



TL904D User Manual

Version: V1.0

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1 Introduction

This document is the user manual of TL904D equipment provided by **Think Power** Technology Co., Ltd. which introduces examples of product startup, upgrade, online confirmation and protocol analysis.

2 Abbreviation

Abbrev.	Extraction
GPS	Global Positioning System
SMS	Short Message Service

3 Illustration

Indicator light	Indicator status	Status
Green GSM indicator	FLICKER QUICKLY (100MS ON/400MS OFF)	NETWORK SEARCHING
	ALWAYS OFF	SLEEP
	ALWAYS ON	NETWORK CONNECTION SUCCESSFUL
Blue GPS indicator	FLICKER QUICKLY (100MS ON/400MS OFF)	GPS IS NOT FIX
	ALWAYS ON	GPS FIX
	ALWAYS OFF	GPS FAULTY
Red Power indicator	ALWAYS OFF	NO POWER, EQUIPMENT NOT WORKING, SLEEP, ETC
	ALWAYS ON	THE POWER SUPPLY IS NORMAL
	FLICKER SLOWLY (1000MS ON/1000MS OFF)	CHARGE
	FLICKER QUICKLY (100MS ON/400MS OFF)	LOW ELECTRICITY

4 Operating of device

4.1 Overview

Step 1	Install SIM card
Step 2	Install driver for USB serial cable (Windows 10)
Step 3	Turn on tracker device
Step 4	Open serial command shell
Step 5	Configure parameters for data connection
Step 6	Configure target platform for data reporting

4.2 Install SIM card

- 1) Acquire & prepare Nano SIM card (Shown as Figure 4-1) from your local telecom operator.



Figure 4-1 Green right Nano SIM card

- 2) Open the rear cover of the TL904D (Figure 4-2) with a screwdriver.

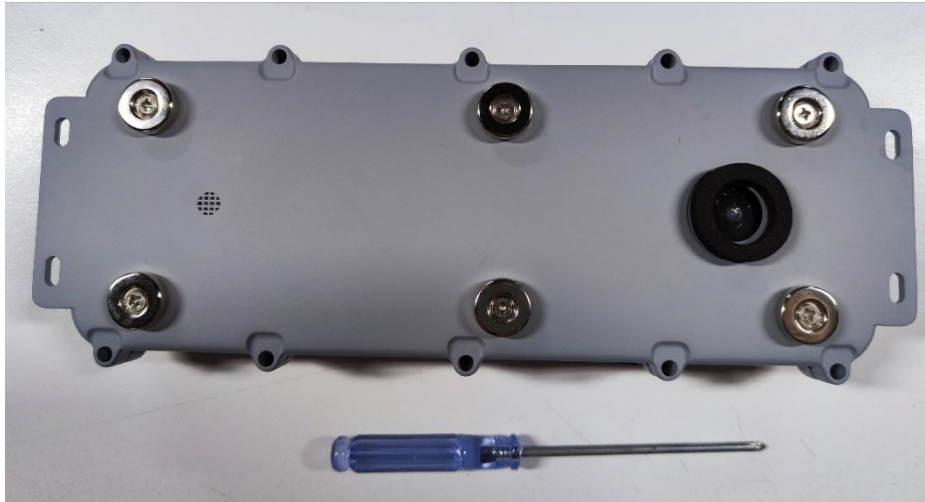


Figure 4-2 rear cover of TL904D

- 3) Open the SIM card cover, put the SIM card in and cover it.
<take a photo here>
- 4) Re-screws rear cover of the TL904D.

