



**Satlab SLC Sensor  
The Ultimate Expandable Handheld  
User Manual V1.1**



**2018**

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### **User Manual Revision**

#### **SATLAB SLC GNSS RECEIVER**

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## Chapter

# 1

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Foreword  
What is Satlab SLC Sensor?  
Use and Precautions

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## Foreword

### Introduction

The SatLab SLC product is a multi-purpose, surveying grade GNSS receiver with industrial modem for internet and one button operation. This manual will explain how to install and operate the receiver.

### Recommendation

For you to make better use of the SatLab SLC receiver, SatLab recommends that you read this manual carefully. If you still need further information please visit SatLab's official website: [www.satlabgps.com](http://www.satlabgps.com)



#### **Safety Tips**

Note: The Note contents is for the general operation of the receiver which requires special attention, please read carefully.



Warning: The warning content will generally provide very important information. If the receiver is not operated in accordance with the warnings, it could cause damage, loss of data, or even endanger your personal safety.

### Limitation of Liability

Before use, please be sure to read the instruction manual, which will help you make better use of this product. If you do not follow instructions when operating the receiver, or fail to understand the requirements of the specification and the proper use of this product, any resulting loss or damages resulting from the misuse are limited to the terms of SatLab's International Warranty 'Limitation of Liability' clause.

SatLab is committed to continuous improvement of product functionality and performance, and accordingly reserves the right to make changes to the product and contents of this manual without prior notice.

We have reviewed the contents of this publication in conjunction with the hardware and software to ensure consistency, however, this does not exclude the possibility of errors. The User's Guide is for reference only, if it deviates from the actual product then the actual product version prevails.

### Your suggestions

If you have any suggestions and comments relating to the SatLab SLC receiver, please contact us through email at [info@satlabgps.com](mailto:info@satlabgps.com)

Your feedback on the quality of our products will be greatly appreciated.

## What is Satlab SLC Sensor?

The SatLab SLC GNSS sensor is a multi-purpose, surveying grade GNSS receiver with industrial modem for internet and one button operation. Its unique design allows to easily attach PC tablets or smartphones on the top of the unit using the supplied attachment plates.

SLC GNSS sensor includes 2 mounting plates to attach your tablet computer, running any surveying, mapping or GIS application accepting NMEA format of messages, or “mock” GNSS position. Its industrial grade 3.5G modem applies available RTK corrections to provide cm accuracy. The USB/RS232 serial connection allows for external power, UHF radio connection or wired connection to a display.

SLC utilizes a Novatel GNSS OEM board with all options enabled. The GNSS board can be controlled through the RS232 Serial Port or Bluetooth for custom applications. The SLC tracks multi constellation satellites as well as SBAS satellites. The SLC is ready to use RTK corrections from NTRIP casters and proprietary *Satlab InternetRTK* servers. SLC contains a convenient internal full constellation dual frequency tracking antenna for centimetre accuracies in your hand. For even greater precision, an external geodetic antenna kit and pole mount option is available.



Note: This manual does not represent the standard configuration; the inside information can be adjusted according to different user needs. Before using this receiver, we recommend that you check the product packaging is not damaged; please carefully open the box to confirm whether the items inside the box matches the bill of materials; if you find the product and its accessories have any lost items or damaged parts, immediately contact the local SatLab office or distributor. Please also read the instructions carefully before handling and use.

### Features

#### 1. Supports all major operating systems

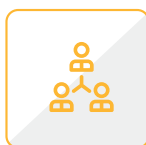


Any software running on Windows, Android or iOS accepting GNSS position over a serial port (Direct or over Bluetooth) can be used. This makes SLC the high precision positioning solution to virtually unlimited number of applications. Satlab’s SLC Toolbox software running on different operation systems allows an easy configuration of the unit. Precise positioning information coming from GNSS sensor can be used in numerous fields of industry from land surveying, high accuracy GIS, web based facility management and precise farming over to hydrography, geophysics or aeronautics.



#### 2. Supports all available GNSS signal reception

With 120 parallel receiving channels, the receiver tracks GPS, GLONASS, BDS, GALILEO, QZSS and SBAS positioning systems and can maximize the tracking to observe all visible GNSS satellite signals, thereby providing maximum performance for accuracy and real-time measurements.



#### 3. Multi-purpose Capability

SatLab SLC has the ability to perform multiple tasks. It can be used as GNSS rover or reference station for RTK survey and it has also capacity to store raw data for post processing. With optional remote antenna and pole or fixed mount accessories, the SLC can be configured as a sensor for machine control applications.

**4. Internal memory**

32 GB built-in, high-performance storage allows to store raw data which can be used for post processing applications.

**5. High-precision measurement technology**

With high performance precision GNSS measurement techniques and algorithms, centimetre-level accuracy with the highest levels of quality assurance is obtained. RTK initialization time is 10 seconds in typical surveying conditions. For highest accuracy SatLab recommends usage of external antenna on the pole.

