GPS Vehicle Tracker

USER MANUAL

(Model: TK110)

Version 4.0

(Date: Jan. 2010)

CONTENT

Preface

This Mini GPS Vehicle Tracker is the most cost-effective device to track your vehicle or the other objects. It has very small size, so it can be installed in very secret place. The installation & usage is very easy.

This Mini GPS tracker communicates with user by SMS, not by GPRS, so it can work alone & the management center is not a must. It is specially designed for individual vehicles, user could use any GSM mobile phone to supervise, control and locate the car without the third party.

On the other hand, if the management center is set up, many useful & interesting functions can be realized, such as monitoring many vehicles together by map, converting the GPS coordinate into the real address automatically. If user has MAPINFO map with detailed landmarks, the software can translate the car's location automatically into the real physical address (such as city name, street name, building, etc.), then send this real physical address to user's mobile by SMS.

Read it Firstly:

Please read this manual thoroughly before you use the device; please keep it for future reference.

Attention:

Please keep the device away from the water, humidity, high temperature, heavy dust or strong magnetism.

Warning:

We **strongly** suggest user let the professional car electrician to install the system.

Functions & Features

(1) Check the car's location, speed & direction via SMS;

(2) Cut off the car power/fuel supply by SMS, to stop the car;

(3) Movement Alert:

Once the car is parked, you can send the SMS instruction to put the system in movement alert status. Then, if the car moves, the system will send SMS to inform you. It is a very useful function, which enables the tracker to work as the car alarm too;

(4) Geo-fence Alert:

User can set a certain zone by SMS, once the vehicle runs over the fence, the alarm will send SMS to inform you;

(5) Over-speed Alert.

User can set a certain speed limitation by SMS. Once the vehicle is running over this speed, the system will send SMS to inform you;

(6) Built-in rechargeable backup battery. If the system's main power supply is cut off or low enough, system will send SMS to warn you;

(7) Two kinds of location information; user could locate the precise location by GPS. If there is no GPS signal, user could also locate the car by CPS (cellular positioning system - located by GSM network)

(8) Monitor the voice around the car via telephone;

(9) Anti-robbery switch, send out SMS for help in case of hijack; (optional function)

(10) Track the car by SMS or by online mapping (The software is optional).

(11) Flexible design, the system can work alone without support of center. If the center is set up, the functions can be much stronger, you can monitor & control many vehicles in the center, and the information of vehicle's location can be more detailed and friendly.

(12) Anti-tamper design in small size, stable, reliable & easy installation.

(13) Support SMS & GPRS communication

(14) The Alert Text in SMS can be re-defined in different languages.

Explanation on SMS Message

When the alarm is triggered, it will send the alert SMS message to the authorized mobile. This SMS alarm message includes:

✧ Alarm type. "Be robbed", "Power failure", etc..

✧ Base station's code of GSM signal relay tower. The GSM operator can tell you the location by this code because they have the related database. In some countries, this function is not open to the public.

✧ Latitude & longitude. User could locate the car's precise position by help of GOOGLE MAP (http://maps.google.com/) or GOOGLE EARTH (Download link: http://earth.google.com/).

✧ GPS signal's Status: A : GPS's signal is available, the car is at broad outside place; V: GPS's signal is shielded, the car is at the underground; H: The car pass through 10 GSM base stations, but the received GPS's data doesn't change, it means that there is no GPS signal or GPS's receiver is damaged

✧ Speed. The car's speed in KM/H.