4.3 Install driver for USB serial cable (Windows 10)

1. Turn on the PC for Windows 10 and plug in the USB serial cable;
2. Download CH341SER.zip and extract it into a folder for later using;
3. Right click CH341SER.EXE and select 'Run as administrator' from the pop-up menu to start the install program of driver;
4. Click **INSTALL** button shown as Figure 4-3;

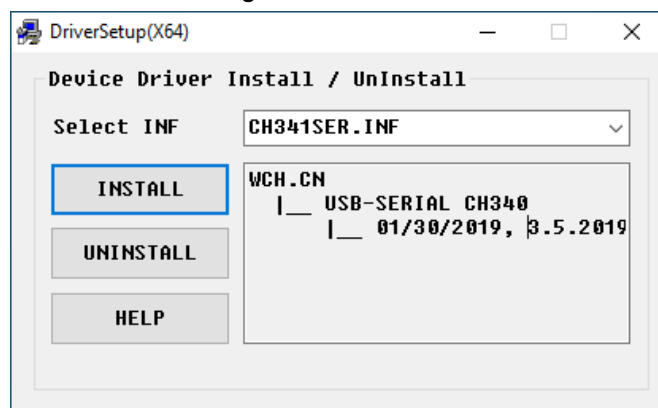


Figure 4-3 CH340 / CH341 device driver install program

5. After successful installation you should see this message.

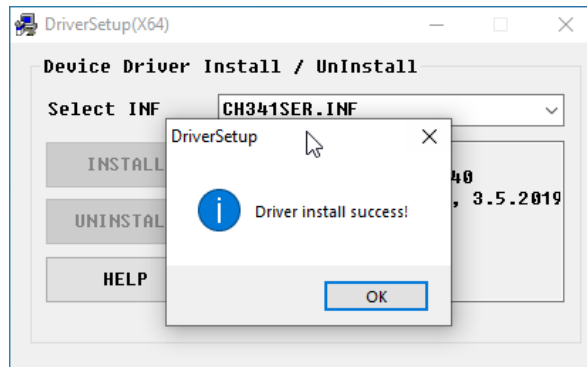


Figure 4-4 CH340 / CH341 device driver install success



Note

In some cases, you may need to restart Windows after the driver installation is complete.

6. Checking Correct Driver Installation in Device Manager

If your driver has been installed correctly, and if you connect your board to a computer, then you can see its name and port number in the Port section. For example, my tracker device is connected to COM7 (Figure 4-5, the actual sequence No. of COM maybe varied).

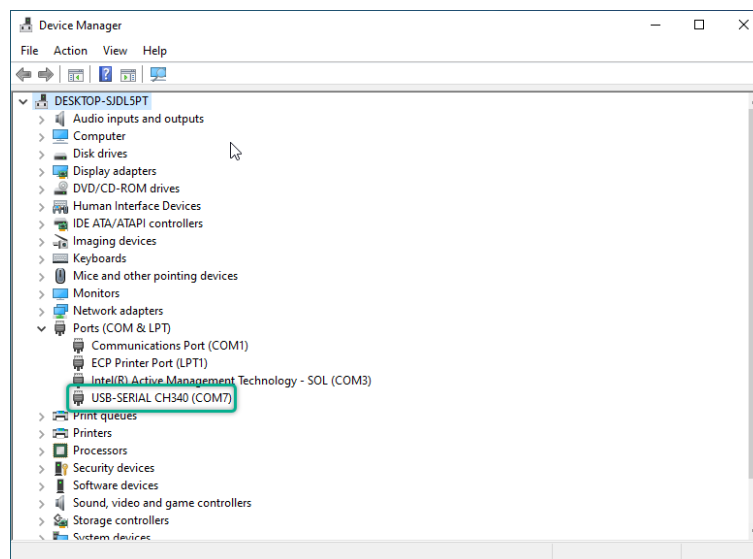


Figure 4-5 USB-SERIAL in device manager (Windows 10)



Success

At this point, you have successfully installed the driver for USB serial cable correctly, and from now on you can easily run shell command through 'Serial Port Utility'.

4.4 Turn on the tracker device

Open the rubber plug at the side, press and hold power button for about 4 seconds until the power indicator (*RED led on front panel*) lights up.



4.5 Open serial command shell

Serial Port Utility is a tool help read information and write command between PC and tracker device (TL904D). This chapter will help setup the command shell environment step by step.