**6. Excellent compatibility**

Real-time compatibility is easily achieved with available output of RTCM, RTCMV2.1, 2.3, 3.0, 3.1, 3.2, and RTCA other formats of differential data. The receiver is easily integrated into existing CORS networks, but can also output high precision GNSS data in real time for simple single base operation.

**7. Interface options**

Equipped with mini USB charging and interface port, RS232 serial, integrated Bluetooth communications interface, a 3,5G modem, the receiver can simply interface PC tablets or smartphones. RF port is ready to connect with external geodetic antenna.

**8. High autonomy on internal battery**

The built-in large capacity non-removable lithium allows terrain working up to 12 hours depending on the working mode and environmental conditions. Your PC or tablet can serve also as charging unit. Charging time is around 6 hours.

## Use and Precautions



Although SatLab SLC GNSS receiver is built according to high standards for outside use in harsh environmental conditions, it is a sophisticated instrument and needs careful use and maintenance. It is desirable if possible to maintain a dry environment. And in order to improve the stability and prolong the life of the receiver, avoid exposure to extreme environments, such as:

- 1- Water: unit is IP67 water/dustproof, but should not be intentionally immersed into water
- 2- Temperature above 65 degrees Celsius
- 3- Temperatures lower than -40 degrees Celsius
- 4- Corrosive liquids or gases



Avoid the GNSS antenna being placed near sources of electricity or strong interference signals:

- 1- Television and computer monitors
- 2- Generator's
- 3- Electric motors
- 4- DC - AC power conversion equipment and power switches

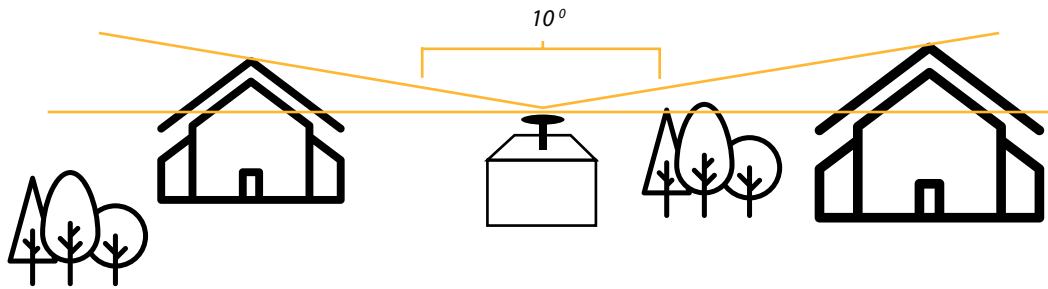


Figure 1-1

When selecting the GNSS receiver's antenna position for Base operations, pay attention to the following matters: The site should be chosen for easy access and should be clear of obstructions. Field of view of around 10 degrees or lower in height should be clear of obstacles to avoid blockage of the GNSS signals, shown in Figure 1-1:

- 1- Site should not have large areas of water or objects that can cause signal reflection, so as to reduce the impact of multipath effects.
- 2- The site should if possible be located at least 200m away from high-power radio emission sources (such as television, microwave stations, etc.); and at least 50m away from high voltage power lines in order to avoid electromagnetic interference to GNSS signals.
- 3- Antenna should be mounted so that it is stable and will not move.
- 4- Ensure there is a reliable and stable power supply and communication network available.
- 5- Receiver should be installed in a secure environment for the protection of GNSS reference station equipment.
- 6- Install in a developed area with easy access to check and maintain.

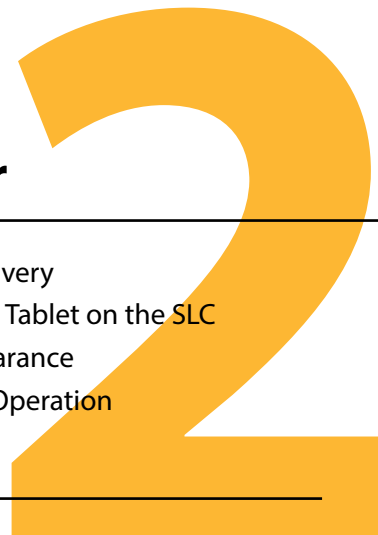


## Chapter

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Content of Delivery  
Mounting your Tablet on the SLC  
Receiver Appearance  
Single Button Operation  
LED Status

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## Content of Delivery

This chapter describes the content of SLC delivery. The unit is delivered in a compact black soft case, practical for carrying the receiver, even with an added tablet or smartphone.



