

GPS
Vehicle
Tracker

USER MANUAL
V5.0

TK310

Contents

1	Product Overview	3
2	For Your Safety	3
3	TK310 Parameters	3
4	Getting Started	4
4.1	Hardware and Accessories	4
4.2	Light and Button Functionality	4
4.3	Connecting and Installation	5
4.4	Examples of Interfacing Application	6
5	SMS Command	9
5.1	Basic SMS Commands	9
5.1.1	Position Report	9
5.1.2	Set Interval for Automatic Timed Report	9
5.1.3	Stop Automatic Timed Report	10
5.2	GPRS Setting by SMS	10
5.2.1	Set ID for TK310	10
5.2.2	Set APN	10
5.2.3	Set IP Address and Port	10
5.2.4	Set Time Interval for Sending GPRS Packet	10
5.2.5	Enable GPRS Tracking Function	10
6	Tracking on Map	11
7	Troubleshooting	12
8	SMS Command List	13

1 Product Overview

TK310 is a GPS/GSM/GPRS tracking device which is specially developed and designed for vehicle real-time tracking and security. With superior GPS and GPRS modules, TK310 has good sensitivity and stable performance. It can get accurate GPS fix even in remote places.

Main Features:

Tracking via SMS or GPRS (TCP/UDP)

Current location report

Tracking by time interval

Position logging capacity up to 260,000+ waypoints

Built-in motion sensor for power saving

SOS panic button

Geo-fencing control

Low battery alert

Speeding alert

Engine Cut

Wiretapping (optional)

Alert when TK310 enters/exits GPS blind area

Alert when TK310 is turned on

I/O: 5 digital inputs, 3 negative and 2 positive triggering; 5 outputs.

Analog Input: 2 10 bits resolution analog inputs



2 For Your Safety

Read these simple guidelines. Not following them may be dangerous or illegal. Read the full user manual for more information.

Proper Connection - When connecting with other device, read carefully its manual so as to carry out correct installation. Do not connect it to other incompatible devices.

Qualified Accessories - Use original parts, qualified batteries and peripheral equipments to avoid damage to TK310.

Safe Driving - Drivers should not operate this product while driving.

Qualified Service - Only qualified personnel can install or repair TK310.

Water Resistance - TK310 is not water resistant. Keep it dry. Install it inside the vehicle or use waterproof bag if necessary.

Confidential Phone Number - For safety reason, do not tell other people the mobile phone number of your TK310 without taking precautions of security settings.

3 TK310 Parameters

Power Supply	+9V - +35V / 1.5A
Backup Battery	750mAh
Dimension	104mm x 62mm x 24mm

Installation Dimension	104mm x 83mm x 24mm
Weight	150g
Operating temperature	-20° to 55° C
Humidity	5% to 95% Non-condensing
Frequency	GSM 850/900/1800/1900Mhz
GPS Module	latest GPS SIRF-Star III chipset
GPS Sensitivity	-158Db
GPS Frequency	L1, 1575.42 MHz
GSM antenna's Gain	3.5dBi
GPS antenna's Gain	Antenna Gain: -3dBic at 10°; 3.5dBic at zenith; Amplified Gain: 27dB typ.
C/A Code	1.023 MHz chip rate
Channels	20 channel all-in-view tracking
Position Accuracy	10 meters, 2D RMS
Velocity Accuracy	0.1 m/s
Time Accuracy	1 us synchronized to GPS time
Default datum	WGS-84
Reacquisition	0.1 sec., average
Hot start	1 sec., average
Warm start	38 sec., average
Cold start	42 sec., average
Altitude Limit	18,000 meters (60,000 feet) max.
Velocity Limit	515 meters/second (1000 knots) max.
LED	2 LED lights to show GPS/GSM working status.
Flash Memory	8MB
Interface	5 digital inputs, 3 negative and 2 positive triggering; 2 analog inputs; 5 outputs.

4 Getting Started

This section will describe how to set up your TK310.

