ST730P

USER MANUAL

-Sigfox Back-up Tracking Device-

Suntech
Custom Telematics for Your Business

Suntech International Ltd.

The ST730P is a battery-powered mini tracker utilizing GPS, RF and Sigfox techonology.

Tracking Device with RF shall normally be used for Presence function
(configured as "slave") and might be set in ERB Mode.

With its holder, it is a waterproof (IP67 compliant) hard-cased device to be used for various purposed like an assent tracker or a personal tracker. It works autonomously with its built-in battery.

In addition to 3-axis acceleration sensor, the ST730P have various functionalities such as ultra-low power consumption algorithms and motion checking.

Features;

1. Power On/Off button

   The device can be powered up or down by pressing the On/Off button for at least 2 seconds.

   At power up the device will:

   - Flash 1 time all the LEDs
   - Show the battery status using the battery LED. This status will only show in the first minute after power-up.
   - Send a "power up" message.
   - In case the GPS is configured as a location source, it will start the GPS acquisition. After the GPS fix, the GPS will go into deep sleep mode. There is also a GPS acquisition timeout, after this timeout the GPS will also enter deep sleep.

   At power down:

   - Flash twice all the LEDs

   During operation, if the button is pressed for less than 2 seconds, it will show the battery status using the battery LED.

2. Tracking

The device will send a tracking message at a defined interval. The customer can configure what time interval and the local location source. The location source can be GPS. In the case of GPS as the location source, the device will turn on or wake-up the GPS receiver 30 seconds before sending the message. If the time interval is greater than 1 (?) hour the GPS will be turned on 1 minute before. This is done to keep the message transmissions at regular intervals and increase the probability to get a GPS fix.

3. SOS button

When the device is ON and if this button is pressed, it will trigger the device to send immediately a "SOS" message. It will also turn on the GPS. If it is able to get a fix within the timeout period it will send a location message.

4. Sensors

- Accelerometer
- Hall/Magnetic
- Temperature

5. Geo fence

The device will monitor the location based on the GPS receiver and check if the device is inside or outside the circular fence. A circular fence is defined as a GPS coordinate and a radius in meters. There is a limit of 5 (TBD) circular fences.

In order to save power, the customer can configure the time interval between the GPS acquisition. At the specified time the device will wake-up the GPS receiver and keep it on until there is a fix or a timeout is reached.

The check can also be configured to be triggered by the accelerometer or hall sensors. In this case the check is done every time the accelerometer or hall sensors are triggered.

The device will keep in non-volatile memory the status of the fences (if it is inside or outside) while the device is On.

At power-up the device will turn the GPS on and will set the fences reference at the first GPS fix. This will be used to trigger the fences status change thereafter.

6. Presence Function

The host device will transmit to the slave device(ST730P) over RF 900 MHz that it can't deliver information to the server.

So the slave device could start reporting as a backup method.

7. Settings

The device can be configured by using the Synctrak software or by RF. The RF possible configurations are limited and (TBD)

8. Battery

The battery status can be checked at power up, when the device will show it for 1 minute using the battery LED, and if the device is ON by pressing the On/Off button for less than 2 seconds.

The code of the LED is:

- between 100% and 80%, the LED flashes 5 times
- between 80% and 60%, the LED flashes 4 times
- between 60% and 40%, the LED flashes 3 times
- between 40% and 20%, the LED flashes 2 times
- below 20%, the LED flashes 1 times

A "Low battery" message can be configured to be sent when the battery level reaches at a specified level.

Also an "External power connected" and an "External power disconnected" can be configured.

9. Location sources

GPS – the device has an internal GPS receiver that is able to calculate the geographic coordinates using both the GPS and Glonass constellations.

10. Firmware update

The device can be updated using the following methods:

- USB – the FW can be updated by using the USB port and a specific update software

GENERAL SPECIFICATION

Battery	Primary battery Li-SOCL2 4000mAh
Motion Detection	Built-in 3-axis Acceleration sensor
Report Interval	(1) Normal Mode: Every 6 hour / day (2) Emergency: ≈ 15min /day
RF Presence	Every 15 min
Battery Life Time	(1) 2 years with the report interval above on normal mode (2) 1 week on Emergency mode.
Power Consumption Operating current Deep sleep current	 Sigfox : 17 mA in Rx mode 200mA in Tx mode @ 22.5dBm RF 900MHz : 120mA at 20dBm @3V GPS : 40mA in active mode Less than 15uA
SigFox Frequency	RCZ2: Tx 902.1375MHz, Rx 905.200MHz.
SigFox Output Power	RCZ2: 22dBm
Temperature Range	-20°C ~ +60°C
User Interface	Power Button , SOS Button
Waterproof	IP67
LED Indicator	Sigfox, GPS, RF status
PC Sync Track	USB cable
Dimension	75 x 50.5 x 32.5 mm
Weight	95g(without holder) 205g (with magnetic holder)

Approval	FCC, Sigfox certificate (TBD)

RF TRANSCEIVER SPECIFICATION

Modulation Type	**CSS(Chirp Spread Spectrum)**
Frequency band	902~928MHz
Output power	Maximum 20dBm
Power Consumption	120mA at 20dBm @4V

GPS RECEIVER SPECIFICATION

Receiver Type	56-channel U-Blox 7 engine GPS&QZSS L1 C/A, SBAS : WAAS, EGNOS, MASA,
Update Rate	10Hz
Accuracy [1)]	Position 2.5m CEP SBAS 2.0m CEP
Acquisition [2)]	Cold starts 29s 12s (AssistNow Autonomous) Aided start <1s Hot start <1s
Supply Voltage	Single voltage supply : 1.4V or 3.0V
Sensitivity [3)]	Tracking -162dBm Reacquisition -160dBm Cold start -148dBm
Back-up Supply	Voltage range : 2.5V to 3.6V
Antenna type	Patch Antenna

* 1) All SV @ –130 dBm

* 2) Dependent on aiding data connection speed and latency
* 3) Demonstrated with a good active antenna

INSTALLATION, CONFIGURATION AND PROTOCOL

Most important point is to install the unit horizontally in order to have the top cover to see the sky

For the details of product handlings / installations, please refer to the attached pictures.

***Note 1** : Configuration or Parameter setting should be done before installation.*

Configuration : Refer to separate document and software tool for configuration.

Protocol : Refer to separate document for the standard protocol

FCC Part 15.19
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.

FCC Part 15.21
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.

FCC Part 15.105
Note : This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications, However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by the manufacturer could void your authority to operate the equipment under FCC rules.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
(1) This device may not cause interference.
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
(1) L'appareil ne doit pas produire de brouillage;
(2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FCC and IC RF Radiation Exposure Statement: This equipment complies with FCC and IC RF Radiation exposure limits set forth for an uncontrolled environment. This device 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.

RF du FCC et IC d'exposition aux radiations: Cet équipement est conforme à l'exposition de FCC et IC rayonnements RF limites é-tablies pour un environnement non contrôlé. L'antenne pour ce transmetteur ne doit pas être même endroit avec d'autres émetteur sauf conformément à FCC et IC procédures de produits Multi-émetteur.
Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.