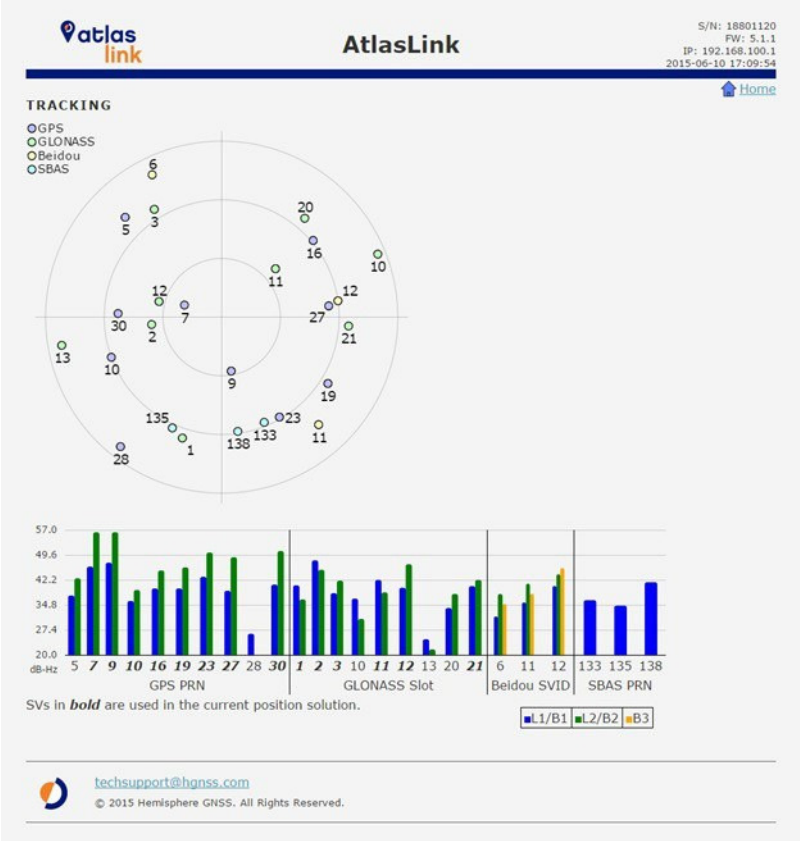
The Position Information page can be accessed from the “Position” subheading of the main menu, under “Status”.

This page shows the smart antenna’s current position as well as other information such as the accuracy, solution type, and age of differential.

Status – Tracking

The Tracking page can be accessed from the “Tracking” subheading of the main menu, under “Status.”

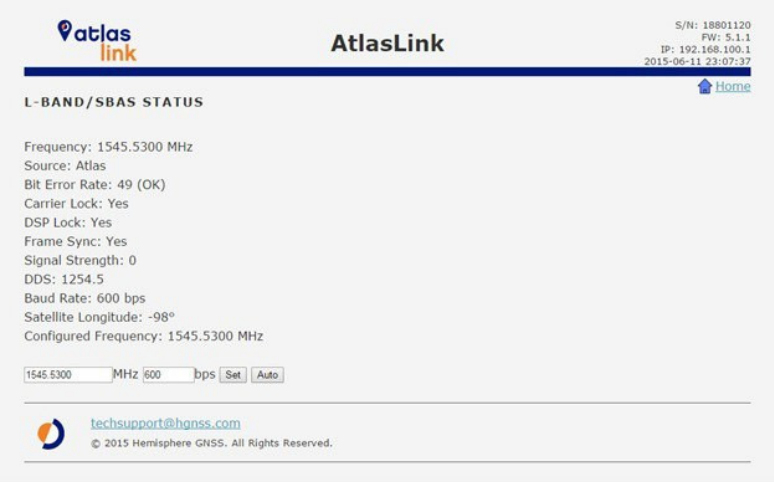
This page shows a summary of all the satellites currently being tracked, in both the form of a sky plot (the circles represent 0, 30, and 60 degree elevations) and a table showing the signal strength of each signal. Satellites which are used in the current position solution are indicated in bold and italics in the table.



Status – L-Band/SBAS

The L-Band/SBAS Status page can be accessed from the “L-Band/SBAS” subheading of the main menu, under “Status”.