✧ Direction: The car's direction is showed in this message. (In coordinates, start from line of the north direction, turn over an angle in the certain degree clockwise.)
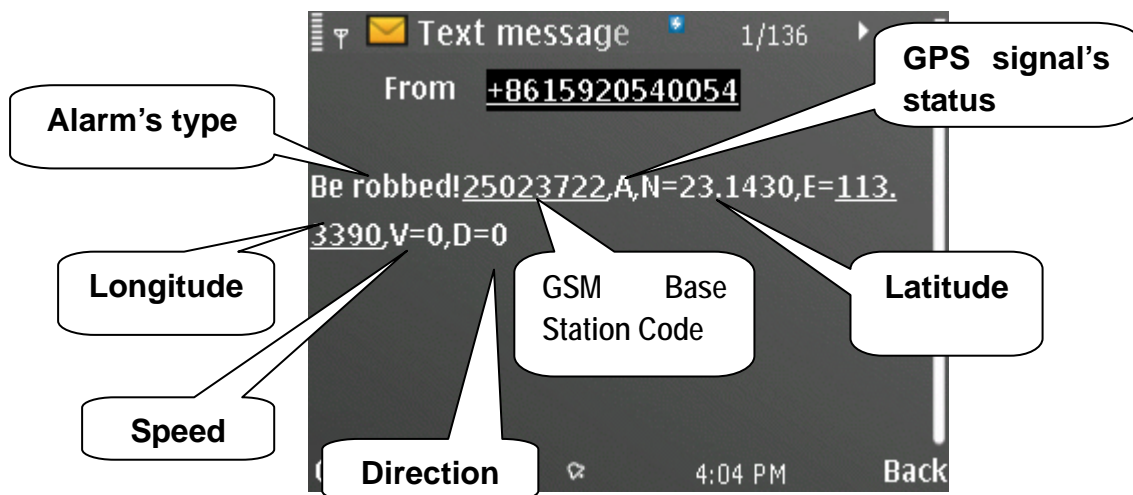
Example: The above message shows that: the SOS anti-robbery button is pressed down. The GSM base station code of the car is 25023722, the car is at outdoors & GPS signal is available, the latitude is 23.1430N, the longitude is 113.3390E, the car's speed

is 0KM/H, and the car's direction is north.

How to Operate It

Arm/Disarm by Phone Calling

User could also use the **first** alarm-received mobile phone to call the system SIM card number, so as to arm/disarm the system.

Arm: After hearing several ring tones, if the systems hang up the call automatically, and call back you, it means that the system is armed.

Disarm: After hearing several ring tones, if the system hangs up the call automatically, and don't call back you, it means that the system is disarmed.

Note:
(1) There is no communication fee for this operation, it is a very convenient way to arm & disarm the system.
(2)The SIM card inside the device must have the function of Caller ID Display.
(3) Only the 1st authorized mobile phone can realize this function.

SMS Control Instructions

User can send SMS instruction to operate the tracker by any mobile phone, the format of the instruction is:

User Password(******)+ Control Code(XXX)

The default user password is 111111.

If the user password is changed, user should send the SMS instruction with the new user password instead of 111111.

XXX is the control code, all the letters must be capital letters or small letters.

There is no space between the user password & the control instruction.

Authorize the Alert-received Mobile

In case of alarm, if user wants to get the alert SMS from the tracker,

he/she needs send the following SMS to program the system firstly:

111111*10 Mobile #1 *20 Mobile #2 *

Other functions:

<u>Mobile #1</u>: it is used to call the tracker No., system will be armed /disarmed

<u>Mobile #2</u>: it is used to call the tracker No., system will send back location SMS to the mobile #2

<u>Example</u>: User sends the SMS **111111*10 13922713571 *20 13711189059 *** to the tracker's SIM card number, if there is any alert, system will send alert SMS to both of these two mobiles. If user uses mobile 13922713571 to call tracker No., system will be arm/disarm; if user uses mobile 13711189059 to call the tracker No., system will send back location SMS to the mobile 13711189059.

● **111111PSWnnnnnn**

This instruction is used to change the user password. The length of the user's password is <u>3~6</u> digits. Users are suggested to change to the new password in use.

<u>Example</u>: User sends the SMS "111111PSW12345" to the system SIM card number, and gets the confirmed SMS "111111PSW12345" in 3 seconds. It means that the user password has been changed to 12345.

<u>Remark: Please keep the password deep in mind if it is changed.</u>

● **111111ARM**

This instruction is used to arm the system.

The system will send back the confirmed SMS to you, such as "Unit Armed! ……"

● **111111DSM**

This instruction is used to disarm the system, to stop receiving the alert SMS from the tracker.

The system will send back the confirmed SMS to you, such as "Unit Disarmed! ……"

- **111111CHK**

This instruction is used to inquiry the vehicle's location & system's status.

