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# Operation Manual


**ST300 / ST340 / ST350**

Suntech 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

Please be advised that, for the firmware version column with specific firmware number, any modification(s) on the comments column should be done on this corresponding firmware version (and the versions thereafter). Please make sure you upgrade the firmware to the specified version before applying any changes made in this protocol.

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## 1. Introduction

The ST300 is a vehicle tracking and controlling device. It is designed to collect location data through GPS technology, various vehicle conditions through event lines, and interact remotely with its server by using GSM/GPRS 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.

Following this "Introduction Chapter" (i.e. Chapter 1.), the Operation Manual is organized as below.

- Chapter 2. Overview

This chapter covers fundamental features of the device.

- Chapter 3. Communication string format ('Command' and 'Report')

This chapter gives descriptions on the two (2) formats, Command (all the formats received by device) and Report (sent from the device).

- Chapter 4. Configuration

This chapter gives users explanation on how and what parameters are required to be set in configuring device.

This manual describes setting commands which can be sent with following three options;

- Option 1 : Setting by PC
- Option 2 : Setting by GPRS
- Option 3 : Setting by SMS

Practically special program (named as "SyncTrack") is used for setting. It enables setting much easier and multi-setting possible in PC environments.

- Chapter 5. Reporting to server

This chapter covers when and what reports are sent back to the server by device.

- Chapter 6. Checking/Changing the current settings


This chapter describes how user can check current settings of the device and how user can change the 'pre-defined' parameters.

- Chapter 7. Detailed description on event lines and special features

This chapter gives users detailed information on key features of the device and on how to operate the device if the events occur after configuring the parameters related to such events.

Please note that this 'Operation Manual' is for a 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 'Operation Manual', users should refer to other documents such as Installation Manual, Technical Data Sheet, Firmware OTA (over-the-air) Manual, Buyer Change Guide, Trace Log, Assembly Guide and so on.

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## 2. Overview

Main function of device installed on a vehicle is to report vehicle location and status to its monitoring server at pre-defined 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 three (3) operation modes below.

- Driving mode:

This mode starts when 'Ignition' of the vehicle is ON.

- Parking mode:

This mode is operational when 'Ignition' is OFF for duration longer than the pre-defined time ('T1').

In parking mode, the device can get into special modes for power saving like 'Sleep mode' and 'Deep sleep mode'. These power saving modes are described in more details in this document.

- Emergency mode:


This mode works either when panic button is ON or when one of any pre-defined events occurs.

### 2-2. Reports sent by device

There are 8 types of report/ response sent by device to the server as follows:

- Status report (made in string / made in zip),
- Status string report (made in string) sent via SMS
- Emergency report,
- Event report,
- Keep-alive report,
- Alert (\*\*),
- Data report delivered through External RS232

*Note (\*\*): In addition to the reports periodically sent to the server as described above, device also sends some alerts. For instance, device sends the server such an alert if the vehicle moves under the parking mode or if the connected Input Line is changed.*

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Suntech can also increase this capacity up to a certain level if a customer of the device wants to do so. As soon as the reporting condition for the device is recovered, the device starts sending all those accumulated reports according to the following rule:

- Emergency (the most important) → Command Response → Alert → Status Report → Alive (the lowest priority)

This means that the emergency report is the first one that should be sent right after the GPRS network condition is recovered.

### 2-3. Parameter change

Parameters which have already been set on the device can be changed via GPRS or via SMS or via RS232 connected with PC/ST50 if a user needs to do so. Some controlling functions can also be implemented in the same way.

How to change values of the current parameters is described in detail in Chapter 4 of this document.

### 2-4. Features

Key features of the ST300 device are as follows:

#### **- Power Saving Modes( = Power Down Modes)**

#### **- LED Indicators**

The LEDs indicate GPRS and GPS status. It is helpful to check what error(s) and why such an error has occurred.

#### **- Event Lines**

Device has 2 output lines, 3 input lines and one ignition line.

#### **- Upgrading Firmware by Over The Air (Firmware OTA)**

In case 'firmware' of the device has an (some) error(s) or needs to be upgraded to provide the user with newly implemented services, the device can upgrade its internal ROM file by over the air (Firmware OTA), remotely via GPRS. The users do not need to visit the vehicle individually to download the new firmware on those vehicles.

How to do OTA is described in detail in the "SunTech\_OTA\_UA\_Protocol" document.


#### **- Parking Lock**

Device is able to check if the vehicle moves away from the pre-defined parking boundary or starts moving without having a mode of the ignition on. In case the device recognizes such an unauthorized moving or driving, it sends an emergency report immediately.

#### **- Overspeed**

Device checks speed of the vehicle and sends to the server an alert if the vehicle runs faster than the pre-defined over-speed threshold values.



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#### **- Checking Connectivity of GPS Antenna**

Device alerts when GPS antenna is disconnected. It is applicable only to the device models which have the external antenna.


#### **- Checking Status of Main Power Source**

Device recognizes its connectivity with the main power source (i.e. vehicle's battery) and is able to inform the server about status on whether or not the main power line is disconnected. The device is also able to inform the server about the voltage level status of the main power source and informs the server in case the voltage level of the main power source drops down below the pre-set value. This function is applicable to battery-installed device models only.

#### **- Alerting Battery Error**

Device sends an alert when a battery charging error occurs. This function is applicable only to the device models available with back-up battery.

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### 3. Communication string format

All the communication messages exchanged between device and its server should be in the form of STRING as described below. Each 'Report' can be compressed in ZIP. Every 'Field' is separated with semicolon. All the report string triggered by device ends with a mark, '\r' (0x0d).

#### 3-1. Command format

The following format is used when the server sends command message to the device(s) as shown in the below table. The "Value"(or Indicating Mark) and its "Meaning" are described individually.

The parts consisting of 'Fields' are capitalized for naming like:

"HDR" stands for the header, 'DEV\_ID' for device' identification number, "VER" for version, Field 1, Field 2, etc.

HDR	DEV_ID	VER	Field 1	Field 2	...	Field n
-----	--------	-----	---------	---------	-----	---------

Field	Value (or Mark)	Meaning
HDR	String	"ST300" + Command type
DEV_ID	9 char.	Device ID
VER	"02"	Protocol Version. This is fixed with "02".
Field 1 ~ n	String	Contents

The 'Device ID' (consisting of 6 digits) is a unique number that each device should have. It is equal to the last 6 digits of IMEI numbers shown on the back label of the device. Whenever the server sends a command message, it designates a specific device along with the unique identification number of the device as a command receiver. And then, the device recognizes a fact that it has received the command message and responds to the server with a relevant response or a relevant action to be taken. This is how a normal communication is made between the server and its device.

On the other hand, sometimes, a very bad GPRS connection between a device and the server may consequently bring about a bad result that the specified command message would be delivered NOT to the targeted device BUT to other device. In such a situation, the wrong device does not accept the command message because the device ID number of the message does not match the ID number of the wrong device.


However, we might consider a situation in which a command message is delivered to a device via RS232. In such a situation the device accepts the command message even though the device ID number of that command message is NOT its own one.

#### 3-2. Report format

The contents of the following table show what messages and how they are delivered to the server in response to the command that the server has sent to the device(s) by requesting the device(s) to respond with.

HDR	DEV_ID	SW_VER	Field 1	Field 2	...	Field n
-----	--------	--------	---------	---------	-----	---------

Field	Value (or Mark)	Meaning
HDR	String	"ST300" + Report type
DEV_ID	9 char.	Device ID
VER	"001"	Software version that the device has.
Field 1 ~ n	String	Contents

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## 4. Configuration

Before a device starts being operated, its parameters should be set first. This *chapter* shows the string to be sent to device.

There are 3 options of sending string.

Option 1: by using PC

Option 2: by using GSM/GPRS network

Option 3: by messaging via SMS

*In practice, configuration can be made more efficiently with 'SyncTrak', i.e. a setting tool provided by Suntech.*


Once a device receives a command from the server, it gets back to the server with a relevant response. Device also changes some parameters (if it is required to do so) or takes an action as instructed below as per the command sent by the server.

### 4-1. Network parameters


The following table shows how and what parameters are required to be set so that the device can be connected with network. As shown in the bottom part of this table, an '<Example>' of '[command]' and '[response]' are made in string respectively when the configuration for the networking is completed.

HDR	DEV_ID	VER	AUTH	APN	USER_ID	USER_PWD	SEVER_IP	SEVER_PORT
	B_SEVER_IP	B_SEVER_IP	SMS_NO	PIN_NO				

Field	Marks	Value	Meaning
HDR	"ST300NTW"		Command type of Header
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
AUTH	'0'/'1'/'A'		<u>GPRS authentication</u>  0 : PAP('NO' in 'SyncTrak')  1 : CHAP('YES' in 'SyncTrak')  A: Automatic GPRS set. In this case, parameters for APN, USER_ID and USER_PWD field should remain empty.
APN	String		Access Point Name
USER_ID	String		ID for GPRS Access
USER_PWD	String		Password for GPRS Access
SEVER_IP	String		Server IP Address
SEVER_PORT	String		Server Port
B_SEVER_IP	String		IP Address of Backup Server
B_SEVER_PORT	String		Port of Backup Server
SMS_NO	String		Phone number that will receive the SMS report sent by the device.  This can be used for backup in the area where GPRS

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			condition is not good. Or, it can be used as a main report receiver when IP and Port are unavailable. If it is not used, it should remain empty.
PIN_NO	String		PIN Number to release PIN lock if it is enabled
<p><b>&lt;Example&gt;</b></p> <p>[command] ST300NTW;100850000;02;0;internet;;;111.111.111.111;8600;;;</p> <p>[response] ST300NTW;Res;100850000;010;0;internet;;; 111.111.111.111;8600;;;</p> <p>ST300NTW;Res;100850000;010;A1;tim.br;tim;tim; 111.111.111.111;8600;;;</p> <p><b>&lt;Note&gt;:</b></p> <p>** If network does not require User ID and Password, these fields should remain empty.</p> <p><b><u>Automatic Setting for GPRS Network</u></b></p> <p>If you set the device to 'Automatic GPRS Set', the device will automatically set the parameters for GPRS with the data available on the inserted SIM card.</p> <p>For instance, if Airtel SIM is inserted, the device will set 'AUTH' to '0', 'APN' to 'airtelgprs.com', 'USER_ID' and 'USER_PASS' to empty respectively.</p> <p>And then, the device reports response string after adding real GPRS parameters, if 'Automatic GPRS Set' is selected.</p> <p><b>DNS</b></p> <p>Server_IP and B_SERVER_IP field can be filled with direct IP address (for example 111.111.111.111) or domain name (for example, suntechint.com). If this field is written by domain, the device will find real IP address by DNS and sends reports to IP address.</p>			

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## 4-2. Reporting parameters


Device responds to the command(s) with the relevant report or response periodically at a time interval or at a travelled distance interval of the vehicle that has already been pre-defined by user. Such a response sent back to the server includes SMS message (if the device user has already configured SMS messaging functionality). The following table shows how to set those parameters.

In bottom part of the table, the following table also shows how and what parameters should be set to utilize functions like:

- 'Angle Report', that is used for displaying the historic path more accurately or saving network cost while the vehicle is driving on straight roads for long time, and
- 'FIFO' or 'LIFO', that should be selected to determine a sequential order if buffer of the device is completely full of reports. For more information, have a look at the description made in the bottom part of the table below.

HDR	DEV_ID	VER	T1	T2	T3	A1	SND_DIST	T4	SMS_T1	SMS_T2	SMS_PACK_NO
-----	--------	-----	----	----	----	----	----------	----	--------	--------	-------------

Field	Marks	Value	Meaning
HDR	"ST300RPT"		Command type
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
T1	String	Sec	Interval to be set to send a Status Report in parking mode:  Range : 0 ~ 86400 If 0, a report in parking will be sent only one time when vehicle starts being parked.
T2	String	Sec	Interval to be set to send a Status Report in driving mode:  Range : 0 ~ 60000 If 0, a report in driving will be sent only one time when vehicle starts driving.
T3	String	Sec	Interval to be set to send a Status Report in emergency mode:  Range : 0 ~ 9999 If 0, an emergency report will be sent only one time when an emergency state occurs.
A1	String		Number of attempts to send an emergency report until the device gets acknowledgement from the server:  If 0, no Emergency Report will be sent. If 65500, unlimited report until get ACK from Server.
SND_DIST	String	Meter	Distance interval to be set when the device sends a Status Report:  Range : 0 ~ 60000 (60km) If 0, a Status Report on traveled distance is disabled. If not 0, a Status Report is sent when traveled distance reaches the predefined SND_DIST.

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T4	String	Sec	Interval to be set to send a the Keep Alive string
SMS_T1	String	Min	Interval to be set to send a Status Report in parking mode
SMS_T2	String	Min	Interval to be set to send a Status Report in driving mode
SMS_PACK_NO	String		Report No in one SMS message

**<Example>**

[command] ST300RPT;100850000;02;180;120;60;3;0;0;0;0

[response] ST300RPT;Res;100850000;010;180;120;60;3;0;0;0;0

**<Note>:**

\*\* If a reporting interval is set with a big number, the network may disconnect GPRS connection because GPRS communication does not make a progress for a long time. So, the device may not receive the command via GPRS. "T4" will be used to prevent such a disconnection by sending a short data for short time.


\*\* The 'Keep Alive' report is sent only when the device has no data to be sent for the time of the interval 'T4'.

#### 4-3. Event Parameters


In order to set these parameters properly, read carefully the contents and <Example> along with <Note> described in the bottom inside the table below.

HDR	DEV_ID	VER	IGNITION	T1	T2
IN1_TYPE	IN2_TYPE	IN3_TYPE	IN1_CHAT	IN2_CHAT	IN3_CHAT
OUT1_TYPE	OUT2_TYPE	OUT1_ACTIVE	OUT2_ACTIVE		
PULSE1_NO	PULSE1_ON	PULSE1_OFF	PULSE2_NO	PULSE2_ON	PULSE2_OFF
IN4_TYPE	IN5_TYPE	IN4_CHAT	IN5_CHAT	BAUD	

Field	Marks	Value	Meaning
HDR	"ST300EVT"		Command type
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
IGNITION	'0' ~ '3'		Ignition using state:  0 : Not use ignition 1 : Use ignition Line 2 : Virtual ignition(power) 3 : Virtual ignition (motion)
T1	String	Sec	Delay in entering parking mode after ignition goes to OFF
T2	String	Sec	Delay in entering driving mode after ignition goes to ON

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IN1_TYPE	'0' ~ '17'		0 = Falling Edge 1 = Rising Edge 2 = Both Edge (Falling & Rising) 3 = Panic Button 7 = Anti-Theft Button 11 = Door Sensor 12 = Ignition Line (Support only in ST350LC4D, ) 13 = Disable Immobilizer if it's activated by jammer Detector 15 = Anti-Theft Button 2 17 = HMeter 19 = Rain Sensor (Gnd) 20 = Rain Sensor (Open) 21 = Rain Sensor (Pulse) Please refer below note for rain sensors. (19 ~20) Others = Reserved Default = '3'.
IN2_TYPE	'0' ~ '17' Or '18'		Same as IN1_TYPE Default = '2' In case of ST300H, It fixed as 18 = I-button.
IN3_TYPE	'0' ~ '17'		Same as IN1_TYPE Default = '2'
IN1_CHAT	String	100ms	Input1 chattering time. Range : 0 ~ 9999 Default = 3 sec. If 0, input1 is not checked.
IN2_CHAT	String	100ms	Input2 chattering time. Range : 0 ~ 9999 Default = 2 sec. If '0', the input2 is not checked.
IN3_CHAT	String	100ms	Input3 chattering time. Default = 2 sec. If '0', the input3 should not be set
OUT1_TYPE	'0' ~ '9'		0 = GPIO 1 = immobilizer 2 = Immobilizer & Auto active Auto Active means immobilizer is activated automatically when the vehicle starts being parked. 3 = Pulse 5 = Buzzer 8 = Immobilizer 2 9 = Auto Immobilizer 2 Others = Reserved
OUT2_TYPE	'0' ~ '9'		Same as OUT1_TYPE
OUT1_ACTIVE	'0' or '1'		0 = Open when out1 is active 1 = GND when out1 is active
OUT2_ACTIVE	'0' or '1'		0 = Open when out2 is active 1 = GND when out2 is active


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PULSE1_NO	String		Pulse number when the out1 type is set to pulse. Range : 0 ~ 9999 If Pulse Number is 9999, pulsing runs permanently.
PULSE1_ON	String	100ms	Active time of Pulse1:  Range : 0 ~ 9999 It should be set with an even number.
PULSE1_OFF	String	100ms	Inactive time of Pulse1:  Range : 0 ~ 9999 It should be set with an even number.
PULSE2_NO	String		Pulse number when out2 type set to pulse. Range : 0 ~ 9999 Same as PULSE1_NO
PULSE2_ON	String	100ms	Active time of pulse2:  Range : 0 ~ 9999 It should be set with an even number.
PULSE2_OFF	String	100ms	Inactive time of Pulse2:  Range : 0 ~ 9999 It should be set with an even number.
IN4_TYPE	'0' ~ '7' Or '9'		Case that an extra event IN4is available: Same as IN1_TYPE Case that an extra event IN4 is not available: IN4_TYPE should be '9'. 9 = No Use
IN5_TYPE	'0' ~ '7' Or '9'		Case that an extra event IN4can be supported : Same as IN1_TYPE Case that an extra event IN4 is not available: IN4_TYPE should be '9'. 9 = 'No Use'
IN4_CHAT	String		Chattering time when an extra event IN4is available:  Range : 0 ~ 9999 If 0, Input 4 is not checked. When the extra event IN4 is not available, it should be '0'.
IN5_CHAT	String		Chattering time when extra event IN5is available:  Range : 0 ~ 9999 If '0', Input 5 is not checked. When an extra event IN5 is not available, it should be '0'.
BAUD	'0' ~ '6'		It is available when RS232 is not supported for extra events. Baud-rate are: 0 = No use 1 = 4800bps 2 = 9600bps 3 = 19200bps 4 = 38400bps 5 = 115200bps 6 = 2400bps If the device does not support RS232, it should be 0.

**<Example>**

[command] ST300EVT;100850000;02;1;60;0;3;2;2;30;20;20;1;0;1;0;0;0;0;0;0;0;0;0



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[response] ST300EVT;Res;100850000;010;1;60;0;3;2;2;30;20;20;1;0;1;0;0;0;0;0;0;0;0;0

#### <Note>:

\*\* If IGNITION is set to '0', the device doesn't check driving or parking state of the vehicle. It always reports status string under parking mode, and cannot support Parking Lock and the Service which enters Sleep or Deep Sleep automatically when the vehicle is parked.

\*\* If IGNITION is set to '2', the device checks driving or parking state of the vehicle with voltage range of vehicle's battery. We named it as 'Virtual Ignition'. Virtual ignition runs when the device installed on a real vehicle and it may need to adjust the voltage range for special vehicle. For setting method, please refer to 6.3 of this document.

\*\* If "IN1\_TYPE" = 12 automatically "IGNITION" change for "1".

\*\* In case of pulse, pulse time may have tolerance about dozens of ms.

\*\* Immobilizer, LED Blink line and Buzzer type cannot set both OUT1 and OUT2 simultaneously.

\*\* In case that an event is set to "door sensor", the Active State means that the door is open.

#### \*\* Rain Sensor

Rain sensors are inputs to check if it rains.

If the type of rain sensor set to 'GND', the device recognizes rain when related line keeps ground during chattering time. Also, if it set to 'OPEN', the device recognizes rain when the line keeps logical high or open state during chattering time.


If the type of rain sensor set to 'PULSE', related chattering time means maximum time of one cycle of pulses. In this case, the device recognizes rain when pulses that don't exceed related chattering time continue to be generated.

#### In case of Input 4 or Input 5 in 'Event Parameters' section in the 'SyncTrak':

'Input 4 Type' should be fixed to "No Use".

The following table shows an example of how an event of 'Input 4 Type' should be set.

Field	Mark(s)	Value	Meaning
HDR	"ST300EVT"		Command type
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
IGNITION	'0' ~ '3'		Ignition using state 0 : Not use ignition 1 : Use ignition Line 2 : Virtual ignition(power) 3 : Virtual ignition (motion)
T1	String	Sec	Delay for entering parking mode after ignition goes to off
T2	String	Sec	Delay for entering driving mode after ignition goes to on

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IN1_TYPE	'0' ~ '13'		0 = Falling Edge 1 = Rising Edge 2 = Both Edge (Falling & Rising) 3 = Panic Button 4 = Call1 Button 5 = Call 2 Button 6 = Reserved 7 = Anti-Theft Button 9 = Not Used 11 = Door Sensor 12 = Ignition Line 13 = Disable Immobilizer if it is activated by jammer detector. 15 = Anti-Theft Button 2 17 = Hmeter Default = '3'. Only the device with a voice option (audio circuit) can be set to 'Call1 Button' or 'Call2 Button'.
IN2_TYPE	'9'		9 = No Use
IN3_TYPE	'9'		9 = No Use
IN1_CHAT	String	100ms	Chattering time of Input 1 Range : 0 ~ 9999 Default = 3 sec. If 0, the Input1 is not checked.
IN2_CHAT	'0'		
IN3_CHAT	'0'		
OUT1_TYPE	'7'		7 = No Use
OUT2_TYPE	'7'		7 = No Use
OUT1_ACTIVE	'0' or '1'		
OUT2_ACTIVE	'0' or '1'		
PULSE1_NO	'0'		
PULSE1_ON	'0'		
PULSE1_OFF	'0'		
PULSE2_NO	'0'		
PULSE2_ON	'0'		
PULSE2_OFF	'0'		
IN4_TYPE	'9'		9 = No Use
IN5_TYPE	'9'		9 = No Use
IN4_CHAT	'0'		
IN5_CHAT	'0'		
BAUD	'0'		0 = No use


<Example>:

[command] ST300EVT;100850000;02;1;60;0;3;2;2;30;20;20;1;0;1;0;0;0;0;0;0;0;0;0;0  
 [response] ST300EVT;Res;100850000;010;1;60;0;3;8;8;30;0;0;6;6;1;0;0;0;0;0;0;0;8;8;0;0;0

<Note>:

\*\* In case of Event 4 line model, IN2\_TYPE, IN3\_TYPE, IN4\_TYPE, IN5\_TYPE, OUT1\_TYPE and OUT2\_TYPE should be 'No Use'.

The 'Type' and 'Chat Time' of non-used event lines are set to 'No Use' and '0' automatically even though these Command Fields were set to other value.

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#### 4-4. GSM Parameters for SMS Messaging / Phone Calling

In order to set these parameters properly, read carefully the contents and <Example> along with <Note> described in the bottom inside the table below.

HDR	DEV_ID	VER	SMS_LOCK	SMS_MT1	SMS_MT2	SMS_MT3
SMS_MT4	IN_CALL_LOCK	CALL_MT1	CALL_MT2	CALL_MT3	CALL_MT4	CALL_MT5
CALL_MO1	CALL_MO2					

Field	Marks	Value	Meaning
HDR	"ST300GSM"		Command type
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
SMS_LOCK	'0' or '1'		Lock of Receiving Commands by SMS Disable (0) / Enable (1) If enabled, only the commands which have been received from SMS_MT1 ~ MT3, their number(s) can be accepted.
SMS_MT1	String	Up to 20 char.	Phone number for SMS commands
SMS_MT2	String	Up to 20 char.	Phone number for SMS commands
SMS_MT3	String	Up to 20 char.	Phone number for SMS commands
SMS_MT4	String	Up to 20 char.	Phone number for SMS commands
IN_CALL_LOCK	'0' or '1'		Lock of Incoming Call Disable (0) / Enable (1) If enabled, only a call number which have been received from CALL_MT1 ~ MT5 can be accepted.
CALL_MT1	String	Up to 20 char.	Phone number for calling
CALL_MT2	String	Up to 20 char.	Phone number for calling
CALL_MT3	String	Up to 20 char.	Phone number for calling
CALL_MT4	String	Up to 20 char.	Phone number for calling
CALL_MT5	String	Up to 20 char.	Phone number for calling
CALL_MO1	String	Up to 20 char.	Phone number for outgoing call from device
CALL_MO2	String	Up to 20 char.	Phone number for outgoing call from device


##### <Example>

[command] ST300GSM;100850000;02;0;;;0;;;

[response] ST300GSM;Res;100850000;010;0;;;0;;;

##### <Note>

\*\* When SMS or Call numbers are not set, that field should be empty.


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#### 4-5. Parameters for various features

In order to set these various parameters properly, read carefully the contents and <Example> along with <Note> described in the bottom inside the table below. In setting a new device, the 'SyncTrak' will show you detailed explanation on how to set parameters relating to these 'Fields'.