Note: Satlab Geosolutions does not deliver any tablets or smartphones to work with SLC unit. We recommend to select a light compact device, sufficiently rugged for out door use. The SLC unit will be clicked on the backside of your tablet, so ideally select a tablet with a detachable protective case.

There are two different configurations of SLC:

- PN 400-102 Satlab SLC Rover with GSM**
- PN 400-101 Satlab SLC Rover with GSM and External Antenna Kit**

**The PN 400-102 contains following parts:**



- 1- SatLab SLC Receiver**
  - 2- Carrying Soft Case**
  - 3- Charger: 5 V DC 1 A**
  - 4- USB to mini USB cable: to connect with charger or USB connector on PC**
  - 5- USB Serial cable**
  - 6- Screw driver to screw/unscrew the SIM card protection plug**
  - 7- Large plate to mount SLC on a tablet PC: 2 large plates are part of shipment**
  - 8- Small plate to mount SLC on a smartphone: 2 small plates are part of shipment**
  - 9- Adhesive stickers to attach mounting plate to backside of tablet PC or smartphone**
- Optional accessory for the SLC working using the internal SLC antenna is a short pole mounting kit enabling accurate positioning of the phase centre of internal antenna above the surveyed point.

The **PN 400-101** contains, in addition to above parts:  
**10-** Geodetic antenna  
**11-** Geodetic antenna cable  
**12-** Geodetic 2m antenna pole consisting of two parts  
**13-** Pole mount and bracket for SLC (not pictured)



Figure 2-3



Figure 2-2

## Mounting Your Tablet On Top of SLC

SLC is designed to mount light tablets and smartphones on the top of the unit. Mounting plates of two different sizes and adhesive stickers are used to attach the plate to the backside of tablet or smartphone. Attaching the tablet to the SLC is then performed by aligning the mounting plate with the four notches on the top of the SLC unit then pressing and sliding downwards to click into place.

Figure 2-4 shows how the mounting plate is attached on the backside of Samsung Galaxy tablet with protective case, and how the tablet is then clicked into place on the SLC.



Figure 2-4

This is how the SLC typically looks with attached Samsung tablet or with a smartphone:



Figure 2-5

## Receiver Appearance

The receiver forms a compact body. All electronics - GNSS board, internal GNSS antenna, battery, GSM modem, BlueTooth – are integrated inside a waterproof casing.



### Bottom View

The bottom part of the receiver contains two protected slots.

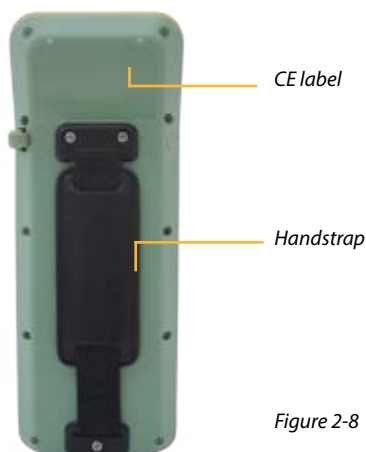
1-MiniUSB

2-SIM card slot: Allows inserting mini SIM card for 3.5 wireless network communications;



### Rear View

The rear panel includes the CE label informing about IMEI, part number and serial number, and an ergonomic hand strap for easy carrying the unit in hand with attached tablet or smartphone.



*Note: The hand strap detaches to enable mounting of the pole bracket.*

## Key Features

Receiver control panel contains three LED control lights:

### Single Button Operation

Most settings and operations of the receiver are completed using the only button on the left side of the unit.



Figure 2-9

Operation	Explanation
On	Press the button approximately two seconds to boot; hold until all LED's illuminate Green then release.
Off	Press the button approximately two seconds (left and right LED's will double flash), then release the button
Hard reset	When unit is on, long press the button until left and right LED's double flash twice, then release the button; as result all lights flash at the same time with different colours, after some time you will see "normal" blinking lights again
Forced shutdown	When unit is on, long press the button for more than eight seconds; as result all lights will go off

Table 2-1

### LED Status Meaning

LED	Colour	Light	Meaning
Power	Green	Constant	Full Battery. Internal battery power > 50 %
Power	Yellow	Constant	Battery in good shape. < 50% Internal battery power >20%
Power	Red	Constant	Low stage of battery. < 20 % Internal battery power > 10 %
Power	Red	Flashing	Very Low battery. Internal battery power < 10 %
Signal	Green	Flashing	Logging on server for correction data.
Signal	Yellow	Flashing	RTK mode: flashes according to correction data stream.
Satellite	Green	Constant	Tracking satellites.
Satellite	Green	Flashing	Insufficient number of satellites for position.
Satellite	Yellow	Flashing	Static mode: flashes according to sampling interval.
All Three	Changing	Fast Flashing	Receiver hard reset.