The system will send back the SMS, includes the similar information, such as "Unit Disarmed……"

- **111111STP**

This instruction is used to cut off the car's power supply or fuel supply, so as to stop the car.

The car will be controlled to stop gradually.

Attention: It is very dangerous to stop the car when the vehicle is running at high speed. We do not take any responsibility to the consequence caused by this action.

- **111111STPN** or **111111STP(N)**

This instruction is used to stop the car under the condition of speed limitation.

If the car is running at speed higher than N (KM/H), the instruction will not be carried out. System will send back feedback SMS "No parking, vehicle …"; If the car's speed is less than the value N , it will be controlled to stopped gradually.

Example: N =40. The car is running at speed of 50KM/H, user send 111111STP40 or 111111STP(40) to system, the system will send back SMS "No parking." to warn user that the condition is not met. Once the car's speed is about 39KM/H, the system will automatically carry out this instruction & stop the car.

The Minimum value of N is 30KM/H

- **111111RES**

This instruction is used to restore the car to normal status after stopping the car.

It is also used to stop the receiving of SOS alert SMS once the anti-robbery SOS switch is pressed down.

- **111111MONP**

This instruction is used to monitor the voice around the car. The SIM card inside the system pays for the communication fee.

The P is the telephone which is used to monitor the voice. When user send out this SMS to the system, the system will call back the telephone P,

user could listen in the voice around the car upon picking up the call.

If you use the present mobile to carry out the monitoring, you can let the P as blank, sending <u>111111MON</u> is OK.

<u>Example</u>: P =13780012345. If user sends 111111MON13780012345 to system, the system will call back the phone 13780012345 immediately. Once upon pickup the call from the system, user can hear the voice around.

● **111111MON:Phone No.**

This instruction is used to monitor the voice around the car. The user's telephone pays for the communication fee.

<u>Example</u>: User uses the telephone 38351400 to carry out monitoring and pay the communication fee, user can send <u>111111MON:38351400</u> to the tracker firstly, then use this phone 38351400 to call the tracker, it will be connected automatically to monitor the voice. This setting is stored all the time until you change it to another phone no.

Remark: please do not set the user's 1st alert-received phone no. as this phone no.

SOS Anti-robbery Alert

It is the optional function, it needs the optional component: SOS switch.

If you program the 1st & 2nd alert-received mobile only, once the SOS switch is pressed down & hold for at least 3 seconds, the system will send alarm SMS to the   1st & 2nd alert-received mobile. User can send command <u>111111RES</u> to release it.

If you program the 3rd alert-received mobile as the center number, once the SOS switch is pressed down & hold for at least 3 seconds, the system will <u>ONLY</u> send alarm SMS to the center number. (the 3rd mobile no.). User can send command <u>111111RES</u> to release it.

Movement Alert

111111MOV0   to disable the movement alert

111111MOV1   to enable the movement alert, the present location is the center.

111111MOV？   to check the center's position.

Once the system is armed, the movement alert will be automatically enabled. Once the system is disarmed, the movement alert will be automatically disabled.

111111RAD:XR:a,YR:b   to define the distance for triggering the alert

Example: If you want to set the radius in latitude as 60meters, radius in longitude as 80 meters, you can send 111111RAD:XR:60,YR:80 to the tracker. This setting will be stored in the tracker all the time until you change it again.

Geo-Fence Alert

Format of SMS instructions:

111111FEN0   Disable the Geo-fence

111111FEN1   Enable the Geo-fence, using the stored setting

111111FEN1()   Enable the geo-fence, using the latitude & longitude of present location, the distance of latitude & longitude are 1000 meters.

111111FEN？   Check the setting of geo-fence

111111RAL:XR:a,YR:b,X:c,Y:d

Or **111111RAL:XR:a,YR:b**

Or **111111RAL:X:c,Y:d**

XR:a,   a is the distance of latitude (Meter)

YR:b,   b is the distance of longitude (Meter)

X:c,   c is latitude(degree), the range of the value is 0-90）

Y:d,   d longitude (degree), the range of the value is 0~180）

Remark: (1) RAL, XR, YR, X, Y must be in capital letter.