HDR	DEV_ID	VER	PARKING_LOCK	SPEED_LIMIT	PWR_DN
CON_TYPE	ZIP	GROUP_SEND	MP_CHK	ANT_CHK	BAT_CHK
M_SENSOR	CALL	GEO_FENCE	DATA_LOG	<b>SPEED_LIMIT UNDER_RAIN</b>	<b>DELAY_FOR_RAIN OVSPD_RPT</b>

Field	Marks	Value	Meaning
HDR	"ST300SVC"		Command type
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
PARKING_LOCK	'0' or '1'		Parking lock enable (1) / disable (0):  If 1, the device periodically checks vehicle position under parking status. When the vehicle goes off some boundary or starts moving faster than the predefined velocity, the device reports the Parking Lock Emergency.
SPEED_LIMIT	String	Km/h	Over speed limit:  If 0, the device does not check the over-speed.  If 1 and if the vehicle runs faster than the over predefined value, the device reports an alert once.
PWR_DN	'0' ~ '2'		Power saving type:  0 : Disabled sleep and deep sleep service 1 : Enabled deep sleep 2 : Enabled sleep
CON_TYPE	'0' ~ '2'		Connection Type with Server:  0 = KEEP_CON 1 = KEEP_DISCON 2 = KEEP_NOP Detail explanation is below.
ZIP	'0' or '1'		Use Zip Disable (0) / Enable (1)
GROUP_SEND	'0' or '1'		Group Send for stored data:  0 : Disable 1 : Enable. One packet can include up to 5 reports. The 'Group Send' function is explained below.
MP_CHK	'0' or '1'		Checking Main Power Disconnection:  Disable (0) / Enable (1)
ANT_CHK	'0' or '1'		GPS Antenna Connection Error Check:  Disable (0) / Enable (1)

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BAT_CHK	'0' or '1'		Backup Battery Error Check:  Disable (0) / Enable (1)																																				
M_SENSOR	'0' ~ '7'		Motion Sensor <table border="1"> <thead> <tr> <th></th><th>Motion</th><th>Collision</th><th>Shock</th></tr> </thead> <tbody> <tr><td>0</td><td>Disable</td><td>Disable</td><td>Disable</td></tr> <tr><td>1</td><td>Enable</td><td>Disable</td><td>Disable</td></tr> <tr><td>2</td><td>Disable</td><td>Disable</td><td>Enable</td></tr> <tr><td>3</td><td>Enable</td><td>Disable</td><td>Enable</td></tr> <tr><td>4</td><td>Disable</td><td>Enable</td><td>Disable</td></tr> <tr><td>5</td><td>Enable</td><td>Enable</td><td>Disable</td></tr> <tr><td>6</td><td>Disable</td><td>Enable</td><td>Enable</td></tr> <tr><td>7</td><td>Enable</td><td>Enable</td><td>Enable</td></tr> </tbody> </table>		Motion	Collision	Shock	0	Disable	Disable	Disable	1	Enable	Disable	Disable	2	Disable	Disable	Enable	3	Enable	Disable	Enable	4	Disable	Enable	Disable	5	Enable	Enable	Disable	6	Disable	Enable	Enable	7	Enable	Enable	Enable
	Motion	Collision	Shock																																				
0	Disable	Disable	Disable																																				
1	Enable	Disable	Disable																																				
2	Disable	Disable	Enable																																				
3	Enable	Disable	Enable																																				
4	Disable	Enable	Disable																																				
5	Enable	Enable	Disable																																				
6	Disable	Enable	Enable																																				
7	Enable	Enable	Enable																																				
CALL	'0' or '1'		Support Call with headset:  Disable (0) / Enable (1)																																				
GEO_FENCE	'0' or '1'		Support Geo-fence:  Disable (0) / Enable (1)																																				
DAT_LOG	'0' or '1'		Log out with RS232:  0 = No Use 1 = Enable getting saved log data by RS232  This parameter is not used now. But you can get all the stored data log from the device by using the SyncDown program and Setting cable.																																				
SPEED_LIMIT_UNDER_RAIN	String '0' ~ '300'	Km/h	Over speed limit under the rain. If 0, the device does not check over speed under rain. If greater than 0 and when it rains, the device checks over-speed under rain with SPEED_LIMIT_UNDER_RAIN.  This is supported only when protocol type of ST300H is set to 'ST300 P2'. In other cases, this field would be disappeared.																																				
DELAY_FOR_RAIN_OVSPD_RPT	'0' ~ '600'		Delay for alert report of over speed under rain. If the device has buzzer, the buzzer activates as soon as the vehicle runs faster than SPEED_LIMIT_UNDER_RAIN. But, the 'alert for over-speed under rain' would be reported after DELAY_FOR_RAIN_OVSPD_RPT seconds.  Unit : seconds This is supported only when protocol type of ST300H is set to 'ST300 P2'. In other cases, this field would be disappeared.																																				

**<Example>**


[command] ST300SVC;100850000;02;1;120;0;0;0;1;1;1;0;0;0;0

[response] ST300SVC;Res;100850000;010;1;120;0;0;0;1;1;1;0;0;0;0

**<Note>:**

\*\* Function of M\_SENSOR can be used with the model that has motion sensor.

If shock or collision detection is enabled and if there is shock or collision on the vehicle, the device sends a report to the server.

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\*\* If these parameters are customized for your device, please follow the instructions customized for you instead of using this table.

### **CON TYPE**

1. KEEP\_CON: Device always keeps TCP connection and can receive a command via GPRS.
2. KEEP\_DISCON: Device maintains TCP connection while the device is sending the data to the server. Within 3 minutes after sending all the data that the device has been keeping, the device disconnects GPRS and TCP connection as there is no data to be sent any more inside the device. In this case, the device cannot receive a command via GPRS.
3. KEEP\_NOP: Device does not send any reports after being installed. When the device enters Emergency mode or receives 'Start Report' command via SMS or RS232, it starts reporting depending on report parameters. It may be used for saving GPRS fee. The current version cannot support this option.


### **Group Send**

Device stores data if the vehicle is in 'no GPRS area'. And, the vehicle moves to GPRS available area, device starts sending the stored data.

If the 'Group Send option' is enabled, the device sends the server5 reports at one time as one bundle. The 'Group Send' is useful to speed up sending.

### **M Sensor**

1. Collision: Device sends an event report when ignition is ON and the vehicle moves.
2. Shock: Device sends an event report when ignition is OFF and the vehicle moves.

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#### 4-6. Voltage control parameters

In order to set these parameters properly, read carefully the contents and <Example> along with <Note> described in the bottom inside the table below. In setting a new device, the 'SyncTrak' will show you detailed explanation on how to set parameters relating to these 'Fields'.

HDR	DEV_ID	VER	CHR_STOP_THRES_12	CHR_STOP_THRES_24	DECIDE_BAT_24
OPERATION_STOP_THRES_12	OPERATION_STOP_THRES_24	IGNDET_H	IGNDET_L		

Field	Marks	Meaning
HDR	"ST300MBV"	Command type
DEV_ID	9 char.	Device ID
VER	"02"	Protocol Version
CHR_STOP_THRES_12	String	Not used
CHR_STOP_THRES_24	String	Not used
DECIDE_BAT_24	String	Voltage value to check if the vehicle's battery is 12V or 24V.
OPERATION_STOP_THRES_12	String	Voltage value to protect vehicle battery. In case of 12 V vehicle, the device stops operation if car battery voltage gets lower than this value.
OPERATION_STOP_THRES_24	String	Voltage value to protect vehicle. In case of 24 V vehicle, the device stops operation if car battery voltage gets lower than this value.
IGNDET_H	String	In case of virtual ignition, the vehicle can recognize driving state when vehicle power is higher than IGNDET_H. Default = '0'
IGNDET_L	String	In case of virtual ignition, the vehicle can recognize parking state when vehicle power is less than IGNDET_L. Default = '0'


##### <Example>

[command] ST300MBV;100850000;02;0;22;19;8.00;18.00;0;0

[response]ST300MBV;Res;100850000;122;0;22;19;8.00;18.00;0;0

##### <Note>

1. IGNDET\_H and IGNDET\_L are '0', device check parking and driving automatically.
2. CHR\_STOP\_THRES\_12 and CHR\_STOP\_THRES\_24 parameters are not used in ST300/ST340/ST350. Charging is stopped every time when vehicle mode changed to Parking.

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#### 4-7. Motion sensor parameters

In order to set these parameters properly, read carefully the contents and <Example> along with <Note> described in the bottom inside the table below. In setting a new device, the 'SyncTrak' will show you detailed explanation on how to set parameters relating to these 'Fields'.

HDR	DEV_ID	VER	SHOCK_DELAY	MOTION_THRES	SHOCK_THRES
COLL_THRES					

Field	Marks	Value	Meaning
HDR	"ST300MSR"		Command type
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
SHOCK_DELAY	String	Sec.	Delay in entering shock detection mode after ignition off 0 – Disable Range : 1 ~ 21600 (5hour) Recommend: 600 ( 10 min.)
MOTION_THRES	String	Step	Detection level of shock violation. Range : 0.04 ~ 2.0 Recommend : 0.04
SHOCK_THRES	String	Step	Detection level of shock violation. Range : 0.04 ~ 2.0 Recommend : 0.04
COLL_THRES	String	Step	Gravity for collision report. Range : 0.1 ~ 2.0 Recommend : 0.7
<p>&lt;Example&gt; [command] ST300MSR;;02;600;0.04;0.04;0.7 [response] ST300MSR;Res;852588;128;600;0.04;0.04;0.70</p> <p>&lt;Note&gt; * For the shock level, it is recommended that the user should set to 0.04. If the motion threshold is higher than 0.04, the sensor will be too sensitive to make a proper detection on shock. The setting values of " MOTION_THRES &lt; SHOCK_THRES &lt; COLL_THRES "</p>			




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#### 4-8. Circular geo-fencing parameters

This table shows how a device user can set parameters for circular geo-fencing. In order to set these parameters properly, read carefully the contents and <Example> along with <Note> described in the bottom inside the table below. In setting a new device, the 'SyncTrak' will show you detailed explanation on how to set parameters relating to these 'Fields'.

HDR	DEV_ID	VER	GEO_ID	ACTIVE	LAT	LON	RADIUS	IN	OUT
GEO_SPD_LIMIT	GEO_SPD_LIMIT_DEBOUNCE								

Field	Marks	Value	Meaning
HDR	"ST300CGF"		Command type
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
GEO_ID	'1' ~ '200'		Geo-fence ID
ACTIVE	'0' or '1'		enable (1) or disable (0)
LAT	String		Central latitude of circular area
LON	String		Central longitude of circular area
RADIUS	String	meter	Radius of circular area Range : 30~65,000
IN	'0' or '1'		Alert that a vehicle enters into the circular area. Enable (1) or disable (0)
OUT	'0' or '1'		Alert that a vehicle goes out from the circular area. Enable (1) or disable (0)
GEO_SPD_LIMIT	String	Km/h '0' ~ '300'	If zero, checking over-speed in a circle geo-fence is not supported. If not zero, when the vehicle is inside in a geo-fence, the device checks over-speed with GEO_SPD_LIMIT.  This is supported only when protocol type of ST300H is set to 'ST300 P2'. In other cases, this field would be disappeared.
GEO_SPD_LIMIT_DEBOUNCE	String	'0' ~ '1800'	De-bouncing time to confirming over-speed in a circle geo-fence.  Unit : second. This is supported only when protocol type of ST300H is set to 'ST300 P2'. In other cases, this field would be disappeared.
<b>&lt;Example&gt;</b> [command] ST300CGF;100850000;02;1;1;+37.000000;+127.000000;50;1;1;75.0;30 [response] ST300CGF;Res;100850000;010;1;1;+37.000000;+127.000000;50;1;1;75.0;30			


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#### 4-9. Additional Parameters (TCP/UDP Parameters)

In order to set these parameters properly, read carefully the contents and <Example> along with <Note> described in the bottom inside the table below. In setting a new device, the 'Additional Parameter' section available in the 'SyncTrak' program will show you detailed explanation on how to set parameters relating to these 'Fields'.

HDR	DEV_ID	VER	SVR_TYPE	B_SVR_TYPE	UDP_ACK	DEV_PORT
PROTOCOL_TYPE	SAT_OUT	SAT_DELAY	SAT_RS232	LBS_INFO	RESERVE	

Field	Definitions	Unit	Remark
HDR	"ST300ADP"		Command type
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
SVR_TYPE	'T' / 'U'		Server Protocol Type T : TCP U : UDP
B_SVR_TYPE	'T' / 'U'		Backup Server Protocol Type T : TCP U : UDP
UDP_ACK	'0' ~ '3'		'ACK' from the server when UPD is used:  0 : No Use  1 : ACK ('Acknowledgement' to be made by the server right after receiving a report from the device) when the server receives reports except 'Alive'  2 : ACK when the server receives reports except 'STT (Status) Report' and 'Alive Report'  3 : ACK when the server receives an 'emergency report'.  'Command response' doesn't need ACK.
DEV_PORT	String		It is a port of the device for receiving commands from the server via UDP.  It can be used only when UDP server is used.  If '0' or empty, the device would use port 9000.  If not zero, the device can receive commands through the port, DEV_PORT.
OLD_PROTOCOL PROTOCOL_TYPE	'0' ~ '2'		If '0', follow this document about commands and reports. 'Speed limit under rain' and 'speed limit in a circle geo-fence' cannot be supported. If '1', follow old document of ST215 or ST240 series. ( For example, use "SA200" as header and 6digits as unit ID). If '2', follow this document about commands and report including 'speed limit under rain' and 'speed limit in a circle geo-fence'.
SAT_OUT	String	'0' ~ '4'	Output control for satellite modem can detect the situation of

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			<div>no GSM. 0 = Disable 1 ~ 4 = Enable satellite if lost GSM signal.</div> <table><tr><td>SATELLITE</td><td>OUT 1</td><td>OUT 2</td></tr><tr><td>'1'</td><td>X</td><td>X</td></tr><tr><td>'2'</td><td>O</td><td>X</td></tr><tr><td>'3'</td><td>X</td><td>O</td></tr><tr><td>'4'</td><td>O</td><td>O</td></tr></table> <div>Please refer below note, Control of Satellite Modem</div>	SATELLITE	OUT 1	OUT 2	'1'	X	X	'2'	O	X	'3'	X	O	'4'	O	O
SATELLITE	OUT 1	OUT 2																
'1'	X	X																
'2'	O	X																
'3'	X	O																
'4'	O	O																
SAT_DELAY	String	Sec	<div>Delay time to activate the output after losing GSM/GPRS signal. Range : 0 ~ 86400 Please refer below note, Control of Satellite Modem</div>															
SAT_RS232	String	'0' or '1'	<div>Send reports through RS232 when SAT_OUT is activated. 0 : Disable 1 : Enable Caution: This function use only in ST300R. Please refer below note, Control of Satellite Modem</div>															
LBS_INFO / BACKUP_VOLT_F OR_POWER_OFF	String	'0' or '1'	<div>LBS_INFO Added LBS cell information fields(CELL_ID, MCC, MNC, RX_LVL, LAC, TM_ADV, GPS_ON_OFF) to STT, EMG, EVT, ALT report. 0 : Disable 1 : Enable Caution: This function use only in ST350B to supported LBS cell information.  BACKUP_VOLT_FOR_POWER_OFF When the vehicle battery line is disconnected, the device can power off if voltage of backup battery is less than setting value. This is for protection for whole discharge of backup battery and sudden power off at low battery. 0.0 = disable</div>															
RESERVE																		

<example>  
[command] ST300ADP;100850000;02;U;T;2;9000;0;0;0;0;1;0  
[response] ST300ADP;Res;100850000;022;U;T;2;9000;0;0;0;0;1;0  
<notes>  
This command can be applied from software version 22.

ACK in case of UDP

UDP is protocol that doesn't check whether the data is transmitted successfully. So, the device checks completion of sending with ACK depending on UDP\_ACK type.  
  
ACK is sent by server when the server receives the data.  
  
If the ACK has not been sent for more than 2 minutes after sending, the device recognizes the data has not been reached to the server and sends the data again.

Examples of ACK report are as below.  
String Format : "ST300ACK;100850000"  
Zip Format : 0x15 0x85 0x00 0x00

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Device users are recommended to set ACK\_TYPE to '1' to confirm that all the data can be transmitted successfully.

Report Type	UDP_ACK=0	UDP_ACK=1	UDP_ACK=2	UDP_ACK=3
Alive	X	X	X	X
STT	X	O	X	X
Event, Alert, Etc.	X	O	O	X
Emergency	X	O	O	O

<Note>

'O': Necessary


'X': Not necessary

#### **Control of Satellite Modem**

SAT\_OUT, SAT\_DELAY and SAT\_RS232 are used for connected satellite modem can communicate with server instead of the device under no GSM/GPRS situation.

Operation of the control is as follows.

1. If no GSM/GPRS situation keeps more than SAT\_DELAY, the device activates related output depend on SAT\_OUT.
2. If SAT\_OUT is activated, the satellite modem detects no GSM situation and starts own communication.
3. If SAT\_RS232 is enabled, the device sends STT string which has 'O' in MSG\_TYPE field through RS232. And then it sends all reports except for STT and Alive.
4. If GSM signal is recovered, the device deactivates output line related on SAT\_OUT. If SAT\_RS232 is enabled, STT string which has 'O' in MSG\_TYPE field is sent before the deactivation.

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#### 4-10. New Parameter Setting

In order to set these parameters properly, read carefully the contents and <Example> along with <Note> described in the bottom inside the table below. In setting a new device, the 'New Parameter Setting' section available in the 'SyncTrak' program will show you detailed explanation on how to set parameters relating to these 'Fields'.


HDR	DEV_ID	VER	ANGLE_RPT	RPT_TYPE	ANTITHFT_CNT1	ANTITHFT_CNT2	JAM_DET
JAM_CHK_DIST	JAM_CHK_TM	VI_ON_THRES	VI_ON_DELAY	VI_OFF_THRES	VI_OFF_DELAY		

- Definition : Set parameters related on report interval.

Field	Definitions	Unit	Remark																				
HDR	"ST300NPT"		Command type																				
DEV_ID	9 char.		Device ID																				
VER	"02"		Protocol Version																				
ANGLE_RPT	String	'0' - '180'	Reporting about the STT Message if the steering angle is greater than ANGLE_RPT:  0 : Disable Range : 1 to 180 degrees																				
RPT_TYPE	String	'0' or '1'	How to set a sequential rule of storing/erasing reports if buffer of the device is full of reports un-sent to the server:  0: FIFO: First in First Out. 1: LIFO: Last In First Out.																				
ANTITHFT_CNT1	String	Sec	Delay of Anti-Theft Release:  When ignition is on, it starts Anti-Theft emergency state after the user-defined time. Range : 10 to 10000 second																				
ANTITHFT_CNT2	String	Sec	Delay of Anti-Theft Alert:  When it is Anti-theft emergency state, it sends the emergency report after the user-defined time. Range : 0 to 10000 second																				
JAM_DET	String	'0' ~ '4'	GPRS or GPRS+GPS Jamming detection function:  0 = Disable 1 ~ 4 = enabled jamming detection and if detected first, check assist functions and then triggered by JAM_DET mode as follows. <table border="1"> <tr> <th>JAM_DET</th><th>Alert</th><th>Active Immob.</th><th>Active Buzzer</th></tr> <tr> <td>'1'</td><td>O</td><td>X</td><td>X</td></tr> <tr> <td>'2'</td><td>O</td><td>O</td><td>X</td></tr> <tr> <td>'3'</td><td>O</td><td>X</td><td>O</td></tr> <tr> <td>'4'</td><td>O</td><td>O</td><td>O</td></tr> </table> X – Inactive, O – Activated if jamming is detected.  Immobilizer: You can disable it by command.	JAM_DET	Alert	Active Immob.	Active Buzzer	'1'	O	X	X	'2'	O	O	X	'3'	O	X	O	'4'	O	O	O
JAM_DET	Alert	Active Immob.	Active Buzzer																				
'1'	O	X	X																				
'2'	O	O	X																				
'3'	O	X	O																				
'4'	O	O	O																				

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			<p>Buzzer: It is disabled automatically after being released from jamming.</p> <p>Device will send an alert after recovering the GSM network. It takes about 2 minutes or more for the device to complete a jamming detection.</p> <p>Default : 0</p>
JAM_CHK_DIST	'0' ~ '60000'	Meter	<p>This is complementary to the detection function of device described above on the GPRS jamming by utilizing a distance value as a parameter when jamming is done.</p> <p>Once jamming on the GPRS network starts being detected, the device will also check the distance between the current location of the vehicle and the First geographical Point ('Fp') where the jamming started being detected.</p> <p>If the distance is greater than JAM_CHK_DIST for a while triggered by JAM_DET mode.</p> <p>If '0', skip this procedure.</p> <p>Default : 500 meters</p>
JAM_CHK_TM	'0' ~ '43200'	Sec.	<p>It is complementary to the function of GPRS jamming detection in an area 'without GPS connectivity' ('No GPS').</p> <p>After detecting jamming first in such a bad GPS connecting area, the device begins to count the 2 time-length factors (<i>A</i> and <i>B</i>) to make a sum (<math>A + B = C</math>) if the vehicle moves in the area:</p> <ul style="list-style-type: none"> <li>● <i>A: time length that needs to complete the jamming detection</i></li> <li>● <i>B: time length that the vehicle driver needs to complete driving in the area.</i></li> </ul> <p>If <i>C</i> (the sum) is longer than the length of the jamming detection ('JAM_CHK_TM') the device judges that jamming was done in the area. Please refer to the table for more details.</p> <p>If the has not moved in the area, ignore jamming detection until the jamming detection function is released.</p> <p>If '0', skip this procedure.</p> <p>Default: 300 seconds.</p>
VI_ON_THRES	String	1/255G	<p>Threshold value for Motion Virtual Ignition On</p> <p>Range : 3~30</p> <p>Default : 5</p>
VI_ON_DELAY	String	Sec.	<p>Delay time for Motion Virtual Ignition On</p> <p>Range : 3~999</p> <p>Default : 10</p>
VI_ON_PERCENT	String	%	<p>Percent for Motion Virtual Ignition On.</p> <p>Range : 30~100</p>

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			Default: 70
VI_OFF_THRES	String	1/255G	Threshold value for Motion Virtual Ignition Off Range : 3~30 Default : 5
VI_OFF_DELAY	String	Sec.	Delay time for Motion Virtual Ignition Off Range : 3~999 Default : 10
VI_OFF_PERCENT	String	%	Percent for Motion virtual Ignition Off. Range : 30 ~ 100 Default : 70
HBM_STT	String	0' or '1'	Type of report as follows. 0 : Not Increase H_METER/ BCK_VOLT/ MSG_TYPE in "STT" String 1: Increase H_METER/ BCK_VOLT/ MSG_TYPE in "STT" String.
SVR_PWD	String		6 digits password that is encoded

**<example>**

[command] ST300NPT;100850000;02;0;0;0;0;500;300;5;10;70;5;10;70;0

[response] ST300NPT;Res;100850000;010; 02;0;0;0;0;500;300;5;10;70;5;10;70;0

**Jamming detection procedure**

JAM\_CHK\_DIST and & JAM\_CHK\_TM are complementary to jamming detection to avoid false detection. At least, we recommend that users of our device should utilize the 'JAM\_CHK\_DIST' for safety purposes. If you use the 2 (two) functions, it can detect the following two cases of jamming:

\*Case A: Jamming GPRS only.

Jamming detected ->JAM\_CHK\_DIST -> JAM\_CHK\_TM -> Triggered by JAM\_DET mode.

\*Case B: Jamming GPRS & GPS.

Jamming detected ->JAM\_CHK\_TM -> Triggered by JAM\_DET mode.

JAM\_CHK\_DIST: if 0, skip this function.

JAM\_CHK\_TM: if 0, skip this function.


In case all of the complementary functions are disabled, device starts working according to the jamming mode (JAM\_DET mode) after detecting the jamming. In this case, a false detection might be made in an area having a weak GSM connectivity or in an area having a strong radio.

**<note>**

**SVR\_PWD must be encoded by some algorithm.**

**This algorithm is described in 'Engineering\_Command\_ST300\_Series.pdf'.**



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#### 4-11. Telemetry Parameter Setting

HDR	DEV_ID	VER	TRAVEL_EVT	ODO_USE	ODO_UNIT	RPM_UNIT	ECO_MAX_RPM
ECO_MIN_RPM	MAX_RPM	DID_OUT_CTRL	MASTER_ADD	MASTER_REMOVE			
CHK_GEAR	CHK_GEAR_TIME	CHK_GEAR_RPM	MAX_REST_TIME	MAX_STOP_TIME			

- Definition : Set telemetry parameters.