Table 2-2





## Chapter

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# 3

Slc Toolbox Software  
Inserting Your Sim Card  
Connection Tab  
About Tab  
Internet Tab  
Mode Tab  
Terminal Tab  
Exiting Slc Toolbox  
Saving Configuration File  
Loading Configuration File

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## SLC Toolbox Software – Introduction and Installation

*SLC Toolbox* software is a SatLab tool available for Windows and Android to connect and configure the SLC for operations as a base, rover or static receiver. It serves to define GSM settings and set NMEA message output for third party software. *SLC Toolbox* also enables the user to check the registration status of the SLC and current SW and FW versions installed.

*SLC Toolbox* is part of the delivery content of each SLC receiver ordered from SatLab Geosolutions. Please contact SatLab [info@satlabgps.com](mailto:info@satlabgps.com) for the most recent version of *SLC Toolbox* and you will be sent a server link to download the software.

For installation of *SLC Toolbox* follow the download and installation instructions on your PC, tablet or smartphone. At the completion of the installation you will see the yellow icon for the application circled below.

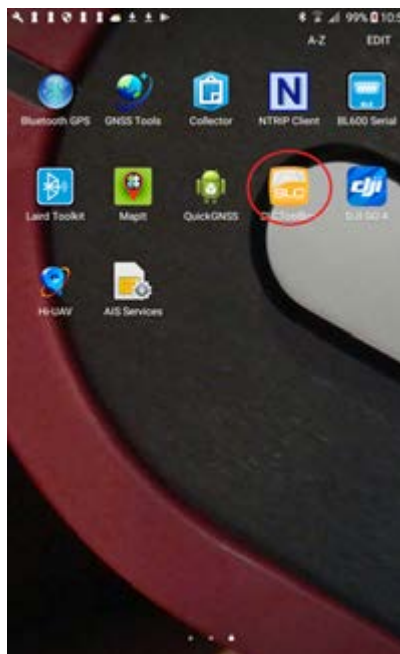


Figure 3-1

## Inserting SIM Card Into The Receiver

Use a mini size SIM card from your local GSM provider. Make sure your SIM card is data capable and the PIN is deactivated (this can be done using your mobile phone). Unscrew the SIM card protective plug and insert the SIM card into the SIM card slot on the bottom of the SLC. Make sure your SIM card is inserted correctly according to the small icon on the protective plug.



Figure 3-2



Note: Following screen shots are taken from the *SLC Toolbox* application running on Android Samsung Galaxy Tab A6. Screens on your tablet or smartphone might look slightly differently depending on the type of tablet, OS version and version of the Toolbox software. SatLab will continuously improve the software performance and interface based on your feedback.

## Connection Tab

Switch on the SLC receiver and place it near to your tablet. Make sure your tablet has Bluetooth communication enabled. Bluetooth is the preferable way of communication between your tablet and SLC. If your tablet does not allow Bluetooth connection, you can also connect using the serial communication cable delivered by SatLab.

Start the *SLC Toolbox* software and by default you will be in the 'Connection' page. Switch on the Bluetooth handle on your screen and click on "Search device" to search for all Bluetooth devices in range of your tablet. Look for the serial number corresponding to the number of your SLC and select it with your finger or stylus.



Note: Make sure you select the serial number starting with the digit, not the one starting with letter 'B'. The 'B' connection is for BLE (low energy BT) which is directly compatible with iOS devices but it needs BLT support in the relevant iOS Application to enable the connection.

Note: If the SLC Toolbox on your tablet does not pair with your SLC unit, create first a pair using Windows or Android Settings menu on your tablet.



Figure 3-3

After selecting your SLC unit by clicking on its serial number you will see a green status bar informing about the status of the connection:



Figure 3-4

After a successful connection you will see the connected serial number and battery status on the bottom of your screen.



Figure 3-5

## About Tab Registering the SLC Receiver

SatLab has a tool to prevent usage of SLC receiver by unauthorized users. Each serial number is linked to a 24 digit's code. Receivers are usually shipped with 'Temporary' codes are valid only for a limited time and after expiration of this period the SLC will not be capable to work in RTK mode.

Before use of your equipment make sure that your SLC is 'permanently' registered. Go to *ABOUT* screen (the most right Tab) of SLC Toolbox software. The screen shows the current version of *SLC Toolbox* software and receiver firmware. Click on *REGISTRATION*.



Figure 3-6

The following screen will inform you about registration status of your receiver. In below example you notice top left of the screen shows the SLC is registered to 2099-01-01, which indicates this a 'Permanent' registration. You will be able to use this receiver until the end of its lifetime.

In case you see an expiration date close to or prior to the current calendar date, contact your local vendor or SatLab Geosolutions for a 'Permanent' code. You will receive the 24 digit's code which you can enter by virtual keyboard. Click the 'Register' button and you should receive a confirmation message. Also check the date on top left now shows 2099-01-01.