- 1) Connect the USB serial cable between PC and the tracker device (TL904D);
<take a photo here>
- 2) Download 'Serial Port Utility.zip' and extract it into a local folder, then double click SerialPortUtility.exe to start the program. (Shown as Figure 4-6)

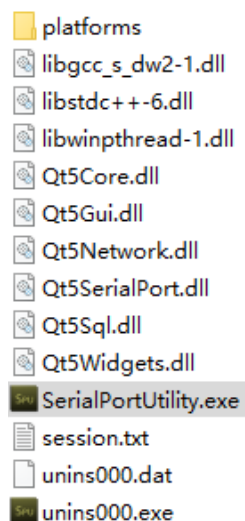


Figure 4-6 Files list of Serial Port Utility

- 3) If SerialPortUtility.exe is running for the first time on a PC, a register window will pop up, just ignore it by click 'Register Later' button; (Show as Figure 4-7)

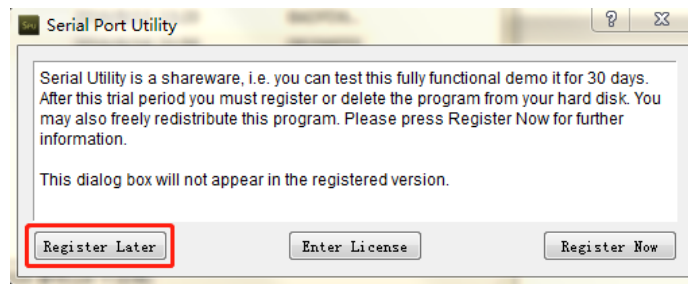


Figure 4-7 Register Window of Serial Port Utility

- 4) The main window will show as Figure 4-8, it contains 4 function regions: top toolbar, left sidebar, output region and input region;

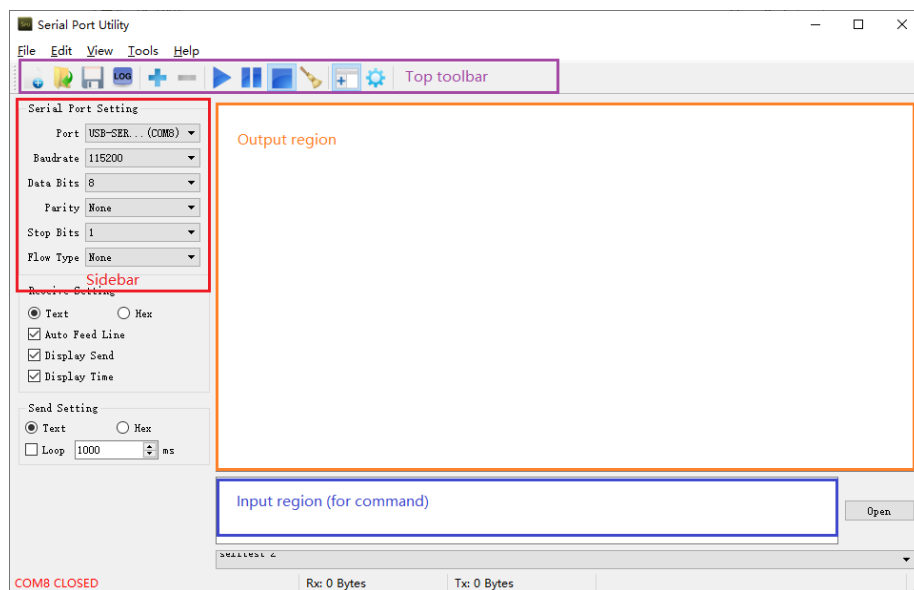


Figure 4-8 Overview of Serial Port Utility

- 5) Choose correct COM port from left tool sidebar (Figure 4-9), the sequence No. of COM port is got when the driver of USB serial cable is installed success. 【4.3 Install driver for USB serial cable (Windows 10)】