Field	Definitions	Unit	Remark															
HDR	“ST300HTP”		Command type															
DEV_ID	9 char.		Device ID															
VER	“02”		Protocol Version															
TRAVEL_EVT	String	‘0’ or ‘1’	0: Doesn’t send travel event string 1: Send travel event string when the vehicle is parked.															
ODO_USE	String	‘0’ or ‘1’	0: Use GPS to report speed and distance. 1: Use odometer to report speed and distance”.															
ODO_UNIT	String	Pulse	Number of pulse in 1km. If the field is “A”, ODO_UNIT should be calibrated by the installer. Refer odometer calibration in 7.9. <b>If the field is ‘0’, it means no use of odometer. So, distance by odometer is not calculated any more.</b>															
RPM_UNIT	String	pulse	Number of pulse in 1000RPM. If the field is “A”, RPM_UNIT should be calibrated by the installer. Refer RPM calibration in 7.9.															
ECO_MAX_RPM	String	RPM	Maximum RPM of economic range															
ECO_MIN_RPM	String	RPM	Minimum RPM of economic range															
MAX_RPM	String	RPM	Maximum PRM When RPM of vehicle exceeds the MAX_RPM, the device counts this time and reports in travel event string.															
DID_OUT_CTRL	String	‘0’ ~‘4’	Output control by Driver ID <table><tr><td></td><td>Out 1</td><td>Out 2</td></tr><tr><td>‘0’</td><td>X</td><td>X</td></tr><tr><td>‘1’</td><td>O</td><td>O</td></tr><tr><td>‘2’</td><td>X</td><td>O</td></tr><tr><td>‘3’</td><td>O</td><td>X</td></tr></table> O: It means the output is activated automatically when the vehicle starts driving (ignition on) without registered driver ID. X : Not control		Out 1	Out 2	‘0’	X	X	‘1’	O	O	‘2’	X	O	‘3’	O	X
	Out 1	Out 2																
‘0’	X	X																
‘1’	O	O																
‘2’	X	O																
‘3’	O	X																
MASTER_ADD	String		Master driver ID to register new driver ID. Master is inserted and removed, and then another I-button is inserted within 10s after removing master. In this case, another ID can be registered automatically.															
MASTER_REMOVE	String		Master driver ID to unregister driver ID. Master is inserted and removed, and then another I-button is inserted within 10s after removing master. In this case, another ID can be unregistered automatically.															
CHK_GEAR	String	‘0’ or ‘1’	Enable/disable checking the vehicle moves putting the gear in dead center (neutral). Dead center condition is checked when so low RPM but vehicle moves fast. 0 : Disable															



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			1 : Enable
CHK_GEAR_TIME	String	Sec.	Time to check CHK_GEAR Range : 3~999 Recommended value : 10
CHK_GEAR_RPM	String	RPM	PRM value to judge alert situation of CHK_GEAR Recommended value : 1000
MAX_REST_TIME	String	Sec.	Time to alert for no driving with ignition on. If not '0', the device alerts when the driver stops with ignition on during more MAX_REST_TIME.
MAX_STOP_TIME	String	Sec.	Time to alert for stopping If not '0', the device alerts when the time of stop exceeds MAX_STOP_TIME.
<b>&lt;example&gt;</b> [command] ST300HTP;850000;02;1;1;16344;16;3200;1500;4000;0;0100004E160000;;1;10;1000;0;0 [response] ST300HTP;Res;850000;267;1;1;16344;16;3200;1500;4000;0;0100004E160000;;1;10;1000;0;0 <b>&lt;notes&gt;</b> <b>This setting work only ST300H</b>			


## 4-12. Driver ID Parameter Setting

### 4-12-1. ADD Driver ID

HDR	DEV_ID	VER	DID_POS (1 <sup>st</sup> )	DID (1 <sup>st</sup> )	...	...	DID_POS (last)	DID (last)
-----	--------	-----	----------------------------	------------------------	-----	-----	----------------	------------

- Definition : Add driver ID to registration table.

Field	Definitions	Unit	Remark												
HDR	"ST300HAD"		Command type												
DEV_ID	9 char.		Device ID												
VER	"02"		Protocol Version												
DID_POS (1 <sup>st</sup> )	String	"1~ 100"	Index position of driver ID to save												
DID(1 <sup>st</sup> )	String	14hex digits	Driver ID												
...															
...															
DID_POS (last)	String	"1~ 100"	Index position of driver ID to save												
DID(last)	String	14hex digits	Driver ID												
<b>&lt;example&gt;</b> [command] ST300HAD;850000;02;001;00001000000000;002;00002000ABCDEF;005;00003333AAAAAA; ... [response] ST300HAD;Res;850000;267;001; 00001000000000;002; 00002000ABCDEF;005;00003333 AAAAAA; ...  After receiving this command, the device will save new driver ID as below table. <table> <tr> <td>1<sup>st</sup> position</td><td>00001000000000</td><td>2<sup>nd</sup> position</td><td>00002000ABCDEF</td></tr> <tr> <td>3<sup>rd</sup> position</td><td></td><td>4<sup>th</sup> position</td><td></td></tr> <tr> <td>5<sup>th</sup> position</td><td>00003333AAAAAA</td><td>...</td><td></td></tr> </table> <b>&lt;notes&gt;</b> <b>This setting work only ST300H</b>				1 <sup>st</sup> position	00001000000000	2 <sup>nd</sup> position	00002000ABCDEF	3 <sup>rd</sup> position		4 <sup>th</sup> position		5 <sup>th</sup> position	00003333AAAAAA	...	
1 <sup>st</sup> position	00001000000000	2 <sup>nd</sup> position	00002000ABCDEF												
3 <sup>rd</sup> position		4 <sup>th</sup> position													
5 <sup>th</sup> position	00003333AAAAAA	...													

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#### 4-12-2. Remove Driver ID

HDR	DEV_ID	VER	DID_POS
-----	--------	-----	---------

- Definition : Remove driver ID to registration table.


Field	Definitions	Unit	Remark
HDR	"ST300HRD"		Command type
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
DID_POS	String	"1~ 100" or "ALL"	Index position of driver ID to remove. If "ALL", all driver ID will be removed.
<b>&lt;example&gt;</b> [command] ST300HRD;850000;02;001 [response] ST300HRD;Res;850000;267;001 <b>&lt;notes&gt;</b> <b>This setting work only ST300H</b>			

#### 4-12-3. Get Drive ID

HDR	DEV_ID	VER	HD_DID	DRIVE_ID_N	ID_DRIVER
-----	--------	-----	--------	------------	-----------

- Definition : Read driver ID from registration table.

Field	Definitions	Unit	Remark
HDR	"ST300HGD"		Command type
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
DID_POS	String	"1~ 100" or "ALL"	Driver ID's position If "ALL", the device should informs all driver IDs.
<b>&lt;example&gt;</b> [command] ST300HGD;850000;02;001 [response] ST300HGD;Res;850000;267;001; <b>00001000000000</b>  In case of the device has 21 driver id : [command] ST300HGD;850000;ALL [response] ST300HGD;Res;850000;267;001;01000000000101;002;01000000000102;003;01000000000103; 004;01000000000104;005;01000000000105;006;01000000000106;007;01000000000107; 008;01000000000108;009;01000000000101;010;01000000000101;011;01000000000111; 012;01000000000112;013;01000000000113;014;01000000000114;015;01000000000115; 016;01000000000116;017;01000000000117;018;01000000000118;019;01000000000119; 020;01000000000120; <b>Continued</b> SA200HGD;Res;850000;267;021;01000000000121 <b>&lt;notes&gt;</b> <b>This setting work only ST300H</b>			


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#### 4-13. Driver Pattern Analysis Setting

HDR	DEV_ID	VER	DRVPTN_EN	BASESPEED	FASTACCEL
HARSHBRAKE	SHARPTURN				

- Definition : Set parameter related Driver Pattern Analysis Function.

Field	Definitions	Unit	Remark
HDR	"ST300DPA"		Command type
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
DRVPTN_EN	0 or 1		0 : disable 1 : enable
BASESPEED	String	Km/h	Base speed limitation value (default : Device will be checking Driver Pattern Data when the current speed is over this value.
FASTACCEL	String	[X/256]G	Fast acceleration violation value This value is based on the difference value of speed during 1 second. This value can be set 1 ~ 512
HARSHBRAKE	String	[X/256]G	Harsh brake violation value. This value can be set 1 ~ 512
SHARPTURN	String	[X/256]G	Sharp turn violation value. This value can be set 1 ~ 512
HAB_BUZZER	String	'0' or '1'	0 : Disable "active output (Buzzer)" when sending Driver Pattern alert 1 : Enable "active output (Buzzer)" when sending Driver Pattern alert
TIME_BUZZER	String		Time to active Buzzer when driver pattern alert.
<b>&lt;example&gt;</b> [command] ST300DPA;600850000;02;1;50.0;7.5;15.0;45.0;1;5  [response] ST300DPA;Res;600850000;651;1;50.0;7.5;15.0;45.0;1;5  <b>&lt;notes&gt;</b> <b>This setting works only ST300H, ST350LC2D, ST350LC4D</b>			

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## 5. Reporting to Server

Once a device is configured properly and registered on its server for operation, it sends reports to the server (or sends SMS messages to cellular phone whose number is pre-defined) either in response to the commands made by the server or as per the way how the device has been configured to respond to its server.

This *chapter* shows the strings of each report, so that server could understand the contents. One report can be issued in either of two types, normal string and zip string, both of which are described below.

Also, note that we take an <Example> and make a <Note> in bottom part of each report in this chapter to help the users understand better what contents are included in the report. So, it is highly recommended that users should read the whole parts of the reports very carefully.


Model Identification Table

Model	ID
ST300RI	01
ST340	02
ST340LC(4pin)	03
ST300H	04
ST350	05
ST340RB	17

### Observation

The "H\_METER/ BCK\_VOLT/ MSG\_TYPE" is include in report only when "HBM\_STT" is "1"

The "DID/ DID\_REG/RPM" is include in report only when "HBM\_STT" is "1" at **ST300H** model.

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## 5-1. Status Report

This report ('Status Report') is sent to the server periodically as defined by user to configure 'status report' if conditions for issuing the report are met. The following two (2) tables show that one reporting can be made in 2 different types such as in 'string' and in 'zip'.

HDR	DEV_ID	MODEL	SW_VER	DATE	TIME	CELL	LAT
LON	SPD	CRS	SATT	FIX	DIST	PWR_VOLT	I/O
MODE	MSG_NUM	H_METER	BCK_VOLT	MSG_TYPE	RPM	DID	DID_REG
CELL_ID	MCC	MNC	RX_LVL	LAC	TM_ADV	GPS_ON_OFF	

### 5-1-1. Normal

Field	Marks	Meaning
HDR	"ST300STT"	Header of Status Report
DEV_ID	9 char.	Device ID
MODEL	2Char	Device Model (According to table model)
SW_VER	3 char.	Number of the released Software Version
DATE	8 char.	GPS date (yyyymmdd) Year + Month + Day
TIME	8 char.	GPS time (hh:mm:ss) Hour : Minute : Second
CELL	String	Location Code ID(3 digits hex) + Serving Cell BSIC(2 digits decimal)
LAT	String	Latitude (+/-xx.xxxxxx)
LON	String	Longitude (+/-xxx.xxxxxx)
SPD	String	Speed in km/h This value returns to 0 when it is over than 200,000km (kilo meters).
CRS	String	Course on the ground in degree
SATT	String	Number of satellites
FIX	'1' or '0'	GPS is fixed (1); GPS is not fixed (0)
DIST	String	Traveled distance in meter. Max 999999999
PWR_VOLT	String	Voltage value of the main power
I/O	6 char.	Current I/O status of the inputs and the outputs:  Ignition + Input1 + Input 2 + Input 3 + Out1 + Out2 Ignition : '1' (ON), '0' (OFF) Input1 ~ Input3 : '1' (Ground, Shorted), '0' (Opened) Out1 ~ Out2 : '1' (Active), '0' (Inactive)
MODE	1 char.	'1' = Idle mode(Parking) '2' = Active Mode(Driving)
MSG_NUM	4 char.	Message number  After "9999" is reported, message number returns to '0000'.
H_METER	String	Driving hour-meter. Max 999999
BCK_VOLT	String	Voltage value of backup battery
MSG_TYPE	1 char	Report is real time (1), Report is storage (0)
RPM	String	Current RPM. Only for ST300H
DID	14 char.	Driver ID (inserted I-button ID ). Only for ST300H

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DID_REG	1 char.	State of DID's registration. Only for ST300H '0' = not registered. '1' = registered.
CELL_ID	String	Information of Cell ID Cell ID(4 digits hex) + Location Code ID(4 digits Hex) + Serving Cell DSIC(2 digits decimal)
MCC	String	Information of Mobile Country Code
MNC	String	Information of Mobile Network Code
RX_LVL	String	Information of Signal Strength
LAC	String	Information of Location Area Code
TM_ADV	String	Information of Timing Advance
GPS_ON_OFF	String	GPS ON or GPS OFF flag

**<Example>**

ST300STT;100850000;01;010;20081017;07:41:56;00100;+37.478519;+126.886819;000.012;000.00;9;1;0;15.3  
0;001100;1;0072;0;4.5;1;1750;012497F1160000;1;004f001454;450;00;-320;20;255;1


**<Note>**

The "H\_METER/ BCK\_VOLT/ MSG\_TYPE" a include in STT only when "HBM\_STT" is "1"  
 The "DID/ DID\_REG/RPM" is include in STT only when "HBM\_STT" is "1" at **ST300H** model.  
 The "CELL\_ID/MCC/MNC/RX\_LVL/LAC/TM\_ADV/GPS\_ON\_OFF" is included in STT only when "LBS  
 Information" is enable at ST350B model to supported LBS.

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## 5-1-2. Zip

Field	Marks	Meaning						
STX	0x02	Start of zip data						
PKT_LEN	2 Bytes	Length of zip data, HDR to MSG_TYPE						
HDR	0x10	Header of Status Report						
DEV_ID	5 bytes	Device ID BCD format  If the Device ID is 123456789, this field will be filled with 0x12, 0x34, 0x56 0x78 and 0x90.						
MODEL	1byte	Device Model (According to table model)						
SW_VER	2 byte	Software Version						
DATE_TIME	6 bytes	GPS date & Time (Year + Month + Day + Hour + Minute + Second)						
CELL	3 bytes	Location Code ID (2 bytes) + Serving Cell BSIC (1 byte)						
LAT	4 bytes	1 byte (integer) + 3 bytes (BCD)						
LON	4 bytes	1 byte (integer) + 3bytes (BCD)						
SPD	3 bytes	2 bytes (integer) + 1 byte (BCD)						
CRS	3 bytes	2 bytes (integer) + 1 byte (BCD)						
SATT_FIX	1 byte	<table><tr><td>Bit 7 Fix</td><td>Bit 6 Latitude +/- sign</td><td>Bit 5 Longitude +/- sign</td><td>Bit 4 ~ Bit 0 Satellite's count</td></tr></table> + sign = 0, - sign = 1	Bit 7 Fix	Bit 6 Latitude +/- sign	Bit 5 Longitude +/- sign	Bit 4 ~ Bit 0 Satellite's count		
Bit 7 Fix	Bit 6 Latitude +/- sign	Bit 5 Longitude +/- sign	Bit 4 ~ Bit 0 Satellite's count					
DIST	4 bytes	Traveled distance in meter						
PWR_VOLT	2 bytes	Voltage value of main power 1 byte (integer) + 1 byte (BCD)						
I/O	1 byte	<table><tr><td>Bit 5 Out 2</td><td>Bit 4 Out1</td><td>Bit 3 Input 3</td><td>Bit 2 Input 2</td><td>Bit 1 Input1</td><td>Bit 0 Ignition</td></tr></table> Ignition : 1 (ON), 0 (OFF) Input1 ~ Input3 : 1 (Ground, Shorted), 0 (Opened) Out1 ~ Out2 : 1 (Active), 0 (Inactive)	Bit 5 Out 2	Bit 4 Out1	Bit 3 Input 3	Bit 2 Input 2	Bit 1 Input1	Bit 0 Ignition
Bit 5 Out 2	Bit 4 Out1	Bit 3 Input 3	Bit 2 Input 2	Bit 1 Input1	Bit 0 Ignition			
MODE	1 byte	1 = Idle (Parking), 2 = Active (Driving)						
MSG_NUM	2 bytes	Message number  After 9999, message number returns to 0.						
H_METER	4 bytes	Driving hour-meter						
BCK_VOLT	2 bytes	Voltage value of backup battery						
MSG_TYPE	1 byte	Report is real time (1), Report is storage (0)						
RPM	2 bytes	Current RPM						
DID	7 bytes	Driver ID (inserted I-button ID )						
DID_REG	1 byte	State of DID's registration. 0 = not registered. 1 = registered.						
CELL_ID	5 bytes	Information of Cell ID Cell ID(2 bytes(hex)) + Location Code ID(2 bytes(hex)) + Serving Cell DSIC(1 byte(integer))						
MCC	4 bytes	Information of Mobile Country Code This field shown ASCII code. 0x00 means empty space(NULL).						
MNC	4 bytes	Information of Mobile Network Code This field shown ASCII code. 0x00 means empty space(NULL).						

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RX_LVL	2 bytes	Information of Signal Strength If this field is starting to 0xf(like 0xfe), this value is minus. If you want correct value then do 2's complement.
LAC	2 bytes	Information of Location Area Code
TM_ADV	1 bytes	Information of Timing Advance
GPS_ON_OFF	1 bytes	GPS ON or GPS OFF flag
ETX	0x03	End of zip data.

#### <Example>

#### Original String :

ST300STT;100850001;01;010;20081017;07:41:56;2F100;+37.478519;+126.886819;032.512;000.00;9;1;500;15.30;001100;1;0072;0;4.5;1;1750;012497F1160000;1;004f001454;450;00;-320;20;255;1


#### → Zip Packet

Filed name	Zip data	Comment with string data
STX	0x02	
PKT_LEN	0x00 0x3c	
HDR	0x10	"ST300STT"
DEV_ID	0x10 0x08 0x50 0x00 0x10	"100850001", BCD, MSB
MODEL	0x01	"01"
SW_VER	0x00 0x0a	"010"
DATE_TIME	0x08 0x0a 0x11 0x07 0x29 0x38	"20081017;07:41:56"
CELL	0x02 0xf1 0x00	"2F100", BCD, MSB
LAT	0x25 0x47 0x85 0x19	"+37.478519", Decimal part is BCD
LON	0x7e 0x88 0x68 0x19	"+126.886819", Decimal part is BCD
SPD	0x00 0x20 0x51	"032.512". Convert to "032.51" Decimal part is BCD, MSB
CRS	0x00 0x00 0x00	"000.00", Decimal part is BCD, MSB
SATT_FIX	0x89	GPS fixed. Cell count = 9. Lat. & Lon. sign = plus
DIST	0x00 0x00 0x01 0xf4	"500". MSB
PWR_VOLT	0x0f 0x30	"15.30". Decimal part is BCD, MSB
I/O	0x0c	"001100"
MODE	0x01	"1"
MSG_NUM	0x00 0x48	"0072", MSB
H_METER	0x00 0x00 0x00 0x00	"0", MSB
BCK_VOLT	0x04 0x50	"4.5", Decimal part is BCD
MSG_TYPE	0x01	"1"
RPM	0x06, 0xd6	"1750", MSB
DID	0x01 0x24 0x97 0xf1 0x16 0x00 0x00	"012497F1160000"
DID_REG	0x01	"1"
CELL_ID	0x00 0x4f 0x00 0x14 0x36	"004f001454"
MCC	0x34 0x35 0x30 0x00	"450"
MNC	0x30 0x30 0x00 0x00	"00"
RX_LVL	0xfe 0xc0	"-320"
LAC	0x00 0x14	"20"
TM_ADV	0xff	"255"
GPS_ON_OFF	0x01	"1"
ETX	0x03	

#### <Note>

The "H\_METER/ BCK\_VOLT/ MSG\_TYPE" is include in STT only when "HBM\_STT" is "1"  
 The "DID/ DID\_REG/RPM" is include in STT only when "HBM\_STT" is "1" at **ST300H** model.  
 The "CELL\_ID/MCC/MNC/RX\_LVL/LAC/TM\_ADV/GPS\_ON\_OFF" is included in STT only when "LBS Information" is enable at ST350B model to supported LBS.



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## 5-2. Emergency Report

When an emergency occurs, device sends to the server this 'emergency report' as defined already in the course of configuring device.

HDR	DEV_ID	MODEL	SW_VER	DATE	TIME	CELL	LAT
LON	SPD	CRS	SATT	FIX	DIST	PWR_VOLT	I/O
EMG_ID	H_METER	BCK_VOLT	MSG_TYPE	RPM	DID	DID_REG	CELL_ID
MCC	MNC	RX_LVL	LAC	TM_AVD	GPS_ON/OFF		

### 5-2-1. Normal

Field	Marks	Meaning
HDR	"ST300EMG"	Header of Status Report
DEV_ID	9 char.	Device ID
MODEL	2Char	Device Model (According to table model)
SW_VER	3 char.	Software Version
DATE	8 char.	GPS date (yyyymmdd)
TIME	8 char.	GPS time (hh:mm:ss)
CELL	String	Location Code ID(3 digits hex) + Serving Cell BSIC(2 digits decimal)
LAT	String	Latitude (+/-xx.xxxxxx)
LON	String	Longitude (+/-xxx.xxxxxx)
SPD	String	Speed in km/h
CRS	String	Course over ground in degree
SATT	String	Number of satellites
FIX	'1' or '0'	GPS is fixed (1), GPS is not fixed (0)
DIST	String	Traveled distance in m.
PWR_VOLT	String	Voltage value of main power
I/O	6 char.	Current I/O status of inputs and outputs. Ignition + Input1 + Input 2 + Input 3 + Out1 + Out2 Ignition : '1' (ON), '0' (OFF) Input1 ~ Input3 : '1' (Ground, Shorted), '0' (Opened) Out1 ~ Out2 : '1' (Active), '0' (Inactive)
EMG_ID	1 char.	Emergency type:  '1' = emergency by panic button '2' = emergency by parking lock '3' = emergency by removing main power. It's only available in model that has a backup battery. '5' = emergency by anti-theft '6' = emergency by anti-theft door '7' = emergency by motion '8' = emergency by anti-theft shock
H_METER	String	Driving hour-meter
BCK_VOLT	String	Voltage value of backup battery
MSG_TYPE	1 char	Report is real time (1), Report is storage (0)
RPM	String	Current RPM
DID	14 char.	Driver ID (inserted I-button ID )
DID_REG	1 char.	State of DID's registration. '0' = not registered. '1' = registered.

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CELL_ID	String	Information of Cell ID Cell ID(4 digits hex) + Location Code ID(4 digits Hex) + Serving Cell DSIC(2 digits decimal)
MCC	String	Information of Mobile Country Code
MNC	String	Information of Mobile Network Code
RX_LVL	String	Information of Signal Strength
LAC	String	Information of Location Area Code
TM_ADV	String	Information of Timing Advance
GPS_ON_OFF	String	GPS ON or GPS OFF flag

**<Example>**

ST300EMG;100850000;01;010;20081017;07:41:56;00100;+37.478519;+126.886819;000.012;000.00;9;1;0;15.30;001100;1;0;4.5;1;1750;012497F1160000;1;004f001454;450;00;-320;20;255;1


**<Note>**

Emergency reports are sent A1 times until the unit receives server acknowledge.

The "H\_METER/ BCK\_VOLT/ MSG\_TYPE" is include in emergency report only when "HBM\_STT" is "1"


The "DID/ DID\_REG/RPM" is include in emergency report only when "HBM\_STT" is "1" at **ST300H** model.

The "CELL\_ID/MCC/MNC/RX\_LVL/LAC/TM\_ADV/GPS\_ON\_OFF" is included in EMG only when "LBS Information" is enable at ST350B model to supported LBS.