Figure 3-7

## Internet Tab

The *SLC Toolbox* software is controlled by tabs on the top of the screen. The second tab 'INTERNET' enables input of GSM settings. Tapping on the line for APN will enable virtual keyboard with which you enter the parameters relevant to your service provider. If your provider requires User name and Password, please enter these on the next two lines respectively.

Click on SET and wait for a confirmation message "Set successful".

There are two switches providing Advanced setting capability and in the event of connection issues Network Diagnosis. Generally it should not be necessary to use these but if you experience Network connection issues please contact Satlab for instructions and trouble shooting procedures.



Figure 3-8

## Mode Tab

The MODE tab enables the setting of the operating mode of the receiver. This can be either Base, Rover or Static operation. Under each of these modes you have options for transmission or reception of corrections and in Static mode it enables Antenna selection, file naming and recording parameters.

Tapping on Mode box will display the menu selection at bottom then each selection will display the relevant setup pages for that Mode.



Figure 3-9

## Base Settings

When Base is selected the Base setting page appears. Tap on Operation box and the options of *Cable* and *Internal GSM intRTK* are available.

## Case

*Cable* enables connection to a third party transmitter connected via the USB/Serial port using the supplied Serial cable. When selected the configuration page will enable setting of Antenna type (typically the External antenna SLGAT-35101H will be used) and orientation, Message Type and Serial Baud rate.

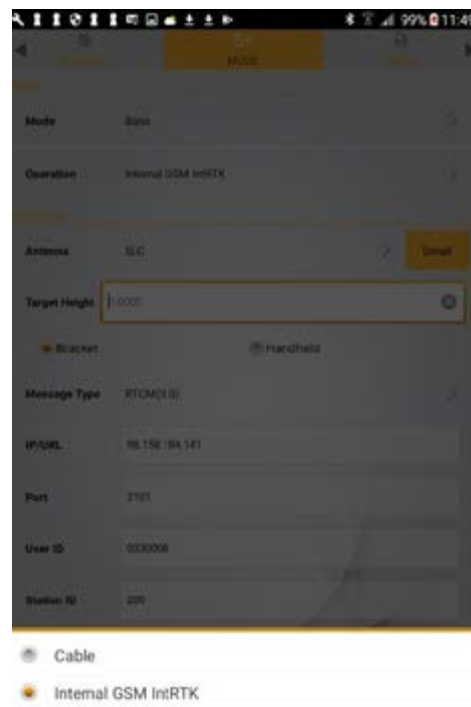


Figure 3-10

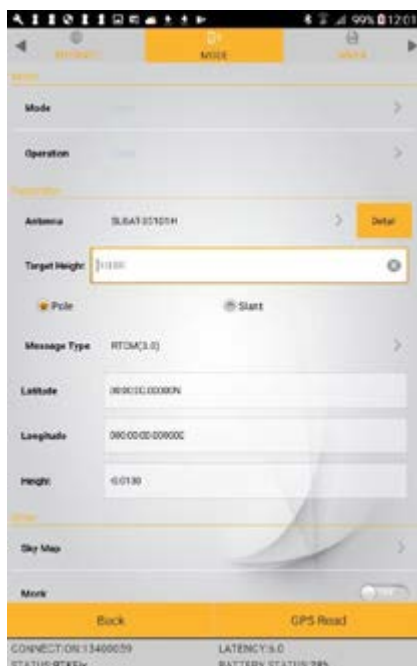


Figure 3-11

At center bottom of the screen is a Position button. This is used to set the reference position for the Base. Coordinates must be entered in Latitude, Longitude and Ellipsoid Height of the ground point or the GPS Read button can be used to acquire the average GNSS calculated position.



Note: The L1 Phase offset and Target Height will be subtracted from the GPS 'measured height' to define the ground point Reference Height.



Figure 3-12

Once all the parameters are correctly set and the Reference Position defined click the SET button and wait for the Set Successful acknowledgement.

## Internal GSM intRTK

This option for Base communication uses the Internal GSM modem with the Satlab proprietary internetRTK service. Selecting Internal GSM intRTK will display the following page.



Figure 3-13

InternetRTK (intRTK) is a proprietary service offered by Satlab free of charge to its users. The Base receiver uses GSM to communicate with one of two servers Satlab maintains and makes it possible for any number of Rovers to login and receive correction data from the selected Base. The server is identified by a unique IP address and Port number. The user login is defined by a User ID (country specific) and a Station ID (user specific).

For more information on the operation and use of Satlab intRTK please contact Satlab or your local distributor. Once Antenna, Message Type, and intRTK login credentials are entered and the Reference Position is set (as described in *Cable* mode above) then click SET to initiate the connection.