This page shows diagnostic information about the tracking of the Atlas L-Band or SBAS signal. Please avoid setting the frequency or baud rate without ensuring you have the correct information. If you don’t have that information, please contact Hemisphere. To reset the L-Band configuration to “automatic mode,” press the “Auto” button. In this mode, the receiver will automatically select the correct Atlas L-Band frequency for the current location.



Receiver Mode Pages

The receiver mode can be changed via the main menu, by selecting the radio button to the left of the desired mode.

When you've changed the selected mode, a "Change Mode" button will appear as shown below. The mode of the receiver will change once the user confirms the new selection by clicking this button.

Receiver Mode – Rover

The Rover Configuration page can be accessed from the “Rover” subheading of the main menu, under “Receiver Mode”.

The “Maximum Differential Age” option controls the number of seconds after which the receiver will stop using a differential source once corrections are no longer being received.

Receiver Mode – BaseLink

The BaseLink configuration page can be accessed from the “BaseLink” subheading of the main menu, under “Receiver Mode.”

The BaseLink receiver mode is where you can configure the receiver to start outputting RTK base station corrections data via a serial port, once a specified reference station position accuracy has been reached using Atlas corrections. Note, this mode should only be used when the AtlasLink smart antenna is at a fixed location. Because it relies on Atlas corrections, this feature requires an Atlas subscription.

In order to use BaseLink, configure the correction output format and baud rate desired, the target accuracy level (in 3D 2-sigma), and click the “Save” button.

The receiver will then begin to show information below the form indicating the current BaseLink status. It will only begin outputting corrections once the target accuracy level that you specified has been reached. Note that if you did not specify any correction formats, the “Outputting Corrections” will say “No” even if the target accuracy has been reached.

Receiver Mode – SmartLink

The SmartLink configuration page can be accessed from the “SmartLink” subheading of the main menu, under “Receiver Mode.”

The SmartLink receiver mode allows another GNSS receiver capable of using external open-standard corrections to benefit from the Atlas correction service. The AtlasLink smart antenna may be moving during operation while in this mode and is generally intended for cases such as mounting on the same vehicle or location as the other GNSS receiver. Because it relies on Atlas corrections, this feature requires an Atlas subscription.

In order to use SmartLink, configure the correction output format and baud rate desired, the target accuracy level (in 2D 1-sigma), and click the “Save” button.

The receiver will then begin to show information below the form indicating the current SmartLink status. It will only begin outputting corrections once the target accuracy level that you specified has been reached. Note that if you did not specify any correction formats, the “Outputting Corrections” will say “No” even if the target accuracy has been reached.

Configuration Pages

Configuration – Device Name

The Device Name configuration page can be accessed from the “Device Name” subheading of the main menu, under “Configuration”.

This menu is used to rename the device. The customized device name can be shown on the heading at the top of the web UI. If you have multiple AtlasLink smart antennas, you may wish to use this to make it easier to identify each receiver when using the web UI.

Configuration – General

The General Configuration page can be accessed from the “General” subheading of the main menu, under “Configuration.”

This page is used for configuring GNSS receiver settings which apply to all modes.

Configuration – WiFi

The WiFi Configuration page can accessed from the “WiFi” subheading of the main menu under “Configuration”.

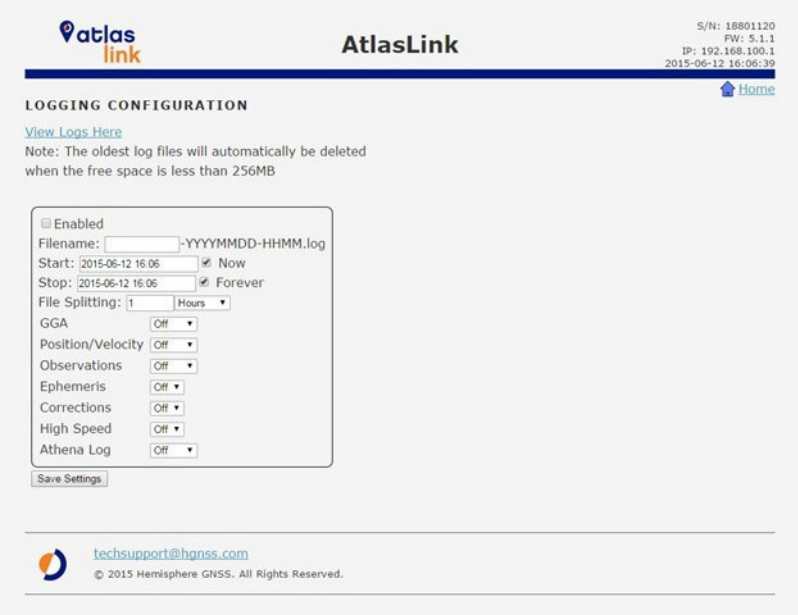
This configuration page is used to change the setting for the smart antenna’s WiFi support. From this menu the access point’s name, and security settings can be changed.