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## 5-2-2. Zip

Field	Marks	Meaning						
STX	0x02	Start of zip data						
PKT_LEN	2 Bytes	Length of zip data, HDR to MSG_TYPE						
HDR	0x11	Header of Emergency Report						
DEV_ID	5 bytes	Device ID BCD format  If the Device ID is 123456789, this field will be filled with 0x12, 0x34, 0x56 0x78 and 0x90.						
MODEL	1byte	Device Model (According to table model)						
SW_VER	2 byte	Software Version						
DATE_TIME	6 bytes	GPS date & Time (Year + Month + Day + Hour + Minute + Second)						
CELL	3 bytes	Location Code ID (2 Bytes) + Serving Cell BSIC (1 Byte)						
LAT	4 bytes	1 byte (integer) + 3 bytes (BCD)						
LON	4 bytes	1 byte (integer) + 3bytes (BCD)						
SPD	3 bytes	2 bytes (integer) + 1 byte (BCD)						
CRS	3 bytes	2 bytes (integer) + 1 byte (BCD)						
SATT_FIX	1 byte	<table border="1"><tr><td>Bit 7 Fix</td><td>Bit 6 Latitude +/- sign</td><td>Bit 5 Longitude +/- sign</td><td>Bit 4 ~ Bit 0 Satellite's count</td></tr></table> + sign = 0, - sign = 1	Bit 7 Fix	Bit 6 Latitude +/- sign	Bit 5 Longitude +/- sign	Bit 4 ~ Bit 0 Satellite's count		
Bit 7 Fix	Bit 6 Latitude +/- sign	Bit 5 Longitude +/- sign	Bit 4 ~ Bit 0 Satellite's count					
DIST	4 byte	Traveled distance in meter						
PWR_VOLT	2bytes	Voltage value of the main power 1 byte (integer) + 1 byte (BCD)						
I/O	1 byte	<table border="1"><tr><td>Bit 5 Out 2</td><td>Bit 4 Out1</td><td>Bit 3 Input 3</td><td>Bit 2 Input 2</td><td>Bit 1 Input1</td><td>Bit 0 Ignition</td></tr></table> Ignition : 1 (ON), 0 (OFF) Input1 ~ Input3 : 1 (Ground, Shorted), 0 (Opened) Out1 ~ Out2 : 1 (Active), 0 (Inactive)	Bit 5 Out 2	Bit 4 Out1	Bit 3 Input 3	Bit 2 Input 2	Bit 1 Input1	Bit 0 Ignition
Bit 5 Out 2	Bit 4 Out1	Bit 3 Input 3	Bit 2 Input 2	Bit 1 Input1	Bit 0 Ignition			
EMG_ID	1 byte	Emergency type:  1' = emergency by panic button 2' = emergency by parking lock 3' = emergency by removing main power. It's only available in model that has a backup battery. 5' = emergency by anti-theft 6' = emergency by anti-theft door 7' = emergency by motion 8' = emergency by anti-theft shock						
H_METER	4bytes	Driving hour-meter						
BCK_VOLT	2bytes	Voltage value of backup battery						
MSG_TYPE	1 char	Report is real time (1), Report is storage (0)						
RPM	2 bytes	Current RPM						
DID	7 byte	Driver ID (inserted I-button ID )						
DID_REG	1 byte	State of DID's registration. 0 = not registered. 1 = registered.						
CELL_ID	5 bytes	Information of Cell ID Cell ID(2 bytes(hex)) + Location Code ID(2 bytes(hex)) + Serving Cell						

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		DSIC(1 byte(integer))
MCC	4 bytes	Information of Mobile Country Code This field shown ASCII code. 0x00 means empty space(NULL).
MNC	4 bytes	Information of Mobile Network Code This field shown ASCII code. 0x00 means empty space(NULL).
RX_LVL	2 bytes	Information of Signal Strength If this field is starting to 0xf(like 0xfe), this value is minus. If you want correct value then do 2's complement.
LAC	2 bytes	Information of Location Area Code
TM_ADV	1 bytes	Information of Timing Advance
GPS_ON_OFF	1 bytes	GPS ON or GPS OFF flag
ETX	0x03	End of zip data.

#### <Example>


##### Original String :

ST300EMG;100850001;01;010;20081017;07:41:56;2F100;+37.478519;+126.886819;032.012;000.00;9;1;500;15.30;001100;1;0;4.5;1;1750;012497F1160000;1;004f001454;450;00;-320;20;255;1

##### → Zip Packet

Zip data	Filed name	Comment
0x02	STX	
0x00 0x3a	PKT_LEN	
0x11	HDR	"ST300EMG"
0x10 0x08 0x50 0x00 0x10	DEV_ID	"100850001", BCD, MSB
0x01	MODEL	"01"
0x00 0x0A	SW_VER	"010"
0x08 0x0a 0x11 0x07 0x29 0x38	DATE_TIME	"20081017;07:41:56"
0x02 0xF1 0x00	CELL	"2F100", BCD, MSB
0x25 0x47 0x85 0x19	LAT	"+37.478519", Decimal part is BCD
0x7e 0x88 0x68 0x19	LOn	"+126.886819", Decimal part is BCD
0x00 0x20 0x51	SPD	"032.512". Convert to "032.51" Decimal part is BCD, MSB
0x00 0x00 0x00	CRS	"000.00", Decimal part is BCD, MSB
0x89	SATT_FIX	GPS fixed. Cell count = 9. Lat. & Lon. sign = plus
0x00 0x00 0x01 0xF4	DIST	"500". MSB
0x0F 0x30	PWR_VOLT	"15.30". Decimal part is BCD, MSB
0x0c	I/O	"001100"
0x01	EMG_ID	"1"
0x00 0x00 0x00 0x00	H_METER	"0", MSB
0x04 0x50	BCK_VOLT	"4.5", Decimal part is BCD
0x01	MSG_TYPE	"1"
0x06, 0xD6	RPM	"1750", MSB
0x01 0x24 0x97 0xF1 0x16 0x00 0x00	DID	"012497F1160000"
0x01	DID_REG	"1"
0x00 0x4f 0x00 0x14 0x36	CELL_ID	"004f001454"
0x34 0x35 0x30 0x00	MCC	"450"
0x30 0x30 0x00 0x00	MNC	"00"
0xfe 0xc0	RX_LVL	"-320"
0x00 0x14	LAC	"20"
0xff	TM_ADV	"255"
0x01	GPS_ON_OFF	"1"
0x03	ETX	

#### <Note>

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Emergency reports are sent A1 times until the unit receives server acknowledge.  
The "H\_METER/ BCK\_VOLT/ MSG\_TYPE" is include in emergency report only when "HBM\_STT" is "1"  
The "DID/ DID\_REG/RPM" is include in emergency report only when "HBM\_STT" is "1" at **ST300H** model.  
The "CELL\_ID/MCC/MNC/RX\_LVL/LAC/TM\_ADV/GPS\_ON\_OFF" is included in STT only when "LBS Information" is enable at ST350B model to supported LBS.


### 5-3. Event Report

When an emergency occurs, device sends to the server this 'event report' as defined already in the course of configuring the device. The following shows a sample of event report that is sent to the server if 'Input Line' is changed.

HDR	DEV_ID	MODEL	SW_VER	DATE	TIME	CELL	LAT
LON	SPD	CRS	SATT	FIX	DIST	PWR_VOLT	I/O
EVT_ID	H_METER	BCK_VOLT	MSG_TYPE	RPM	DID	DID_REG	CELL_ID
MCC	MNC	RX_LVL	LAC	TM_ADV	GPS_ON_OFF		

#### 5-3-1. Normal

Field	Marks	Meaning
HDR	"ST300EVT"	Event report header
DEV_ID	9 char.	Device ID
MODEL	2Char	Device Model (According to table model)
SW_VER	3 char.	Software Version
DATE	8 char.	GPS date (yyyymmdd)
TIME	8 char.	GPS time (hh:mm:ss)
CELL	String	Location Code ID(3 digits hex) + Serving Cell BSIC(2 digits decimal)
LAT	String	Latitude (+/-xx.xxxxxx)
LON	String	Longitude (+/-xxx.xxxxxx)
SPD	String	Speed in km/h
CRS	String	Course over ground in degree
SATT	String	Number of satellites
FIX	'1' or '0'	GPS is fixed (1), GPS is not fixed (0)
DIST	String	Traveled distance in meter
PWR_VOLT	String	Voltage value of the main power
I/O	6 char.	Current I/O status of inputs and outputs. Ignition + Input1 + Input 2 + Input 3 + Out1 + Out2 Ignition : '1' (ON), '0' (OFF) Input1 ~ Input3 : '1' (Ground, Shorted), '0' (Opened) Out1 ~ Out2 : '1' (Active), '0' (Inactive)
EVT_ID	1 char.	Event type: 1 = Input1 goes to ground state. 2 = Input1 goes to open state. 3 = Input2 goes to ground state. 4 = Input2 goes to open state. 5 = Input3 goes to ground state. 6 = Input3 goes to open state.
H_METER	String	Driving hour-meter
BCK_VOLT	String	Voltage value of backup battery

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MSG_TYPE	1 char	Report is real time (1), Report is storage (0)
RPM	String	Current RPM
DID	14 char.	Driver ID (inserted I-button ID )
DID_REG	1 char.	State of DID's registration. '0' = not registered. '1' = registered.
CELL_ID	String	Information of Cell ID Cell ID(4 digits hex) + Location Code ID(4 digits Hex) + Serving Cell DSIC(2 digits decimal)
MCC	String	Information of Mobile Country Code
MNC	String	Information of Mobile Network Code
RX_LVL	String	Information of Signal Strength
LAC	String	Information of Location Area Code
TM_ADV	String	Information of Timing Advance
GPS_ON_OFF	String	GPS ON or GPS OFF flag

**<Example>**

ST300EVT;100850001;01;010;20081017;07:41:56;00100;+37.478519;+126.886819;000.012;000.00;9;1;0;15.3  
0;001100;3;1;0;4.5;1;1750;012497F1160000;1;004f001454;450;00;-320;20;255;1

**<Note>**


The "H\_METER/ BCK\_VOLT/ MSG\_TYPE" is include in event report only when "HBM\_STT" is "1"  
The "DID/ DID\_REG/RPM" is include in event report only when "HBM\_STT" is "1" at **ST300H** model.  
The "CELL\_ID/MCC/MNC/RX\_LVL/LAC/TM\_ADV/GPS\_ON\_OFF" is included in EVT only when "LBS Information" is enable at ST350B model to supported LBS.

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### 5-3-2. Zip

Field	Marks	Meaning						
STX	0x02	Start of zip data						
PKT_LEN	2 Bytes	Length of zip data, HDR to MSG_TYPE						
HDR	0x12	Header of Event Report						
DEV_ID	5 bytes	Device ID BCD format  If the Device ID is 123456789, this field will be filled with 0x12, 0x34, 0x56 0x78 and 0x90.						
MODEL	1byte	Device Model (According to table model)						
SW_VER	2 byte	Software Version						
DATE_TIME	6 bytes	GPS date & Time (Year + Month + Day + Hour + Minute + Second)						
CELL	3 bytes	Location Code ID (2 Bytes) + Serving Cell BSIC (1 Byte)						
LAT	4 bytes	1 byte (integer) + 3 bytes (BCD)						
LON	4 bytes	1 byte (integer) + 3bytes (BCD)						
SPD	3 bytes	2 bytes (integer) + 1 byte (BCD)						
CRS	3 bytes	2 bytes (integer) + 1 byte (BCD)						
SATT_FIX	1 byte	<table><tr><td>Bit 7 Fix</td><td>Bit 6 Latitude +/- sign</td><td>Bit 5 Longitude +/- sign</td><td>Bit 4 ~ Bit 0 Satellite's count</td></tr></table> + sign = 0, - sign = 1	Bit 7 Fix	Bit 6 Latitude +/- sign	Bit 5 Longitude +/- sign	Bit 4 ~ Bit 0 Satellite's count		
Bit 7 Fix	Bit 6 Latitude +/- sign	Bit 5 Longitude +/- sign	Bit 4 ~ Bit 0 Satellite's count					
DIST	4 byte	Traveled distance in meter						
PWR_VOLT	2bytes	Voltage value of the main power 1 byte (integer) + 1 byte (BCD)						
I/O	1 byte	<table><tr><td>Bit 5 Out 2</td><td>Bit 4 Out1</td><td>Bit 3 Input 3</td><td>Bit 2 Input 2</td><td>Bit 1 Input1</td><td>Bit 0 Ignition</td></tr></table> Ignition : 1 (ON), 0 (OFF) Input1 ~ Input3 : 1 (Ground, Shorted), 0 (Opened) Out1 ~ Out2 : 1 (Active), 0 (Inactive)	Bit 5 Out 2	Bit 4 Out1	Bit 3 Input 3	Bit 2 Input 2	Bit 1 Input1	Bit 0 Ignition
Bit 5 Out 2	Bit 4 Out1	Bit 3 Input 3	Bit 2 Input 2	Bit 1 Input1	Bit 0 Ignition			
EVT_ID	1 char.	Event type: 1 = Input1 goes to ground state. 2 = Input2 goes to open state. 3 = Input2 goes to ground state. 4 = Input2 goes to open state. 5 = Input3 goes to ground state. 6 = Input3 goes to open state.						
H_METER	4bytes	Driving hour-meter						
BCK_VOLT	2bytes	Voltage value of backup battery						
MSG_TYPE	1 char	Report is real time (1), Report is storage (0)						
RPM	2 bytes	Current RPM						
DID	7 byte	Driver ID (inserted I-button ID )						
DID_REG	1 byte	State of DID's registration. 0 = not registered. 1 = registered.						
CELL_ID	5 bytes	Information of Cell ID Cell ID(2 bytes(hex)) + Location Code ID(2 bytes(hex)) + Serving Cell DSIC(1 byte(integer))						
MCC	4 bytes	Information of Mobile Country Code This field shown ASCII code. 0x00 means empty space(NULL).						



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MNC	4 bytes	Information of Mobile Network Code This field shown ASCII code. 0x00 means empty space(NULL).
RX_LVL	2 bytes	Information of Signal Strength If this field is starting to 0xf(like 0xfe), this value is minus. If you want correct value then do 2's complement.
LAC	2 bytes	Information of Location Area Code
TM_ADV	1 bytes	Information of Timing Advance
GPS_ON_OFF	1 bytes	GPS ON or GPS OFF flag
ETX	0x03	End of zip data.

#### <Example>

#### Original String :

ST300EVT;100850000;01;010;20081017;07:41:56;2F100;+37.478519;+126.886819;032.012;000.00;9;1;500;15.30;001100;1;0;4.5;1;1750;012497F1160000;1;004f001454;450;00;-320;20;255;1


#### → Zip Packet

Zip data	Filed name	Comment
0x02	STX	
0x00 0x3a	PKT_LEN	
0x12	HDR	"ST300EVT"
0x10 0x08 0x50 0x00 0x10	DEV_ID	"100850001", BCD, MSB
0x01	MODEL	"01"
0x00 0x0a	SW_VER	"010"
0x08 0x0a 0x11 0x07 0x29 0x38	DATE_TIME	"20081017;07:41:56"
0x02 0xF1 0x00	CELL	"2F100", BCD, MSB
0x25 0x47 0x85 0x19	LAT	"+37.478519", Decimal part is BCD
0x7e 0x88 0x68 0x19	LON	"+126.886819", Decimal part is BCD
0x00 0x20 0x51	SPD	"032.512". Convert to "032.51" Decimal part is BCD, MSB
0x00 0x00 0x00	GRS	"000.00", Decimal part is BCD, MSB
0x89	SATT_FIX	GPS fixed. Cell count = 9. Lat. & Lon. sign = plus
0x00 0x00 0x00 0x00	DIST	"500". MSB
0x0F 0x30	PWR_VOLT	"15.30". Decimal part is BCD, MSB
0x0c	I/O	"001100"
0x01	EVT_ID	"1"
0x00 0x00 0x00 0x00	H_METER	"0", MSB
0x04 0x05	BCK_VOLT	"4.5", Decimal part is BCD
0x01	MSG_TYPE	"1"
0x06, 0xD6	RPM	"1750", MSB
0x01 0x24 0x97 0xF1 0x16 0x00 0x00	DID	"012497F1160000"
0x01	DID_REG	"1"
0x00 0x4f 0x00 0x14 0x36	CELL_ID	"004f001454"
0x34 0x35 0x30 0x00	MCC	"450"
0x30 0x30 0x00 0x00	MNC	"00"
0xfe 0xc0	RX_LVL	"-320"
0x00 0x14	LAC	"20"
0xff	TM_ADV	"255"
0x01	GPS_ON_OFF	"1"
0x03	ETX	

#### <Note>

The "H\_METER/ BCK\_VOLT/ MSG\_TYPE" is include in event report only when "HBM\_STT" is "1"  
The "DID/ DID\_REG/RPM" is include in event report only when "HBM\_STT" is "1" at **ST300H** model.  
The "CELL\_ID/MCC/MNC/RX\_LVL/LAC/TM\_ADV/GPS\_ON\_OFF" is included in STT only when "LBS Information" is enable at ST350B model to supported LBS.



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## 5-4. Alert Report


Device sends 'Alert' to the server as defined by user in the course of setting the relevant parameters. Most of cases that requiring an alert to be issued means that the vehicle or asset or its driver is in danger or is almost in danger that should be notified by device to the server and/or the cellular phone (If communication via SMS has been configured) for warning.

Have a close look at the fields from the following table for more information on when and what alerts are triggered. An <Example> of alerting and <Note> are also described in the bottom part of the table below.


HDR	DEV_ID	MODEL	SW_VER	DATE	TIME	CELL	LAT
LON	SPD	CRS	SATT	FIX	DIST	PWR_VOLT	I/O
ALERT_ID	H_METER	BCK_VOLT	MSG_TYPE	RPM	DID	DID_REG	CELL_ID
MCC	MNC	RX_LVL	LAC	TM_AVD	GPS_ON_OFF		

### 5-4-1. Normal

Field	Marks	Meaning
HDR	"ST300ALT"	Alert report header
DEV_ID	9 char.	Device ID
MODEL	2Char	Device Model (According to table model)
SW_VER	3 char.	Software Version
DATE	8 char.	GPS date (yyyymmdd)
TIME	8 char.	GPS time (hh:mm:ss)
CELL	String	Location Code ID(3 digits hex) + Serving Cell BSIC(2 digits decimal)
LAT	String	Latitude (+/-xx.xxxxxx)
LON	String	Longitude (+/-xxx.xxxxxx)
SPD	String	Speed in km/h
CRS	String	Course over ground in degree
SATT	String	Number of satellites
FIX	'1' or '0'	GPS is fixed (1); GPS is not fixed (0)
DIST	String	Traveled distance in m.
PWR_VOLT	String	Voltage value of main power
I/O	6 char.	Current I/O status of inputs and outputs. Ignition + Input1 + Input 2 + Input 3 + Out1 + Out2 Ignition : '1' (ON), '0' (OFF) Input1 ~ Input3 : '1' (Ground, Shorted), '0' (Opened) Out1 ~ Out2 : '1' (Active), '0' (Inactive)
ALERT_ID	1 char.	Alert type 1 = Start driving faster than SPEED_LIMIT. 2 = Ended over-speed condition 3 = Disconnected GPS antenna 4 = Reconnected GPS antenna after disconnected 5 = The vehicle exited the geo-fenced area that has the following ID. (5001 ~ 5200) 6 = The vehicle entered the geo- fenced area that has the following ID. (6001 ~ 6200) 8 = Shorted GPS antenna. This alert may not support depending on GPS chipset model. 9 = Enter the Deep Sleep Mode 10 = Exit from the Deep Sleep Mode

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		<p>13 = Backup battery error</p> <p>14 = Vehicle battery goes down to a very low level. Refer to "7.6. Protection of Vehicle Battery"</p> <p>15 = shocked</p> <p>16 = Collision has occurred to the vehicle.</p> <p>*40 = Connected with the Main Power source</p> <p>*41 = Disconnected with the Main Power source</p> <p>*44 = Connected with the Back-up Battery</p> <p>*45 = Disconnected with the Back-up Battery</p> <p>46 = Alert of fast acceleration from Driver Pattern Analysis</p> <p>47 = Alert of harsh brake from Driver Pattern Analysis</p> <p>48 = Alert of sharp turn from Driver Pattern Analysis</p> <p>50 = Jamming detected</p> <p>59 = Inserted I-Button</p> <p>60 = Removed I-Button</p> <p>61 = The vehicle turns on (ignition ON) but doesn't drive during MAX_REST_TIME.</p> <p>62 = Stopped more than predefined time.</p> <p>63 = Dead center</p> <p>64 = Over RPM</p> <p>65 = Completed automatic RPM calibration</p> <p>66 = Completed automatic odometer calibration (by ignition or by command)</p> <p>67 = Completed automatic odometer calibration as another type in dual gear system</p> <p>68 = Completed automatic Driver Pattern calibration.</p> <p>70 = Alert when the vehicle runs faster than 'SPEED_LIMIT_UNDER_RAIN' during 'DELAY_FOR_RAIN_OVSPD_RPT' under rain.</p> <p>71 = Alert when the vehicle's speed becomes less than 'SPEED_LIMIT_UNDER_RAIN' under rain after alerting '70'.</p> <p>72 = Alert when the vehicle's speed becomes less than 'SPEED_LIMIT_UNDER_RAIN' after alerting '70' and stopping rain.</p> <p>73 = Alert when the vehicle is inside a circle geo-fence and it's speed exceeds 'GEO_SPD_LIMIT' during 'GEO_SPD_LIMIT_DEBOUNCE'.</p> <p>74 = Alert when the vehicle's speed returns less 'GEO_SPD_LIMIT' during 'GEO_SPD_LIMIT_DEBOUNCE' after alert '73'.</p> <p>Please refer below note for report format of alert 70, 71, 72, 73 and 74.</p>
H_METER	String	Driving hour-meter
BCK_VOLT	String	Voltage value of backup battery
MSG_TYPE	1 char	Report is real time (1), Report is storage (0)
RPM	String	Current RPM
DID	14 char.	Driver ID (inserted I-button ID)
DID_REG	1 char.	State of DID's registration. '0' = not registered. '1' = registered.
CELL_ID	String	Information of Cell ID Cell ID(4 digits hex) + Location Code ID(4 digits Hex) + Serving Cell DSIC(2 digits decimal)
MCC	String	Information of Mobile Country Code
MNC	String	Information of Mobile Network Code
RX_LVL	String	Information of Signal Strength
LAC	String	Information of Location Area Code

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TM_ADV	String	Information of Timing Advance
GPS_ON_OFF	String	GPS ON or GPS OFF flag
FORCE	[X/256]G	Value of force when DPA Alert. This value is only for alert "46", "47" and "48"
MAX_SPD	Km/h	For alert ID 70, 71, 72, 73 and 74
SET_SPD	Km/h	For alert ID 70, 71, 72, 73 and 74. Value of SPD_LIMIT_UNDER_RAIN or GEO_SPD_LIMIT.
GEO ID	001 up to 200	For alert ID 73 and 74

\*40,41,44 and 45 are optional functions . (Not the standard specifications)

\*46,47,and 48 are optional functions to analyze the 'Driver Pattern'.

#### <Example>

ST300ALT;100850000;01;010;20081017;07:41:56;00100;+37.478519;+126.886819;000.012;000.00;9;1;0;15.3  
0;001100;3;0;4.5;1;1750;012497F1160000;1;004f001454;450;00;-320;20;255;1

#### <Note>


ALERT\_ID 3, 4, and 8 are applicable to the device that has an external GPS antenna.

ALERT\_ID 13 may be reported if the Back-up Battery cannot be charged or cannot be supported for long time enough in case the Main Power source (vehicle's battery) is disconnected.

The "H\_METER/ BCK\_VOLT/ MSG\_TYPE" is include in alert report only when "HBM\_STT" is "1"  
The "DID/ DID\_REG/RPM" is include in alert report only when "HBM\_STT" is "1" at **ST300H** model.  
The "CELL\_ID/MCC/MNC/RX\_LVL/LAC/TM\_ADV/GPS\_ON\_OFF" is included in ALT only when "LBS Information" is enable at ST350B model to supported LBS.


ALERT\_ID 70, 71 and 72 includes configured speed limit (SPEED\_LIMIT\_UNDER\_RAIN) and maximum speed during over-speed under rain condition. Maximum speed can be read from GPS or odometer depending on ODO\_USE option.

ALERT\_ID 73 and 74 includes geo-fence ID, configured speed limit (GEO\_SPD\_LIMIT) and maximum speed during over-speed in a circle geo-fence.