If the connection is successful the right most LED will go solid GREEN to indicate connection to the server then will flash YELLOW to indicate data flow.



## Rover Settings

When Rover mode is selected, Mode page Operation setting offers five options.

**Cable** is similar to that described under the Base Setting section in that it enables connection of a third party radio to receive correction data via the USB/Serial port.

The remaining combinations are for NTRIP or intRTK communication using either Internal GSM or Data Collector Internet. *The Internal GSM* is self-explanatory and uses the Internal GSM modem. Data Collector Internet utilizes the internet connection on the Tablet running SLC Toolbox and can be either GSM or WiFi.

Respective data entry fields required for NTRIP or intRTK will be the same regardless of which communication mode (GSM or Data Collector) is selected. For examples, in the following screen shots we show settings for Internal GSM but these equally relate to *Data Collector Internet*.

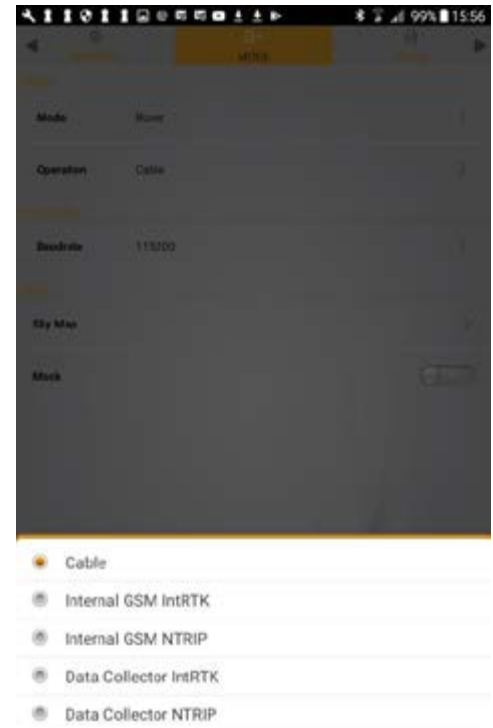


Figure 3-14



Note: When using Internal GSM for either intRTK or NTRIP, once the SLC is configured you can exit SLC Toolbox and the receiver will remain connected to your Network and output NMEA messages per your settings. If the receiver is power cycled the settings are still retained and the receiver will automatically reconnect to the Network and resume operations.

Note: If using Data Collector Internet for communications you must NOT close SLC Toolbox as it is providing the communication connection to the receiver via the Tablet. If using Android applications you must switch the Mock button to 'on' and set the application receiver to 'Internal'.

## Internal GSM IntRTK

The following figure shows the intRTK configuration page when Rover/Internal GSM intRTK is selected. Enter the Network IP address, Port number and your allocated User ID and Station ID.



For details of intRTK operations please contact your Dealer or Satlab Geosolutions on [info@satlabgps.com](mailto:info@satlabgps.com).



Figure 3-15

Once all the settings are confirmed click 'SET' to configure the receiver for connection to the Satlab proprietary intRTK server. The settings will be confirmed with the message *Set Successful*.

Watch the status on the bottom of the setting page, and the signal LED on the top right of SLC. If your connection to NTRIP network is successful, the signal LED will change to solid GREEN and when data is received it will flash YELLOW.

On your tablet PC the *STATUS* on the bottom will show Latency time and *STATUS* will change from *Single* over to *RTD*, *RTK Float* to *RTKFix*. An indicator of correction quality is the value of latency in seconds which should be fluctuating between 1 to 2 seconds in ideal case.

## Internal GSM NTRIP

The following figure shows the NTRIP configuration page when Rover/Internal GSM NTRIP is selected. Enter the Network IP address, Port number and your User name and Password.



Note: The Source Node can be typed into the Source Node box or can be selected per the procedure described on following page.



Figure 3-16

Once all the settings are confirmed click 'SET' to configure the receiver for connection to the Network. The settings will be confirmed with the message Set Successful.

Watch the status on the bottom of the setting page, and the signal LED on the top right of SLC. If your connection to NTRIP network is successful, the signal LED will change to solid GREEN and when data is received it will flash YELLOW.

On your tablet PC the STATUS on the bottom will show Latency time and STATUS will change from Single over to RTD, RTK Float to RTKFix. An indicator of correction quality is the value of latency in seconds which should be fluctuating between 1 to 2 seconds in ideal case.



Note: NTRIP configuration for *Data Collector* NTRIP is same with exception the internet connection is via the Tablet modem.

## Selecting the Mount Point (Source Node)

To select the required Mountpoint (Source Node) click on the 'SET' button next to the 'Source Node' box on the configuration page and the following page will appear.

1. Click on 'Get Source Node' at bottom left of the page and the Source table for the Network will appear.
2. Next click on the required Mount point then click OK to select and it will populate the Source Node box at top of page.
3. Click on OK bottom middle of page to confirm the selection.
4. Click Back at bottom right to return to the NTRIP config page.