4.1 Hardware Features

The standard package of TK310 includes:

- *TK310 Main Unit*
- *GPS Antenna*
- *GSM Antenna*
- *Wires*
- *USB Cable*
- *Relay*
- *CD including*
 - *User Manual*
 - *Other document or software if required*

4.2 Light and Button Functionality

Blue LED - indicating GPS status	
On	One or more inputs are active
Flashing (every 0.1 second)	The unit is being Initialized
Flashing (on for 0.1 second and off for 2.9 seconds)	TK310 has a GPS fix
Flashing (on for 1 second and off for 2 seconds)	TK310 has no GPS fix
Green LED - indicating GSM status	
On	One call is coming in/ one call is being made
Flashing (every 0.1 second)	The unit is being Initialized
Flashing (on for 0.1 second and off for 2.9 seconds)	TK310 is connected to the GSM network
Flashing (on for 1 second and off for 2 seconds)	TK310 is not connected to the GSM network
SOS Button	Press it to send SMS alert

4.3 Connecting and Installation

Read this manual before using your TK310 and check if all parts are included in the packaging box.

Ensure that your TK310 has a working SIM installed.

- Check that the SIM has not run out of credit (test the SIM in a phone to make sure it can send and receive SMS)
- Check that the SIM Lock code is turned off
- If you require the function of sending an SMS location report to the authorized phone number when it makes a call to the TK310, please make sure the SIM installed supports displaying caller ID.

Before inserting SIM card, turn off the power for the tracker's main unit.

Install SIM Card

- Press the yellow button beside the SIM card slot to spring out the SIM card holder.
- Insert the SIM card to the holder, then insert it into the card slot, please make sure to insert it with the chip module facing to the connectors on PCB.

Connect the GSM Antenna to the unit.

Connect the GPS Antenna to the unit.

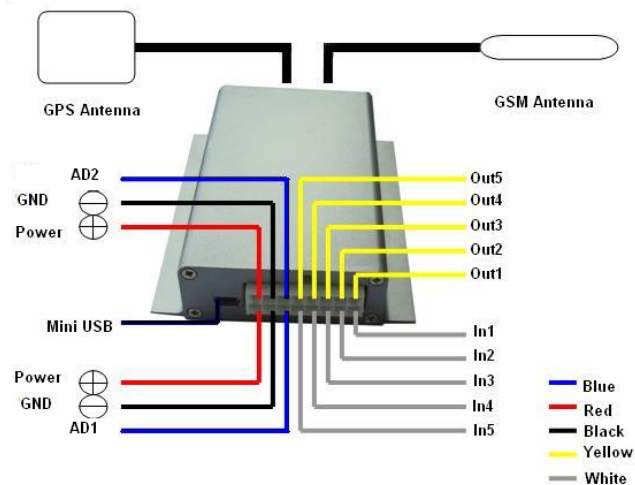
- GPS antenna is used to receive satellite signals upside the sky. It should be fixed to face the sky and should not be covered or shielded by any objects containing metal, such as the metallic windshield.

Find a suitable place inside the car for installing the unit. Wiring connections must be firm and reliable and the joints should be wrapped with insulating tape tightly. The unused electrical wire should be properly insulated.

Check if all wirings have been connected correctly and then connect the unit to the vehicle power.

A connector for microphone is set in the PCB. If you need to link with an extra microphone for wiretapping purpose, contact us to add this optional function before we deliver the devices to you.

Installation Guide:



Descriptions of PINs

Pin	Color	Function
1	Red	DC In. Input voltage: 9V~35V. 12V suggested.
2	Black	GND
3	White	Digital Inputs
4	Yellow	Outputs
5	Blue	10 Bits Resolution Analog Inputs. Input voltage: 0~6V.

Mini USB Port

Connect the tracker with computer by USB cable for configuration and reading stored waypoints data.

You need to install the driver - **CP210x Driver Installer** - for using the USB cable.

Refer to <GPS Tracker Parameter Editor> for configuration and <GPSLog User Guide> for reading stored waypoints.