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## 5-4-2. Zip

Field	Marks	Meaning						
STX	0x02	Start of zip data						
PKT_LEN	2 Bytes	Length of zip data, HDR to MSG_TYPE						
HDR	0x13	Header of Alert Report						
DEV_ID	5 bytes	Device ID BCD format  If the Device ID is 123456789, this field will be filled with 0x12, 0x34, 0x56 0x78 and 0x90.						
MODEL	1byte	Device Model (According to table model)						
SW_VER	2 byte	Software Version						
DATE_TIME	6 bytes	GPS date & Time (Year + Month + Day + Hour + Minute + Second)						
CELL	3 bytes	Location Code ID (2 Bytes) + Serving Cell BSIC (1 Byte)						
LAT	4 bytes	1 byte (integer) + 3 bytes (BCD)						
LON	4 bytes	1 byte (integer) + 3bytes (BCD)						
SPD	3 bytes	2 bytes (integer) + 1 byte (BCD)						
CRS	3 bytes	2 bytes (integer) + 1 byte (BCD)						
SATT_FIX	1 byte	<table><tr><td>Bit 7 Fix</td><td>Bit 6 Latitude +/- sign</td><td>Bit 5 Longitude +/- sign</td><td>Bit 4 ~ Bit 0 Satellite's count</td></tr></table> + sign = 0, - sign = 1	Bit 7 Fix	Bit 6 Latitude +/- sign	Bit 5 Longitude +/- sign	Bit 4 ~ Bit 0 Satellite's count		
Bit 7 Fix	Bit 6 Latitude +/- sign	Bit 5 Longitude +/- sign	Bit 4 ~ Bit 0 Satellite's count					
DIST	4 byte	Traveled distance in meter						
PWR_VOLT	2bytes	Voltage value of main power 1 byte (integer) + 1 byte (BCD)						
I/O	1 byte	<table><tr><td>Bit 5 Out 2</td><td>Bit 4 Out1</td><td>Bit 3 Input 3</td><td>Bit 2 Input 2</td><td>Bit 1 Input1</td><td>Bit 0 Ignition</td></tr></table> Ignition : 1 (ON), 0 (OFF) Input1 ~ Input3 : 1 (Ground, Shorted), 0 (Opened) Out1 ~ Out2 : 1 (Active), 0 (Inactive)	Bit 5 Out 2	Bit 4 Out1	Bit 3 Input 3	Bit 2 Input 2	Bit 1 Input1	Bit 0 Ignition
Bit 5 Out 2	Bit 4 Out1	Bit 3 Input 3	Bit 2 Input 2	Bit 1 Input1	Bit 0 Ignition			
ALERT_ID	1 byte	Alert type 0x01 ~ 0x44						
H_METER	4bytes	Driving hour-meter						
BCK_VOLT	2bytes	Voltage value of backup battery						
MSG_TYPE	1 char	Report is real time (1), Report is storage (0)						
RPM	2 bytes	Current RPM						
DID	7 byte	Driver ID (inserted I-button ID )						
DID_REG	1 byte	State of DID's registration. 0 = not registered. 1 = registered.						
CELL_ID	5 bytes	Information of Cell ID Cell ID(2 bytes(hex)) + Location Code ID(2 bytes(hex)) + Serving Cell DSIC(1 byte(integer))						
MCC	4 bytes	Information of Mobile Country Code This field shown ASCII code. 0x00 means empty space(NULL).						
MNC	4 bytes	Information of Mobile Network Code This field shown ASCII code. 0x00 means empty space(NULL).						
RX_LVL	2 bytes	Information of Signal Strength If this field is starting to 0xf(like 0xfe), this value is minus. If you want correct value then do 2's complement.						

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LAC	2 bytes	Information of Location Area Code
TM_ADV	1 bytes	Information of Timing Advance
GPS_ON_OFF	1 bytes	GPS ON or GPS OFF flag
ETX	0x03	End of zip data.

#### <Example>

#### Original String :

ST300ALT;100850001;01;010;20081017;07:41:56;2F100;+37.478519;+126.886819;032.512;000.00;9;1;500;15.30;001100;1;501;0;4.5;1;1750;012497F1160000;1;004f001454;450;00;-320;20;255;1

#### → Zip Packet

Zip data	Filed name	Comment
0x02	STX	
0x00 0x3a	PKT_LEN	
0x13	HDR	"ST300ALT"
0x10 0x08 0x50 0x00 0x10	DEV_ID	"100850001", BCD, MSB
0x01	MODEL	"01"
0x00 0x0a	SW_VER	"010"
0x08 0x0a 0x11 0x07 0x29 0x38	DATE_TIME	"20081017;07:41:56"
0x02 0xf1 0x00	CELL	"2F100", BCD, MSB
0x25 0x47 0x85 0x19	LAT	"+37.478519", Decimal part is BCD
0x7e 0x88 0x68 0x19	LON	"+126.886819", Decimal part is BCD
0x00 0x20 0x51	SPD	"032.512". Convert to "032.51" Decimal part is BCD, MSB
0x00 0x00 0x00	CRS	"000.00", Decimal part is BCD, MSB
0x89	SATT_FIX	GPS fixed. Cell count = 9. Lat. & Lon. sign = plus
0x00 0x00 0x00 0x00	DIST	"500". MSB
0x0f 0x30	PWR_VOLT	"15.30". Decimal part is BCD, MSB
0x0c	I/O	"001100"
0x01	ALT_ID	"1"
0x00 0x00 0x00 0x00	H_METER	"0", MSB
0x04 0x50	BCK_VOLT	"4.5", Decimal part is BCD
0x01	MSG_TYPE	"1"
0x06, 0xd6	RPM	"1750", MSB
0x01 0x24 0x97 0xf1 0x16 0x00 0x00	DID	"012497F1160000"
0x01	DID_REG	"1"
0x00 0x4f 0x00 0x14 0x36	CELL_ID	"004f001454"
0x34 0x35 0x30 0x00	MCC	"450"
0x30 0x30 0x00 0x00	MNC	"00"
0xfe 0xc0	RX_LVL	"-320"
0x00 0x14	LAC	"20"
0xff	TM_ADV	"255"
0x01	GPS_ON_OFF	"1"
0x03	ETX	


#### <Note>

ALERT\_ID 3, 4, and 8 are applicable to the device that has an external GPS antenna.

ALERT\_ID 13 may be reported if the Back-up Battery cannot be charged or cannot be supported for long time enough in case the Main Power source (vehicle's battery) is disconnected.

The "H\_METER/ BCK\_VOLT/ MSG\_TYPE" is include in alert report only when "HBM\_STT" is "1"

The "DID/ DID\_REG/RPM" is include in alert report only when "HBM\_STT" is "1" at **ST300H** model.

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The "CELL\_ID/MCC/MNC/RX\_LVL/LAC/TM\_ADV/GPS\_ON\_OFF" is included in STT only when "LBS Information" is enable at ST350B model to supported LBS.

ALERT\_ID 70, 71 and 72 includes configured speed limit (SPEED\_LIMIT\_UNDER\_RAIN) and read maximum speed from GPS during delay duration (in case of '70) or over-speed duration (in case of '71' and '72'). These flow alert ID as below.

... [ALERT ID] ; [SPD LIMIT UNDER RAIN] ; [GPS MAX SPD] ; [H METER] ; ...


ALERT_ID	1 byte	Alert type 0x01 ~ 0x44
SPD LIMIT UNDER RAIN	3 bytes	2 bytes (integer) + 1 byte (BCD)
GPS MAX SPD	3 bytes	2 bytes (integer) + 1 byte (BCD)
...		

ALERT\_ID 73 and 74 includes geo-fence ID, configured speed limit (GEO\_SPD\_LIMIT) and read maximum speed from GPS during de-bouncing time (in case of '73) or over-speed duration (in case of '74').

These flow alert ID as below.

... [ALERT ID] ; [GEO ID] ; [GEP SPD LIMIT] ; [GPS MAX SPD] ; [H METER] ; ...

ALERT_ID	1 byte	Alert type 0x01 ~ 0x44
OVSPD GEO_ID	2 byte	
GEP SPD LIMIT	3 bytes	2 bytes (integer) + 1 byte (BCD)
GPS MAX SPD	3 bytes	2 bytes (integer) + 1 byte (BCD)
...		

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## 5-5. Travel Event Report


Device sends 'Travel Event' to the server as defined by user in the course of setting the telemetry parameters. This event is sending when the vehicle is parked.

HDR	DEV_ID	MODEL	SW_VER	DATE	TIME	DIST	PWR_VOLT	H_METER	BCK_VOLT	
MSG_TYPE		TRAVEL_DIST		TRAVEL_TIME		TIME_STOP		TIME_MOVING		LAT_TRAVEL_ST
LON_TRAVEL_ST		LAT_TRAVEL_FI		LON_TRAVEL_FI		AVERAGE_SPD		MAX_SPD		TIME_OVER_SPD
TIME_ECO_UP		TIME_ECO_DOWN		TIME_ECO_INSIDE		TIME_ECO_OUTSIDE		TIME_OVER_RPM		
TIME_DC		DRIVER_ID								

### 5-5-1. Normal

Field	Definitions	Remark
HDR	"ST300HTE"	Status report header
DEV_ID	9 char.	Device ID
MODEL	2 Char	Device Model (According to table model)
SW_VER	3 char.	Software Release Version
DATE	8 char.	GPS date (yyyymmdd) Year + Month + Day
TIME	8 char.	GPS time (hh:mm:ss) Hour : Minute : Second
DIST	String	Traveled distance in meter
PWR_VOLT	String	Voltage value of main power
H_METER	String	Driving hour-meter
BCK_VOLT	String	Voltage value of backup battery
MSG_TYPE	1 char	Report is real time (1), Report is storage (0)
TRAVEL_DIST	String	Traveled distance during this travel(in meter)
TRAVEL_TIME	String	Time of this travel (in minute)
TIME_STOP	String	Duration of stop in this travel (in minute)
TIME_MOVING	String	Duration of moving in this travel (in minute)
LAT_TRAVEL_ST	String	Latitude of start position of this travel (+/-xx.xxxxxx)
LON_TRAVEL_ST	String	Longitude of start position of this travel (+/-xxx.xxxxxx)
LAT_TRAVEL_FI	String	Latitude of end position of this travel (+/-xx.xxxxxx)
LON_TRAVEL_FI	String	Longitude of end position of this travel(+/-xxx.xxxxxx)
AVERAGE_SPD	String	Average speed in this travel(in km/h)
MAX_SPD	String	Maximum speed in this travel (in km/h)
TIME_OVER_SPD	String	Accumulated time that the car exceeded over-speed in this travel. (in minute)
TIME_ECO_UP	String	Accumulated time that RPM was above the economic range in this travel.(in minute)
TIME_ECO_DOWN	String	Accumulated time that RPM was below the economic range in this travel. (in minute)
TIME_ECO_INSIDE	String	Accumulated time that RPM was within economic range in this travel. (in minute)
TIME_OVER_RPM	String	Accumulated time that RPM exceeded maximum RPM in this travel. (in minute)
TIME_DC	String	Accumulated time that the vehicle was driven putting the gear in dead center in this travel. (in minute)




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DRIVER_ID	String	Inserted driver ID
<example> ST300HTE;100850001;04;248;20110101;00:13:52;167559;12.28;004005;0.0;1;0;3;3;0;-22.881018;-047.070831;-22.881018;-047.070831;000.000;000.000;0;0;3;0;0;0;01E04D44160000		

## 5-5-2. Zip

Field	Definitions	Remark				
STX	0x02	Start of zip data				
PKT_LEN	2 Bytes	Length of zip data, HDR to MSG_TYPE				
HDR	0x1B	Header of Travel Event Report				
DEV_ID	5 bytes	Device ID BCD format If the Device ID is 123456789, this field will be filled with 0x12, 0x34, 0x56 0x78 and 0x90.				
MODEL	1byte	Device Model (According to table model)				
SW_VER	2 byte	Software Version				
DATE_TIME	6 bytes	GPS date & Time (Year + Month + Day + Hour + Minute + Second)				
DIST	4 byte	Traveled distance in meter				
PWR_VOLT	2bytes	Voltage value of main power 1 byte (integer) + 1 byte (BCD)				
H_METER	4bytes	Driving hour meter				
BCK_VOLT	2bytes	Voltage value of backup battery				
MSG_TYPE	1 byte	Report is real time (1), Report is storage (0)				
TRAVEL_DIST	3bytes	Traveled distance during this travel(in meter)				
TRAVEL_TIME	2bytes	Time of this travel (in minute)				
TIME_STOP	2bytes	Duration of stop in this travel (in minute)				
TIME_MOVING	2bytes	Duration of moving in this travel (in minute)				
LAT_TRAVEL_ST	4bytes	Latitude of start position of this travel (+/-xx.xxxxxx) 1 byte (integer) + 3 bytes (BCD)				
LON_TRAVEL_ST	4bytes	Longitude of start position of this travel (+/-xxx.xxxxxx) 1 byte (integer) + 3 bytes (BCD)				
LAT_TRAVEL_FI	4bytes	Latitude of end position of this travel (+/-xx.xxxxxx) 1 byte (integer) + 3 bytes (BCD)				
LON_TRAVEL_FI	4bytes	Longitude of end position of this travel(+/-xxx.xxxxxx) 1 byte (integer) + 3 bytes (BCD)				
POS_SIGN	1byte	Minus sign of travel positions <table><tr><td>Bit 3 Travel start latitude +/- sign</td><td>Bit 2 Travel start longitude +/- sign</td><td>Bit 1 Travel stop latitude +/- sign</td><td>Bit 0 Travel stop longitude +/- sign</td></tr></table> + sign = 0, - sign = 1	Bit 3 Travel start latitude +/- sign	Bit 2 Travel start longitude +/- sign	Bit 1 Travel stop latitude +/- sign	Bit 0 Travel stop longitude +/- sign
Bit 3 Travel start latitude +/- sign	Bit 2 Travel start longitude +/- sign	Bit 1 Travel stop latitude +/- sign	Bit 0 Travel stop longitude +/- sign			
AVERAGE_SPD	3bytes	Average speed in this travel(in km/h) 2 bytes (integer) + 1 byte (BCD)				
MAX_SPD	3bytes	Maximum speed in this travel (in km/h) 2 bytes (integer) + 1 byte (BCD)				
TIME_OVER_SPD	2bytes	Accumulated time that the car exceeded over-speed in this travel. (in minute)				
TIME_ECO_UP	2bytes	Accumulated time that RPM was above the economic range in this travel.(in minute)				




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TIME_ECO_DOWN	2bytes	Accumulated time that RPM was below the economic range in this travel. (in minute)
TIME_ECO_INSIDE	2bytes	Accumulated time that RPM was within economic range in this travel. (in minute)
TIME_OVER_RPM	2bytes	Accumulated time that RPM exceeded maximum RPM in this travel. (in minute)
TIME_DC	2bytes	Accumulated time that the vehicle was driven putting the gear in dead center in this travel. (in minute)
DRIVER_ID	7bytes	Inserted driver ID. BCD format
ETX	0x03	End of zip data

<example>

ST300HTE;600850777;04;377;20110101;00:01:10;151229;12.07;000669;0.0;1;135010;351;21;330;-22.881018;-047.130831;-22.882034;-047.087123;035.350;096.480;3;5;12;334;7;0;01E04D44160000

Field	Data in string format	Data in ZIP format
STA		0x02
PKTLEN		0x00 0x4f
HDR	"ST300HTE"	0x1b
DEV_ID	600850777	0x60 0x08 0x50 0x77 0x70
MODEL	"04"	0x04
SW_VER	"377"	0x01 0x79
DATE_TIME	"20140428" "00:13:52"	0x0e 0x04 0x1c 0x00 0x0d 0x34
DIST	"151227"	0x00 0x02 0x4e 0xbb
PWR_VOLT	"12.11"	0x0c 0x11
H_METER	"000662"	0x00 0x00 0x02 0x96
BCK_VOLT	"0.0"	0x00 0x00
MSG_TYPE	"1"	0x01
TRAVEL_DIST	"135010"	0x02 0x0f 0x62
TRAVEL_TIME	"351"	0x01 0x5f
TIME_STOP	"21"	0x00 0x15
TIME_MOVING	"330"	0x01 0x4a
LAT_TRAVEL_ST	"-22.881018"	0x16 0x88 0x10 0x18
LON_TRAVEL_ST	"047.130831"	0x2f 0x13 0x08 0x31
LAT_TRAVEL_FI	"-22.882034"	0x16 0x88 0x20 0x34
LON_TRAVEL_FI	"-047.087123"	0x2f 0x08 0x71 0x23
POS_SIGN		0x0f
AVERAGE_SPD	"035.350"	0x00 0x23 0x35
MAX_SPD	"096.480"	0x00 0x60 0x48
TIME_OVER_SPD	"3"	0x00 0x03
TIME_ECO_UP	"5"	0x00 0x05
TIME_ECO_DOWN	"12"	0x00 0x0c
TIME_ECO_INSIDE	"334"	0x01 0x4e
TIME_OVER_RPM	"7"	0x00 0x07
TIME_DC	"0"	0x00 0x00
DRIVER_ID	"01E04D44160000"	0x01 0xe0 0x4d 0x44 0x16 0x00 0x00

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## 5-6. Keep-Alive Report

A typical GSM/GPRS service provider in any countries has its own corporate policy restricting connection time of device with the GSM/GPRS networks only at an interval if device does not communicate with its server for a long time, which is 1 hour, for instance. The time length varies depending upon such service provider. Please check it by asking your GSM/GPRS service provider this question in your country.

In a casethat there has not been any communication between device and server for such a time period, the GSM/GPRS service provider would not provide GSM/GPRS service for the device temporarily. To avoid such a case, device sends the server this 'Keep-Alive' Report at an interval, 'T4' ('Keep-Alive' interval named in 'SyncTrak' and in this document), which is shorter than the 60 minutes. User of the device may adjust the value of 'T4' as desired.

This Report is intended to mean that the device is still alive and ready for any possible communications with the server for that long time ('T4') even though the device does not interact temporarily with the server.


### 5-6-1. Normal

HDR	DEV_ID
-----	--------

Field	Marks	Meaning
HDR	"ST300ALV"	Header of Alive report
DEV_ID	9 char.	Device ID
<b>&lt;Example&gt;</b> ST300ALV;600850777		

### 5-6-2. Zip

Field	Marks	Meaning
HDR	0x14	Alive Report header (1 byte)
DEV_ID	5 bytes	Device ID BCD format If the Device ID is 123456789, this field will be filled with 0x12, 0x34, 0x56, 0x78 and 0x90.
<b>&lt;Example&gt;</b> <b>Original String :</b> ST300ALV;600850777  <b>→ Zip Packet</b>		
Filed name	Zip data	Comment with string data
STX	0x02	
PKT_LEN	0x00 0x06	
HDR	0x14	"ST300ALV"
DEV_ID	0x60 0x08 0x50 0x77 0x70	"600850777"
ETX	0x03	

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## 5-7.Data Report from External RS232

If device is connected with external appliance by RS232, it receives data from the appliance and sends the data to the server. Data transfer is made with below string.


HDR	DEV_ID	MODEL	SW_VER	DATE	TIME	CELL	LAT
LON	SPD	CRS	SATT	FOX	DIST	PWR_VOLT	I/O
LEN	DATA	H_METER	BCK_VOLT	MSG_TYPE	CHK_SUM		

### 5-7-1. Normal

Field	Marks	Meaning
HDR	"ST300UEX"	Report Header of External Device's Data
DEV_ID	9 char.	Device ID
MODEL	2Char	Device Model (According to table model)
SW_VER	3 char.	Software Version
DATE	8 char.	GPS date (yyyymmdd)
TIME	8 char.	GPS time (hh:mm:ss)
CELL	String	Location Code ID(3 digits hex) + Serving Cell BSIC(2 digits decimal)
LAT	String	Latitude (+/-xx.xxxxxx)
LON	String	Longitude (+/-xxx.xxxxxx)
SPD	String	Speed in km/h
CRS	String	Course over ground in degree
SATT	String	Number of satellites
FIX	'1' or '0'	GPS is fixed (1), GPS is not fixed (0)
DIST	String	Traveled distance in meter
PWR_VOLT	String	Voltage value of main power
I/O	6 char.	Current I/O status of inputs and outputs. Ignition + Input1 + Input 2 + Input 3 + Out1 + Out2 Ignition : '1' (ON), '0' (OFF) Input1 ~ Input3 : '1' (Ground, Shorted), '0' (Opened) Out1 ~ Out2 : '1' (Active), '0' (Inactive)
LEN	String	Length of Data
DATA		Data from external RS232 device Up to 500 bytes
H_METER	String	Driving hour-meter
BCK_VOLT	String	Voltage value of backup battery
MSG_TYPE	1 char	Report is real time (1), Report is storage (0)
CHK_SUM	String	8bit Checksum.
<b>&lt;Example&gt;</b> ST300UEX;100850000;01;010;20081017;07:41:56;2F100;+37.478519;+126.886819;000.012;000.00;9;1;0;15.3 0;001100;25;Welcome to Suntech World!;12;0;4.5;1		

### 6-7-2. Zip

Field	Marks	Meaning
STX	0x02	Start of zip data
PKT_LEN	2 Bytes	Length of zip data, HDR to MSG_TYPE
HDR	0x16	Report Header of External Device's Data

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DEV_ID	5 bytes	Device ID BCD format  If the Device ID is 123456789, this field will be filled with 0x12, 0x34, 0x56 0x78 and 0x90.									
MODEL	1byte	Device Model (According to table model)									
SW_VER	2 byte	Software Version									
DATE_TIME	6 bytes	GPS date & Time (Year + Month + Day + Hour + Minute + Second)									
CELL	3 bytes	Location Code ID (2 Bytes) + Serving Cell BSIC (1 Byte)									
LAT	4 bytes	1 byte (integer) + 3 bytes (BCD)									
LON	4 bytes	1 byte (integer) + 3bytes (BCD)									
SPD	3 bytes	2 bytes (integer) + 1 byte (BCD)									
CRS	3 bytes	2 bytes (integer) + 1 byte (BCD)									
SATT_FIX	1 byte	<table><tr><td>Bit 7 Fix</td><td>Bit 6 Latitude +/- sign</td><td>Bit 5 Longitude +/- sign</td><td colspan="2">Bit 4 ~ Bit 0 Satellite's count</td></tr></table> + sign = 0, - sign = 1				Bit 7 Fix	Bit 6 Latitude +/- sign	Bit 5 Longitude +/- sign	Bit 4 ~ Bit 0 Satellite's count		
Bit 7 Fix	Bit 6 Latitude +/- sign	Bit 5 Longitude +/- sign	Bit 4 ~ Bit 0 Satellite's count								
DIST	4 bytes	Traveled distance in meter									
PWR_VOLT	2bytes	Voltage value of the Main Power 1 byte (integer) + 1 byte (BCD)									
I/O	1 byte	<table><tr><td>Bit 5 Out 2</td><td>Bit 4 Out1</td><td>Bit 3 Input 3</td><td>Bit 2 Input 2</td><td>Bit 1 Input1</td><td>Bit 0 Ignition</td></tr></table> Ignition : 1 (ON), 0 (OFF) Input1 ~ Input3 : 1 (Ground, Shorted), 0 (Opened) Out1 ~ Out2 : 1 (Active), 0 (Inactive)				Bit 5 Out 2	Bit 4 Out1	Bit 3 Input 3	Bit 2 Input 2	Bit 1 Input1	Bit 0 Ignition
Bit 5 Out 2	Bit 4 Out1	Bit 3 Input 3	Bit 2 Input 2	Bit 1 Input1	Bit 0 Ignition						
LEN	2 bytes	Length of Data									
DATA		Data from external RS232 device Up to 500 bytes									
CHK_SUM	1 byte	8bit Checksum, Refer to 4.8									
H_METER	4bytes	Driving hour-meter									
BCK_VOLT	2bytes	Voltage value of backup battery									
MSG_TYPE	1 char	Report is real time (1), Report is storage (0)									
ETX	0x03	End of zip data.									


#### <Example>

#### Original String :

ST300UEX;100850001;01;010;20081017;07:41:56;2F100;+37.478519;+126.886819;032.012;000.00;9;1;500;15.30;001100;25;Welcome to Suntech World!;12;0;4.5;1

#### → Zip Packet

0x02  
 0x00 0x47  
 0x16  
 0x10 0x08 0x50 0x00 0x10  
 0x01  
 0x00 0x0a  
 0x08 0x0a 0x11 0x07 0x29 0x38  
 0x02 0xF1 0x00  
 0x25 0x47 0x85 0x19  
 0x7e 0x88 0x68 0x19

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0x00 0x20 0x01  
 0x00 0x00 0x00  
 0x89  
 0x00 0x00 0x01 0xF4  
 0x0F 0x30  
 0x0c  
 0x00 0x19  
 0x57 0x65 0x6C 0x63 0x6F 0x6D 0x65 0x20 0x74 0x6F 0x20 0x53 0x75 0x6E 0x74 0x65 0x63 0x68 0x20  
 0x57 0x6F 0x72 0x6C 0x64 0x21  
 0x12  
 0x00 0x00 0x00 0x00  
 0x04 0x05  
 0x01  
 0x03

## 5-8. Transferring Data to External RS232 Device

HDR	DEV_ID	VER	LEN	DATA	CHK_SUM
-----	--------	-----	-----	------	---------

- Definition : If the device receives this command, it transfers the data to connected RS232's device.