We recommend you change the default password (encryption key). Make sure you remember the password, because you can only recover from a forgotten password by physically connecting to the smart antenna via a serial port. In this event, please contact Hemisphere technical support for details.

Configuration – Logging

The Logging Configuration page can be accessed from the “Logging” subheading of the main menu under “Configuration”. This page can be used to configure the AtlasLink smart antenna’s built-in data-logging support.

You can set a prefix for the log filename, a start and stop time (in UTC) for the logging session, a duration after which to split the log file, and the list of messages that will be logged. Be sure to select the “enabled” check box before saving settings, to ensure logging is enabled. If you later uncheck “enabled” and click “Save Changes” it will pause the logging session. More details are described below.



The “Start” and “Stop” options define a time logging will not start until, and a time after which logging will automatically stop. Like noted above, these times are in UTC. If “Now” is checked, then the time in the “Start” text box will be ignored and logging will begin immediately. If “Forever” is checked, the time in the “Stop” text box will be ignored and logging will not automatically end. Note, the logging will only begin at the specified time if the “Enabled” check box is first checked.

The “File Splitting” option allows you to specify duration after which a new log file should be started. Note that the duration is always relative to when each file was opened, so file splits are not relative to any specific time system. Also note that no logged messages are missed when switching log files, and when ephemeris logging is enabled, every file will begin with the most recent ephemeris data.

The GGA logging option specifies whether $GPGGA messages will be logged, and at what rate.

The Position/Velocity option specifies whether the binary messages for position and velocity will be logged, and at what rate.

The Observations option specifies whether the binary messages for observations will be logged, and at what rate.

The Ephemeris option specifies whether satellite ephemeris binary messages are logged.

The Corrections option specifies whether messages containing correction information (i.e. Atlas, RTK, SBAS) will be logged.

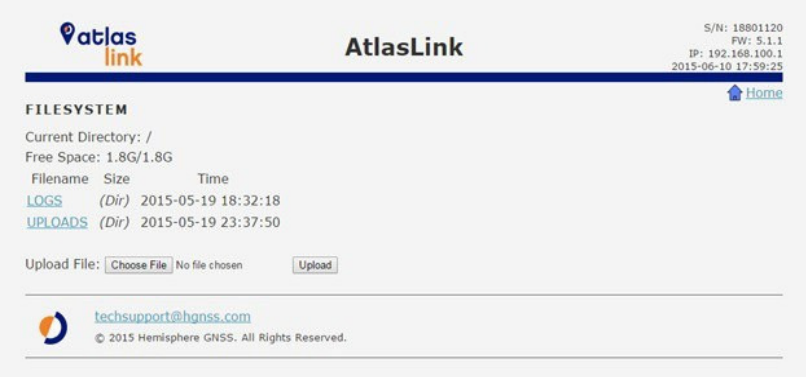
The “High Speed” option activates special diagnostic log messages and should not be used unless instructed to by Hemisphere support.

The “Athena Log” option activates a pre-set combination of logging options which are recommended for providing diagnostic information to Hemisphere. A rate of 1Hz is normally suitable.

Filesystem

The Filesystem menu can be accessed from the “Filesystem” heading of the main menu.

From this menu you can access log files from the logging system, and also upload firmware updates to the device.



Once uploaded, firmware updates to either the AtlasLink carrier board or to the GNSS board may be applied using links shown to the right of the uploaded file.