Figure 3-17

## Static Settings

The SLC has 32GB internal memory for logging RAW Static GNSS data. Selecting 'Static' Mode opens the page Figure 3-18 below. Logging screens are also accessible from both Base and Rover mode setting pages and will allow post-processing of the Base position or processing of the Kinematic file collected while used in Rover mode.

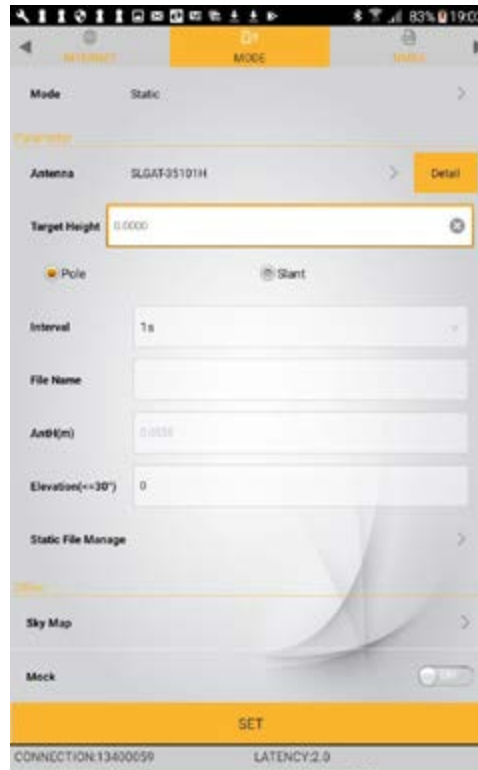


Figure 3-18

Typically Static logging will be done using the external SLGAT-35101H antenna but antenna settings are available when using the SLC mounted on a Pole Bracket or in Handheld mode where the reference point is the back of the SLC case.

The Static page allows entry for Logging Interval from 1 to 50 seconds, File name, Target height (distance from ground point to ARP), and Elevation cut-off angle. When all information is entered press SET to configure the receiver.

In Static mode the right LED will blink RED at the logging interval rate set to indicate a recording session is active.

If a logging session is activated while in Base or Rover mode the right LED will be flashing YELLOW indicating data transmission so the logging session is indicated by the left LED flashing YELLOW at the logging interval.

## Static File Manager

The Static page also gives access to the *Static File Manager*. Clicking on this will open the following page Figure 3-19 below.

ID	File Name	Size	Date
1	_,0592590.GNS	39.64K	2017-09-16
2	_,0593130.GNS	18.53K	2017-11-09

This page allows you to view the current logged files. Tapping on one or several of the listed files will highlight those selected and a Delete button will appear at the bottom of the page. Clicking this will result in the selected files being deleted.

If no file selection is made, the internal memory can be formatted by clicking the Format button at bottom left. This will result in all files being permanently deleted.

## Downloading Static GNSS Files

To download the RAW data files connect the SLC to your PC using a standard USB cable. The internal memory will be logged as an external drive titled 'Static' under which there is a 'GNSS' directory. Files can be copied and transferred to your PC but you cannot delete the files which is intentional as a safety precaution. Files can only be deleted using SLC Toolbox as described above.



Figure 3-19

## Satellite Sky Map

To download the RAW data files connect the SLC to your PC using a standard USB cable. The internal memory will be logged as an external drive titled 'Static' under which there is a 'GNSS' directory. Files can be copied and transferred to your PC but you cannot delete the files which is intentional as a safety precaution. Files can only be deleted using SLC Toolbox as described above.



Note: The Novatel OEM6 board used in the SLC is engineered to track all available Satellite constellations and is currently enabled for all except Galileo. Tracking of Galileo is dependent on firmware upgrade and availability will be announced by Novatel at a later date.



Figure 3-20

## NMEA Tab

### Setting NMEA Message output

Your surveying, mapping or GIS application is most probably interfacing with the SatLab SLC using the NMEA message protocol. In addition to GGA message that contains a GNSS coordinate, several additional NMEA messages offer quality and satellite constellation information. Check your application software regards which NMEA messages it processes and at what frequency rate, then select accordingly.

Messages are selected/deselected by checking or unchecking the box to the left of the message type. Frequency is set by clicking on the frequency value next to the message type then selecting as required. Every message can be sent in intervals of 0.2, 0.5, 1, 2, or 5 Hz.



Figure 3-21

The above screen shows the setting for Bluetooth but Serial output is also available. Clicking on the 'Bluetooth' under the 'Send using' heading will open a selection menu with Bluetooth and Cable. If Cable is selected you are also given the option to select the Baud rate.