4.4 Examples of Interfacing Application

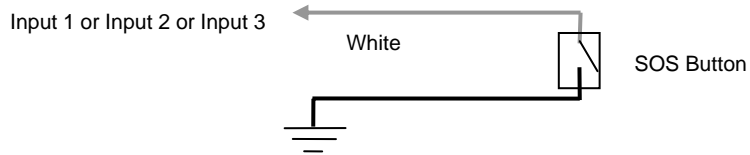
Level of the PINS

Pin	Normally (inactive)	Level of active	Limit of input
Input 1/2/3	3V	0V	45V
Input 4/5	0V	3-40V	45V
Output 1/2/3/4/5	About 0V	0V	45V/500mA
DC IN	/	9-36V	45V
AD 1/2	0V	0-6V	Not higher than DC IN

Examples of Interfacing Application

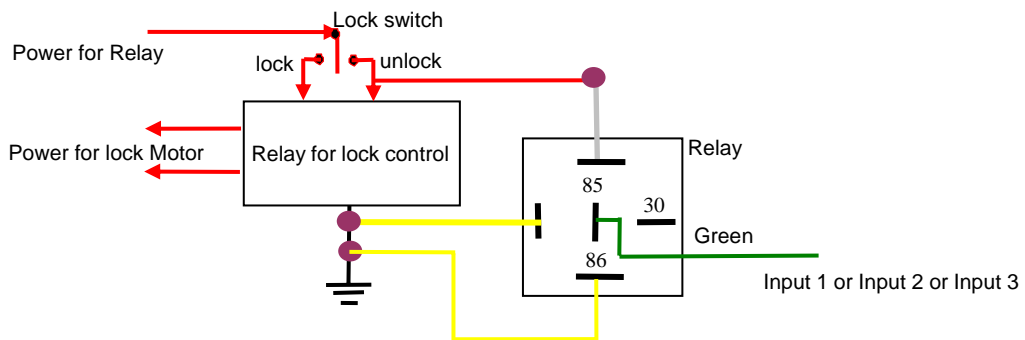
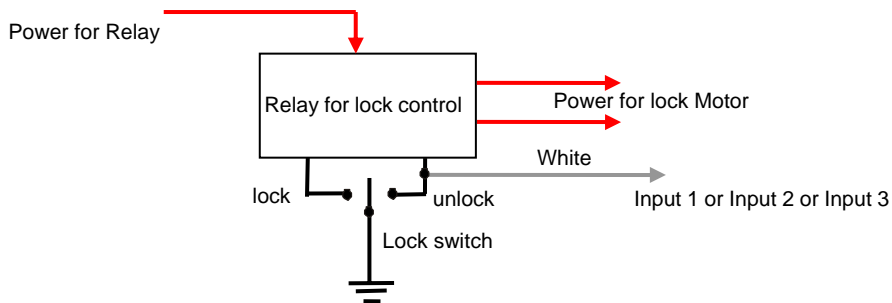
For Input Ports

1. Input1 also named SOS Button (Key1) and Input2 named B Button (Key2), Input3 named C Button (Key3). They are negative triggering. You can set an authorized phone number for it to receiving SMS alarm or calling when it is pressed to negative(0V). **Please Refer to <GPS Tracker Parameter Editor> or <SMS Command List> for configuration phone number.**

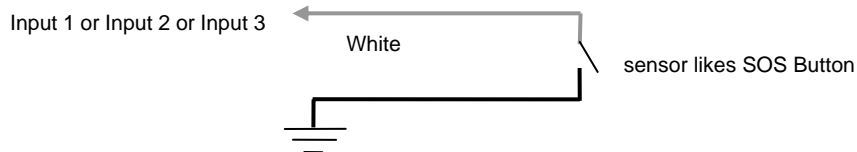


2. Detecting Lock Status of Car's Door or Trunk(Car Boot).

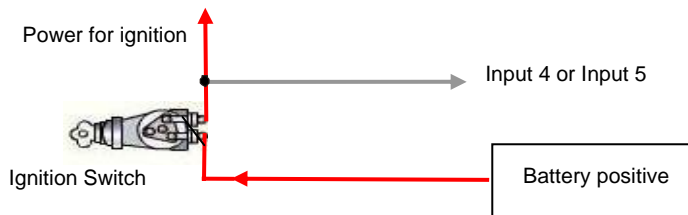
When the lock is opened, there will be negative triggering to Input 1 or Input 2 or Input 3, then a SMS alarm is sent to the authorized phone number and a GPRS alarm is sent to the Server (please refer to the GPRS Command 0x9999).