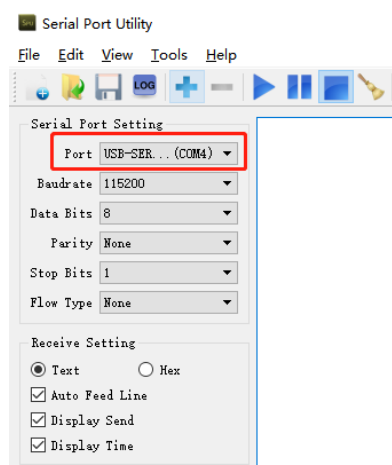


Figure 4-9 Choose correct serial port

- 6) Ensure 'Baudrate' of the COM port is 115200 bps;
- 7) Click the start button (▶) on top toolbar of main window, Serial Port Utility will start listening and printing the serial communication between the PC and the tracker device.

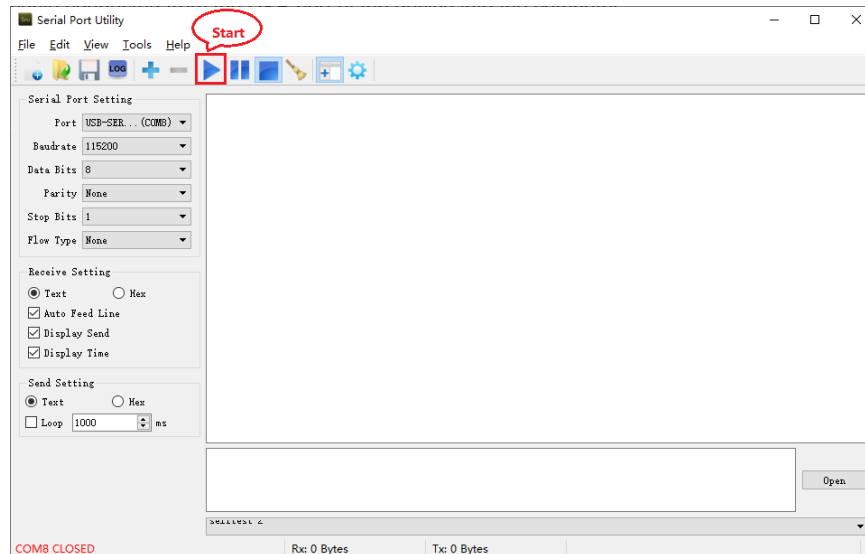


Figure 4-10 'Start' button on top toolbar

- 8) Click the input region and enter command string here, extra 'RETURN' key-in must require at the end of command line (or not the command will be ignored when received by the tracker device). Input command and send it to the tracker device (TL904D), most of commands will be back instantly; (Shown as Figure 4-11)