(2) The Setting will be stored.

Example: If the fence is a circle with Radius of 5000meters, the coordinates of the circle's center is: latitude:+23.1400, longitude:+113.4500, then the SMS instruction is: 111111RAL:XR:5000,Y:5000,X:23.1400,Y:113.4500 . If the vehicle is running across the boundary of the fence, the system will automatically send out Alert SMS.

Over-speed Alert

111111SPD:X   x is the speed in KM/H , maximum value is 300KM/H

(For example: 111111SPD:120, if the car speed is over 120KM/H, it will send SMS to warn you)

111111SPD:?   to check the setting of over-speed alert.

Default setting: 200KM/H

How to disable this function: You can send 111111SPD:290 to disable this Over-speed Alert

Remark: this function is just for reference, because there might be some delay or error in detecting the car's real speed by GPS.

The Setting for GPRS Connection

The GPRS command is used for the GPRS setting. User needs the GPRS online tracking server firstly. For more information, please refer to the GPRS communication protocol.

111111WWW:IDN:*;IPN:*;APN:*;COM:*;RPT:*;RUN:*;ARM:*;TDW:*;

IDN: The tracker's ID number, the length cannot be longer than 14, it can be numbers or letters.

IPN: The IP address of the GPRS server

APN: The Access Point Name for the GSM SIM card.

COM: The Serial COM port for the GPRS server

RPT: The time interval for the uploading GPRS packet (Unit: 10 sec.)

ARM: 1 to enable the alert via GPRS, 0 to close the alert via GPRS；

TDW：1 --TOPTEN GPRS protocol #1

          2 --TOPTEN GPRS protocol #2

          0 -- NMEA0183 format

Example, if server IP is: 98.143.144.145, TCP port is 8500, tracker ID is 13922713571. APN is CMNET. Then the command is:

111111WWW:IDN:13922713571;IPN:98.143.144.145;APN:CMNET;COM:8500;RPT:1;ARM:0;TDW:2;

W111111,013,B

B=0: close GPRS function

B=1: open GPRS function

Re-define the Alert Text in other languages

Step 1: Switch from English Mode to other language mode

W111111,023,0 :   Default setting, English Text Mode

W111111,023,1   Other language Text Mode

Step 2: Define your own text by the following command:

111111TXT：nn strD nn strD nn strD nn strD nn strD nn strD

Remarks:

(1) 6 pieces of strings can be defined in one command.

(2) nn: 2bits, range:01~24

(3) D: it can be (,) or (!)

(4) the number of letters in each str. can not be more than 8

(5) the character (.) ,(.),(!) can not be showed in str.

Example: 111111TXT:09vibración! is to define the alarm text in Spanish when the shock sensor is triggered

nn	Str.
01	Patrol area
02	Patrol area
03	Patrol area
04	Patrol area
05	Be robbed
06	Power failure
07	Door opened
08	Seeks help
09	Be vibrated
10	Engine ignited
11	Door opened
12	Cross border
13	Line broken
14	Lamp alarm
15	Vehicle moved
16	Exceed limit
17	No parking
18	Vehicle stopped
19	Unit disarmed
20	Unit armed
21	Not defined
22	Not defined

How to Track the Car

(1). Track the Car by SMS

The user could get SMS alarm message from the system, this message includes 2 kinds of location information:

(1) .The code of the GSM network's base station. By the help of the GSM operator, the car could be easily located because the GSM operators have the database of the GSM network's base station code. But in many countries, this service is not open to public.

(2). The GPS's latitude & longitude, user could track the car's precise location after inputting them in the GOOGLE EARTH (please download it from http://earth.google.com)

(The details are attached in Appendix I.)

(2). Track by the Management Software (Optional)

This function is not the standard function. It needs the support of the management center. To setup the center, user should buy the management software, GSM Modem & digital map (Mapinfo format or Google map). The center can monitor many vehicles at the same time on the map, and it could translate the professional SMS alarm message (latitude, longitude, etc.) into friendly information (such as: city, street…etc).

