

TR-150

Personal Tracker

User Manual

Version 0.1.7



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1 Introduction and Features

Introduction

TR-150 is durable and water resistant GPS/GSM tracker. Allow a user to track his vehicle and assets from anywhere through SMS. TR-150 is designed with high capacity Li-ion battery for long operation time. There is one SOS button on the TR-150 for emergency help. It is very easy to install or hide TR-150 in the car to perform tracking. TR-150 is ideal application for vehicle tracking and equipment/assets monitoring.

Features

- SiRF Star III GPS chipset
- Combination of GPS ,GSM wireless network
- Durable and water resistant GPS tracker
- Easy to install or hide in the car to perform tracking. No external wires needed.
- Ideal application for vehicle tracking and equipment/assets monitoring
- Optional external antenna for GPS reception
- Rechargeable 2100mA high capacity Li-ion battery for long operation time
- External DC power supply
- Configuration can be done via SMS commands or by application software via USB interface.SOS (emergency) button.
- Voice monitor function to monitor the sound/conversation live.
- Geofence function

2 Specifications

Hardware

GSM module:	Siemens GSM 900/1800
GPS Chipset:	SiRF Star III
Antenna Type:	GPS patch antenna
Dimension:	86.7*48.9*32.5 mm
Battery:	2100mA rechargeable Li-ion battery
LED indicator:	For Charging, GPS,GSM and Status.
Interface:	Mini USB port for connecting to PC
Casing:	Water resistant
GPS external antenna port:	MMCX port
SOS button:	SOS button
Mounting bracket with magnet:	Optional

3 Start-up

Install SIM card and Battery



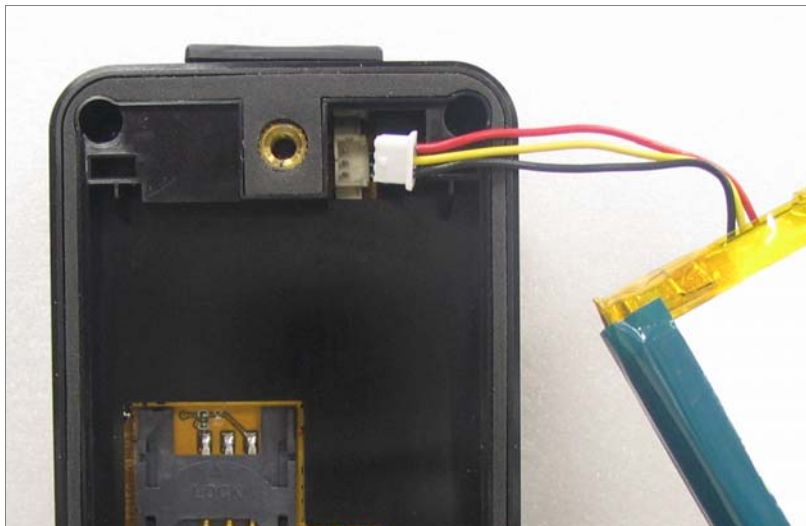
- Use a coin or screwdriver to loosen the screw on back cover.



- Lift the back cover and remove it as the direction shown.



- Slide down the SIM card slot as the direction marked "OPEN" on it.
- Slide in the SIM card with its metal contacts facing down and the cut corner at the top left.



- Plug the battery connector into socket. Be aware that the **red wire** is on the top side when you plug in the connector.

Charging the battery

Before you can use the TR-150, you must complete the following procedures:



1. Fully charge the battery. Before your first time using of TR-150, please connect it with AC power adapter for battery charging under the power-off condition. (The included battery is specially designed for TR-150. Please do not use other type of battery; otherwise it will damage the device. If you need to change the battery for TR-150, please contact you local dealer.)