3. Connecting with Sensors (such as sensor for detecting someone is seated). The SMS alarm will be sent to the authorize phone number of the button.

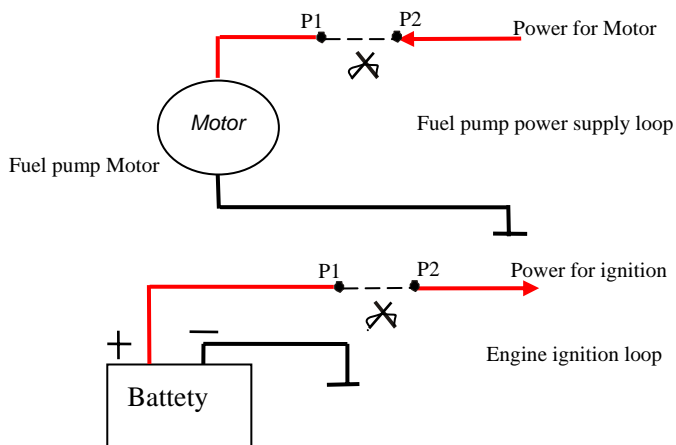
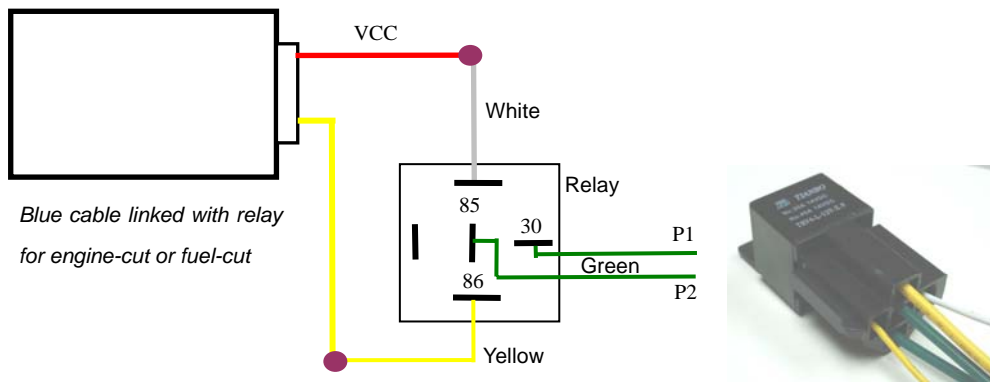


4. Ignition Detection - Input 4 / Input 5, they are positive triggering, The detection will be send to Server as a alarm via GPRS. Please refer to GPRS Communication Protocol Alarm Command 0x9999.



For Output Ports

1. Fuel-cut or Engine-cut



- (1) Connect the relay as above picture shows and calculate the correct VCC value according to the relay parameter to make sure to comply with the following requirements:

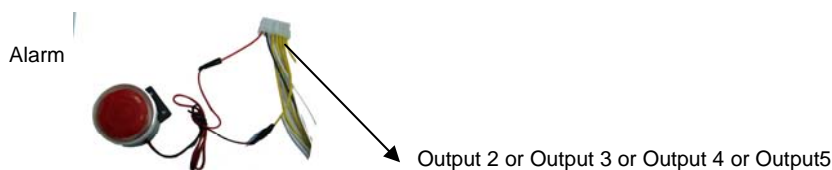
Input Voltage to Output	Must < 45V
input Current to Output	Must < 500mA

Normally two green wires are connected solidly, when output 1 is open (be negative), two green wires will disconnect, so the power is cut.