Specifications

Size of the main unit:	7.5*5.4*2.5 (CM)
Weight of the main unit:	0.1KG
Working temperature:	-20 ~ 65℃
Humidity:	0 ~ 95%
GSM frequencies:	850MHz/900MHz/1800MHz/1900MHz
GPS chip:	Latest SiRF-Star III chipset
GSM antenna's Gain	3.5dBi
GPS antenna's Gain	Antenna Gain: -3dBic at 10°; 3.5dBic at zenith; Amplified Gain: 27dB typ.
Working voltage:	12VDC/ or 24 VDC
Power Consumption:	Working current: ≤250mA; Static current: ≤60mA; Peak current: 300mA;
Internal Backup battery:	Rechargeable 3.7V 750mAh Li-ion battery

FAQs & Troubleshooting

| FAQ	Troubleshooting
Call the tracker, it does not ring	(1) The GSM SIM card has no credit; (2) The SIM card is protected by PIN code; (3) Fix the GSM antenna to open place to test; (4) The SIM card is placed correctly in the slot; (5) Check the connection of the GSM antenna, or change another GSM antenna to test;
Call the tracker, it rings, but it doesn't send back response SMS	(1)The user password is wrong, please use the correct password or reset the password to test; (2) Low power, please use outside 12VDC power supply to power on the unit to test
The mobile can not recieve the alarm informations. The other functions are OK.	(1) The SIM card inside the device has no credit; (2) The SMS instruction is not in correct format; (2) The mailbox of the user's mobile is full;
No GPS signal or GPS signal is weak	(1) Fix the GPS antenna to open place to test; (2) Please check the connection of the GPS antenna; (3) Chang another GPS antenna to test; (4) In cloudy condition, it is a little hard to get the GPS signal, and the GPS coordinate might have some errors.
I can check the location, but I can not get the alert SMS when the car moves	(1) Please setup the system firstly. (authorize SMS-received mobile number, etc); (2) In arming status,the device only warn you once the car moves at about 50 meters away from the parking place;
I can not stop my car	(1) Check the format of the instruction ******STP is correct or not? (2) Replace another relay to test. (3) The relay's control output is suggested to control the power supply loop of the fuel pump. In some cars, it can also used to control the engine ignition loop.
I can't arm/disarm system by phone call	(1) Only the 1st authorized moible number can realize this funciton; (2) The SIM card inside the device must have the function of Caller ID Display.

Installation

Packing List（Standard Package）

Standard package:

Component name	Quantities
Main unit	1 pc
GPS antenna	1 pc
GSM antenna	1 pc
4-pins wiring harness	1 pc
Cut-off relay	1 pc
Microphone	1 pc

Optional components (not included in the standard package):

Component name	Quantities
Anti-robbery SOS Switch	1 pc
Shock Sensor	1 pc
12-Pins iring harness	1 pc