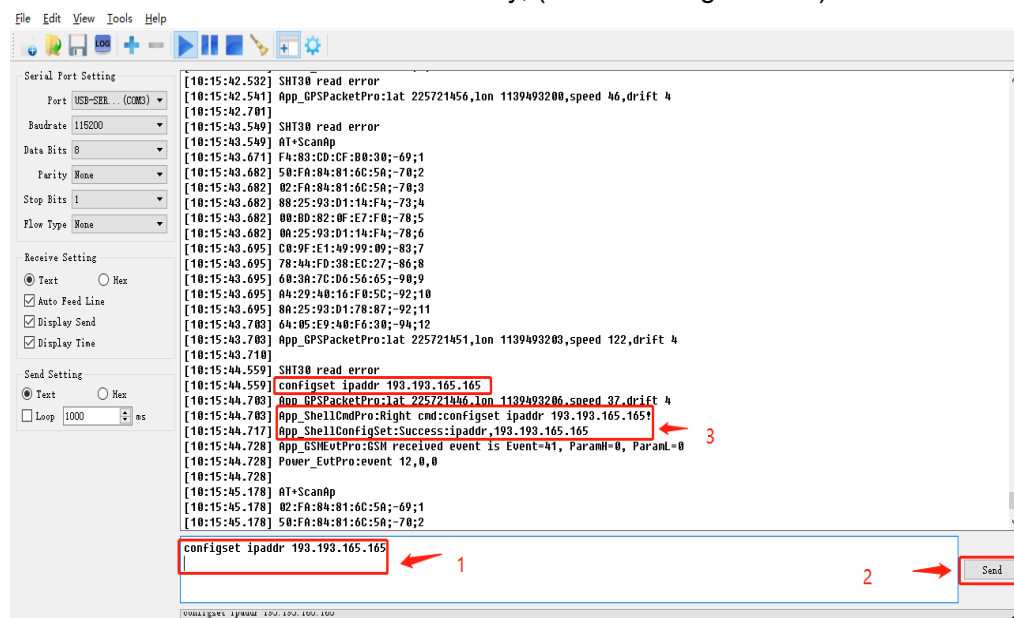


Figure 4-11 Input command and send out on Shell



Note

Each input command must be end with hard 'RETURN' key-in.

- 9) The contents on output region can be saved as file for further analyzing. Click “Settings→Log”, The saved file name and path can be changed as your prefer.

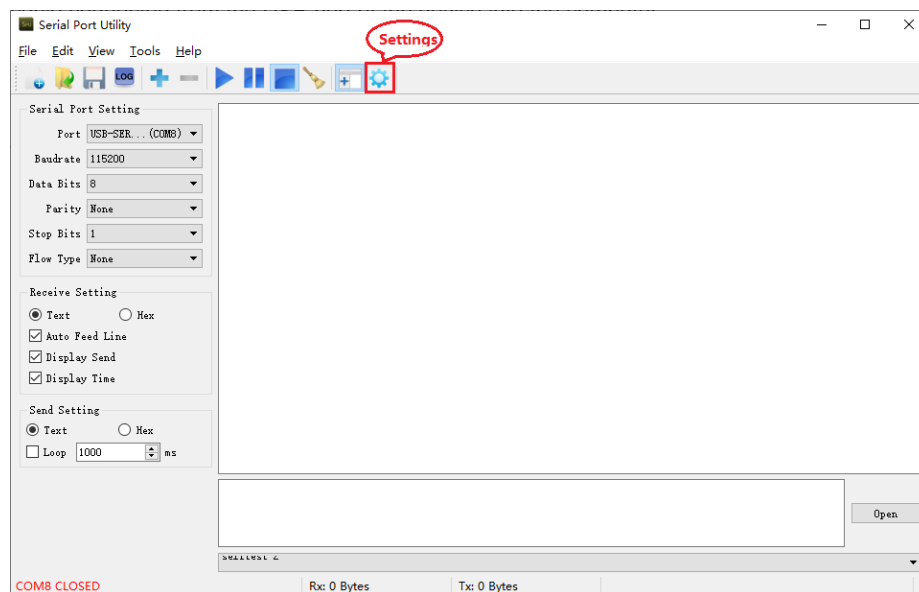


Figure 4-12 open 'Settings' window

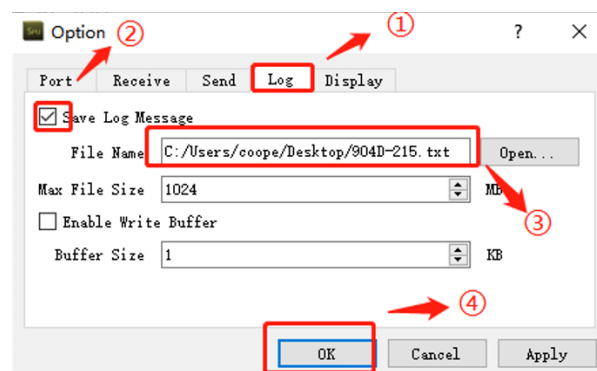


Figure 4-13 Settings for saving log message as file

4.6 Configure parameters for data connection

APN is the Name of Access Point when attach to cellular service. Although it is not necessary to set it most of the time, when the device encounters connectivity problems, setting the correct APN can help eliminate the cause of the problem. Chapter 4.6 help configure APN name and check if the config take effect or not.