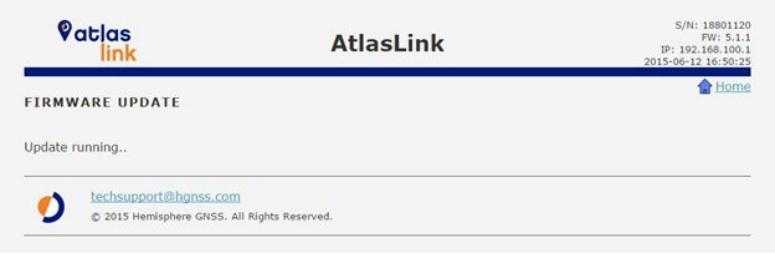
Firmware Update

As indicated in the above section, firmware update capability can be accessed by going to the "Filesystem" page and uploading new firmware to the device.

When loading GNSS firmware, after uploading the file, click the "Load GNSS FW" button to begin the process, after which you should see a series of pages like the following:

Once the Firmware Update page looks like the last page shown above, the GNSS firmware update process is complete.

When upgrading the carrier board firmware, after uploading the file click the "Update Carrier FW" link to begin the process, after which you should see a series of pages like the following.



Reboot

The web browser will remain at the “Reboot” page shown above until the device you are using to view the web UI reestablishes communication with the AtlasLink smart antenna, after which you will be sent directly to the main menu.

Chapter 3: Troubleshooting

Table 3-1 provides a list of issues with possible solutions to help you troubleshoot anomalous AtlasLink operation.

Table 3-1: Troubleshooting

Issue	Possible Solution
Receiver fails to power	• Verify polarity of power leads • Check 1.0A in-line power cable fuse connection (only if the cable has a built-in fuse) • Check integrity of power cable connections • Check power input voltage (7 - 32VDC) • Check current restrictions imposed by power source (maximum is 500 mA at 12 VDC)
No data from the AtlasLink • (1) No communication • (2) No valid data	• (1) Check receiver power status • (2) Verify it is locked to a valid DGNSS signal • (2) Verify it is locked to 4 or more GNSS satellites • (2) Check integrity and connectivity of power and data cable connections • Verify the baud rate settings match • If trying to connect over WiFi, ensure the unit is powered properly and recognized by pairing device. You can check connectivity by going to the web UI, http://atlaslink or http:// 192.168.100.1
Random binary data from AtlasLink	• Verify the RCTM or the BIN messages are not being accidentally output • Verify the baud rate settings match • Potentially, the volume of data requested to be output could be higher than the current baud rate supports. Try either using a higher baud rate for communications or decreasing the number of messages and/or baud rates
No GNSS lock	• Check the integrity of the antenna's power/data cable • Verify the antenna's view of the sky • Verify the lock status and signal-to-noise ratio (SNR) of GNSS satellites
No GNSS position	• Verify the antenna's view of the sky, especially toward GNSS satellites • Set the satellite selection to automatic mode
Non-DGNSS output	• If using RTK, ensure the receiver is properly authorized for RTK by using the web UI.(See page 14, Status – Receiver Information)
AtlasLink LED not blinking after connection to power	• Check to see if the power supply is functioning properly • Ensure cable is completely seated and secured to the AtlasLink connector

Table 3-1: Troubleshooting (*continued)*

Issue	Possible Solution
AtlasLink LED displays solid color (not blinking)	• Power-cycle the receiver • Contact Technical Support (See page ii for contact information)
Not able to connect to AtlasLink via WiFi	• Check firewalls on your device • Power-cycle the receiver
Web UI appears frozen	• Refresh the URL page • Close browser and start a new session • power-cycle the unit

Chapter 4: Technical Specifications

Table 4-1 through Table 4-7 provide the GNSS sensor, horizontal accuracy, L-Band sensor, communication, power, environmental, and mechanical specifications for the AtlasLink.