Wiring Diagram
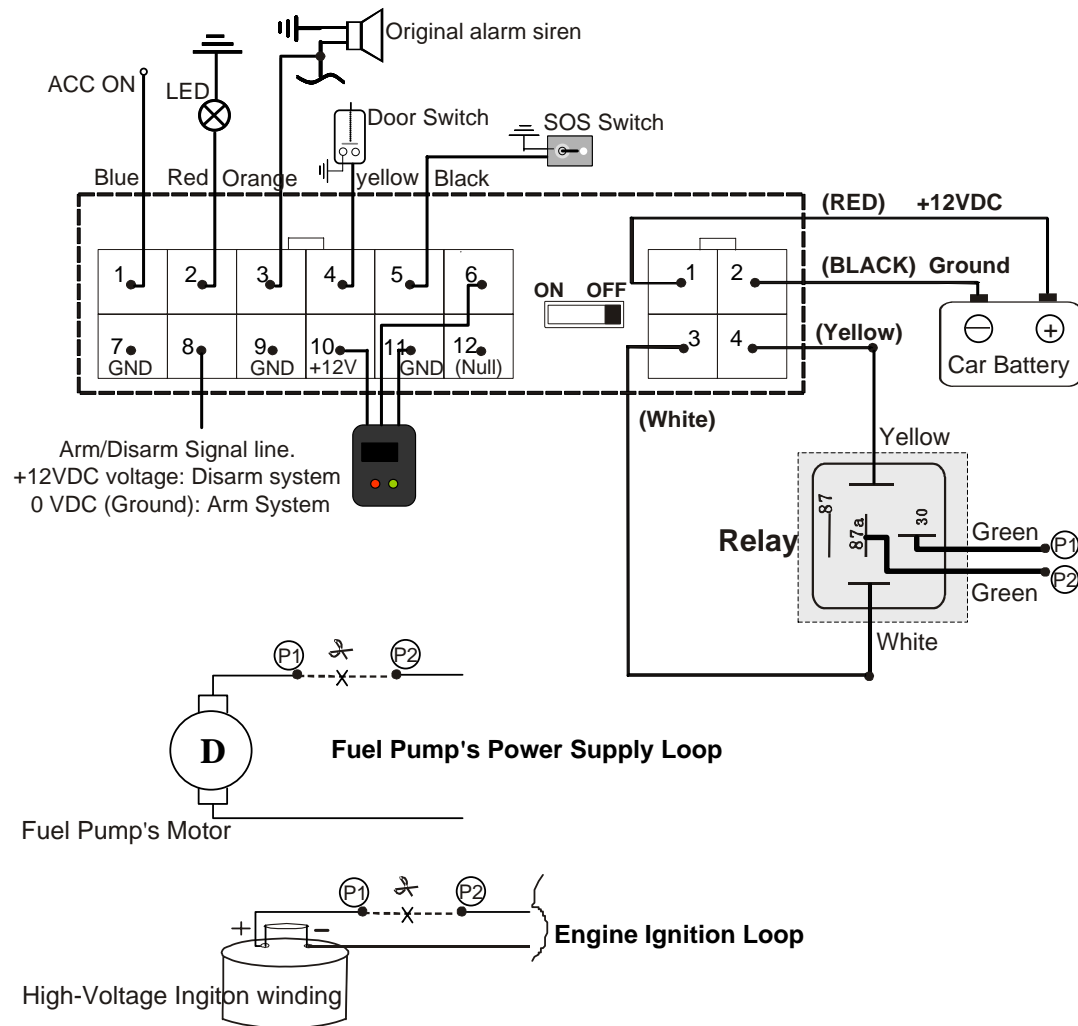
Notes:

(1). The relay's control output (2 green lines, no polarity) has 2 kinds of connections. It can be used to cut off the engine ignition loop or the fuel pump's power supply loop. It is suggested to control the fuel pump.

(2). Please turn the switch to ON position. It is the switch of the inside backup battery.

(3). The 12-pins wiring harness are optional components.

(4). The SOS button and LED are already connected in the 12-pins wiring harness.

(5). The shock sensor is connected to the 12-pins wiring harness

(6). The Orange line in 12-pins connector can be connected with positive of alarm siren or car lamp. No matter in arming or disarming status, once it detects +12VDC signal for at least 8 seconds, it will send out alert.

4P & 12P Connector	Color	No.	Function & connection
4-PIN connector	Red	1	Positive input from car battery（DC12V）
	Black	2	Negative input（GND）

	white	3	Relay's positive control output
	yellow	4	Relay's negative control output
12-PIN connector	blue	1	ACC ON alert signal input
	red	2	Status indicator LED
	Orange	3	Integration line with the original car alarm's siren
	yellow	4	Car door switch input
	black	5	SOS switch input
	green	6	Shock sensor input
	black	7	GND output
	purple	8	Arming/disarming signal line. Once it detects +12VDC, system will be disarmed. Once it is 0V signal, it is armed.
	black	9	GND output
	black	10	+12VDC output (only in arming status)
	black	11	GND output (same as Pin7 & Pin 9)
		12	(Null)

Important Notice on Installation

✧ We strongly recommend you to ask the professional car electrician to do the installation.

✧ Please prepare a valid GSM SIM card in advance.

✧ IMPORTANT: Please do not insert or pull out the SIM card when the main unit has power. Before doing this operation, please disconnect the outside power supply lines, and turn off the internal backup battery's switch firstly. The wrong operation might damage the main unit.