4 Hardware Overview

Appearance



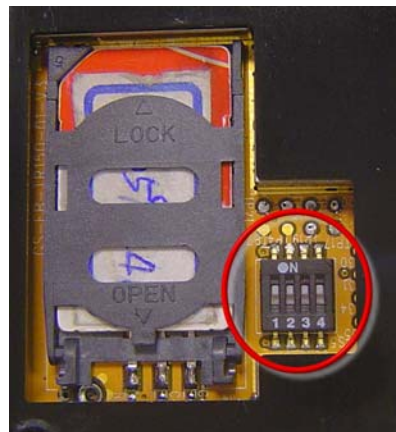
(1)	Power button
(2)	SOS button
(3)	Indicators
(4)	USB connector
(5)	Microphone
(6)	External antenna connector

Button description

<p>Power button</p>	<ol style="list-style-type: none"> 1. Power On: Press and hold the power button for 3-4 seconds. The status LED will flash 2 times 2. Power Off: Press and hold the power button for 3-4 seconds. The status LED will flash 1 time.
<p>SOS button</p>	<p>Presses the SOS Button, the status LED will flash 3 times to indicate the button is activated. TR-150 will immediately send out an emergency message along with its GPS report to 3 preset phone numbers.</p>
<p>Indicator</p>	 <ol style="list-style-type: none"> 1. GSM LED: <ul style="list-style-type: none"> • Voice monitoring: LED steady on. • When no SIM card inserted, network search in progress, ongoing user authentication, or network login in progress: LED is blinking quickly (about once per second). • In standby mode: LED is blinking slowly (once per 3 seconds) 2. GPS LED: The LED is steady on when it is fixing the location. The LED will be blinking when TR-150's location is fixed. 3. Status LED: <ul style="list-style-type: none"> • When battery low: LED steady on. • When enter setup mode: LED steady on. • Press power button to turn on: LED will flash 2 times. • Press power button to turn off: LED will flash 1 times. • When SOS button is pressed: LED will flash 3 times. • When encounter error: LED will flash 5 times. 4. Power LED: The LED will be orange when charger is plugged for charging the battery. When the battery is been fully charged, the LED goes off.

USB connector	Connecting TR-150 to PC by a Mini USB cable, you can setup all its features and functions from application software in PC. You can also plug in USB cable for charging the battery.
Microphone	For voice monitoring use.
External antenna connector	For you to connect a MMCX external GPS antenna.

DIP switch



Note: The Factory default of DIP switch is set to OFF.

Switch 1 sets to ON: Enable the Auto-On feature. When external power is connected, the device will auto-on. When remove external power, the device is off.

Switch 2 sets to ON: All LEDs (except Status LED) go off to perform secret tracking. Status LED flashes as usual except battery low. (In another word, Status LED is not on if battery is low.)

Switch 3 sets to ON: For entering setting mode.

Switch 4: Reserved for future use.

6 Operating the device

Turn on / Turn off

- **Turn on:** When the device is off, press the Power button for 3 seconds to turn on the device. When the device is on, GPS will do cold start to locate its position for the first time with the green GPS LED on. If location is fixed, the LED will be blinking. If the location is not fixed in 3 minutes, the GPS function goes sleep mode for 30 minutes before its next trial. It is suggested that you stay at outer place or near the window where it can receive the better GPS signal when you turn on the device.

NOTICE: If it did not finish the successful fix after turned on, it may be difficult to get fixed in the weak signal area or on the move.

- **Turn off:** When the device is on, press the Power button for 3 seconds to turn it off. When the LEDs go out, it indicates that the device is turned off for sure.

Tracking/Monitoring TR-150 by SMS

SMS Commands for controlling TR-150

	Report type	Format	Return message
0	Immediate report	?0,IMEI,Report_Format,Return_Phone_Number!	\$0,IMEI,OK!
1	Period report	?1,IMEI,Report_Interval,Number_of_Reports,Report_Format,Return_Phone_Number!	?1,IMEI,OK!
2	Stop	?2,IMEI,Return_Phone_Number!	?2,IMEI,OK!
4	Geofence	?4,IMEI,{[R,longitude,latitude,longitude,latitude],[C,longitude,latitude,radius(meter)]},In_or_Out,Report_Interval,Number_of_Reports,Report_Format,Return_Phone_Number!	?4,IMEI,OK!
6	Voice monitor	?6,IMEI,Return_Phone_Number! Note: If return phone number is empty, TR will call back to Caller ID	

Note :

1. Data Report Format:

Report_Format=0 → Format0

Report_Format=1 → Format1

Please refer to description in this chapter later.

2. Return Phone Number:

Return_Phone_Number

TR will send data report and return message back to this return phone number.