- (2) Send the following SMS to open Output1(cut engine or cut fuel)
W<password>,020,1,1
- (3) Send the following SMS to close Output1:
W<password>,020,1,0

2. Connecting with Car Alarm

When the output that connected to the Alarm is open, the Alarm will work. Please refer to the <SMS Command List> for the command.



For Analog Inputs

The input must be voltage and input voltage: 0-6V. Please refer to <GPRS Communication

Protocol >for the AD1 and AD2 datas. For example:

094506.000,A,2232.5412,N,11404.6919,E,0.00,,290709,,*12|1.7|110|0000|0002,0267

As above, 0x0002 is AD1, 0x0267 is AD2.

Fuel sensor input for example:

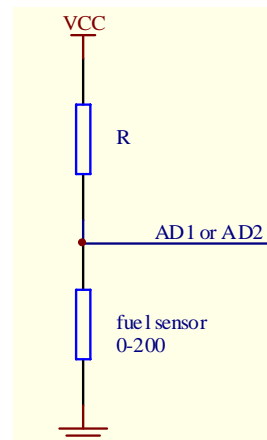
Our fuel sensor is resistance type sensor, output resistance:0-200ohm.

As the right circuit, if VCC is 12V, R should be 200ohm and if VCC is 24V then R should be 600ohm to make the input range to AD1 or AD2 is 0-6V.

Below formula is for calculate the fuel percent left (it only suit to above fuel sensor):

$$\frac{1024 - \text{Value}_{AD1/AD2}}{1024} \%$$

Note: the Value must be converted to decimal, for example: 0x0267 is 615 in decimal.



5 SMS Command

TK310 will only accept commands from a user with the correct password. Commands with wrong password are ignored. The default password is 000000.

5.1 Basic SMS Commands

5.1.1 Position Report

To know the location of your TK310, send an SMS or make a telephone call directly to TK310 and it will report its location by SMS.

Command: W<password>,<000>

Notes: The default password is 000000.

Example:

SMS sent: W000000,000

SMS received:

Latitude = 22 32 36.63N Longitude = 114 04 57.37E, Speed = 2.6854Km/h, 2008-12-24,01:50

To get TK310's position by another easier way:

- (a) Call TK310 using your mobile phone.
- (b) After listening to the ring for 10 - 20 seconds, hang up the phone.
- (c) Then after 20 second, your mobile phone will receive a position SMS.

5.1.2 Set Interval for Automatic Timed Report

Description: Automatic timed reports will be sent to your mobile phone according to the time interval you set.

Command: W<password>,002,XXX

Notes: XXX is the interval in **minute**. If XXX=000 it will stop tracking

Example:

SMS sent: W000000,002,005

SMS received: Set Timer Ok/005

TK310 will then report its location by SMS every 5 minutes.

5.1.3 Stop Automatic Timed Report

Description: Automatic timed reports will stop once TK310 receives stop command.

Command: W<password>,002,000

Example:

SMS sent: W000000,002,000

SMS received: Set Timer Ok/000

TK310 will stop automatic timed report

For more detailed SMS commands please go to Chapter 8 - SMS Command List

5.2 GPRS Settings by SMS

Tracking via GPRS, you should set IP, Port and APN for TK310.

Ensure that your SIM card in TK310 supports GPRS connection prior to setting.

5.2.1 Set ID for TK310

Command: W<password>,010,ID

Note: Tracker ID must not over 14 digits.

Example: W000000,010,123456789

TK310 will then reply with an SMS ('Set SIM Ok/123456789') to confirm this setting.

5.2.2 Set APN

Command: W<password>,011,APN,APN Name,APN Password

Note: If no APN name and password required, input APN only.

Example: W000000,011,CMNET

TK310 will reply with an SMS (like 'Set APN Ok/CMNET') to confirm this setting.

5.2.3 Set IP Address and Port

Command: W<password>,012,IP,PORT

Example: W000000,012,202.116.11.12,8000

TK310 will then reply an SMS ('Set IP Ok /202.116.11.12,8000') to confirm this setting.