✧ Please fix the main unit at secret place to avoid being destroyed by theft. Please keep it away from the high-temperature, humidity or strong magnetic object. Please fasten it tightly.

✧ While mounting the GPS antenna, the flat magnetic side must be placed downside. There could not be any metal or shielded obstacles

around the upside of the GPS antenna, so that it can receive the satellite signal from upside the sky very well, the GPS antenna should be placed at broad & secret place too. It should be drew straight and kept away from the sound box or speaker.

✧ While mounting the GSM antenna, it should be placed at broad & secret place where there is no shielded obstacle.

✧ The GSM antenna can't be placed along with the GPS antenna in parallel. It should be drew straight and kept away from the sound box or speaker.

✧ After installation, please test the system & make sure that it can GSM signal & GPS signal very well. Otherwise, fix the GSM antenna or GPS antenna at other places until the signals are OK.

✧ For security, please fix the GSM & GPS antenna in secret places.

Recommended places: (1).Downside the fore windshield class (2).Downside the dashboard (3).Downside water brusher（no metal coat） (4). Inside the door edge of the car's roof (nearby the driving room).

Appendix I: How to Track the Car

Track the Car by GPRS Center (Optional)

The user should setup their own GPRS center firstly, then program the tracker to send GPS data by GPRS network to the server. It is online real-time tracking which is special for fleet management.

Track the Car by SMS & Google Map

The user could get SMS alarm message from the system, this message includes 2 kinds of location information:

(1) .The code of the GSM network's base station. By the help of the GSM operator, the car could be easily located because the GSM operators have the database of the GSM network's base station code. But in many countries, this service is not open to public.

(2). The GPS's latitude & longitude, user could track the car's precise location after inputting them in the GOOGLE EARTH (please download it from http://earth.google.com) or http://maps.google.com (Noted, please add the minus before X & Y if they have)

It is cost-effective way for tracking, but it is not so convenient because user must use internet to track by Google Map.
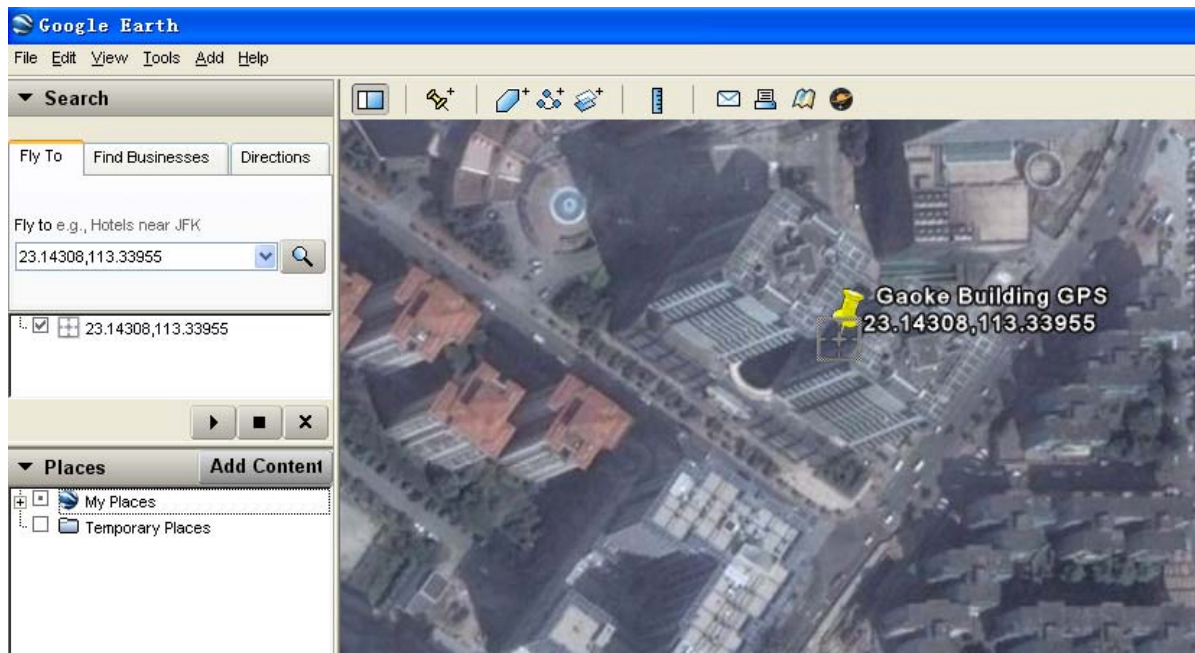
Track by the SMS Center Software & MapInfo Map (Optional)