- 1) Configure APN name
`configset apnname cmnet`



Note

Please replace 'cmnet' with your own.

- 2) Check APN name
`configset apnname`



Note

Please check the return apnname if it's the same with your setting.



Note

Common APNs collection:

Area	Operator	APN
North America	Verizon native	VZW.INTERNET
North America	AT&T native	data641003

For more APNs, please consult the local operator or service provider.

4.7 Configure target platform for data reporting

Target platform is the destination server for data reporting of tracker device. A full setting for platform server contains IP address (or domain name) and related port. Chapter 4.7 help configure those two parameters and check if the config take effect or not.

- 1) Configure platform server IP address (or domain name)
`configset ipaddr 1.2.3.4`
`configset ipaddr data.example.com`



Note

Please replace '1.2.3.4' or 'data.example.com' with your own.

- 2) Configure platform server port
`configset port 1000`



Note

Please replace '1000' with your own.

- 3) Check platform server IP address (or domain name) you configured.
configget ipaddr
- 4) Check platform server port you configured.
configget port

5 Example data reporting platform



Note

Please refer to *Flespi Use Tutorial*.

6 Configure Commands

6.1 by Serial Port

6.1.1 configget / configset / configreset

configget [option]

configset [option] [value ...]

configreset [option]

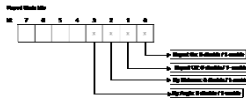
configget	Read configure entry.
configset	Write configure entry with assigned value.
configreset	Reset configure entry with default value.

[option] The configure entry to be get or (re)set, refer to **list of options below** for more details.

[value] The value of option, it can be absent, 1, or more according to the claim of option.

List of options (name-range-comments)

swversion		Firmware version(get only)
sn		IMEI of device(get only)
password		Password of device
ipaddr		IP address of platform server
port	1~65535	TCP port of platform server
heartbeatidletime	10~65	Interval of heartbeat,unit:s
heartbeattimeout	10~65	timeout of heartbeat,unit:s

ftpipaddr		IP address or domain name of ftp server
ftpurl		Full pathname to firmware storage on ftp server
ftpuser		Username to access ftp server
ftppass		Password to access ftp server
apnname		Name string of APN
apnusername		Username of APN
apnpassword		Password of APN
sos		1st SOS phone
sos1		2nd SOS phone
sos2		3rd SOS phone
sos3		4th SOS phone
soswarn		switch for SOS warning, 0 disable, 1 enable
automonitor		Call mode, 1-monitor, 0-two-way
smsfunc		SMS function switch, 0-OFF, 1-ON
gsensorxsens	16~3985	collision threshold of X-axis,unit:mg
gsensorysens	16~3985	collision threshold of Y-axis,unit:mg
gsensorzsens	16~3985	collision threshold of Z-axis,unit:mg
gsensorcollisionsens	16~3985	Sensitive for collision,unit:mg
gsensorcollisionwarn		Switch for collision warning, 0-disable, 1-enable
gsensorwakeupthreshold	16~3985	Threshold for wakeup,unit:mg
gsensorwakeupcount	0~10000	Wakeup count time,unit:ms
highgthreshold	16~3985	High-G threshold,unit:mg
highgcount	0~2500	High-G count time,unit:ms
offlinefunc		Switch for temporary storage when offline
reportmode		Report mode by bit offset
reportoninterval	5~86400	Report interval on wakeup,unit:s
reportoffinterval	10~86400	Report interval on sleep,unit:s
reportdistance	20~10000	Report distance,unit:m
speedingwarn		Switch for overspeed warning, 0-no, 1-yes
speedingthreshold	1~150	Threshold to overspeed,unit:K/h
speedwarnduration		Report interval on overspeed
reportangle	10~359	Threshold to angle change
gpsstatechangerep		switch for GNSS status change, 0-ignore, 1-report
geofencefunc		Switch for Geofence support, 0-disable, 1-enable
hightempvalue		Temperature alarm threshold
highhumivalue		Humidity alarm threshold
lowpowerwarn		Low power alarm switch, 0-disable, 1-enable
powersafemode		Anti illegal shutdown mode. 0-off, 1-on
antitheftfunc		Bluetooth anti loss function. 0-off, 1-on
batteryreportfunc		Voltage reporting percentage.0-off, 1-on
btkey		BLE pairing key
btscantimeout		Bluetooth scanning time threshold
btsn1		1st SN of slave
btsn2		2nd SN of slave
btsn3		3rd SN of slave