5.2.4 Set Time Interval for Sending GPRS Packet

Command: W<password>,014,time interval(in unit of 10 seconds)

Example: W000000,014,00003

TK310 will send GPRS packet every 30 seconds

5.2.5 Enable GPRS Tracking Function

Command: W<password>,013,X

X=0, to turn off GPRS tracking function (default);

X=1, to set TCP

X=2, to set UDP

Example: W000000,013,1

TK310 will reply with an SMS to confirm this setting.

For more information regarding of bulk configuration by USB cable please refer to < GPS Tracker Parameter Editor>.

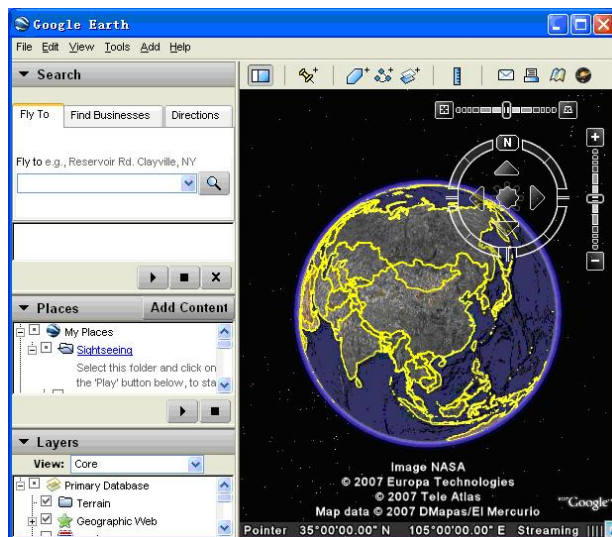
For more information regarding GPRS settings please refer to <GPRS Communication Protocol >.

If you are using GpsGate Software, please contact us for writing GpsGate protocol before delivery.

6 Tracking on Map

Download Google Earth from <http://earth.google.com/>

Start the Google Earth (For more information about Google Earth please refer to <http://earth.google.com/>) as the following picture shows:



Input the latitude and longitude that you receive from the tracker by SMS and click the search button.

Google Earth will display the location for you.

Example:

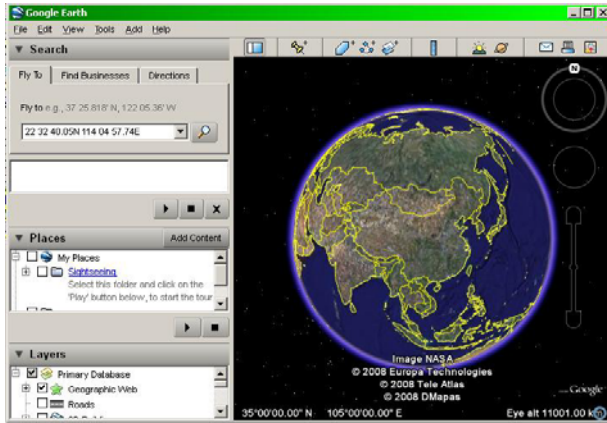
When you receive:

Latitude = 22 32 40.05N

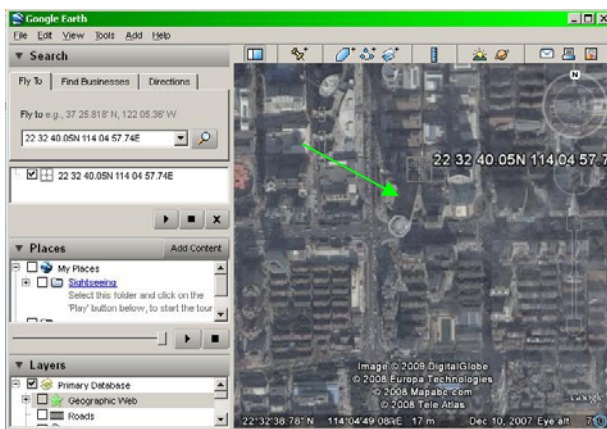
Longitude = 114 04 57.74E

Type as the following picture shows:

(Note: you should input the latitude and longitude as: 22 32 40.05N 114 04 57.74E)



Now you can find the location of your tracker:



Or you can start the Internet Explorer and connect to <http://maps.google.com> for displaying the location.