Field	Definitions	Unit	Remark
HDR	"ST300DEX"		Command type
DEV_ID	9 char.		Device ID
VER	"02"		Protocol Version
LEN			Length of data
DATA			Up to 500bytes
CHK_SUM			8bit Checksum

### <example>

[command] ST300DEX;100850000;02;6;012345;2F

[response] ST300DEX;Res;100850000;010;25;012345;2F

### <note>

CHK\_SUM is string converted from lower 8 bit of the summation of DATA field.

In case of above example.

Value of '0' character in DATA field is equal to 0x30 in hex system, and '1' is equal to 0x31 in hex system.


In this case, summation of DATA will be 0x12F (0x30+0x31+0x32+0x33+0x34+0x35), and CHK\_SUM string will be "2F".

And, whole string from server will be "ST300DEX;100850000;02;6;012345;2F".

If DATA field includes 0x00 or 0x01, server should convert and send as below.

Original Data : 0x30 0x31 **0x00** 0x32 **0x01**

Conversion : 0x30 0x31 0x01 0x10 0x32 **0x01 0x11**

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## 5-9. Status String Reporting via SMS

### 5-9-1. In case of Back-up method

In case device is located in an area where it has good connectivity with GSM and without having good connectivity with GPRS, it sends a string type report to its server. However, as soon as the bad connectivity between GPRS and device gets back to normal, the device will try to send the reports to the server.


HDR	DEV_ID	MODEL	SW_VER	DATE1	TIME1	CELL1	LAT1	LON1	SPD1	CRS1
SATT1	FIX1	DIST1		PER_VOLT1	I/O1	MODE1				
DATE2	TIME2	CELL2		LAT2	LON2	SPD2	CRS2	SATT2	FIX2	DIST2
PER_VOLT2	I/O2	MODE2								

Note): 'STT String' sent via SMS does not include the 'message number field'.

### 5-9-2. In case of Main method

Device sends to its server 'status string' via SMS when it can be connected with the server only via SMS without being connected with GPRS.

Report data has same format that is reported by GPRS. See 5-1 Status Report for details.

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## 5-10. Location query sent via smart phone

If you are a smart phone user, you can use it to easily find the current location on the google map

Just send one of the following messages by your smart phone:


“Where are you”, “whereareyou”, “Where r u”, “whereru”

And, then the google map will be responding to you by sending the address on your smart phone. You can see the current location of ST300/ST340/ST350 just by opening the message containing that address on the web browser.

In order to enable ST300/ST340/ST350 to accept your SMS message, you have to add your smart phone number to one of the 4 optional numbers such as SMS\_MT1 to SMS\_MT4 or disable SMS\_LOCK. Refer to *Chapter 4.4* of this Manual, “GSM Parameter Setting” for more details. Before you start using this function, you should get to know the URL (server address) of the Google map first.

You can have more information about how to get the server address of the Google map in section “Command to Get Google Map Address” of this document.

You can also get more information about how to set the server address of the Google map in section “Command to Set Google Map Address” of this document.

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## 6. Command for general use

After device is configured, user may need to check/query values of the parameters if he/she wants to change those values. This chapter shows user how to change the parameters' values that have been set already.

### 6-1. Common parts of this command

HDR	DEV_ID	VER	CMD_ID
-----	--------	-----	--------

Field	Marks	Value	Meaning
HDR	"ST300CMD"		Command type
DEV_ID	9 char.		Device ID
VER	'02'		Protocol Version
CMD_ID	String		

\*\*Caution: If 'Device ID' is not correct, this command will be ignored by the device.

### 6-2. Requesting Status

Once this command is made, some interactions will be made between the server and the device as described in the 'Meaning' section of the table below.


Field	Mark	Value	Meaning
CMD_ID	"StatusReq"		Requesting Status of the device. If device receives this 'Request' command from the server, it sends the Status string to the server promptly.
<b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;StatusReq  [response] ST300STT;100850000;010;20090724;07:12:16;00129;+37.479995;+126.885815;000.029;000.00;7;1;0;15.33;100000;2;0002			

### 6-3.Re-setting (Restoring to factory defaults and Rebooting)

Once this command is made, some interactions will be made between the server and the device as described in the 'Meaning' section of the table below.

Field	Mark	Value	Meaning
CMD_ID	"Reset"		Re-setting the current parameters' values This command is used to initialize all the parameters with the values set in the factory of the devices and to reboot the device.
<b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;Reset  [response] ST300CMD;Res;100850000;010;Reset			



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#### 6-4. Pre-setting

Once this command is made, some interactions will be made between the server and the device as described in the 'Meaning' section of the table below.

Field	Mark	Value	Meaning
CMD_ID	"Preset"		Report parameters' setting values and current device status  Response includes network, report, event, GSM and Service parameters included in 'SyncTrak'. It includes status of device as well.

##### <Example>

[command] ST300CMD;100850000;02;Preset

[response] ST300CMD;Res;100850000;010;Preset;  
 NTW;0;internet;;;111.111.111.111;8600;;;1234;  
 RPT;60;180;120;60;3;0;0;;;;  
 EVT;1;60;0;3;2;2;30;20;20;1;1;1;0;0;0;0;0;0;0;0;0;0;  
 GSM;0;;;0;;;  
 SVC;1;120;0;0;0;0;1;1;1;0;0;0;0;  
 DEV;0;0;0;0

[response] Model – Event 4 Line

NTW;0;internet;;;111.111.111.111;8600;;;1234;  
 RPT;60;180;120;60;3;0;0;;;;  
 EVT;1;60;0;3;8;8;30;0;0;6;6;1;0;0;0;0;0;0;0;0;0;  
 GSM;0;;;0;;;  
 SVC;1;120;0;0;0;0;1;1;1;0;0;0;0;  
 DEV;0;0;0;0

##### <Note>

\*\* After power is on, the device sends to the server response string of the 'Preset' once.

\*\* The 'DEVFiled' informs the device of the current status as below.


OUT1	OUT2	PWR_DN	BAT_CON
0 = Disable 1 = Enable	0 = Disable 1 = Enable	0 = Normal 1 = Sleep 2 = Deep sleep	0 = Backup battery is disconnected. 1 = Backup battery is connected.

Field	Mark	Value	Meaning
CMD_ID	"PresetA"		Report all the parameters including additional parameter.

##### <Example>

[command] ST300CMD;100850000;02;Preset A

[response] ST300CMD;Res;100850000;010;PresetA;  
 NTW;0;internet;;;111.111.111.111;8600;;;1234;  
 RPT;60;180;120;60;3;0;0;;;;  
 EVT;1;60;0;3;2;2;30;20;20;1;1;1;0;0;0;0;0;0;0;0;  
 GSM;0;;;0;;;  
 SVC;1;120;0;0;0;0;1;1;1;0;0;0;0;  
 ADP;U;T;2;9000;0;0;0;0;0;0;

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MSR;10;0.10;0.10;0.70;  
MBV;9.43;21.07;17.07;8.00;18.00;0.00;0.00;  
NPT;02;0;0;0;0;0;500;300;5;10;5;10;  
DEV;0;0;0;0;0;0;0;0;  
HTP;0;0;A;A;0;0;0;0;;;1;100;0;0;0


**<Note>**

\*\* This command starts being applicable to the Software Version 22.

\*\* 'DEVFiled' informs the server about the current status of the device as below.

OUT1	OUT2	PWR_DN	BAT_CON
0 = Disable 1 = Enable	0 = Disable 1 = Enable	0 = Normal 1 = Sleep 2 = Deep sleep	0 = Backup battery is disconnected. 1 = Backup battery is connected.

TRACKING	Anti-Theft	Reserved	Reserved
0 = Stop Tracking 1 = Start Tracking	0 = Disable 1 = Enable		

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## 6-5. ACK of Emergency

Once this command is made by the server, the device will stop reporting about the occurrence of emergency. More details are described in the 'Meaning' section of the table below.


Field	Mark	Value	Meaning
CMD_ID	"AckEmerg"		<u>'Acknowledge' of emergency report</u>  The server sends device this command as a response to inform the device that the server has completed receiving all the 'emergency reports'. And then, the device will stop sending Emergency reports if it is in emergency state.
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;AckEmerg [response] ST300CMD;Res;100850000;010;AckEmerg			

## 6-6. Enable1 ('Activating Output 1')

Field	Mark	Value	Meaning
CMD_ID	"Enable1"		Enable Output1
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;Enable1 [response] ST300CMD;Res;100850000;010;Enable1 [response] ST300CMD;Res;100850000;010;Enable1NoUse (in case that IN type is set to 'No Use').  <b>&lt;Note&gt;</b> ** Output1 line goes to active status.  ** If OUT1 is set with immobilizer, output1 line goes to the Active Status gradually with pulse in driving mode.  ** If OUT1 is set with pulse type, output1 line generates pulse and automatically returns to the Inactive State after pulsing out.			

## 6-7. Disable1 ('Inactivating Output1')

Field	Mark	Value	Meaning
CMD_ID	"Disable1"		Disable Output1
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;Disable1 [response] ST300CMD;Res;100850000;010;Disable1 [response] ST300CMD;Res;100850000;010;Disable1NoUse (in case that IN type is set to 'No Use').  <b>&lt;Note&gt;</b> ** Output1 line goes to the Inactive Status.			


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## 6-8. Enable2 ('Activating Output 2')

Field	Mark	Value	Meaning
CMD_ID	"Enable2"		Enable Output2
<p><b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;Enable2  [response] ST300CMD;Res;100850000;010;Enable2  [response] ST300CMD;Res;100850000;010;Enable2NoUse (in case that IN type is set to 'No Use').</p> <p><b>&lt;Note&gt;</b>  ** Output2 line goes to the Active Status.  ** If OUT2 is set to immobilizer, Output2 line goes to the Active Status gradually with pulse in driving mode.  ** If OUT2 is set to the pulse type, Output2 Line generates pulse and automatically returns to the Inactive State after pulsing out.</p>			

## 6-9. Disable2 ('Inactivating Output2')

Field	Mark	Value	Meaning
CMD_ID	'Disable2'		Disable Output2
<p><b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;Disable2  [response] ST300CMD;Res;100850000;010;Disable2  [response] ST300CMD;Res;100850000;010;Disable2NoUse (in case that IN type is set to 'No Use').</p> <p><b>&lt;Note&gt;</b>  ** Output2 Line goes to the Inactive Status.</p>			

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## 6-10. Command on how to shutdown back-up battery

The 'Shutdown command' is mainly used to save power consumption of the back-up battery which has not been installed completely on a vehicle. This command is available only for a device model that has a back-up battery.

This command should be sent only via RS232; not via 'SyncTrak'.

<b>Command</b>	\$SHTDN<enter>
<b>Response</b>	OK (successful) NO SIM (Error: No SIM is inserted.) ERROR: Plug out the Main Power! (Error: The Main power is connected).
<b>&lt;Note&gt;</b>  In order to send this command, the following three steps should be taken to: <ol style="list-style-type: none"> <li>1. Insert SIM and connect the main power (12V or 24V) and the battery.</li> <li>2. Disconnect the main power.</li> <li>3. Send "\$SHTDN" command 3 seconds later.</li> </ol> <p>After entering the storage mode, the device cannot be operated until the main power is connected.</p> <p>A battery with 69ecogni. 30% of charging level can last for 2 months in Shutdown Mode.</p>	

## 6-11. Command on how to stop shutdown back-up battery


This command is used when a tracking system programmer wants to stop processing the 3 steps described above. This command should be sent only via RS232; not via 'SyncTrak'.

<b>Command</b>	\$SHTRST<enter>
<b>Response</b>	OK
<b>&lt;Note&gt;</b>  This command can be recognized only for the time that the device does not complete steps for entering storage mode yet.	

## 6-12. Requesting IMSI

Once this command is made, some interactions will be made between the server and the device as described in the 'Meaning' section of the table as below.

Field	Mark	Value	Meaning
CMD_ID	"ReqIMSI"		The server sends the device this command requesting IMSI (International Mobile Subscriber Identity) if the server wants to receive IMSI from the device.) If the device receives the command from the server, it sends the IMSI to the server.
<b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;ReqIMSI [response] ST300CMD;Res;100850000;010;ReqIMSI;724031111553779			

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### 6-13. Requesting ICCID

Once this command is made, some interactions will be made between the server and the device as described in the 'Meaning' section of the table as below.

Field	Mark	Value	Meaning
CMD_ID	"ReqICCID"		<ul style="list-style-type: none"> <li>How to request ICCID (Integrated Circuit Card Identifier), which is a sequence number that is displayed on SIM</li> </ul> <p>If device receives this command, it sends the server ICCID.</p>
<b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;ReqICCID [response] ST300CMD;Res;100850000;010;ReqICCID;89550230000084256668			

### 6-14. Requesting Version

Once this command is made, some interactions will be made between the server and the device as described in the 'Meaning' section of the table as below.


Field	Mark	Value	Meaning
CMD_ID	"ReqVer"		<u>Requesting version of the device</u>  If the device receives this command, it reports to the server about: Model, Buyer, Protocol and Software(S/W) release version.
<b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;ReqVer [response] ST300CMD;Res;100850000;010;ReqVer;ST300E_SAMPLE_STBASE_001			

### 6-15. Status Request made by External device connected with RS232 of Event Lines

This command is made towards ST300 by the external device connected with RS232 of the event line. Once the ST300 receives this command, some interactions will be made between the external device and the ST300 as described in the 'Meaning' section of the table as below.

HDR	DEV_ID	VER	LEN	DATA	CHK_SUM
-----	--------	-----	-----	------	---------

Field	Mark	Value	Meaning
CMD_ID	"SttReq"		Status request If received, the device sends status string instantly.
<b>&lt;Example&gt;</b>  [command] SttReq [response] ST300STT;100850000;01;010;20090724;07:12:16;00129;+37.479995;+126.885815;000.029;000.00;7;1;0;15.33;100000;2;0002			

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## 6-16. AT Commands from RS232

HDR	AT COMMAND	CR/LF
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- Definition : Controls some functions

Field	Definitions	Unit	Remark
HDR	"ATCMD"		Header
AT COMMAND			General AT Commands string
CR/LF	0x0d0x0a		Mark of End [Carriage Return Line Feed]

### <example>

[command]

ATCMD;AT+CGREG? CR/LF

[response]

+CGREG: 0, 1

OK

Note.

2014.

we can support to the most of at commands except SMS commands.

## 6-17. Start Counting of Odometer Pulse


- Definition : Start counting odometer pulse to set "ODO\_UNIT"

Field	Definitions	Unit	Remark
CMD_ID	"StartCountOdo"		Start counting odometer pulse

### <example>

[command] ST300CMD;100850000;02;StartCounterOdo

[response] ST300CMD;Res;100850000;267;StartCounterOdo

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## 6-18. End Counting of Odometer Pulse

- Definition : End counting odometer pulse to calibrate.


Field	Definitions	Unit	Remark
CMD_ID	"StopCountOdo"		End counting odometer pulse Device responds with counted pulse no.
DIST		meters	Traveled distance
<b>&lt;example&gt;</b> [command] ST300CMD;100850000;02;StopCountOdo=1500 1500 is traveled distance after "StartCountOdo" command. [response] ST300CMD;Res;100850000;267;StopCountOdo;3300 Device calculates ODO_UNIT with count of odometer pulses and value of entered traveled distance and responds with ODO_UNIT value (odometer's pulse count per 1km distance). 3300 in above example was calculated by 4950/1.5 (pulse count during the travel / travel distance).  <b>&lt;note&gt;</b> Refer 9-10 for calibration by using this command.			

## 6-19. Request RPM Unit

- Definition : Request RPM unit

Field	Definitions	Unit	Remark
CMD_ID	"ReqRPMU"		Request RPM unit (pulse/second of 1000RPM)
<b>&lt;example&gt;</b> [command] ST300CMD;850000;02;ReqRPM [response] In case that RPM_UNIT of telemetric setting parameter is set to "A". ST300CMD;Res;100850000; 267;ReqRPM;A (if not calibrated yet) ST300CMD;Res;100850000; 267;ReqRPM;A;12500 (if calibrated) In case that RPM_UNIT of telemetric setting parameter was set with value. SA200CMD;Res; 100850000; 267;ReqRPM;12500			



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## 6-20. Request Odometer Unit

- Definition : Request odometer unit

Field	Definitions	Unit	Remark
CMD_ID	"ReqOdoU"		Request Odometer unit (pulse per 1km)
<b>&lt;example&gt;</b> [command] ST300CMD;100850000;02;ReqOdoU [response] In case that ODO_UNIT of telemetric setting parameter is set to "A". ST300CMD;Res;100850000;267;ReqOdo;A (if not calibrated yet) ST300CMD;Res;100850000;267;ReqOdo;A;12500 (if calibrated) ST300CMD;Res;850000;267;ReqOdo;A;12500;6250 (if calibrated with dual type) In case that ODO_UNIT of telemetric setting parameter was set with value. SA200CMD;Res; 100850000;267;ReqOdo;12500  <b>&lt;note&gt;</b> In case of big truck, the vehicle may have dual gear system and may be changed odometer unit (pulse per 1km distance). When ODO_UNIT is set to "auto", the device can recognize these dual situations automatically and can apply different value depending on dual situations as calculating speed and moving distance.			

## 6-21. Request Driver ID


- Definition : Request current inserted driver ID

Field	Definitions	Unit	Remark
CMD_ID	"ReqDriverID"		Request inserted driver ID
<b>&lt;example&gt;</b> [command] ST300CMD;;02;ReqDriverID [response] ST300CMD;Res;100850000;267;ReqDriverID;0100004E160000 SA200CMD;Res;100850000;267;NoDriverID			

## 6-22. Request Release Output Control by Driver ID

- Definition : Request all registered driver IDs

Field	Definitions	Unit	Remark
CMD_ID	"ReleaseDIDOutControl"		Release output control by driver ID temporarily
<b>&lt;example&gt;</b> [command] ST300CMD;;02;ReleaseDIDOutControl [response] ST300CMD;Res;100850000;267;ReleaseDIDOutControl  <b>&lt;note&gt;</b> When the device activates related output because registered I-button is not inserted and the device receives this command, the device deactivates related output temporarily until next parking.			

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## 6-23. Request Telemetry Setting Parameter

- Definition : Request telemetry setting parameter

Field	Definitions	Unit	Remark
CMD_ID	"ReqTeleParam"		Request telemetric parameter
<b>&lt;example&gt;</b> [command] ST300CMD;100850000;02;ReqTPParam [response]ST300CMD;Res;100850000;267;ReqTeleParam;1;1;A;A;3200;1500;4000;0;0100004E160000;;1;3;1000;0;0			

## 6-24. Request Driver Pattern Parameter

- Definition :Request Driver Pattern setting parameter

Field	Definitions	Unit	Remark
CMD_ID	"ReqDPAParam"		Request telemetric parameter
<b>&lt;example&gt;</b> [command] ST300CMD;100850000;02;ReqDPAParam [response]ST300CMD;Res;100850000;267; ReqDPAParam;1;10;20;30;40			

## 6-25. Setting ImproveBatteryLife


- Definition : Setting Improve Battery Life.

Field	Definitions	Unit	Remark
CMD_ID	"ImproveBatteryLife"		0 = Disable ImproveBatteryLife 1 = Enable ImproveBatteryLife
<b>&lt;example&gt;</b> [command] ST300CMD; 600850000;02;ImproveBatteryLife=0 [response] ST300CMD;Res; 600850000;010;ImproveBatteryLife=0			

## 6-26. Request ImproveBatteryLife

- Definition : Request Improve Battery Life.

Field	Definitions	Unit	Remark
CMD_ID	"ReqBattLife"		Request Improve Battery Life
<b>&lt;example&gt;</b> [command] ST300CMD;600850000;02;ReqBattLife [response] ST300CMD;Res;600850000;534;ReqBattLife;1			

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## 7. Command for non-general use

Description on each factor necessary to make types of these commands is shown in this Chapter.

HDR	DEV_ID	VER	CMD_ID
-----	--------	-----	--------

Field	Marks	Value	Meaning
HDR	"ST300CMD"		Command type
DEV_ID	9 char.		Device ID
VER	'01'		Protocol Version
CMD_ID	String		Control command content

Commands are classified into two groups such as:

- "Commands for General Use", which have already been explained in the previous chapter, Chapter 8,
- "Commands for Non-general Use".

The latter commands are described here as below.

### 7-1. Erase All


This command is used if you want to erase all the saved reports and disable the outputs.

Field	Mark	Value	Meaning
CMD_ID	"EraseAll"		This command is used if you want to erase all the saved reports and disable the outputs. This command is needed to initialize the device which is to be delivered to a new customer.
<b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;EraseAll [response] ST300CMD;Res;100850000;010;EraseAll			

### 7-2. Setting Traveled Distance

This command is used if you want to set the travelled distance.

Field	Mark	Value	Meaning
CMD_ID	"SetOdometer="	meter	Setting odometer.
<b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;SetOdometer=999999999 [response] ST300CMD;Res;100850000;010;SetOdometer=999999999			

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### 7-3. Initializing Message Number

This command is used if you want to initialize sequence number of the message.

Field	Mark	Value	Meaning
CMD_ID	"InitMsgNo"		Set message number to 0.
<b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;InitMsgNo [response] ST300CMD;Res;100850000;010;InitMsgNo			

### 7-4. Setting Hour-Meter


This command is used if you want to set the travelled time period.

Field	Mark	Value	Meaning
CMD_ID	"SetHMeter="	minute	What to set the travelled time period.
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;SetHMeter=999999 [response] ST300CMD;Res;100850000;010;SetHmeter=999999 Max value is '999999'			

### 7-5. Requesting Circular Geo-fence

This command is used if the device is required to report to the server with all of the geo-fence parameters that are pre-set.

Field	Mark	Value	Meaning
CMD_ID	"ReqCircleGeo"		<ul style="list-style-type: none"> <li>Report the enabled circular geo-fences</li> <li>Response consists of continuous field (0 or 1) and information about all the geo-fences including the first geo-fence up to the last one whose last digit is 1 (One).</li> </ul>
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;ReqCircleGeo [response] Case that unit has 3 geo-fences : ST300CMD;Res;100850000;010;ReqCircleGeo;001; <b>1</b> ;1;+37.000000;+127.000000; 2000;1;1 ST300CMD;Res;100850000;010;ReqCircleGeo;001; <b>1</b> ;2;1;+37.100000;+ 127.100000;2000;1;0 ST300CMD;Res;100850000;010;ReqCircleGeo;001; <b>0</b> ;3;1;+37.200000;+127.200000;2000;1;1 Case that unit has no geo-fence. ST300CMD;Res;100850000;ReqCircleGeo;NoData  <b>&lt;Notes&gt;</b> ** Continuous field of above response string represents bold.			

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## 7-6. Requesting Own Phone Number


Once this command is made, some interactions will be made between the server and the device as described in the 'Meaning' section of the table as below.

Field	Mark	Value	Meaning
CMD_ID	"ReqOwnNo"		Requesting own phone number
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;ReqOwnNo [response] ST300CMD;Res;100850000;010;ReqOwnNo;82220275656  <b>&lt;Notes&gt;</b> ** When the device has no SIM or is under power-on process, the own phone number cannot be read. The device reports with "NotReady"  ** If the own number field in SIM is empty, the device reports with "NoData".			

## 7-7. Setting Own Phone Number

Once this command is made, some interactions will be made between the server and the device as described in the 'Meaning' section of the table as below.

Field	Mark	Value	Meaning
CMD_ID	"SetOwnNo"		<ul style="list-style-type: none"> <li>How to set the own phone number</li> </ul> This command is followed by "=" and own number.
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;SetOwnNo=21140108 [response] ST300CMD;Res;100850000;010;SetOwnNo=21140108  <b>&lt;Notes&gt;</b> ** <b>When the device has</b> no SIM or is under power-on process, the own phone number cannot be set. The device reports with "NotReady"			

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## 7-8. Requesting the Current Volume Level in Call

This command is used if the current volume level needs to be reported to the server.

Field	Mark	Value	Meaning
CMD_ID	"ReqVol"		Request volume
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;ReqVol [response] ST300CMD;Res;100850000;010;ReqVol;200  <b>&lt;Notes&gt;</b> ** It's available only for the model that can support voice call.			

## 7-9. Command to Set Volume Level


This command is made to the device when the volume level for the phone call receiver needs to be set.

Field	Mark	Value	Meaning
CMD_ID	"SetVol"		Set volume level in call. It is followed by "=" and volume number (0~255).
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;SetVol=200 [response] ST300CMD;Res;100850000;010;SetVol=200  <b>&lt;Notes&gt;</b> ** It is available only for the model that can support voice call.			

## 7-10. Command to Reboot

This command is made by the server to the device which needs to be reboot.