btsn4	4th SN of slave
btsn5	5th SN of slave
btsn6	6th SN of slave
btsn7	7th SN of slave
btsn8	8th SN of slave

Examples (configset)

configset ipaddr 193.193.165.165

configset port 21610

configset reportoninterval 10

Set IP address to
193.193.165.165
Set Port to 21610
Set reporting interval to 10
seconds

6.1.2 configallget / configallreset

configallget

configallreset

<i>configallget</i>	Read all configuration entries.
<i>configallreset</i>	Reset all configuration entries with default value.

Examples

configallget

configallreset

list all configurations of device(Serial port only).
Restore all configurations of device to default.

6.1.3 factory

factory

retore all configurations of device to factory.

6.1.4 reboot

reboot

Reset device

6.1.5 gsenset

gsenset 8 300 100 1000 60

Set group settings for wak-up(anonymous
parameter list)
param 1st - rangeSel
param2nd- wakeupthd
Param3rd- wakeupCnt
param 4th - highThd
param 5th - highcount

6.1.6 gsenget

gsenget

Get group settings for wake-up.

6.2 by SMS

This is of the form:

\$password **conf get** [options]

\$password **conf set** [options] [\$value]

6.2.1 Parameter Setting

description: set parameter value according to parameter name.

format:

\$password conf set <parameter-name> <parameter-value>

tracker return response(correct):

IMEI,executed,<parameter-name> conf

tracker return response(wrong):

IMEI,fail,<parameter-name> conf

example:

123456 conf set apnname internet

tracker return response:

[IMEI],executed,apnname conf

6.2.2 Query Parameter

description:query the parameter value.

format:

\$password conf get <parameter-name>

tracker return response(correct):

`<parameter-name>,<parameter-value>,IMEI,executed,conf`

tracker return response(wrong):

`<parameter-name>,IMEI,fail,conf`

example:

123456 conf get apnname

tracker return response:

`apnname,[apnname],[IMEI],executed conf`

6.2.3 reboot

description:reset the unit.

format:

`$password reboot`

tracker return response:

`IMEI,executed,reboot`

example:

123456 reboot

tracker return response:

`[IMEI],executed,reboot`

6.2.4 factory

description:factory reset.

format:

`$password factory`

tracker return response:

`IMEI,executed,factory`

example:

123456 factory

tracker return response:

[IMEI],executed,factory

6.2.5 Get position

description:get current position.

format:

\$password pos

tracker return response:

[https://www.google.com/maps?q=\[lat\],\[lon\],IMEI,executed,pos](https://www.google.com/maps?q=[lat],[lon],IMEI,executed,pos)

example:

123456 pos

tracker return response:

[https://www.google.com/maps?q=\[lat\],\[lon\],IMEI,executed,pos](https://www.google.com/maps?q=[lat],[lon],IMEI,executed,pos)

6.2.6 Update Firmware

description:update firmware.

format:

\$password update <parameter-firmwarename>

example:

123456 update app

tracker return response:

