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User Manual

ST6952

Sunlab International Ltd.

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Warning

Our customers are required to be aware that connecting the wire inputs can be hazardous to both of the installer and your vehicle's electrical system(s) if not done by an experienced installer. This document assumes you are aware of the inherent dangers of working in installing the device on the vehicle(s) and the machinery.

Document Amendments

When it comes to the firmware version column with specific firmware number, any amendment(s) on the comments column should be made on this relevant firmware version (and the versions thereafter). Before applying any changes made in this protocol, you are required to make sure that you have upgraded the firmware suitable for the specified version.

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1. Introduction

The ST6952 is a asset tracker for a vehicle. It is designed to collect location data through GPS technology and interact remotely with its server by using LTE & BLE technology.

In order to make the vehicle tracking system work, device should be configured and installed properly on a vehicle whose geographical position and/or state is desired to be remotely monitored and/or controlled.

Please note that this Operation Manual is for the standard model. In case specific requirements are incorporated into this Manual, such a manual applies only for the case.

For overall operation including installation, in addition to the 'Device Manual', users should refer to other documents such as Parameter Manual, Commands Manual, Reporting Manual and so on.

2. Overview

Main function of device installed on a vehicle is to report vehicle location and status to its monitoring server at predefined interval and to deliver command coming from the server for activating any appliance connected to the device.

2-1. Operation modes

The device works in one of the two (2) operation modes below.

- Parking mode:
 - ✓ This mode is operational when 'MOTION' is OFF for duration longer than the pre-defined time or 'motion sensor' is disabled.
- Driving mode:
 - ✓ This mode starts when 'MOTION' is ON for duration longer than the pre-defined time.

2-2. Reports sent by device

There are 2 types of report/response sent by device to the server as follows:

- ✓ Status Report
- ✓ Alerts Report

2-3. Parameter change

Parameters which have already been set on the device can be changed via LTE or via SMS or via USB connected with PC if a user needs to do so. Some controlling functions can also be implemented in the same way.

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2-4. Features

Key features of the ST6952 device are as follows:

- Unified Protocol

- ✓ Support standard report format fixed to all models.
- ✓ Customer can select only the data they want from the data included in the report, so that they can configure their own report format.

- Power Saving

- ✓ The device can save power consumption of the battery according to options. (motion sensor and tracking time)

- LED Indicators

- ✓ The LEDs indicate LTE and GPS status. It is helpful to check what error(s) and why such an error has occurred.
Please refer to Chapter 3-1

- Maintenance server support

- ✓ Upgrading Firmware by Over The Air (Firmware OTA)

- Alerting Battery Low & Shutdown

Device sends an alert or will be shutdown when a battery voltage is lower than pre-defined.

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3. DETAILED DESCRIPTION

3-1. Indication with Three(3) LEDs

Green LED indicates GPS status.

Blue LED of the dual color led indicates LTE status and red LED of the dual color led indicates entering or exiting shutdown the device.

Red LED is indicates charging battery status.

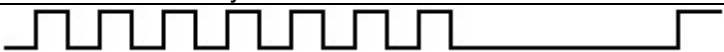
3-1-1. Green LED for GPS

GPS	Blink Count	Meaning
Normal	1	
NMEA data not received	2	 <Probable Situations> 1. NMEA data is not received from the GPS chipset
No time data in NMEA data		 <Probable Situations> 1. NMEA data is received from the GPS chipset, but no time data is received from the chipset.
No location data in NMEA data	4	 <Probable Situations> 1. Location data not received.
Number of satellites is less than specified		 <Probable Situations> 1. Location data was received, but the number of satellites is less than the specified number, so the location data is not reliable.

3-1-2. Blue LED of the dual color led for LTE

LTE	Blink Count	Meaning
Normal	1	
Server Com. Error	2	 < Probable Situations > 1. If the server or network parameter is wrong. 2. If the server is closed. 3. If there is a temporary network barrier.
LTE Com. Error	3	

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		<Probable Situations > 1.If network parameter is wrong. 2. If SIM is blocked and it is impossible to use LTE session. 3. If there is a temporary network barrier. 4. If device receives weak LTE signal. 5. If LTE connectivity with a device is weak.
No Network	4 (NOT USED)	 ST6952 is not use and support external antenna.
SIM PIN Locked	5	 <Probable Situation > 1. If SIM PIN is enabled.
Cannot Attach NW	6	 < Probable Situations> 1. If device receives weak LTE signal. 2.If LTE connectivity with a device is weak.
No SIM	7	 < Probable Situations > 1. If there is no SIM or if SIM is not inserted properly. 2. If SIM or SIM socket is broken.
SIM PUK Locked	8	<Probable Situation > 1. If SIM PUK is enabled.

3-1-3. Red LED of the dual color led for SHUTDOWN TO DEVICE

SHUTDOWN TO DEVICE	Blink Count	Meaning
Enter Shutdown	15	 The device is in the process of entering shutdown. Blinking more than 15 times and then shutdown. It keeps blinking until the shutdown ready state is complete. When the device shuts down, no action is taken. (You have to hold the magnet on the device's Hall sensor position for more than 3 seconds, then release it when the green LED turns to a red LED.)
Exit Shutdown	3	 The device is in the process of exiting shutdown Blinking 3 times and then returns to normal mode. (You have to hold the magnet on the device's Hall sensor position for more than 3 seconds, and then release it when the red LED blinks 3 times and turns to a green LED.)

3-1-4. Red & Green LED the dual color led for CHARGING BATTERY

When the battery is charging via USB, the red LED will blink and turn on when charging is complete.

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When the battery is charging via solar, the green LED will blink and turn on when charging is complete.
When the battery is empty, the LED will turn off.

3-2. Power Saving

Device turns off GPS and LTE part except for time to send report. All communication with the server is impossible and it cannot receive any SMS messages. If LTE wake up for sending report, will be respond to message received.

3-3. Turn On/Off

This device can be powered on by turning the On/Off switch. It may power off due to low battery.

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3-4. Storage of Reports un-sent

Device has maximum storage capacity of the un-sent reports in such cases as follows:

- 2,000 reports (**),

Note (**):

Due to bad report-routing environment, device could not make a real-time based reporting. For example, the reporting router does neither run properly, is nor connected properly. In such a situation there might be a report which has consequently failed to arrive in the server successfully after making several attempts to send the report to the server. In that case, the device stores such a report for a while until such environment (e.g. LTE network) gets back to normal to enable the device to try to send the report to the server again.

When 'reports' start being accumulated, max 2000 reports can be hold in the buffer storage of the device. If those 'reports' are triggered out to the server, the oldest report is erased first and a new report is buffered if the buffer is completely full of those reports. And then, a new status report enters (FIFO: First In First Out as a sequential system).

Note..

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.
- Any changes or modifications (including the antennas) to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

This equipment and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

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REVISIONS

Rev. No.	Date	Modifications were made on:	Writer
Rev. 1.00	2025-08-14	Draft a manual	CKJANG

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