Note: You can simultaneously send data via Bluetooth and Serial port with different output message settings.



## Exiting SLC Toolbox

When using *Cable* or *Internal GSM* settings, once the receiver is configured you should exit SLC Toolbox before connecting to your Survey or GIS Application. The settings in the SLC are saved and there is no need to connect to SLC Toolbox again until you need to change any of the previous settings.

If using *Data Collector* settings for correction source then you **MUST NOT** exit the program as this would stop the data stream. For use with Android applications you must check the 'Mock' box in the MODE page then leave Toolbox running in the background.



Figure 3-23

## Saving Configuration to file

Prior to Disconnecting you can save the current configuration to a file which is available to load at a later date. This enables easy configuration if you need to change between Networks or working Modes.

Click on the *Configure* button, enter a file name then press Save and the current setup will be saved to the file.



## Loading Configuration File

After connecting to the SLC click on Configure button on the CONNECTION page. And the following page Figure 3-24 will appear. Click on the required configuration file and it will be highlighted and the *Load and Delete* buttons will appear. Click on the Load button and the receiver will be configured per the settings in the file.



Figure 3-24

## Disconnect Toolbox

For Android there are two methods to correctly exit SLC Toolbox.

1. Click on the 'back arrow' on your device and a Warning message will appear. You can confirm exit by clicking OK or reject by clicking Cancel.
2. Go to the Connection page and click the Disconnect button. Again there is a Warning message and you can accept or reject as above.

For Windows go to the connection page and click the Disconnect button.



Note: It is important to exit Toolbox correctly to ensure all binary characters are eliminated from the NMEA output messages.



# Chapter

Loading Firmware  
Technical Specifications

# 4

## Firmware Upgrade

As the receiver firmware is updated from time to time, SatLab provides free-of-charge upgrades to all users of SLC. Firmware is stored in a file with extension .htb which will be available either on Satlab Gesolutions’ website or provided to you by email.

The upgrade is easily done by connecting SLC with the grey USB cable to your PC. Your PC will recognize SLC as an external drive and you will see new folders created:

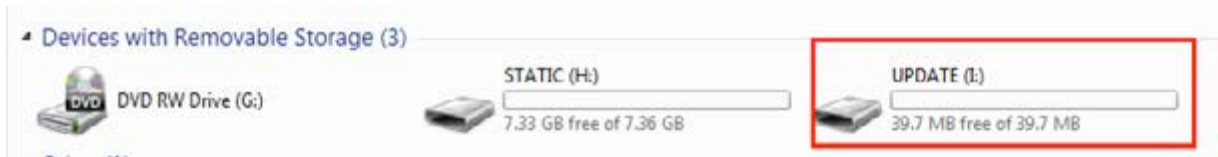


Figure 4-1

Copy and paste the firmware file in the folder UPDATE. Then unplug the cable, restart the receiver and the update will be done automatically. SLC Toolbox’s ABOUT screen will inform you about the current firmware version.

## Technical Specification

### System

- Multi Purpose GNSS Receiver
- Internal Memory: 32GB

### Channel Configuration

- 120 Channels

### GNSS Tracking

- GPS : L1, L2, L2C
- GLONASS : L1, L2
- BEIDOU : B1, B2
- GALILEO\*\* : E1, E5b
- QZSS : L1, L2C
- SBAS : L1 C/A

### Horizontal Position Accuracy (RMS)

- Single Point L1 1.5 m
- Single Point L1/L2 1.2 m
- SBAS 0.6 m
- DGPS 0.4 m
- RTK 1 cm + 1 ppm
- Initialization Time < 10 s
- Initialization Reliability > 99.9%

### Measurement Precision (RMS)

- L1 Carrier Phase 0.5 mm 1 mm
- L2 Carrier Phase 1 mm 1 mm
- L2C Carrier Phase 1 mm 1 mm

### Formats

- NTRIP, intRTK
- Navigation Output Support for NMEA 0183, NovAtel\* ACSII and Binary Logs
- Differential Correction Support for RTCM 2.1, 2.3, 3.0, 3.1, 3.2, CMR, CMR+ and RTCA
- Raw data recording for Post Processing
- Field Upgradable Software
- Differential GPS Positioning

### Interface and Hardware

- USB (Disk and Charging)
- RF for External GNSS Antenna
- RS232 Serial
- Optional 3.5G GSM Modem

### Environmental

- IP67 water/dustproof
- Temp: -20°C to +65°C

### Physical

- Size: 25 x 9.5 x 3 cm
- Weight: 620 grams

### Power

- Mini USB Charging (Power Bank compatible) @1A
- Battery life 8-12 hours depending on the working mode and environmental conditions

\*NovAtel is a registered trademark of NovAtel Inc.

\*\*Optional Specifications subject to change without notice.



SLC GNSS RECEIVER



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