If return phone number is empty, TR will send report back to default SMS return phone number.

If default SMS return phone number is empty neither, TR will send report back to caller ID.

3. Number of Report:

Number_of_Reports=0 → continuous report

Number_of_Reports=X → X times report

4. Report Interval:

Report_Interval

Set Report Interval in seconds.

SMS Report functions _ Immediate Report

Immediate Report: When TR150 receives the **SMS command**, it will return a SMS to confirm the receipt of command. TR150 starts to get position fixed within the **Maximum GPS Fixing Time**. If it can not fix the position in the period of time, it will return the previous location. When the GPS position is fixed, it will again return the position data.

	Report type	Format	Return message
0	Immediate report	?0,IMEI,Report_Format,Return_Phone_Number!	\$0,IMEI,OK!

The description of SMS

Format	Description
?0	Start sign and function code
IMEI	IMEI of TR
Report_Format	Ask TR to return message by Format0 or Format1. (see description below)
Return_Phone_Number	The report message will be sent to the phone number.
!	End sign

Example: Require immediate report in format1 sent to 626-123456

?0,355632000166323,1,626123456!

SMS Report functions _ Period Report

Period Report: When TR150 receives the SMS, it will return a SMS to confirm the receipt of command. TR150 starts to get position fixed. When the GPS position is fixed, it will again return the position data, and continue to send back the data by the **Interval Time** you set. You can set the number of report in **Number of reports** field. If you set "0", it will not limit the number of report.

	Report type	Format	Return message
1	Period report	?1,IMEI,Report_Interval,Number_of_Reports,Report_Format,Return_Phone_Number!	?1,IMEI,OK!

The description of SMS

Format	Description
?1	Start sign and function code
IMEI	IMEI of TR
Report_Interval	Time interval of sending data report. The unit is second.
Number_of_Reports	How many reports will be sent? Number_of_Reports=0 → continuous report Number_of_Reports=X → X times report
Report_Format	Ask TR to return message by Format0 or Format1. (see description below)
Return_Phone_Number	The report message will be sent to the phone number.
!	End sign

Example 1: Require continuous 120-sec period report in format1 sent to 626123456
?1,355632000166323,120,0,1,626123456!

Example 2: Require 10 times, 180-sec period report in format0 sent to 626123456
?1,355632000166323,180,10,0,626123456!

SMS Report functions _ Stop Report

Stop Report: When TR150 receives the **SMS**, it will return a SMS to confirm the receipt of command and stop **all report modes** and back to standby status.

	Report type	Format	Return message
2	Stop	?2, IMEI, Return_Phone_Number!	?2, IMEI, OK!

The description of SMS

Format	Description
?2	Start sign and function code
IMEI	IMEI of TR
Return_Phone_Number	The report message will be sent to the phone number. No report message.
!	End sign

Example:

Send Stop command to disable data report and make GPS off. Return message will be sent to 626123456

?2, 355632000166323, 626123456!

Geofence

1. Send SMS command to make TR-150 enter into Geofence mode. The content of the SMS also includes boundary information (rectangle or circular), in or out to send alarm, time intervals of alarm report (0 means one time report, X means the interval is X seconds), return counts, report format and return phone number.
2. After the TR-150 enter into this mode, the device will start GPS fixing and the GPS is always on. Once TR-150 detects the device in or out the boundary, the TR-150 will send alarm message back to preset number by SMS.

	Report type	Format	Return message
4	Geofence	?4,IMEI,{[R,longitude,latitude,longitude,latitude],[C,longitude,latitude,radius(meter)]},In_or_Out,Report_Interval,Number_of_Reports,Report_Format,Return_Phone_Number!	?4,IMEI,OK!