Field	Mark	Value	Meaning
CMD_ID	"Reboot"		Reboot device.
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;Reboot [response] ST300CMD;Res;100850000;010;Reboot			

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## 7-11. Command on How to Restart Anti-Theft 2

Field	Definitions	Unit	Remark
CMD_ID	"RestartAntiTheft2"		Restart anti-theft after anti-theft disabled by press of panic button in case of 'Anti-theft 2'.
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;RestartAntiTheft2 [response] ST300CMD;Res;100850000;010; RestartAntiTheft2  <b>&lt;Note&gt;</b> This command is only for 'Anti-theft 2' mode.			

## 7-12. Command on How to Set SMS Number for Panic Situation

This table shows us how to set the SMS number to be used when the panic button is pressed.

Field	Mark	Value	Meaning
CMD_ID	"SetSMSNoOfPanic"		How to set the SMS number where the location information (i.e. the location link address) will be delivered through SMS when the panic button is pressed.
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;SetSMSNoOfPanic=01988888888 [response] ST300CMD;Res;100850000;010;SetSMSNoOfPanic=01988888888			

## 7-13. Requesting SMS Number Used in Panic Situation


This table shows us how to get the SMS number when the panic button is pressed.

Field	Mark	Value	Meaning
CMD_ID	"ReqSMSNoOfPanic"		Requesting SMS number where the location link address is sent when the panic button is pressed.
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;ReqSMSNoOfPanic [response] ST300CMD;Res;100850000;010;ReqSMSNoOfPanic;NoData			

## 7-14. Command to Set Google Map Address

In a case that you use a smart phone operating a function of "Where Are You", you can use the server of the Google as set below *in italic bold letters, "Google map address"*. The users of the Google map should check what the right map address of the Google is and that the right address should be set. The Google map address needs to be checked. If the Google map address is not right, this function ("Where Are You") cannot be used.

Field	Mark	Value	Meaning
CMD_ID	"SetGoogleMap"		Set location link address format (Google map address).

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		This command is either followed by "=" or inserted inside the address.
<p><b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;SetGoogleMap=<a href="http://maps.google.com/maps?q=">http://maps.google.com/maps?q=</a>  [response] ST300CMD;Res;100850000;010; SetGoogleMap=<a href="http://maps.google.com/maps?q=">http://maps.google.com/maps?q=</a></p> <p>[command] ST300CMD;100850000;02;SetGoogleMap=<a href="http://maps.google.com/[Lon],[Lat]/maps?q">http://maps.google.com/[Lon],[Lat]/maps?q</a>  [response] ST300CMD;Res;100850000;010;SetGoogleMap=<a href="http://maps.google.com/[Lon],[Lat]/maps?q">http://maps.google.com/[Lon],[Lat]/maps?q</a></p> <p><b>&lt;Note&gt;</b>  The max of input string is 96 characters.</p>		

### 7-15. Command to Get Google Map Address

In case this command is made, the pre-set existing Google Map address will be known.  
Get Google Map Address.


Field	Mark	Value	Meaning
CMD_ID	"ReqGoogleMap"		Request the Google Map Address. This command is followed by "=" and Google Map Address.
<p><b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;ReqGoogleMap  [response] ST300CMD;Res;100850000;010;ReqGoogleMap;<a href="http://maps.google.com/maps?q=">http://maps.google.com/maps?q=</a></p>			

### 7-16. Simultaneous Testing Output 1 and Output 2 Test for 30 seconds.

This table shows you how to test the two outputs (i.e. Output1 and Output2) at the same time for 30 seconds.

Field	Mark	Value	Meaning
CMD_ID	"ReqShortTest"		Request the device to activate all outputs to do testing at the same time for 30seconds.
<p><b>&lt;example&gt;</b>  [command] ST300CMD;100850000;02;ReqShortTest  [response] ST300CMD;Res;100850000;259;ReqShortTest</p> <p>Output 1 and Output 2 will be activated for 30 seconds for the testing. In 30 seconds, the two outputs will be deactivated.</p>			



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### 7-18. Simultaneous Testing Output 1 and Output 2 Test for 60 seconds.

This table shows you how to test the two outputs (i.e. Output1 and Output2) at the same time for 60 seconds.

Field	Mark	Value	Meaning
CMD_ID	"ReqTest"		Request the device to activate all outputs to do testing at the same time for 60seconds.
<b>&lt;example&gt;</b> [command] ST300CMD;100850000;02;ReqTest [response] ST300CMD;Res;100850000;259;ReqTest  Output 1 and Output 2 will be activated for 60 seconds for the testing. In 60 seconds, the two outputs will be deactivated.			

### 7-19. Enable PIN Lock. (ST350 only)


This command is for PIN lock command.

Field	Mark	Value	Meaning
CMD_ID	"EnablePINLock"		Enable the PIN lock function. This command is followed by "=" and optional values(current PIN number and new PIN number).
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;EnablePINLock=<*CURRENT_PIN_NO>,<**NEW_PIN_NO> [response] (Success) ST300CMD;Res;100850000;010;EnablePINLock=<*CURRENT_PIN_NO>,<**NEW_PIN_NO> (Error)ST300CMD;Res;100850000;010;EnablePINLock=<*CURRENT_PIN_NO>,<**NEW_PIN_NO>;<***ERR_CODE>  <b>&lt;note&gt;</b> * CURRENT_PIN_NO: Current PIN number. ** NEW_PIN_NO: New PIN number. *** ERR_CODE - PIN_NO: PIN number is wrong. - PUK_LOCK: You have entered wrong PIN number over three times. If a device is set enable PIN lock, you can just change the PIN number to NEW_PIN_NO. If a device is set disable PIN number, you can set PIN lock and change PIN number to NEW_PIN_NO.			

### 7-20. Disable PIN Lock. (ST350 only)

This command is for PIN unlock command.

Field	Mark	Value	Meaning
CMD_ID	"DisablePINLock"		Disable the PIN lock function. This command is followed by "=" and PIN number.
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;DisablePINLock=<*CURRENT_PIN_NO> [response] (Success) ST300CMD;Res;100850000;010;DisablePINLock=<*CURRENT_PIN_NO> (Error) ST300CMD;Res;100850000;010;DisablePINLock=<*CURRENT_PIN_NO>;<***ERR_CODE>  <b>&lt;note&gt;</b> * CURRENT_PIN_NO: Current PIN number.			

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**\*\* ERR\_CODE**

- ALREADY\_SET: A device was already disable the PIN lock function.
- PIN\_NO: PIN number is wrong.
- PUK\_LOCK: You have entered wrong PIN number over three times.

## 7-21. GPS On

This command can turn on the GPS. Only ST350B to supported LBS cell information can be using this command.

Field	Mark	Value	Meaning
CMD_ID	"GpsOn"		This command can turn on the GPS. Soon, the fields which related GPS are updated by current value
<b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;GpsOn [response] ST300CMD;Res;100850000;519;GpsOn			

## 7-22. GPS Off


This command can turn off the GPS.

Field	Mark	Value	Meaning
CMD_ID	"GpsOff"		This command is used if you want to erase all the saved reports and disable the outputs. This command is needed to initialize the device which is to be delivered to a new customer.
<b>&lt;Example&gt;</b>  [command] ST300CMD;100850000;02;GpsOff [response] ST300CMD;Res;100850000;519;GpsOff			

## 7-23. Start DPA Calibration (ST350LC2D, ST350LC4D only)

This command is for starting DPA calibration.

Field	Mark	Value	Meaning
CMD_ID	"StartDPACAL"		
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;StartDPACAL [response] ST300CMD;Res;100850000;010;StartDPACAL  <b>&lt;note&gt;</b>			


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## 7-24. Stop DPA Calibration (ST350LC2D, ST350LC4D only)

This command is for stopping DPA calibration.

Field	Mark	Value	Meaning
CMD_ID	"StopDPACAL"		
<b>&lt;Example&gt;</b> [command] ST300CMD;100850000;02;StopDPACAL [response] ST300CMD;Res;100850000;010;StopDPACAL			
<b>&lt;note&gt;</b>			

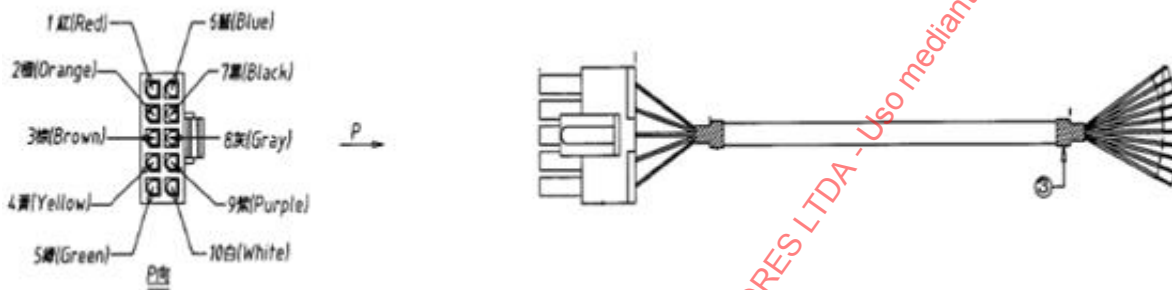
Uso Exclusivo - TOTAL TRAC - LOCACAO E MONITORAMENTO DE RASTREADORES LTDA - Uso mediante contrato de confidencialidade

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## 8. Detailed Description on Event Lines and Features

### 8-1. Total 14-pin/4pin Event Lines


Device has 14-pin event lines consisting of a port with 4-pin lines (to be described later) and another port with 10-pin cables as shown in the below picture to be used for events, communication, power and ground line.

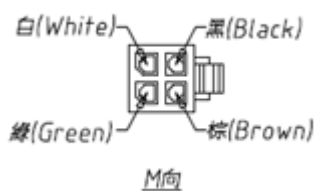


### 10-pin Event lines

Red	pin 1	Car battery (Main power 8V ~ 40V)	<b>FIX wire</b>
ORG	pin 2	Output 1	<b>FIX wire</b>
BRWN	pin 3	Output 2	<b>FIX wire</b>
YELL	pin 4	Input 2 (option ; i-Button)	<b>option</b>
GRN	pin 5	Input 3 (Option = ADC)	<b>option</b>
BLUE	pin 6	Ignition	<b>FIX wire</b>
BLK	pin 7	Ground	<b>FIX wire</b>
GRAY	pin 8	Input 4	<b>option</b>
PURP	pin 9	Input 5	<b>option</b>
WHT	pin 10	Input 1	<b>FIX wire</b>

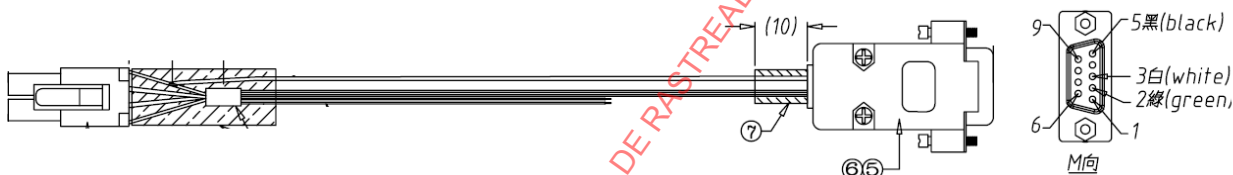
The Input lines were designed to endure up to 50V. The Output lines can endure up to 30V.

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## 4-pin Event line

WHT	pin 1	RS232_DRX ( option; Audio_mic)	option
GRN	pin 2	RS232_DTX (option; Audio_speaker)	option
BRN	pin 3	Power for external (DC4.9V or 12V)	option
BLK	pin 4	Ground	FIX wire



Option1 and Option2 lines can be selected out of the types shown the Figure by changing the circuit of the connection made in the factory.

## Option pins


Type 1	RPM/ Odometer		pin 8	RPM
			pin 9	Odometer

Type 2	CAN		pin 8	CAN_H
			pin 9	CAN_L

Type 3	Output		pin 8	Output3
			pin 9	Output4

Type 4	In/Out		pin 8	Input4
			pin 9	Output4

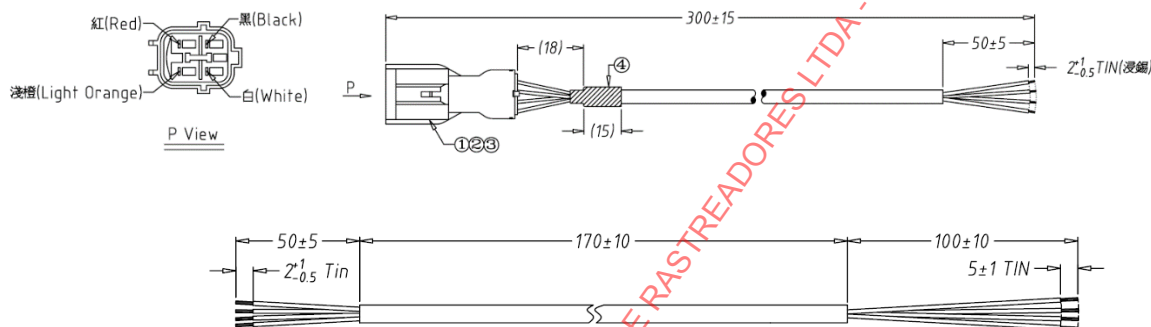
Type 5	RS-232		pin 8	RS232_DTX
			pin 9	RS232_DRX

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## 4-pin Event line for ST350

### 4 Pin event cable

Red	pin 1	Car battery (Main power 8V ~ 40V)	<b>FIX wire</b>
ORG	pin 2	Output 1	<b>FIX wire</b>
BLK	pin 7	Ground	<b>FIX wire</b>
WHT	pin 10	Input 1 (Digital input or Ignition)	<b>Optional</b>



Others models, Please refer to hardware specification for each.

### 8-1-1. Immobilizer

If Output type is set to 'Immobilizer' or 'Immobilizer & Auto Active' and you connect this line to immobilize the vehicle, the Output line can use the immobilizer.


When the device recognizes the command to activate the immobilizer output, one of the 2 options ('Active' or 'Inactive') will be selected. Which activation you choose will depend on what mode the vehicle is in a parking mode or in a driving mode.

In case of driving, the immobilizer activation is made in a way of progressive blocking as shown the following blinking diagram:



The active time of the immobilizer is increased by 90ms each 4s. Three (3) minutes later, the immobilizer starts being activated and will be activated continuously.

However, in case of parking as soon as the vehicle is parked, the immobilizer is activated normally.

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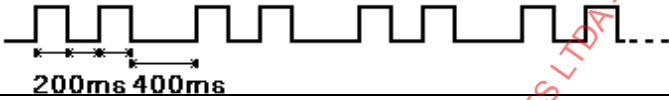
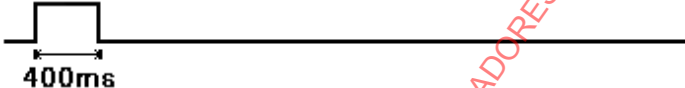
In a case that the Output type is set to 'Immobilizer & Auto active', the output is activated automatically as long as the vehicle is parked. In such a case the Output is also activated as long as the vehicle starts being in a driving mode.

If the device receives a command to activate the immobilizer output, the output is always activated regardless to a mode type (either parking mode or driving mode).

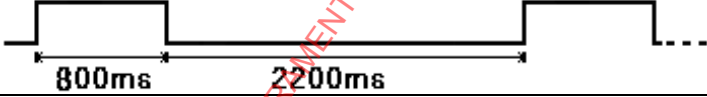
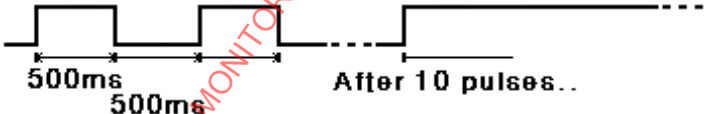
## 8-1-2 Buzzer

In a case that the Output type is set to 'Buzzer', the buzzer alerts. The following table shows such cases:

### 8-1-2-1. Voice Model


Condition	Alert Pulse	Meaning
Incoming Call		When the call is coming.
Outgoing Call Error		When an outgoing call fails.

### 8-1-2-2. Related with over-speed

Condition	Alert Pulse	Meaning
Over-speed (Out = Buzzer)		When vehicle's speed exceeds the over-speed value.
Over-speed (Out = NRT_Buzzer)		When vehicle's speed exceeds the over-speed value.
Stop buzzer		When the vehicle's speed is maintained under (over-speed value - tolerance).

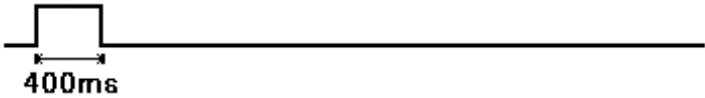
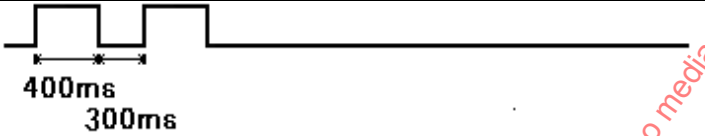
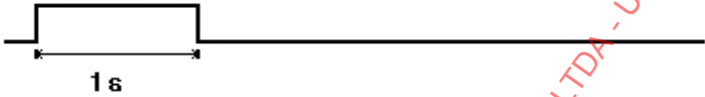

Tolerance speed as below

- 1) If speed-limit is more than 100km/h, tolerance is 5km/h.
- 2) If speed-limit is from 50km/h to 100km/h, tolerance is 3km/h.
- 3) If speed-limit is less than 50km/h, tolerance is 2km/h".


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### 8-1-2-3. Related with Anti-theft

In case one of any input ports is set to "Anti-Theft".

Condition	Alert Pulse	Meaning
Enable		This size of Alert pulse is generated if you enable this function by pressing the anti-theft button for 10 seconds.
Disable		This type of Alert pulse is generated if you disable this function by pressing anti-theft button for 10 seconds.
Lock Alert		When it starts to be in a locking mode. (anti-theft function is enabled and 20 seconds later after beginning to park vehicle.
Emergency		






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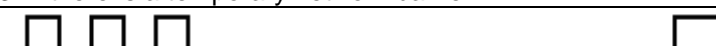

## 8-2. Indication with Two (2) LEDs


Blue LED indicates GPS status and red LED indicates GPRS status while the device is not processing call.




### 8-2-1. Red LED for GPS

GPS	Blink Count	Meaning
Normal	1	
No Fix	2	 <b>&lt;Probable Situations&gt;</b> <ol style="list-style-type: none"> <li>2014. If power is on, GPS chipset tries to find position for some minutes.</li> <li>2014. If device has weak connectivity with GPS network or if it has no GPS signal position</li> <li>3. If GPS connectivity with a device is weak</li> </ol>
GPS Chipset Error GPS Antenna Error	4	 <b>&lt;Probable Situations&gt;</b> <ol style="list-style-type: none"> <li>1. If GPS antenna is disconnected.</li> <li>2. If GPS antenna or socket of GPS antenna is broken.</li> <li>3. If device is broken.</li> </ol>

### 8-2-2. Blue LED for GPRS

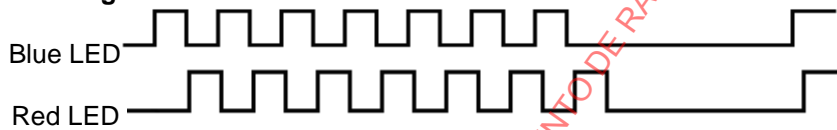
GPRS	Blink Count	Meaning
Normal	1	
Server Com. Error	2	 <b>&lt; Probable Situations &gt;</b> <ol style="list-style-type: none"> <li>1. If the server or network parameter is wrong.</li> <li>2. If the server is closed.</li> <li>3. If there is a temporary network barrier</li> </ol>
GPRS Com. Error	3	 <b>&lt;Probable Situations &gt;</b> <ol style="list-style-type: none"> <li>1. If network parameter is wrong.</li> <li>2. If SIM is blocked and it is impossible to use GPRS session</li> <li>3. If there is a temporary network barrier</li> <li>4. If device receives weak GPRS signal</li> <li>5. If GPRS connectivity with a device is weak</li> </ol>
No Network	4	

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		<b>&lt; Probable Causes&gt;</b> 1. If GPRS antenna is disconnected 2. If GPRS antenna or socket of GPRS antenna is broken 3. If the device is broken
SIM PIN Locked	5	 <b>&lt;Probable Situation &gt;</b> 1. If SIM PIN is enabled.
Cannot Attach NW	6	 <b>&lt; Probable Situations&gt;</b> 1. If device receives weak GPRS signal 2. If GPRS connectivity with a device is weak
No SIM	7	 <b>&lt; Probable Situations &gt;</b> 1. If there is no SIM or if SIM is not inserted properly 2. If SIM or SIM socket is broken.


### 8-2-3. Phone Call LEDs

#### - Incoming Phone Call



#### - While Talking over Phone Call



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### 8-3. Power Saving

The device can save power consumption of the battery by using one of two modes such as Sleep Mode, Deep Sleep Mode. If PWR\_DN is set with '1' or '2' and report interval in parking mode is made every 10 minutes or longer than 10 minutes to enable the devices to process power down while the vehicle is in parking situation.

However, there are some restrictions in processing power down:

- If an emergency situation occurs, device cannot process power down for 30 minutes due to safety issue.
- When GPS signal is not fixed, the device can start to process power down after trying to fix for 5 minutes.
- If communication with the server fails continuously, the device processes Deep Sleep after trying to make communications for 8 minutes.
- While the device is charging the backup battery, it cannot process Deep Sleep.

Device turns off LED, **blinks a GPRS LED one time every 2 minutes** and sends a status report and a related alert before entering the power-down functionality.

The device terminates power down either when ignition is ON or when an event or an emergency occurs. In such cases, the device sends related alert and status string, instead.

#### - Sleep

Device turns off only GPS part and GPRS part enters Sleep. Even for time of Sleep, all communication with the server works normally and the device can receive SMS or call always. Average of Sleep current is lower than 10mA and this current may be increased under weak GPRS condition.

#### - Deep Sleep

Device turns off GPS and GPRS part. For time of Sleep, all communication with the server is impossible and it cannot receive any SMS messages or any calls, either. Device turns on GPRS session every max. 30 minutes. However, the device can receive SMS or call while it is in Deep Sleep. Average current during Deep Sleep mode is around 5mA (non-battery version).

### 8-4.BackupBattery


The device has a back-up battery in order to be prepared for any emergency cases when the main power source is removed or sabotaged. When the vehicle is stolen and power of device is removed, the back-up battery starts working as a replacement power source for the main power source (the vehicle's battery).

Back-up battery at full charge on good GPRS network condition at a reporting interval value of every 3 minutes, the device can work for 6 hours at least.

The device was designed to keep back-up battery staying as effective as possible all the time. Charging the back-up battery starts if voltage of the back-up battery goes below 4.2V. In a parking mode, charging the back-up battery is hold when the main power source gets consumed down to 90% of the normal voltage level.

The charging algorithm for the back-up battery has a protection against over-voltage, abnormal charging current and high temperature.

In addition, the device alerts about battery error if the back-up battery cannot be charged.

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## 8-5. Motion Sensor

### <About How to activate Motion Sensor>

#### - Ignition ON (Driving)

The sensor mode goes to collision detection mode. So, if the vehicle has a car accident, the accident may bring about a big impact of which value is higher than that of the specified collision threshold (COLL\_THRES). In this case the device will be reporting a collision message to the server.

After a collision is made against the vehicle, the sensor will be disabled for a while (30 seconds) so as to avoid sending to the server the same message as the first one repeatedly.

#### - Ignition OFF (Parking)

'Ignition Off' situation means that the vehicle is in state of parking and that the sensor goes to 'parking mode' (shock or movement detection mode).

In this situation, if there is a shock made on the vehicle by somebody, the device will report a shock message to the server. The device will also exit from the power down mode if the device has been in power down mode.

In case of movement, the device will exit from the mode of power down to check functionality of 'Parking Lock' from the power down mode without reporting to the server.

After triggering an event such as a shock or a movement, the sensor will be disabled for a while (for 30 seconds) so as to avoid sending to the server the same message as the first one repeatedly.

### <About Threshold>

#### - Collision Threshold


Our recommendation is 0.7 but it is only for reference value obtained from our field testing made on real vehicles (nearby gear). The value may vary in a real situation depending upon driving manner or condition of road. So, you need to check this value.

#### - Shock Threshold

Our recommendation is 0.04 but it is only for reference value obtained from our field testing made on real vehicles (nearby gear). Motion sensor is installed on an inside part of the vehicle's body to measure sensitivity value(s) created by vibration and shock impact given to the vehicle. Value of this sensitivity varies because it depends on what body part of the vehicle the motion sensor is installed.

Shock Threshold is also used for checking movement of vehicle. So, the device may not be able to recognize if a shock threshold value is too high. You need to consider these kinds of factors measurable under realistic environment when you also adjust the values.