Or you can use local map software on PDA or car navigation device to input the coordinates.

7 Troubleshooting

Problem: Unit will not turn on	
Possible Cause:	Resolution:
Wiring was not connected properly	Check and make sure wiring connection is in order.
Battery needs charging	Recharge battery
Problem: Unit will not respond to SMS	
Possible Cause:	Resolution:
GSM antenna was not installed properly	Make TK310 connected to GSM network.
GSM Network is slow	Wait for SMS. Some GSM networks slow down during peak time or when they have equipment problems.
Unit is sleeping	Cancel sleeping mode
Wrong password in your SMS or wrong SMS format	Write correct password or SMS format

The SIM in TK310 has run out of credit	Replace or top up the SIM card
No SIM card	Insert working SIM card. Check in phone that the SIM can send SMS message.
SIM card has expired	Check in phone that the SIM can send SMS message. Replace SIM card if needed.
SIM has PIN code set	Remove PIN code by inserting SIM in you phone and deleting the code.
SIM is warped or damaged	Inspect SIM, clean the contacts. If re-inserting does not help try another to see if it will work.
Roaming not enabled	If you are in a different country your SIM account must have roaming enabled.
Problem: SMS received starts with 'Last...'	
Possible Cause:	Resolution:
Unit does not have clear view of the sky	Move the antenna of the unit to a location where the sky is visible.
TK310 is in an inner place	Wait for the target to come out
Battery is low	Recharge the unit and the GPS will start working.

8 SMS Command List

(Remarks: ***** is user's password, and the default password is 000000)

Description	Command	Remarks
Get current location	W*****,000	Get current location of TK310
Change user's password	W*****,001,#####	***** is old password ##### is new password
Set interval for automatic timed report	W*****,002,XXX	XXX is the interval in minute. If XXX=000 it will stop tracking
Set preset phone number for SOS button	W*****,003,F,P,T	F=0, to turn off this function; F=1, to send SMS; As SOS button is linked to IN1, P=1. T: Preset phone number. Max 16 digits
Set low power alert When TK310 voltage is lower than the preset value, it will send one low power alert to the SOS preset number.	W*****,004,X	X (voltage preset value) =0 , to turn off this function =1 , <3.3V send SMS alert =2 , <3.4V send SMS alert =3 , <3.5V send SMS alert (default) =4 , <3.6V send SMS alert =5 , <3.7V send SMS alert

<p>Set over speed alert</p> <p>When TK310 speeds higher than the preset value, it will send an SMS to the SOS preset number.</p>	<p>W*****,005,XX</p>	<p>XX (the preset value of speed)</p> <p>=00 , to turn off this function</p> <p>= [01, 20] (unit: 10Km/h)</p> <p>For example, W000000,005,08, it will send alert when it is over 80Km/h</p>
<p>Set Geo-fence alert</p> <p>When the TK310 moves out of preset scope, it will send one Geo-fence SMS to the SOS preset number.</p>	<p>W*****,006,XX</p>	<p>XX (preset distance to original place)</p> <p>=00, close</p> <p>=01, 30m</p> <p>=02, 50m</p> <p>=03, 100m</p> <p>=04, 200m</p> <p>=05, 300m</p> <p>=06, 500m</p> <p>=07, 1000m</p> <p>=08, 2000m</p>