The description of SMS

Format	Description
?4	Start sign and function code
IMEI	IMEI of TR
{[R,longitude,latitude,longitude,latitude],[C,longitude,latitude,radius(meter)]}	Boundary information: R: rectangle → Follow by two longitudes, latitudes. C: circular → Follow by one longitude, latitude and one radius.
In_or_Out	In_or_Out=in → In the boundary to send alarm. In_or_Out=out → Out the boundary to send alarm.
Report_Interval	Time interval of sending data report. The unit is second.
Number_of_Reports	How many reports will be sent? Number_of_Reports=0 → continuous report Number_of_Reports=X → X times report
Report_Format	Ask TR to return message by Format0 or Format1. (see description below)
Return_Phone_Number	The alarm message will be sent to the phone number.
!	End sign

Note 1:

User can set up to 10 rectangle or circular boundaries. Each SMS contains one boundary setting. User can send numerous SMS to complete one set of settings, including numerous rectangle or circle boundaries. For example, user want to set the boundary includes 2 rectangles and 1 circle. User has to send 3 SMS, two with rectangle information, one with circle information.

SMS1:

```
?4,IMEI,R,longitude,latitude,longitude,latitude,In_or_Out,Report_Interval,Number_of_Reports,Report_Format,Return_Phone_Number!
```

SMS2:

```
?4,IMEI,R,longitude,latitude,longitude,latitude,In_or_Out,Report_Interval,Number_of_Reports,Report_Format,Return_Phone_Number!
```

SMS3:

```
?4,IMEI,C,longitude,latitude,radius,In_or_Out,Report_Interval,Number_of_Reports,Report_Format,Return_Phone_Number!
```

If user uses numerous SMS in one setting, the `IMEI`, `In_or_Out`, `Report_Interval`, `Number_of_Reports`, `Report_Format`, `Return_Phone_Number` must be the same between each SMS. If above parameters are not the same between SMS, TR-150 only follows **last SMS**.

Note 2:

In Boundary information

```
{[R,longitude,latitude,longitude,latitude],[C,longitude,latitude,radius],}
```

User can set

`R`: rectangle follows by two longitudes, latitudes.

Or

`C`: circular follows by one longitude, latitude and one radius.

Example: Rectangle

```
R,26.00000,123.00000,27.00000,124.00000
```

Example: Circle (radius is 1000 meters)

```
C,26.00000,123.00000,1000
```

Note 3:

Example:

- Send **one SMS** to setup Geofence.
- Boundary includes **one rectangle** (two longitudes, latitudes → 24.00000,121.00000, 25.00000,122.00000)
- When TR is out boundary, sending format1, 10 times , 120 sec interval, alarm message to 626123456.

```
?4,355632000166323,R,24.00000,121.00000,25.00000,122.00000,out,120,10,1,616123456!
```

Example:

- Send **three SMS** to setup Geofence.
- Boundary includes **one rectangle** (two longitudes, latitudes → 24.00000,121.00000, 25.00000,122.00000) and **two circles** (one longitude/latitude is 26.00000,123.00000, and radius is 1000 meter) (the other longitude/latitude is 27.00000,124.00000, and radius is 1500 meter)
- When TR is out boundary, sending format1, 10 times, 120 sec interval, alarm message to 626123456.

SMS1:

```
?4,355632000166323,R,24.00000,121.00000,25.00000,122.00000,out,120,10,1,616123456!
```

SMS2:

```
?4,355632000166323,C,26.00000,123.00000,1000,out,120,10,1,616123456!
```

SMS3:

```
?4,355632000166323,C,27.00000,124.00000,1500,out,120,10,1,616123456!
```

Voice monitor function

1. Send SMS with IMEI and return phone number to TR-150 to enable voice monitor function.
2. Then TR-150 call back.

	Report type	Format	Return message
6	Voice monitor	?6,IMEI,Return_Phone_Number!	

The description of SMS

Format	Description
?6	Start sign and function code
IMEI	IMEI of TR
Return_Phone_Number	TR will call back to this phone number.
!	End sign

Note: If return phone number is empty, TR will call back to Caller ID

Example:

User send voice command and make TR call back to 626123456

?6,355632000166323,626123456!

The format of return SMS from TR-150

Data Report Format:

Report_Format=0 → Format0

Report_Format=1 → Format1

Format0:	Example:
Position report Name Time Date GPS position Fix or not	Position report Name 2006/9/15 10:20:39 24.99653,121.48769 GPS fixed

Format1:
?IMEI,Status,GPS_Fix,Date,Time,Longitude,Latitude,Altitude,Speed,Heading,Number_of_Satellites_in_use,HDOP!
Example:
?353857014816785,2,3,280807,035825,E12129.2616,N2459.7918,97.2,0.13,142.31,04,2.4!

The description of Format1

Format	Value	Note
?	?	Command Head
IMEI	The number of IMEI	
Status	0 1 3	0: Immediate report 1: Period report 3: Time report
GPS_Fix	1 2 3	1: Fix not available 2: GPS 2D Fix 3: GPS 3D Fix
Date	ddmmyy	
Time	hhmmss	
Longitude	(E or W)dddmm.mmmm	Example: E12129.2186 → E 121°29.2186'
Latitude	(N or S)dddmm.mmmm	Example: N2459.8915 → N 24°59.8915'
Altitude	xxxxx.x	unit: meters
Speed	xxxxx.xx	unit: knots (1knots = 1.852km)
Heading	ddd	
Number_of_Satellites_in_use	xx	
HDOP	x.x	
!	!	Command End

Configure TR-150 by SMS

1. SMS default return phone number
2. MAX. GPS fixing time
3. Default report mode settings:
 - a. Default report mode.
 - b. Return phone number for default report mode.
 - c. Report interval time
 - d. Report count
 - e. Report format
4. SOS numbers

Report type	Format	Return message
SMS Default Return Number	?7,IMEI,1,Enable_SMSDefaultReturnPhoneNumber, SMSDefaultReturnPhoneNumber,Return_Phone_Number!	\$7,IMEI,1,OK!
Maximum GPS fixing time	?7,IMEI,2,Maximum_GPS_Fixing_Time,Return_Phone_Number!	?7,IMEI,2,OK!
Default report mode setting	?7,IMEI,3,Default_Report_Mode,Report_Interval, Number_of_Reports,Report_Format,Return_Phone_Number!	?7,IMEI,3,OK!
SOS numbers	?7,IMEI,4,SOS1,SOS2,SOS3,Return_Phone_Number!	?7,IMEI,4,OK!

Enable_SMSDefaultReturnPhoneNumber: Enable SMS Default Return Phone Number, so you can set its value.

SMSDefaultReturnPhoneNumber: set SMS Default Return Phone Number.

Return_Phone_Number: The report message will be sent to the phone number.

Maximum_GPS_Fixing_Time: If GPS is not fixed within the time, it returns previous location and close GPS.

Default_Report_Mode:

Report_Format: Ask TR to return message by Format0 or Format1.

Report_Interval: Time interval of sending data report. The unit is second.

Number_of_Reports:

Number_of_Reports=0 → continuous report

Number_of_Reports=X → X times report

11 Appendix

FCC Regulations:

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

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

RF Exposure Information (SAR)

This model phone meets the government's requirements for exposure to radio waves.

This phone is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government.

The exposure standard for wireless mobile phones employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6W/kg. *Tests for SAR are conducted using standard operating positions accepted by the FCC with the phone transmitting at its highest certified power level in all tested frequency bands. Although the SAR is determined at the highest certified power level, the actual SAR level of the phone while operating can be well below the maximum value. This is because the phone is designed to operate at multiple power levels so as to use only the power required to reach the network. In general, the closer you are to a wireless base station antenna, the lower the power output.

The highest SAR value for the model phone as reported to the FCC when tested for use at the ear is 0.758 W/kg for GSM850 / 0.735 W/kg for PCS1900 and when worn on the body, as described in this user guide, is 0.21 W/kg for GSM850 / 0.223 W/kg for PCS1900 (Body-worn measurements differ among phone models, depending upon available enhancements and FCC requirements.)

While there may be differences between the SAR levels of various phones and at various positions, they all meet the government requirement.

The FCC has granted an Equipment Authorization for this model phone with all reported SAR levels evaluated as in compliance with the FCC RF exposure guidelines. SAR information on this model phone is on file with the FCC and can be found under the Display Grant section of <http://www.fcc.gov/oet/fccid> after searching on FCC ID: RID-TR101.

For body worn operation, this phone has been tested and meets the FCC RF exposure guidelines for use with an accessory that contains no metal and the positions the handset a minimum of 1.5 cm from the body. Use of other enhancements may not ensure compliance with FCC RF exposure guidelines. If you do not use a body-worn accessory and are not holding the phone at the ear, position the handset a minimum of 1.5 cm from your body when the phone is switched on.