This function is not the standard function. It needs the support of the center (includes: center software, GSM Modem & digital map). **The center can translate the GPS coordinates into the real address (such as: city, street…etc) automatically**.

By this way, the user can directly use mobile to send a SMS command, then he can get the car's real address by SMS. There is no need of internet connection. It is very convenient for users.
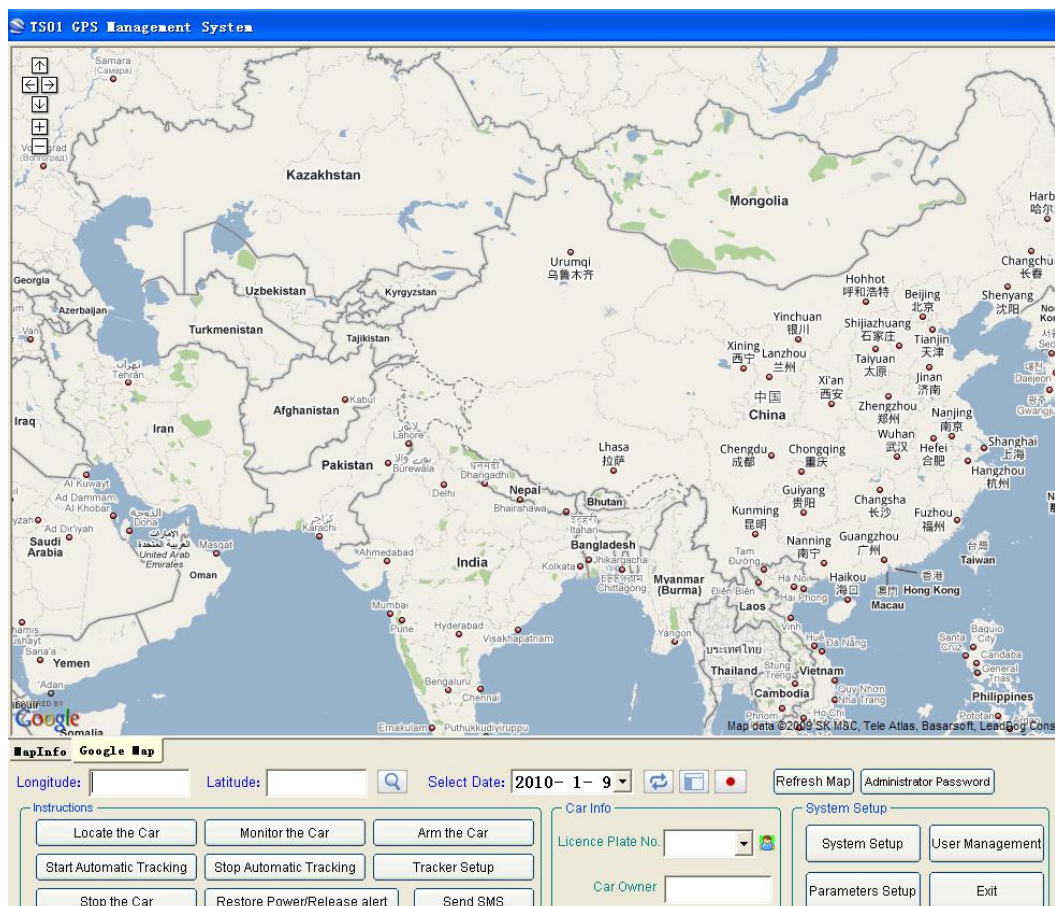
FCC ID: X3U-TK110
Model No.: TK110
Manufacturer: Topten electronics Technology Limited

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