<p>Extend Settings</p>	<p>W*****,008,ABCDEFGF###</p>	<p>A=0, turn off the function of sending an SMS location report to the authorized phone number when it makes a call to TK310.</p> <p>A=1, turn on the function of sending an SMS location report to the authorized phone number when it makes a call to TK310.</p> <p>B=0, location data of NMEA 0183 GPRMC will be interpreted into normal text for easy reading.</p> <p>For example: <i>Longitude = 114 degree - 04 cent -57.74 second</i> <i>Latitude = 22 degree -32 cent -40.05 second</i></p> <p>B=1, location data complies with NMEA 0183 GPRMC protocol.</p> <p>For example: <i>\$GPRMC,072414.000,V,3114.3763,N,12131.3255,E,0.00,0.00,050805,*00</i></p> <p>C=0, turn off the function to automatically hang up an incoming call.</p> <p>C=1, turn on the function to automatically hang up an incoming call after 4 - 5 rings.</p> <p>D=0, Turn off the function of sending an SMS when TK310 is turned on.</p> <p>D=1, Turn on the function of sending an SMS to SOS number when TK310 is turned on.</p> <p>E=0, reserved</p> <p>E=1, TK310 shuts down automatically when the power voltage lower than 3V.</p> <p>F=0, Turn off the alert when TK310 enters GPS blind area.</p> <p>F=1, Turn on the alert when TK310 enters GPS blind area. SMS is to be sent to SOS number</p> <p>G=0, LED light works normally</p> <p>G=1, LED light stops flashing when TK310 working.</p> <p>### is the ending character (default value is: ABCDEFG=1000100)</p>
-------------------------------	-------------------------------	---

Presetting by SMS for GPRS tracking (Ensure that your SIM card supports GPRS connection prior to setting)		
Set ID for TK310	W*****,010,ID	Tracker ID must not over 14 digits.
Set APN	W*****,011,APN,APNName,APN Password	If no APN name and password required, just insert APN only; APN defaulted as 'CMNET'; APN + APN name + password not over 39 characters.
Set IP Address and Port	W*****,012,IP, Port	IP: xxx.xxx.xxx.xxx Port: [1,65534]
Enable GPRS Tracking Function	W*****,013,X	X=0, close GPRS (default); X=1, enable TCP X=2, enable UDP
Set Time Interval for Sending GPRS Packet	W*****,014,XXXXX	XXXXX should be in five digitals and in unit of 10 seconds. XXXXX=00000, to close this function; XXXXX=00001~65535, time interval for sending GPRS packet and in unit of 10 seconds.
For more information regarding GPRS settings please refer to <GPRS Communication Protocol>		
Output Control	W*****,020,P,F	P =1, Out1 =2, Out2 =3, Out3 =4, Out4 =5, Out5 F =0, to close the output =1, to open the output
Output Control (Safe mode) This function is achievable when the speed is below 10km/h and GPS is available.	W*****,120,ABCDE	ABCDE represents Out1, Out2, Out3, Out4, and Out5 respectively. If A or B or C or D or E, =0, to close the output =1, to open the output =2, to remain previous status
Set sleep mode for saving power	W*****,021,XX###	XX=00 turn off sleep mode XX=01 sleep mode XX=02 deep sleep mode ### is the ending character
Set power saving mode when TK310 is inactive (In power saving mode, GPS stops working. GSM enters standby mode and stop sending out message until it is activated by an SMS or an incoming call)	W*****,026,XX	XX=00, to turn off this function XX=01~99, to set this function. It is in unit of minute. Example: If XX=10, TK310 will enter power saving mode after it is immobile for 10 minutes.

Set phone number for wiretapping	W*****,030,T	T is the telephone number for wiretapping and max. 16 digits
Set interval for logging <i>(Note: this interval is not relevant to the interval of continuous tracking)</i>	W*****,031,X	X=0, to turn off this function X=[1, 65535] to set interval in second. For example, W000000,031,60, TK310 will store location data every 60 seconds.
Set time zone difference	W*****,032,T	T=0, to turn off this function T=[1, 65535] to set time difference in minute to GMT. Default value is GMT For those ahead of GMT, just input the time difference in minute directly. For example, W000000,032,120 '-'is required for those behind GMT. For example, W000000,032,-120.
Set character for SOS alert message	W*****,033,1,Char	Char is the character in SOS message and max 32 characters
Get version and serial number	W*****,600	To get version and serial number of current firmware
Get IMEI	W*****,601	To get IMEI

FCC ID: X3U-TK310
Model No.: TK310
Manufacturer: Topten electronics Technology Limited

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

"To comply with FCC RF exposure compliance requirements. The antennas used for this transmitter must be installed to provide a separation distance of at least 30 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment