TR-151SP

Smart Pallet Tracker

User Manual

Version 1.0

Table of Content

1. Introduction and Features

1.1 Introduction

TR-151SP is a durable and water resistant GPS/GSM/GPRS tracker. Users can install TR-151SP on vehicles or assets for tracking. It can send out SMS with its location (longitude and latitude) to user's cell phone by GSM network or to personal computer by internet connection of GPRS network. Then users can track the location of their vehicles or assets. TR-151SP is designed to equip with high capacity of Li-ion battery for long operation time. It is very easy to install or hide TR-151SP in the car to perform tracking. TR-151SP is ideal application for vehicle tracking and equipment/assets monitoring.

1.2 Features

- High sensitive GPS chipset
- Combination of GPS ,GSM/GPRS wireless network
- Durable and water resistant GPS tracker
- Ideal application for vehicle tracking and equipment/assets monitoring
- Optional external antenna for GPS reception
- Rechargeable 15A 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.
- Geo-fence function

NOTE: **Geo-fence** feature allows user to set up to 10 permissible or restricted areas whose shape is either circular or rectangular for tracking the vehicles or monitoring the equipment/assets. Users can choose to receive alarm message if TR-151SP enters the restricted areas or to receive alarm message if TR-151SP gets out the permissible areas.

1.3 Hardware

GSM module:	MC55i GSM 850/900/1800/1900
Operating temperature:	-20°to 55°C
Charging temperature	0°to 45°C
Antenna Type:	GPS patch antenna
Dimension:	128x105x68 mm, for rectangular part 128x130x68 mm, including reset/USB extrusion part
Battery:	15 A rechargeable Li-ion battery
Interface:	Mini USB port for purpose of firmware upgrade, battery charging

Button:	Reset Button: Press the Reset Button for 3 seconds to reset the device
	Note:
	    1. Device is always on until the battery runs out.
	    2. Reset button is disabled when external power connected.

Charging time:	23 hours for fully charge

2. Start-up

2.1 Accessories

TR-151 SP	AC charger
USB Cable	

2.2 Install SIM card

1. Remove all 4 screws from the bottom of the device.

2. Carefully, pull both sides apart. This will reveal the insides of the TR-151-SP.

3. Inside, you'll find a battery, a TR-151-SP, a USB extension cable and a reset button.

4. Carefully, unplug the battery from the TR-151-SP and the reset button.
5. Unplug the TR-151-SP from the USB extension and remove the TR-151-SP from the casing.
6. Open the SIM holder.
7. Install the SIM card and close the SIM holder.
8. Plug everything back together as shown below.

9. Once everything is plugged in, put the two halves back together.
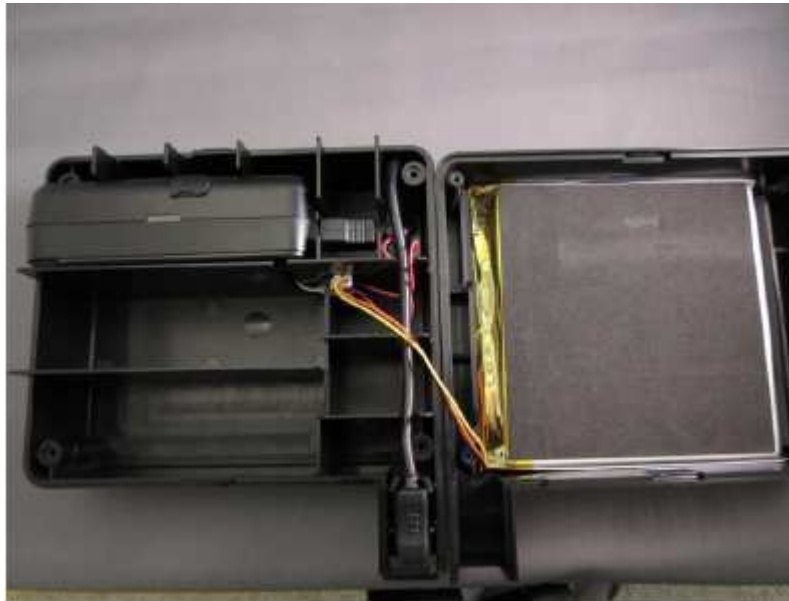
10. Screw in the four screws and you're done.

2.3 How to Turn on/ Charge/ Reset

Device is always on until battery exhausted.

Charging: Before using TR-151-SP for the first time, please fully charge it by connecting to AC power adapter for at least 23 hours (The attached battery is specially designed for TR-151-SP.)

Reset:

Reset button: Pressing the Reset Button for 3 seconds will reset the device.
Note: Reset button is disabled when the external power connected

4. Operating the TR-151

4.1 How to set TR-151SP to immediately report its position?

Users can make TR-151SP to do SMS or/ and GPRS immediate report of its location by the command media of SMS or GPRS. .

The command is following as:

SMS Command Media for Immediate Report	
SMS Report Media	?0,IMEI,Report_Format,Report_Phone_Number!
GPRS Report Media	?8,IMEI,Return_Phone_Number!
SMS and GPRS Report Media	?21,IMEI,Report_Format,Report_Phone_Number!

GPRS Command Media for Immediate Report	
SMS Report Media	$0,IMEI,Report_Format,Report_Phone_Number!
GPRS Report Media	$8,IMEI!
SMS and GPRS Report Media	$21,IMEI,Report_Phone_Number!

The table below explains the content of the command.

Format	Description
?,$	Start sign
0,8,21	Function code
IMEI	IMEI code of the TR-151SP
Report_Format	0 or 1. 0 is text format. 1 is NMEA format
Report Phone Number	The phone number for receiving the report and OK message
Return Phone Number	The phone number for receiving OK message
!	End sign

TR-151SP will send OK message to the return phone number when the command media is SMS or to GPRS server when the command media is GPRS to confirm it has received the request. And then it will start to get fixed the position. After getting fixed the position, it will send its location to the report phone number or GPRS server. If TR-151SP can not get fixed the position within the "Maximum GPS Fixing Time", it will return the previous location.

NOTE:

1. The coordinate unit of report format 0 is degree. The coordinates unit of report format 1 is degree and minute with a 4-digit decimal fraction

2. If TR-151SP can not get fixed the position within the "Maximum GPS Fixing Time", it will return the previous location.

3. Please refer "How to configure TR-151SP by SMS?." to set "Maximum GPS Fixing Time"

Example: If you'd like to ask TR-151SP to send immediate report in format0 to 626-123456 by SMS command media.

You have to enter **?0, 355632000166323,0,626123456!**

And then you will get **?0,355632000166323,OK!**. After TR-151SP get fixed of the position, you will get the position report like Position report

> Name
> 2008/12/15 10:20:39
> N2459.8915,E12129.2186
> GPS fixed

Example: Require GPRS immediate report sent to 626-123456

You have to enter "**?8,355632000166323,626123456!**"

And then you will get "? 8,355632000166323,OK**!**"

Example: Require SMS & GPRS immediate report sent to 626-123-4567 and to GPRS server

You have to enter "**?21,355632000166323,6261234567!**"

And then you will get "?21,355632000166323,OK**!**"

4.2 How to set TR-151SP to periodically report its position?

Users can make TR-151SP to do SMS or/ and GPRS periodic report of its location by the command media of SMS or GPRS. .

The format of command is following as:

SMS Command Media for Periodic Report	
SMS Report Media	?1,IMEI,Report_Interval,Number_of_Reports,Report_Format,Report_Phone_Number!
GPRS Report Media	?9,IMEI,Report_Interval,Return_Phone_Number!
SMS and GPRS Report Media	?22,IMEI,Report_Interval,Report_Phone_Number!

GPRS Command Media for Periodic Report	
SMS Report Media	$1,IMEI,Report_Interval,Number_of_Reports,Report_Format,Report_Phone_Number!
GPRS Report Media	$9,IMEI,Report_interval!
SMS and GPRS Report Media	$22,IMEI,Report_Interval,Report_Phone_Number!

The table below explains the content of the command.

Format	Description
?,$	Start sign
1,9,22	Function code
IMEI	IMEI code of the TR-151SP
Report_Interval	Set the interval between two report
Number_of_Reports	Set how many reporting SMS should be sent
Report_Format	0 or 1. 0 is text format. 1 is NMEA format
Report Phone Number	The phone number for receiving the report and OK message
Return Phone Number	The phone number for receiving OK message
!	End sign

TR-151SP will send OK message to the return phone number when the command media is SMS or to GPRS server when the command media is GPRS to confirm it has received the request. And then TR-151SP will periodically send its location to the report phone number or/and GPRS server according to the report interval.

NOTE:

1. The coordinate unit of report format 0 is degree. The coordinates unit of report format 1 is degree and minute with a 4-digit decimal fraction

2. If user sets the number of reports as 0, TR-151SP will keep sending the periodical report until user

send the SMS of ?**2**,IMEI,Return_Phone_Number! to stop the periodical report.

3. For the command of "?9,IMEI,Report_Interval,Return_Phone_Number!" and "$9,IMEI,Report_interval!", TR-151SP would **keep connected** to GPRS server after it sends the location data.

4. For the command of "?22,IMEI,Report_Interval,Report_Phone_Number!" and "$22,IMEI,Report_Interval,Report_Phone_Number!", TR-151SP would **disconnect** from GPRS server after it sends the location data.

Example 1:   Require continuous 120-sec period report in format0 sent to 626123456 by SMS command media

You have to enter "**? 1,355632000166323,120,0,0,626123456!**"

TR-151SP will send "? 1,355632000166323,OK**!**" And then you will get the position report like
Position report
Name
2008/12/15 10:20:39
N2459.8915,E12129.2186
GPS fixed

TR-151SP will send position report every 120 seconds until you stop periodical report.

Stop periodical report:

Users can send an SMS to stop periodical report.

The format of SMS is following as?**2**,IMEI,Return_Phone_Number!

Users can also stop periodical report by GPRS command

The command is "$2,IMEI!"

4.3 How to set TR-151SP to make GPRS period and disconnect report?

Users can make TR-151SP to make GPRS periodic and disconnect report by the command media of SMS or GPRS. What's different from GPRS periodic report is that for GPRS disconnect and period report, TR-151SP would **disconnect** from GPRS server after it sends the periodic report. For GPRS periodic report (the command start with "?9" and "$9"), TR-151SP would keep connected to GPRS server after it sends the periodic report.

SMS Command Media for GPRS Disconnect and Periodic Report
?10,IMEI,Report_Interval,Return_Phone_Number!

GPRS Command Media for GPRS Disconnect and Periodic Report
$10,IMEI,Report_Interval!

The table below explains the content of the command.

Format	Description
?,$	Start sign and function code
10	
IMEI	IMEI of TR-151SP
Report_Interval	Time interval of sending data report. The unit is second.
Return_Phone_Number	The phone number for receiving OK message.
!	End sign

TR-151SP will send OK message to the return phone number when the command media is SMS or to GPRS server when the command media is GPRS to confirm it has received the request. And then TR-151SP will periodically send its location to the report phone number or/and GPRS server according to the report interval.

NOTE:

1. The coordinate unit of report format 0 is degree. The coordinates unit of report format 1 is degree and minute with a 4-digit decimal fraction

Example 1:   Require 120-sec period report and return phone number is 6261234567 by SMS command media

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You have to enter "**?10,355632000166323,120,6261234567!**

Example 2:   Require 180-sec period report sent to 626123456 by GPRS command media

$10,355632000166323,180!

Stop GPRS disconnect and periodical report:

Users can send an SMS to stop periodical report.

The format of SMS is following as:

?**2**,IMEI,Return_Phone_Number!

4.4 How to set TR-151SP enter Geo-fence mode?

Users can set up to 10 permissible or restricted areas whose shape is circular or rectangular for TR-151SP to track the vehicles or monitor the equipment/assets. The command media could be SMS or GPRS. Users can choose to receive alarm message while TR-151SP enters the restricted areas or to receive alarm message while TR-151SP gets out the permissible areas. The content of the command includes the rectangular or circular areas defined by longitudes and latitudes, getting in the restricted areas or getting out the permissible areas to send alarm, time intervals of alarm report, number of reports, report format and return phone number.

The format of command is as below.

SMS Command media for Geo-fence mode	
SMS Geo-fence	?**4**,IMEI,{[R,longitude,latitude,longitude,latitude],[C,longitude,latitude,radius(meter)]},In_or_Out,Report_Interval,Number_of_Reports,Report_Format,Report_Phone_Number!
GPRS Geo-fence	?**11**,IMEI,{[R,longitude,latitude,longitude,latitude],[C,longitude,latitude,radius(meter)]},In_or_Out,Report_Interval,Number_of_Reports,Report_Format,Return_Phone_Number!
SMS and GPRS Geo-fence	?**23**,IMEI,{[R,longitude,latitude,longitude,latitude],[C,longitude,latitude,radius(meter)]},In_or_Out,Report_Interval,Number_of_Reports,Report_Format,Report_Phone_Number!

GPRS Command media for Geo-fence mode	
SMS Geo-fence	$**4**,IMEI,{[R,longitude,latitude,longitude,latitude],[C,longitude,latitude,radius(meter)]},In_or_Out,Report_Interval,Number_of_Reports,Report_Format,Report_Phone_Number!
GPRS Geo-fence	$**11**,IMEI,{[R,longitude,latitude,longitude,latitude],[C,longitude,latitude,radius(meter)]},In_or_Out,Report_Interval,Number_of_Reports!
SMS and GPRS Geo-fence	$**23**,IMEI,{[R,longitude,latitude,longitude,latitude],[C,longitude,latitude,radius(meter)]},In_or_Out,Report_Interval,Number_of_Reports,Report_Format,Report_Phone_Number!

The description of SMS

Format	Description
?4,$4 ?11,$11 ?23,$23	Start sign and function code ?4,$4→ Send location info to mobile phone. ?11,$11 → Send location info to GPRS server ?23,$23 → Send location info to mobile phone and GPRS server
IMEI	IMEI of TR-151SP
{[R,longitude,latitude,longitude,latitude],[C,longitude,latitude,radius(meter)]}	Boundary information: R: rectangular shape → Follow by two longitudes, latitudes. C: circular shape → Follow by one longitude, latitude and one radius.
In_or_Out	In_or_Out=in → Send alarm message if TR-151SP gets in the restricted areas. In_or_Out=out → Send alarm message if TR-151SP gets

	out the permissible areas.
Report_Interval	Time interval of sending data report. The unit is second.
Number_of_Reports	Set how many reports will be sent? 　Number_of_Reports=0　→ continuous report 　Number_of_Reports=X　→ X times report
Report_Format	Set TR-151SP to return message by Format0 or Format1. (see description below)
Return_Phone_Number	**?4**: The phone number for receiving return message and alarm message. **?11**:The phone number for receiving return message
!	End sign

TR-151SP will send OK message to the return phone number when the command media is SMS or to GPRS server when the command media is GPRS to confirm it has received the request.

Note 1:

The format of Google map/earth's longitudes and latitudes differs from the format of TR-151SP's. So please convert the format of Google map/earth's longitudes and latitudes into the format of TR-151SP's longitudes and latitudes before setting Geofence.

If you get a set of latitude and longitude from Google earth like 24°59'47.40" & 121°29'15.72", you have to convert the format to TR-151SP format as below and then set geo-fence.

47**.**40 ÷60=0.79 15**.**72÷60=0.262

Please take E 12129. & 262 N2459.79 to set geo-fence

If you get a set of latitude and longitude from Google earth like 24**.**9965° & 121 **.**4877°, you have to convert the format to TR-150 format as below and then set geo-fence.

0**.**9965 x60=59.79　0**.**4877 x60=29.262

Please take E12129. 262 & N2459.79 to set geo-fence

Note 2:

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

Command 1:

?4,IMEI,R,longitude,latitude,longitude,latitude,In_or_Out,Report_Interval,

Number_of_Reports,Report_Format,Return_Phone_Number!

Command 2:

?4,IMEI**,**R,longitude,latitude,longitude,latitude,In_or_Out,Report_Interval,

Number_of_Reports,Report_Format,Return_Phone_Number!

Command 3:

?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-151SP only follows **last SMS**.

Note 3

In Boundary information

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

User can set

R: rectangular follows by two longitudes and two latitudes.

Or

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

Example: Rectangle

R,E12128.1883,N2342.8117,E12129.2186,N2459.8915

Example: Circle (radius is 1000 meters)

C,E12129.2186,N2459.8915,1000

Note 4:

Example:

■ Send **one SMS** to setup Geofence.

■ Boundary includes **one rectangle (**two longitudes and two latitudes →
   E12128.1883,N2342.8117,E12129.2186,N2459.8915)

■ When TR-151SP gets out boundary, it would send format1, 10 times, 120 sec interval, alarm
   message to 626123456.

?4,355632000166323,R,E12128.1883,N2342.8117,E12129.2186,N2459.8915,out,120,10,1,616123456!

Example:

■ Send **three SMS** to setup Geofence.

■ Boundary includes **one rectangle (**two longitudes and two latitudes →
   E12128.1883,N2342.8117,E12129.2186,N2459.8915) and **two circles** (one longitude/latitude is
   E12228.1883,N2442.8117, and radius is 1000 meter) (the other longitude/latitude is
   E12328.1883,N2452.8117, and radius is 1500 meter)

■ When TR-151SP gets out boundary, it would send format1, 10 times, 120 sec interval, alarm
   message to 626123456.

SMS1:

?4,355632000166323,R,E12128.1883,N2342.8117,E12129.2186,N2459.8915,out,120,10,1,616123456!

SMS2:

?4,355632000166323,C,E12228.1883,N2442.8117,1000,out,120,10,1,616123456!

SMS3:

?4,355632000166323,C,E12328.1883,N2542.8117,1500,out,120,10,1,616123456!

Exit Geo-fence mode:

Users can send an SMS exit Geo-fence mode.

The format of SMS is following as:

?**2**,IMEI,Return_Phone_Number!

Users can also exit from geo-fence mode by GPRS command

"$2,IMEI!"

Caution:

If you exit Geo-fence mode, all the settings will be deleted.

4.5 How to set TR-151SP enter motion mode?

You could send command to ask TR-151SP to enter motion mode by SMS command media or GPRS command media. Under motion mode, in addition to the static report interval, TR-151SP will send out the motion report when it senses vibration. If you'd like to continually get the location information of the vehicle installed with TR-151SP, you could make TR-151SP enter motion mode.

SMS Command Media for Motion Mode
?16,IMEI,Report_media,Regular_Report_Interval,Vibration_Report_interval, Sensitivity,Motion_Return_Phone_number,Report_phone_number!

GPRS Command Media for Motion Mode
$16,IMEI,Report_media,Regular_Report_Interval,Vibration_Report_interval, Sensitivity,Motion_Return_Phone_number,Report_phone_number!

Format	Description
?,$	Start sign
16	Function code
IMEI	IMEI code of the TR-151SP
Report Media	The method of sending the location information 1: SMS 2: GPRS 3: SMS & GPRS
Static Report Interval	The regular report interval of motion mode. The unit is minute. The range is 30-1440 minute.
Motion Report Interval	The report interval when TR-151SP senses vibration. The unit is second. The range is 5-65535 second.
Sensitivity	The number of vibration which activates TR-151SP to send motion report. The value range is 1~255. The larger the number is, the less sensitive the device is.
Motion_Report_Phone_Number	The phone number for receiving location report
Return_Phone_Number	The phone number for receiving OK message.
!	End sign

TR-151SP will send OK message to the return phone number when the command media is SMS or to GPRS server when the command media is GPRS to confirm it has received the request.

If the report method is SMS:
According to the static report interval, TR-151SP will send the static report like

"?IMEI,**17**,GPS_Fix,Date,Time,Longitude,Latitude,Altitude,Speed,Heading,Number_of_Satellites_In_Use,HDOP!". (For details of the data, please refer to <u>SMS Report Format</u>)

When TR-151SP senses vibration over the value of the sensitivity for the first time, it will send the motion report like

"?IMEI,**24**,GPS_Fix,Date,Time,Longitude,Latitude,Altitude,Speed,Heading,Number_of_Satellites_In_Use,HDOP!". (For details of the data, please refer to <u>SMS Report Format</u>)

When TR-151SP senses vibration over the value of the sensitivity following the first time of motion report, it will send the motion report like

"?IMEI,**16**,GPS_Fix,Date,Time,Longitude,Latitude,Altitude,Speed,Heading,Number_of_Satellites_In_Use,HDOP!". (For details of the data, please refer to <u>SMS Report Format</u>)

If the report method is GPRS:

According to the regular report interval, TR-151SP will send the regular report like

"$IMEI,**17**,GPS_Fix,Date,Time,Longitude,Latitude,Altitude,Speed,Heading,Number_of_Satellites_In_Use,HDOP!". (For details of the data, please refer to <u>GPRS Report Format</u>)

When TR-151SP senses vibration over the value of the sensitivity for the first time, it will send the motion report like

"$IMEI,**24**,GPS_Fix,Date,Time,Longitude,Latitude,Altitude,Speed,Heading,Number_of_Satellites_In_Use,HDOP!". (For details of the data, please refer to <u>GPRS Report Format</u>)

When TR-151SP senses vibration over the value of the sensitivity following the first time of motion report, it will send the motion report like

"$IMEI,**16**,GPS_Fix,Date,Time,Longitude,Latitude,Altitude,Speed,Heading,Number_of_Satellites_In_Use,HDOP!". (For details of the data, please refer to <u>GPRS Report Format</u>)

Example 1:

Asking TR-151SP to enter motion mode, report method: GPRS, static report interval: 90 minute, motion report interval: 60 second, sensitivity: 5, Return phone number: blank.

You can send SMS as: "?16,355632000166323,3,90,60,5!

TR-151SP will send "?16,355632000166323,OK!" to the Caller ID.

TR-151SP will send regular report every 90 minute to GPRS server like

"?,355632000166323,**17**,3,301008,125935,E12129.2616,N2459.7918,97.2,0.13,142.31,04,2.4!

When TR-151SP senses vibration over 5 times for the first time, it will send the motion report like

"?,355632000166323,**24**,3,311008,114550,E12140.1444,N2455.8118,95.3,10.22,142.31,04,2.4!

When TR-151SP senses vibration over 5 times following the first time of motion report, it will send the motion report like

"?,355632000166323,**16**,3,311008,114630,E12130.2233,N2454.8118,95.3,10.22,142.31,04,2.4!

Example 2:

Asking TR-151SP to enter motion mode, report method: SMS & GPRS, regular report interval: 60 minute, motion report interval: 90 second, sensitivity: 10, Motion report phone number: 909-597-8525.

You can send command as: "$16,355632000166323,3,60,90,10,9095978525!

TR-151SP will send "$OK!" to the GPRS server

TR-151SP will send regular report every 60 minute to GPRS server and 909-597-8525 like
"$,355632000166323,**17**,3,301008,125935,E12129.2616,N2459.7918,97.2,0.13,142.31,04,2.4!

When TR-151 senses vibration over 5 times for the first time, it will send the motion report to GPRS server and 0966339154 like
"$,355632000166323,**24**,3,311008,114550,E12140.1444,N2455.8118,95.3,10.22,142.31,04,2.4!

When TR-151SP senses vibration over 5 times following the first time of motion report, it will send the motion report to GPRS server and 909-597-8525 like
"$,355632000166323,**16**,3,311008,114630,E12130.2233,N2454.8118,95.3,10.22,142.31,04,2.4!

Exit Motion mode:

You can send command to exit from motion mode.

The format of SMS is "$2,IMEI!"

5 Configuration

5.1 Read Configuration

5.1.1 How to send SMS and ask TR-151SP for sending back its configuration by SMS?

You can send SMS to TR-151SP to ask it to send SMS with its configuration setting.

The format of the SMS is "?7,IMEI,0,Return_Phone_Number!"

Format	Description
?	Start sign
7	Function code
IMEI	IMEI code of the TR-151SP
0	Report type of reading configuration
Report Phone Number	The phone number for receiving TR-151SP configuration.
!	End sign

TR-151SP will return 3 pieces of SMS with its configuration.

For details, please refer to TR-151SP Configuration Content

5.1.2 How to send SMS and ask TR-151SP for sending back its configuration by GPRS?

You can send SMS to TR-151SP to ask to send message to GPRS server with its configuration setting.

The format of the SMS is "?7,IMEI,9!"

Format	Description
?	Start sign
7	Function code
IMEI	IMEI code of the TR-151SP
9	Report type of reading configuration
!	End sign

TR-151SP will return 3 messages with its configuration.

For details, please refer to TR-151SP Configuration Content

5.1.3 How to send GPRS command and ask TR-151SP for sending back its configuration by SMS?

You can send command by GPRS server to TR-151SP to ask it to send back SMS with its

configuration setting.

The format of the SMS is "$7,IMEI,0,Return_Phone_Number!"

Format	Description
$	Start sign
7	Function code
IMEI	IMEI code of the TR-151SP
0	Report type of reading configuration
Report Phone Number	The phone number for receiving TR-151SP configuration.
!	End sign

TR-151SP will return 3 pieces of SMS with its configuration.

For details, please refer to TR-151SP Configuration Content

5.1.4 How to send GPRS command and ask TR-151SP for sending back its configuration by GPRS

You can send command by GPRS server to TR-151SP to ask it to send back message with its configuration setting.

The format of the SMS is "$7,IMEI,9!"

Format	Description
$	Start sign
7	Function code
IMEI	IMEI code of the TR-151SP
9	Report type of reading configuration
!	End sign

TR-151SP will return 3 messages with its configuration to GPRS server.

For details, please refer to TR-151SP Configuration Content

5.2 Write Configuration

5.2.1 How to configure TR-151SP by SMS?

You can send SMS to configure following parameters into TR-151SP. There are 9 settings as below.

- SMS Default Report Phone Number
- Maximum GPS Fixing Time
- Default Report Mode Setting
- SOS Numbers
- Motion setting
- GPRS setting
- Normal Setting
- On-line setting
- Cell ID setting

Report type	Format	Return message
SMS Default Report Phone Number	?7,IMEI,1,Enable SMS Default Report Phone Number, SMS Default Report Phone Number, Return Phone Number!	?7,IMEI,OK!
Maximum GPS Fixing Time	?7,IMEI,2,Maximum_GPS_Fixing_Time,Return Phone Number!	?7,IMEI,OK!
Default Report Mode Setting	?7,IMEI,3,Default_Report_Mode,Report_Interval,Number_of_Reports,Report_Format,Return_Phone_number_For_Default_Report_Mode,Return_Phone_Number!	?7,IMEI,OK!
SOS Numbers	?7,IMEI,4,SOS1,SOS2,SOS3,Return_Phone_Number!	?7,IMEI,OK!
Motion Setting	?7,IMEI,5,Regular_Report_interval,Motion_report_Interval,Sensitivity,Motion_Return_Number,Return_Phone_Number!	?7,IMEI,OK!
GPRS Setting	?7,IMEI,7,Port,APN,User_Name,User_pwd,DNS1,DNS2,Host_Name,Return_Phone_Number!	?7,IMEI,OK!
Normal setting	?7,IMEI,8,Name,Time_Zone,Report_method of SOS and battery low,Echo_EN,Return_Phone_Number!	?7,IMEI,OK!
On-line setting	?7,IMEI,B,Enable/disable_GPRS_on-line,disconnect and re-connect interval, Return_Phone_Number!	?7,IMEI,OK!
Cell ID	?7,IMEI,C,Enable/disable_Cell_ID,Return_Phone_Number!	?7,IMEI,OK!

Note:

If you don't need the TR151-SP to send back the confirmation message after the TR151-SP receives the configuration SMS, you do not have to set the "Return phone number". Please end the configuration SMS with a "!" instead of the ",Return phone number" without the comma.

Example 1 - Set the cell ID without return phone number: ?7,IMEI,C,Enable/disable_Cell_ID!

Example 2 - Configure GPRS settings without return phone number:

?7,IMEI,7,Port,APN,User_Name,User_pwd,DNS1,DNS2,Host_Name!

- SMS Default Report Phone Number: Set SMS Default Report Phone Number.

- Maximum_GPS_Fixing_Time:

If GPS is not fixed within the time, it returns previous location and close GPS. The unit is minute.

Parameter value range: 3~10 minutes, default value : 5 minutes

- Default_Report_Mode:

    Default_Report_Mode = 0 → SMS immediate report
    Default_Report_Mode = 1 → SMS period report
    Default_Report_Mode = 2 → Stop
    Default_Report_Mode = 8 → GPRS immediate report
    Default_Report_Mode = 9 → GPRS period
    Default_Report_Mode = 10 → GPRS period and disconnect
    Default_Report_Mode = 16 → Motion report
    Default_Report_Mode = 21 → SMS and GPRS immediate report
    Default_Report_Mode = 22 → SMS and GPRS period report

- Enable_SMS_Default_Return_Phone_Number:

    Enable or disable SMS Default Report Phone Number.
    Enable_SMSDefaultReturnPhoneNumber = 0 → Disable
    Enable_SMSDefaultReturnPhoneNumber = 1 → Enable

- Number_of_Reports:

    Set how many report will be sent.
    Number_of_Reports = 0 → continuous report
    Number_of_Reports = X → X times report

- Report_Format: Ask TR-151SP to return message by Format0 or Format1.
- Report_Interval: Time interval of sending data report. The unit is second.
- Return_Phone_Number: TR-151 will send confirmed message back to this Return_Phone_Number.

If you keep Report Phone Number blank, TR-151SP will send report to SMS Default Report Phone Number.

If Report Phone Number and SMS Default Report Phone Number are both blank, TR-151SP will send report to caller ID.

- Report Phone Number For Default Report Mode: Report phone number for default report mode. TR-151SP will send report to this number after it is turned on when Default Report Mode is set to immediate report or period report.

- GPRS setting

Item	Description
GPRS Port	The communication port for connecting GPRS network
GPRS APN	The APN of GPRS network station
GPRS user name	The account for connecting GPRS network
GPRS user password	The password for connecting GPRS network
GPRS DNS 1/ DNS 2	The DNS for connecting GPRS network
GPRS Server Host Name	The fixed IP or Domain Name for the computer running the TR Management Center (It should be a physical IP or a domain name)

1. The value of GPRS port is between 1 and 65,535, and the default is 5000.

2. GPRS APN is different from each GPRS network provider. You have to get the APN from your GPRS network provider.

3. GPRS Server Host Name is the physical IP address of the PC that you installed the call center or a domain name. The IP is for connecting the GPRS network. It should be a physical IP.

4. In Taiwan, GPRS user name, GPRS user password, GPRS DNS1, and GPRS DNS2 are not necessary items. You have to consult with your GPRS network provider about those values.

■ Normal Setting:
Report Method of SOS and battery low: 1=SMS

                          2=GPRS

                          3=SMS & GPRS

Echo_EN: Enable TR-151SP to send "Return Message"=0 → Enable

             Enable TR-151SP to send "Return Message"=1 → Disable

■ On-line Setting:
Enable/disable_GPRS_on-line: 0=disable

                          1=enable
→ Enable/disable_GPRS_on-line in motion mode (the report method must be GPRS)

Disconnect and reconnect interval: interval for cutting GPRS connection and re-connect it. The unit is second

■ Cell ID:
Enable/disable_Cell ID: 0=disable

                    1=enable

5.2.2 How to configure TR-151SP by GPRS server?

You can send command by GPRS server to configure following parameters into TR-151SP.

There are 9 settings as below.

- SMS Default Report Phone Number
- Maximum GPS Fixing Time
- Default Report Mode Setting
- SOS Numbers
- Motion setting
- GPRS setting
- Normal Setting
- On-line Setting
- Cell ID setting

Report type	Format	Return message
SMS Default Report Phone Number	$7,IMEI,1,Enable_SMS Default Report Phone Number, SMS Default Report Phone Number!	$OK!
Maximum GPS Fixing Time	$7,IMEI,2,Maximum_GPS_Fixing_Time!	$OK!
Default Report Mode Setting	$7,IMEI,3,Default_Report_Mode,Report_Interval,Number_of_Reports,Report_Format,Report Phone Number For Default Report Mode!	$OK!
SOS Numbers	$7,IMEI,4,SOS1,SOS2,SOS3!	$OK!
Motion Setting	$7,IMEI,5,Regular Report Interval,Motion report Interval,Sensitivity,Motion_Report_Number!	$OK!
GPRS Setting	$7,IMEI,7,Port,APN,User_Name,User_pwd,DNS1,DNS2,Host_Name,Return_Phone_Number!	$OK!
Normal setting	$7,IMEI,8,Name,Time_Zone,Report_method,Echo_EN,Return_Phone_Number!	$OK!
On-line setting	$7,IMEI,B,Enable/disable_GPRS_on-line,disconnect and re-connect interval, Return_Phone_Number!	$OK!
Cell ID	$7,IMEI,C,Enable/disable_Cell_ID,Return_Phone_Number!	$OK!

- SMS Default Report Phone Number: Set SMS Default Report Phone Number.

- Maximum_GPS_Fixing_Time:

If GPS is not fixed within the time, it returns previous location and close GPS. The unit is in minutes.

Parameter value range: 3~10 minutes, default value: 5 minutes

- Default_Report_Mode:

Default_Report_Mode = 0 → SMS immediate report
Default_Report_Mode = 1 → SMS period report
Default_Report_Mode = 2 → Stop
Default_Report_Mode = 8 → GPRS immediate report
Default_Report_Mode = 9 → GPRS period
Default_Report_Mode = 10 → GPRS period and disconnect
Default_Report_Mode = 16 → Motion report
Default_Report_Mode = 21 → SMS and GPRS immediate report

Default_Report_Mode = 22 → SMS and GPRS period report
- Enable_SMS_Default_Report_Phone_Number:
  Enable or disable SMS Default Report Phone Number.
  Enable_SMSDefaultReturnPhoneNumber = 0 → Disable
  Enable_SMSDefaultReturnPhoneNumber = 1 → Enable
- Number_of_Reports:
  Set how many report will be sent.
  Number_of_Reports = 0 → continuous report
  Number_of_Reports = X → X times report
- Report_Format: Ask TR-151SP to return message by Format0 or Format1.
- Report_Interval: Time interval of sending data report. The unit is second.
- Report_Phone_Number: TR-151SP will send confirmed message back to this Return_Phone_Number.

If you keep Report Phone Number blank, TR-151SP will send report to SMS Default Report Phone Number.

If Report Phone Number and SMS Default Report Phone Number are both blank, TR-151SP will send report to caller ID.
- Report Phone Number For Default Report Mode: Report phone number for default report mode. TR-151SP will send report to this number after it is turned on when Default Report Mode is set to immediate report or period report.

- GPRS setting

Item	Description
GPRS Port	The communication port for connecting GPRS network
GPRS APN	The APN of GPRS network station
GPRS user name	The account for connecting GPRS network
GPRS user password	The password for connecting GPRS network
GPRS DNS 1/ DNS 2	The DNS for connecting GPRS network
GPRS Server Host Name	The fixed IP or Domain Name of server (It should be a physical IP or a domain name)

5. The value of GPRS port is between 1 and 65,535, and the default is 5000.
6. GPRS APN is different from each GPRS network provider. You have to get the APN from your GPRS network provider.
7. GPRS Server Host Name is the physical IP address of the PC that you installed the call center or a domain name. The IP is for connecting the GPRS network. It should be a physical IP.
8. In Taiwan, GPRS user name, GPRS user password, GPRS DNS1, and GPRS DNS2 are not necessary items. You have to consult with your GPRS network provider about those values.

- Normal Setting:
  Report Method of SOS and battery low: 1=SMS

  2=GPRS

  3=SMS & GPRS

  Echo_EN: Enable TR-151SP to send "Return Message"=0 → Enable

  Enable TR-151SP to send "Return Message"=1 → Disable

- On-line Setting:

Enable/disable_GPRS_on-line: 0=disable

　　　　　　　　　　　　1=enable

→ Enable/disable_GPRS_on-line in motion mode (the report method must be GPRS)

Disconnect and reconnect interval: interval for cutting GPRS connection and re-connect it. The unit is second.

■　　Cell ID:

Enable/disable_Cell ID: 0=disable

　　　　　　　　　1=enable

5.3 TR-151SP Configuration Content

Example: **TR,IMEI,1,1,3,30,1,30,0,12,30,0,Tony,+8.00,1,60,1,0,0,1,0,1,1800!**

Parameters	Description
TR	Start sign
IMEI	IMEI
1	Sequence
Enable/ Disable SMS Default Report Phone Number	0: Disable, 1: Enable
Maximum GPS Fixing Time	The maximum time for getting GPS fix. Parameter value range : 3~10 minutes, default value : 5 minutes
Motion Mode Regular Report Interval	The regular interval of sending location report under motion mode
Motion Mode Motion Report Interval	The interval of sending location report when TR-151SP senses vibration under motion mode
Enable/ Disable Cell ID	0: Disable, 1: Enable
Reserved	Reserved (xx)
Reserved	Reserved (xx)
Reserved	Reserved (xx)
User Name	User name
Set Time Zone	Time zone
Default Report mode	Report Mode (Please refer to **Report Type** in SMS Report format or GPRS Report Format)
Period Report interval	Interval of periodic report
SMS Report Format	0 or 1. 0 is for end user, and 1 is for call center development
Number of SMS Period report	Number of SMS Periodic report
Sensitivity	The number of vibration which activates TR-151SP to send motion report. The value range is 1~255. The larger the number is, the less sensitive the device is.
Report Method	1: SMS; 2: GPRS; 3: SMS & GPRS
Echo_EN	Enable/ Disable TR-151SP to send "Return Message 0: Enabled. 1: Disabled
Enable/disable GPRS on-line	0: Enable, 1:Disable (available in GPRS period and disconnect mode, motion mode)
Disconnect and re-connect interval	Interval for GPRS disconnecting and re-connecting in GPRS period and disconnect mode, motion mode. The unit is in second.
!	End Sign

Example:

TR,IMEI,2,18883238720,19095978525,19095973805,19095973058,18883238730,19095973179,19095973179!

Parameter	Description
TR	Start sign
IMEI	IMEI
2	Sequence
SOS Number 1	Set SOS Number 1
SOS Number 2	Set SOS Number 2
SOS Number 3	Set SOS Number 3
Default Report Number	Report phone number
SMS Report Number	Report phone number of SMS report
Motion Report Number	Report phone number of Motion mode reporting SMS
!	End sign

Example: **TR,IMEI,3,5000,internet,,,,,220.128.207.70!**

Parameter	Description
TR	Start sign
IMEI	IMEI
3	Sequence
GPRS Port	The communication port for connecting GPRS network
GPRS APN	The APN of GPRS network station
GPRS user name	The account for connecting GPRS network
GPRS user password	The password for connecting GPRS network
GPRS_DNS1	The DNS1 for connecting GPRS network
GPRS_DNS2	The DNS2 for connecting GPRS network
GPRS Server Host Name	The fixed IP or Domain Name for the Web Portal
!	End sign

6 Report Format

6.1 SMS Report format

The data format is configurable in the SMS tracking commands. There are two types of the data format as below.

Format0 is for general end users who send SMS commands to TR-151SP by their cell phone or PDA phone. This format is very easy to read by end users.

Format1 is specifically read by software Call Center that is developed by service provider.

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 N2459.8915,E12129.2186 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	0:SMS immediate report
	1	1:SMS period report
	2	2: Stop connect
	4	4: SMS Geo-fence (Alarm)
	14	14.Battery low(Alarm)
	16	16: Motion report(Vibration)
	17	17. Motion report(Regular)
	21	21: SMS/GPRS Immediate report
	22	22: SMS/GPRS period report
	23	23: SMS/GPRS Geofence(Alarm)
	24	24. Motion report(Activate)
GPS_fix	1	1: Fix not available
	2	2: GPS 2D Fix
	3	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)ddmm.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	xx	
Command END	!	

6.2 GPRS Report Format

Format of report GPRS from TR-151SP

Format:

Command_Head,IMEI,status,GPS_fix,date,time,longitude,latitude,altitude,speed,heading,number of satellites in use,HDOP,Command_End

Example:

$355632004245866,1,1,040202,093633,E12129.2252,N2459.8891,00161,0.0100,147,07,2.4!

Format	Value	Note
Command_Head	$	
IMEI	(The number of IMEI)	
Report Mode	2	2: Stop connect
	5	5: SOS(Alarm)
	8	8: GPRS Immediate report
	9	9: GPRS Period report
	10	10.Disconnect and GPRS period
	11	11.GPRS Geofence(Alarm)
	14	14.Battery low(Alarm)
	16	16: Motion report(vibration)
	17	17. Motion report(regular)
	21	21: SMS/GPRS Immediate report
	22	22: SMS/GPRS period report
	23	23: SMS/GPRS Geofence(Alarm)
	24	24. Motion report(Activate)
GPS_fix	1	1: Fix not available
	2	2: GPS 2D Fix
	3	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)ddmm.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	xx	
Command END	!	

6.3 Cell ID Report Format

Format of GPRS report with Cell ID from TR-151SP

GSM Cell ID is assisted information to get device location. When TR-151SP does not get GPS fix, you could enable TR-151SP to report the Cell ID.

Note:
If you want TR-151SP to report the Cell ID, please configure TR-151SP by SMS with the content "?7,IMEI,C,Enable/disable _Cell_ID,Report_Phone_Number!" or by GPRS with the content "$7,IMEI,C,Enable/disable _Cell_ID,Report_Phone_Number!
For details, please refer to 1.2 Write Configuration

Format:

Command_HeadIMEI,status,GPS_fix, date,time,"MCC1,MNC1,LAC1,CID1,BSIC1,RSSI1",

"MCC2,MNC2,LAC2,CID2,BSIC2,RSSI2", "MCC3,MNC3,LAC3,CID3,BSIC3,RSSI3",…Command_End

The number of set of cell information depends on GSM network environment.

The maximum number is 5.

Format	Value	Note
Command_Head	$	
IMEI	(The number of IMEI)	
Status	2	2: Stop connect
	5	5: SOS
	8	8: Immediate report
	9	9: Period report
	10	10.stop and connect
	11	11.Geofence
	14	14.Battery low
	16	16: Motion report
	17	17: Motion report(position)
	21	21: SMS/GPRS Immediate report
	22	22: SMS/GPRS period report
	23	23: SMS/GPRS Geofence
	24	24: Motion (Act)
GPS_fix	1	1: Fix not available
	2	2: GPS 2D Fix
	3	3: GPS 3D Fix
	4	4: Cell ID

date	ddmmyy	
time	hhmmss	
MCC	Mobile Country Code	3 digits
MNC	Mobile Network Code	2 or 3 digits
LAC	Location Area Code	4 hexadecimal digits
CID	Cell identifier	4 hexadecimal digits
BSIC	Base Station Identity Code	1 digit or 2 digits
RSSI	Received Signal Strength Indicator	1 digit or 2 digits
Command END	!	

Note: TR-151SP is designed for vehicle and asset for tracking purpose, not for carried by people.