State	Detection			Exit from Power down			Reporting about:		
	Motion	Shock	Collision	Motion	Shock	Collision	Motion	Shock	Collision
Parking	ON	Enable	X	Exit	Exit	Exit	X	Enable	X
Driving	OFF	OFF	Enable	X	X	X	X	X	Enable

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<Note>:

- ON : activation
- OFF : Deactivation
- Enable : Enable or Disable by setting
- X: Please, do not care.


For setting method, please refer “4-8. Motion Sensor Parameter Settings”.

*[Caution] :Basically, the device checks any motions in parking mode(Ignition Off). It does not care about the enable flags such as COLL\_EN or SHOCK\_EN. This means that, if the device senses any motion (movement) created in the power down mode, it will exit from the power down mode as if a creature would wake up from sleeping suddenly. So, if you want to check the power down mode to save power consumption of the backup battery, DO NOT give any impacts to the vehicle.*

## 8-6. Protection of Vehicle Battery

For a period of duration that the vehicle has been in a parking mode for a long time by consuming vehicle's battery down to a very low level, the device starts entering the Deep Sleep Mode automatically. This situation happens because the device intends to prevent vehicle's battery from wasting power. In this case, the device alerts with ALERT\_ID 14 before entering the deep sleep mode, and exits from the deep sleep mode either when ignition line goes to 'ON 'or until the voltage level is increased sufficiently.

The vehicle's battery level for protection can be changed by making a Command, '\$SetMVolt'.

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## 8-7. Anti-Theft

Anti-theft function available at the device is used to protect the vehicle from a risk of potential thefts by utilizing buzzer, immobilizer and alerting to the server.

In order to use the function related with the anti-theft, the following basic conditions should be satisfied:

### [Basic Conditions]

1. IGNITION of event parameter should not be set to "0" (No Use).
2. One input should be set to "**Anti-theft**" or "**Anti-theft 2**" button type.

If one output event is set to immobilizer or buzzer, immobilizer or buzzer can be activated automatically when emergency related with anti-theft occurs.

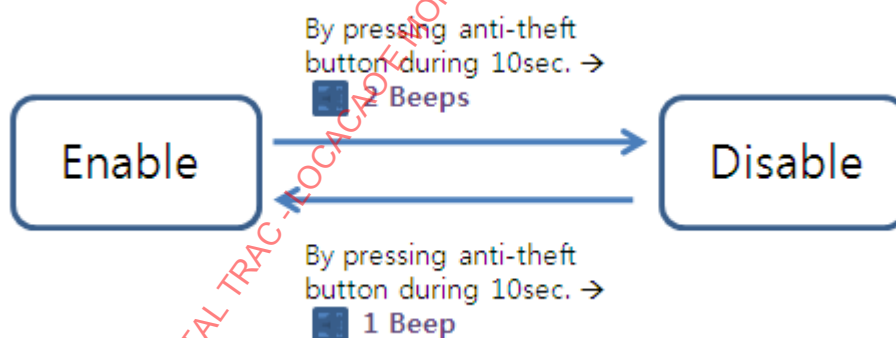
### Activation/Deactivation

When the input is set to "Anti-theft" by command, anti-theft is enabled by default at first. Activation/deactivation state of anti-theft can be checked by "PresetA" command.

### Case of 'Anti-Theft'


In a case that anti-theft button type is "Anti-theft" and that the **device has a buzzer**, the anti-theft function can be activated or deactivated by pressing anti-theft button for more than 10seconds. If anti-theft button is pressed for 10 seconds in activation mode of anti-theft, anti-theft gets disabled by making the buzzer beep two times.

On the other hand, if anti-theft button is pressed as being disabled, anti-theft gets enabled by making the buzzer beep **just** one time.



### Case of 'Anti-Theft 2'

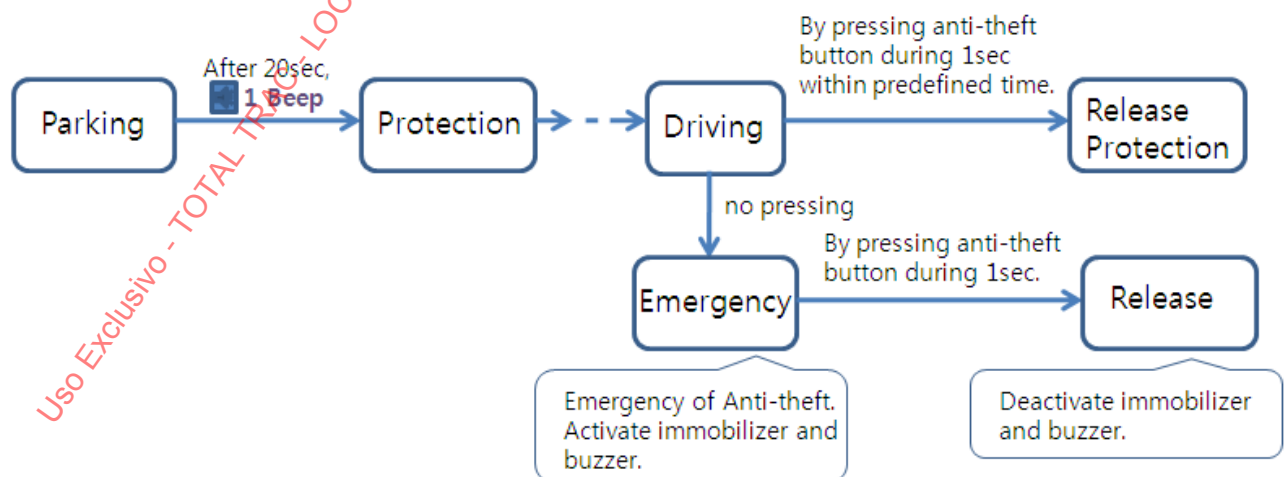
In case that anti-theft button is set to "Anti-theft2", anti-theft activation/deactivation cannot be changed by pressing the anti-theft button. In that case, the anti-theft is always activated.


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### **Anti-theft without Door Sensor**

The anti-theft system in a vehicle without door sensor can be operated. The followings show you how it works:

- About when the anti-theft system starts working? → There are 2 different types of the start timing of the anti-theft function as described below:
  - If your device (ST300) has been configured with the “Anti-theft Button”, twenty (20) seconds later after the vehicle is parked (ignition goes to off), the protection function starts working by making a beep just one time.
  - If your device (ST300) has been configured with the “Anti-theft Button2”, twenty (20) seconds later after the vehicle is parked (ignition goes to off), the protection function starts working silently.
- After driving is started (ignition goes to on) in state of vehicle protection, the driver should press the anti-theft button within the pre-defined time period of “Delay of Anti-theft Release” described in the “New Parameter.
- If the button is pressed for 1 second within this time period, the protection function is released. If the driver has not pressed the button within this time period, anti-theft emergency of the device starts working immediately.
- In emergency, the buzzer and the immobilizer are activated if they are connected properly. After the preset time of “Delay of Anti Theft Alert”, the device sends emergency report about anti-theft occurring.
- However, you can stop such an emergency functioning of the device if you were not expecting such an emergency. The followings are two (2) alternatives on how to stop functioning the Emergency:
  - Alt. 1. By pressing anti-theft button for 1 second, the emergency situation can be stopped immediately.
  - Alt. 2. As soon as all the immobilizer and the buzzer start getting deactivated by commands of the “Disable Output”, the emergency situation will be over.




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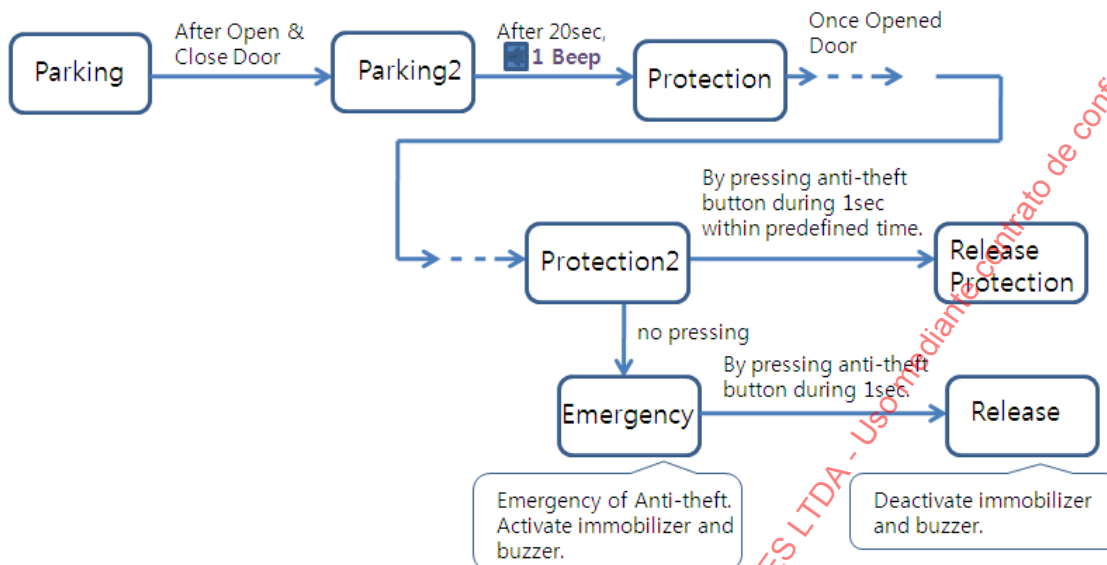
### **Anti-Theft with Door Sensor**

The anti-theft system in a vehicle having door sensor can be operated. The followings show you how it works:

1. About when the anti-theft system starts working? → There are 2 different types of the start timing of the anti-theft function as described below:
  - 1.1 Under an assumption that your device (ST300) has been configured with the “Anti-theft Button”, twenty (20) seconds later after the driver parks the vehicle (ignition goes to off), opens and closes the door, the protection function starts working by making a beep just one time.
  - 1.2 Under an assumption that your device (ST300) has been configured with the “Anti-theft Button2”, twenty (20) seconds later after the driver parks the vehicle (ignition goes to off), opens and closes the door, the protection function starts working silently.
2. After the door is opened and closed in state of vehicle protection, the driver should press the anti-theft button within the pre-defined time period of “Delay of Anti-theft Release” described in the “New Parameter.
3. If the button is pressed for 1 second within this time period, the protection function is released. If the driver has not pressed the button within this time period, anti-theft emergency of the device starts working immediately.
4. In emergency, the buzzer and the immobilizer are activated if they are connected properly. After the preset time of “Delay of Anti Theft Alert”, the device sends emergency report about anti-theft occurring.
5. However, you can stop such an emergency functioning of the device if you were not expecting such an emergency. The followings are two (2) alternatives on how to stop functioning the Emergency:
  - Alt. 1. By pressing anti-theft button for 1 second, the emergency situation can be stopped immediately.
  - Alt. 2. As soon as all the immobilizer and the buzzer start getting deactivated by commands of the “Disable Output”, the emergency situation will be over.



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### Door Protection

Door protection is operated if one (1) input is set to "Door Sensor".

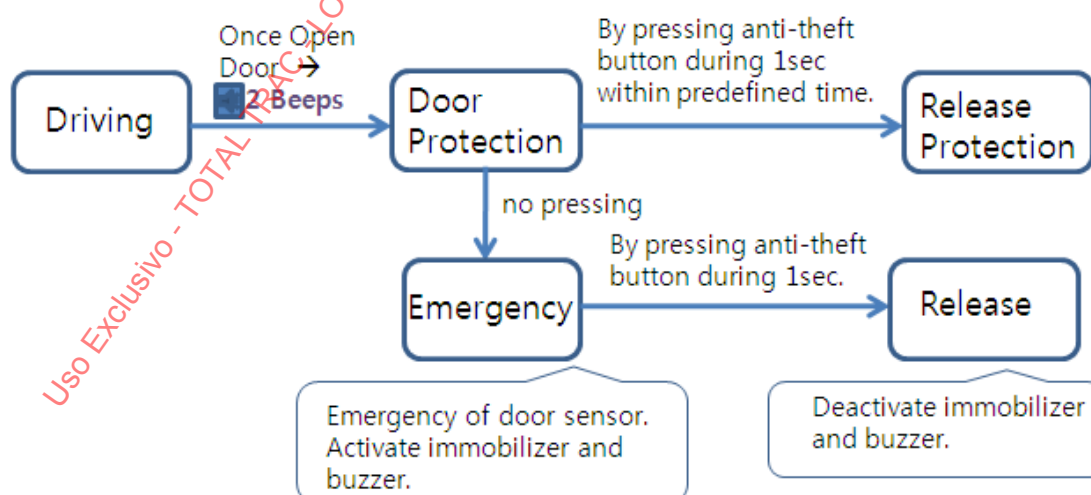
This function is necessary to protect the vehicle from unsafe occurrence events such as door-opening while driving the vehicle.


If the ignition goes to on in a situation of having a door opened, the device beeps two times just for notice. Once this situation occurs, the driver should close the door and press the anti-theft button for 1 second within the predefined time period, "Delay of Anti-Theft Release" of the new parameter.

Otherwise, door sensor emergency of the device will start working and the buzzer and the immobilizer will be activated.

If there is no pressing the anti-theft button for the time period of "Delay of Anti-theft Report", the device starts sending to the server the report about the door sensor emergency.

By pressing anti-theft button shortly (for 1 second), the emergency can be stopped and the immobilizer and the buzzer can be deactivated.



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## **Shock on Anti-theft Protection**

Shock checking can be supported when the following conditions are satisfied:

1. One input should be set to "Anti-theft2".
2. M\_SENSOR of the service parameter should be set to use "shock".


In case that protection against anti-theft starts (with/without door sensor) and that the period of "shock delay time" has passed, the shock protection starts working as well.

In a situation of the shock protection, if a shock is checked, the device activates the immobilizer and the buzzer if they are connected properly. In such a situation, the device will also send the related emergency report to the server. By pressing the anti-theft button shortly (for 1 second), the emergency situation can be stopped and the immobilizer and the buzzer can be deactivated.

## **Temporary deactivation made by Panic**

This function is supported if you select "Anti-theft2" in configuring the device.

If the panic button is pressed, the anti-theft is deactivated temporarily to protect the driver from robbery in a dangerous situation. Once the anti-theft is deactivated, the anti-theft can be activated only by making a command named "restart anti-theft".

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## 8-8. Storage of Reports un-sent

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

- 2,000 status reports (\*\*),
- 50 emergency reports,
- 50 alert reports (including event reports), and
- 1500 bytes for the response that the command has required the device to respond with as command response

### 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. GPRS network) gets back to normal to enable the device to try to send the report to the server again.

When 'status reports' start being accumulated, max 2000 reports can be hold in the buffer storage of the device. If those 'status 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).

## 8-9. Odometer and RPM Calibration

### RPM Calibration

This is the steps to calibrate RPM:


1. Turn ON and turn OFF ignition line (blue line) 9 times continuously.  
On(1<sup>st</sup>) → Off(2<sup>nd</sup>) → On(3<sup>rd</sup>) → Off(4<sup>th</sup>) → On(5<sup>th</sup>) → Off(6<sup>th</sup>) → On(7<sup>th</sup>) → Off(8<sup>th</sup>) → On(9<sup>th</sup>)
2. Wait during 5 seconds.
3. And GPRS LED (blue) blinks 0.5s continuously and GPS LED (red) is turned off.
4. Press accelerator keeping 2000RPM during 10seconds. It should be progressed within 3minutes.
5. As calibration is completed successfully, the GPRS LED illuminates. The LEDs return to normal mode after turn off and on again. In case of fail, the device blinks the LED with normal method and Installer should repeat calibration process from 1<sup>st</sup> step.

### Odometer Calibration

There are two ways to calibrate odometer automatically, by ignition line and by commands. Each calibration follows below steps.

Calibration by ignition:

1. Wait until GPS is fixed (GPS LED (red) blinks one time).
1. Turn ON and turn OFF the blue line (ignition line) 5 times continuously.  
On (1<sup>st</sup>) → Off(2<sup>nd</sup>) → On(3<sup>rd</sup>) → Off(4<sup>th</sup>) → On(5<sup>th</sup>)
2. Wait during 5 seconds.

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3. And, GPS LED (red) blinks 0.5s continuously and GPRS LED (blue) is turned off. If GPS has no enough good condition, LEDs blinks with normal method.
4. Drive more than 1 km.
5. When the calibration is completed successfully, the GPS LED illuminates continuously. The LEDs returns normal way after turn off and on again. In case of fail after driving, the device blinks the LEDs normally and installer should repeat calibration process from 1<sup>st</sup> step.

Calibration by commands :

1. Send "StartCountOdo" command.
  2. Then, if the driver drives, the device counts odometer pulse's number.
  3. Send "StopCountOdo" command with traveled distance.
  4. The device calculates odometer unit with counted pulse's number and traveled distance.
- It recommends the driver drives more than 1kms for precise calibration.

## 8-10. I-button

ST300H supports reading I-button that has unique ID, 14 hex digits. The device uses I-button's ID as driver ID and can permit or reject driving depending on registration of the inserted ID.

Driver ID can be registered up to 100 in one device. There are 2 methods for registration. One is by command, the other is by master I-button.

Below is flow of registration by master I-button.

1. Master I-button (add master / remove master) was inserted and removed.
2. New I-button is inserted within 10 seconds after remove.
3. And, the ID of I-button is registered or deregistered automatically.

Once the device recognizes-button, this ID of the button is valid until the vehicle changes from driving to parking although the I-button is removes. So, until the next parking, the device reports with this ID information and approval of this ID from registration table forbids activation by driver ID.


Let's take two examples.

Case 1)

1. When registered I-button is inserted in parking, the buzzer beeps once (if buzzer is connected) and the device sends alert (ID=59).
2. I-button is removed and the device sends alert (ID=60).
3. Device reports with previous I-button's ID yet.
4. The vehicle turns to driving, but Output is not activated although registered I-button is not inserting because previous I-button's ID is valid.
5. When the vehicle goes to parking, ID is removed.

Case 2)

1. When unregistered I-button is inserted in parking, the buzzer beeps once (if buzzer is connected) and the device sends alert (ID=59).
2. The vehicle turns to driving, and the device activates related output because previous driver ID is not in registration table.
3. The vehicle turns to parking, and the device release related output.
4. When the I-button is removed, device sends alert (ID=60) and the ID field in report is removed.

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## 8-11. Driver Pattern Calibration

This is the steps to calibrate Driver Pattern.

1. Turn ON and turn OFF ignition line (blue line) 7 times continuously.  
On(1<sup>st</sup>) → Off(2<sup>nd</sup>) → ON(3<sup>rd</sup>) → Off(4<sup>th</sup>) → ON(5<sup>th</sup>) → Off(6<sup>th</sup>) → On(7<sup>th</sup>)
2. Wait during 5 seconds.
3. And GPRS LED (blue) and GPS LED (red) blink 0.5s continuously.
4. Driver in normal conditions more than 10 Km/h. The device needs to identify more than 3 braking, acceleration and curve for auto calibration.
5. After driving turn off and turn on the ignition. The device will blinks the LED with normal conditions.

## 8-12. Over-speed for ST300H

There are 3 types of over-speed for ST300 SB retails. Over-speed, over-speed under rain and over-speed in circle geo-fence.

Over-speed has no configurable time for chattering (fixed as 10 seconds), but over-speed under rain and over-speed in circle geo-fence have the configurable time.

All of over-speed can be checked when the speed of vehicle is more than related speed-limit rightly.


And then, return from over-speed can be checked when the speed of vehicle is less than tolerance speed as below.

- 1) If speed-limit is more than 100km/h, tolerance speed is equal "speed-limit - 5km/h".
- 2) If speed-limit is from 50km/h to 100km/h, tolerance speed is equal "speed-limit - 3km/h".
- 3) If speed-limit is less than 50km/h, tolerance speed is equal "speed-limit - 2km/h".

In case of over-speed, the device activates a buzzer rightly when over-speed is checked, and then sends an alert after 10 seconds.


In case of over-speed under rain or over-speed in a circle geo-fence, the device activates a buzzer rightly when over-speed is checked, but send an alert after waiting related delay under over-speed condition.

And.. The device sends an alert and deactivates a buzzer rightly when return from over-speed is checked.

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## Revisions

Rev.	Date	Modifications were made on:	Author
Rev. 1.00	2012-12-05	Construct Protocol	Ronaldo
Rev. 1.01	2012-12-13	Changed Motion Setting, Main Voltage Setting Command	KJH
Rev. 1.02	2012-12-17	General review and changed some details	Ronaldo
Rev. 1.00	2013-01-18	Create ST215 Standard spec.	HG.Park
Rev. 1.01	2013-02-13	Add comment : alert 40,41,44,45 are optional	HG.Park
Rev. 1.02	2013-04-02	SW Version allocation byte changed from 1byte to 2bytes in case of Zip packet.	SE.Park
Rev. 1.03	2013-04-17	Add missed tracking function description from old spec.	HG.Park
Rev. 1.04	2013-05-23	Remove profile ID in tracking function. It's customized option.	HG.Park
Rev. 1.05	2013-06-10	Add Handsfree kit options	SE.Park
Rev. 1.06	2013-06-25	Review whole the document.	DY Jeong
Rev. 1.20	2014-01-25	ST300 : Replace whole document Which was proofread by Mr.Lee Ref. OperationDescription_ST215_ST240_STADV_SUNTECHBR_V112.odf	HG.Park
Rev. 1.22	2014-01-27	Change Event pin configure / add MODEL field in SMS report format. Modify anti-theft description / Proofreading	HG.Park SB.Lee
Rev. 1.23	2014-02-03	Clear Errata.	HG.Park
Rev. 1.24	2014-02-04	Remove HBM_STT field in New Parameter Setting. Requested by SB	HG.Park
Rev. 1.25	2014-02-20	Include ignition in "IN1_TYPE"	Ronaldo
Rev. 1.26	2014-02-21	Include "Protocol Setting"	Ronaldo
Rev. 1.27	2014-02-26	Rearrange about protocol setting & satellite parameter setting	SA Kim
Rev. 1.28	2014-03-19	Include "AT Commands from RS232"	Ronaldo
Rev. 1.29	2014-04-23	Include ST300H setting	Ronaldo
Rev. 1.30	2014-04-28	Add travel event's zip report	SA Kim
Rev1.31	2014-05-19	Change copyright	HG. Park
Rev1.32	2014-07-01	Add model name ST350	HG.Park
Rev 1.33	2014-10-16	Add RPM, DID, DID_REG field in reports	SA Kim
Rev. 1.34.	2015-04-03	Change 'Idle' to 'Parking' and 'Active' to 'Driving'	JK Kim
Rev. 1.35	2015-04-03	Add "PIN LOCK" setting command.	DY Jeong
Rev. 1.36	2015-04-10	Change to concept of PIN lock enable. Be able to change PIN number when users send "EnablePINLock" command.	DY Jeong
Rev. 1.37	2015-05-22	Add "SVR_PWD" field in New Parameter	JH Kim
Rev. 1.38	2015-11-13	Add "IPC Report" in Chapter 6-11.	JK Kim
Rev. 1.39	2015-12-23	Add LBS cell info fields(CELL_ID, MCC, MNC, RX_LVL, LAC, TM_ADV, GPS_ON_OFF) in Chapter 6-1, 6-2, 6-3, 6-4. Remove Chapter 6-11 'IPC Report'. Add 'GpsOn', 'GpsOff' command in Chapter 8-21, 8-22. Add 'LBS_INFO' field in Chapter 4-9.	JK Kim
Rev. 1.40	2016-04-05	Add setting and commands for Driver Pattern Analysis	KJH
Rev. 1.41	2016-08-10	Removed ROUTE DEVIATION function	KJH
Rev. 1.42	2017-03-27	Modified SQA test issues for ST340RB	JH Kim
Rev. 1.43	2017-06-01	Modified SQA test issues for ST340RB	JH Kim
Rev. 1.44	2017-06-02	Modified SQA test issues for ST340RB	JH Kim
Rev 1.45	2017-07-20	Added explanation for setting of ODO_UNIT	SA Kim
Rev 1.46	2017-11-04	Modified LED handling in power down mode.	SA Kim
Rev 1.47		Arranged types of event input and output Added expression for power off when main line is disconnected and backup	SA Kim

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		voltage goes less than set value. Modified expression for Alert 66. Add 'ImproveBatteryLife' and 'ReqBattLifr' command Changed maximum length of google map address	
Rev 1.48	2017-11-15	Modified types of event input and 'ReqTestCmd' command	SA Kim
Rev 1.49	2017-11-17	Added to check over-speed under rain	SA Kim
Rev 1.50	2017-12-01	Added to check over-speed under rain and over-speed in a circle geo-fence	SA Kim
Rev 1.51	2017-12-08	Modified about over-speed	SA Kim

- End of the Document -

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