Table 4-1: GNSS sensor specifications

Item	Specification
Receiver type	GNSS L1 & L2 RTK with carrier phase
Signals received	GNSS, GLONASS, BeiDou, GALILEO[1] and Atlas
Channels	372
GNSS sensitivity	-142 dBm
SBAS tracking	3-channel, parallel tracking
Update rate	10 Hz standard, 20 Hz optional (with subscription)
Pitch/roll accuracy	1º using tilt sensor
Timing (1PPS) accuracy:	20 ns
Cold start	< 60 s typical (no almanac or RTC)
Warm start	< 30 s typical (almanac and RTC)
Hot start	< 5 s typical (almanac, RTC, and position)
Maximum speed	1,850 kph (999 kts)
Maximum altitude	18,288 m (60,000 ft)

Table 4-2: Horizontal accuracy

Item	Specification	
	RMS (67%)	2DRMS (95%)
RTK[2,3]	10 mm+1 ppm	20 mm+2 ppm
L-band[2,4]	0.04 m	0.08 m
SBAS (WAAS)[2]	0.3 m	0.6 m
Autonomous, no SA[2]	1.2 m	2.5 m

Table 4-3: L-band Sensor specifications

Item	Specification
Receiver Type	Single Channel
Channels	1530 to 1560 MHz
Sensitivity	-130 dBm
Channel spacing	5.0 kHz
Satellite selection	Manual and Automatic
Reacquisition time	15 seconds (typical)

Table 4-4: Communication specifications

Item	Specification
Ports	Wi-Fi, CAN, 2 full-duplex RS-232

Table 4-4: Communication specifications (*continued)*

Item	Specification
Baud rates	4800 - 115200
Data I/O protocol	NMEA 0183, NMEA 2000*, Hemisphere GNSS binary, **requires NMEA certification*
Bluetooth	Yes. Bluetooth 2.0 (Class 2)[1]
Wi-Fi	Yes
Web UI	Yes. Http://atlaslink (available when connected via WiFi to the AtlasLink receiver)
Correction I/O protocol	Hemisphere GNSS proprietary, RTCM v2.3 (DGNSS), RTCM v3 (RTK), CMR (RTK), CMR+ (RTK)[5]
Timing output	1 PPS CMOS, active high, rising edge sync, 10 kΩ, 10 pF load
Event marker input	CMOS, active low, falling edge sync, 10 kΩ, 10 pF load
Memory (Internal)	2GB (non volatile)

Table 4-5: Power specifications

Item	Specification
Input voltage	7- 32 VDC with reverse polarity operation
Power consumption	< 5.4 W nominal GNSS (L1/L2), GLONASS (L1/L2), BeiDou (B1/ B2/B3) and L-band
Current consumption	0.39 A nominal GNSS (L1/L2), GLONASS (L1/L2), BeiDou (B1/ B2/B3) and L-band
Power isolation	No
Reverse polarity protection	Yes
Antenna voltage	Internal antenna

Table 4-6: Environmental specifications

Item	Specification
Operating temperature	-40° C to +70° C (-40° F to +158° F)
Storage temperature	-40° C to +85° C (-40° F to +185° F)
Humidity	95% non-condensing
Shock and Vibration	Mechanical Shock: EP455 Section 5.14.1 Operational Vibration: EP455 Section 5.15.1 Random
EMC	CE (ISO 14982 Emissions and Immunity), FCC Part 15, Subpart B, CISPR 22
Enclosure	IP67

Table 4-7: Mechanical specifications

Item	Specification
Dimensions	15.8 L x 15.8 W x 7.9 H (cm) 6.2 L x 6.2 W x 3.2 H (in)

Table 4-7: Mechanical specifications (*continued)*

Item	Specification
Weight	<1.15 kg (<2.53 lbs)
Status indicators (LED)	• Blinking Red - Poweron • Blinking Amber - GNSS position available, includingRTK float and Atlas • Blinking Green - RTK-fixed or Atlas-converged position available • Blinking any color - Receiveroperational
Serial port extension	Wi-Fi communication
Power/data connector	12-pin male (metal)
Antenna mounting	1-14 UNS-2A female, 5/8-11 UNC-2B adapter, and surface mount available

[1] Upgrade required

[2] Depends on multipath environment, number of satellites in view, satellite geometry and ionospheric activity

[3] Depends also on baseline length

[4] Requires a subscription for Atlas

[5] Receive only, does not transmit this format

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