First: <parameter-firmwarename>,IMEI, executed,update

Second:<parameter-firmwarename>,IMEI, success,update

Other: <parameter-firmwarename>,IMEI, update failed!Check file format error!
<parameter-firmwarename>,IMEI, update failed!Check file name error!
<parameter-firmwarename>,IMEI, update failed!Same version!
<parameter-firmwarename>,IMEI, update failed!Login Ftp server failed!
<parameter-firmwarename>,IMEI, update failed!Can't find the file!
<parameter-firmwarename>,IMEI, update failed!The file is empty!
<parameter-firmwarename>,IMEI, update failed!File get fail!
<parameter-firmwarename>,IMEI, update failed!The file path cannot be found!
<parameter-firmwarename>,IMEI, update failed!

7 Protocol Interpreting

The whole data consists of:

Message type	Packet identifier	Payload length	Payload data	CRC-16-CCITT
1 byte	1 byte	2 byte	n byte	2 byte

Ex1:

0102002C01060F38363737333030353139393335373806544C3930344111522D312E302E32382E323032313039333000798A

8A

Ex 1: 0102002C01060F38363737333030353139393335373806544C3930344111522D312E302E32382E323032313039333000798A

1 2 3 4 5 6 7 8 9 10 11 12 13

Message type:	1
Packet identifier:	2
Payload length:	3
Payload data:	4,5,6,7,8,9,10,11,12
CRC-16-CCITT:	13

The data is decomposed and parsed in order:

<https://www.cnthinkpower.com>

	data	meaning
1	01	Message type
2	02	Packet identifier
3	002C	Payload length
4	01	Protocol major version
5	06	Protocol minor version
6	0F	IMEI length
7	383637373330303531393933353738	IMEI(867730051993578)
8	06	Model length
9	544C39303441	Model(TL904A)
10	11	Firmware version length
11	522D312E302E32382E3230323130393330	Firmware version(R-1.0.28.20210930)
12	00	Password length
13	798A	CRC-16-CCITT

Ex2:05590012016108E72A010D743C8843EB47D20000000032B4

Ex2 : 05590012016108E72A010D743C8843EB47D20000000032B4

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

Message type:	①
Packet identifier:	②
Payload length:	③
Payload data:	④,⑤,⑥,⑦
CRC-16-CCITT:	⑧

The data is decomposed and parsed in order:

	data	meaning
①	05	Message type
②	59	Packet identifier
③	0012	Payload length

	data	meaning
④	01	Record count
⑤	6108E72A	Record timestamp
⑥	01	Value type(GPS Location)
⑦	0D743C8843EB47D200000000	Value(0D743C88--Latitude;43EB47D2--Longitude;0000--Speed;0000--Directon)
⑧	32B4	CRC-16-CCITT

Ex3:051800160361D501DE0112304F644810B8A800000000146456016F3D

Ex3: 051800160361D501DE0112304F644810B8A800000000146456016F3D


Message type:	1
Packet identifier:	2
Payload length:	3
Payload data:	4,5,6,7,8,9,10,11
CRC-16-CCITT:	12

The data is decomposed and parsed in order:

	data	meaning
1	05	Message type
2	18	Packet identifier
3	0016	Payload length
4	03	Record count
5	61D501DE	Record timestamp
6	01	Value type(GPS Location)
7	12304F644810B8A800000000	Value(12304F64--Latitude;4810B8A8--Longitude;0000--Speed;0000--Directon)
8	14	Value type(Percentage of remaining battery)
9	64	Value(0x64 = Percentage of remaining battery in %)
10	56	Value type(Lbs state)
11	01	Value(0x01 = location success)
12	6F3D	CRC-16-CCITT

Note: See *tracker Protocol* for details.

8 Upgrade

8.1 Serial Tool Upgrade

The debug cable connects the device to the computer port and opens the serial port upgrade tool ComDebug as shown in Figure 2 below.

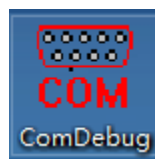


Figure 2

Open Port, Open Firmware, See Figure 3 below.

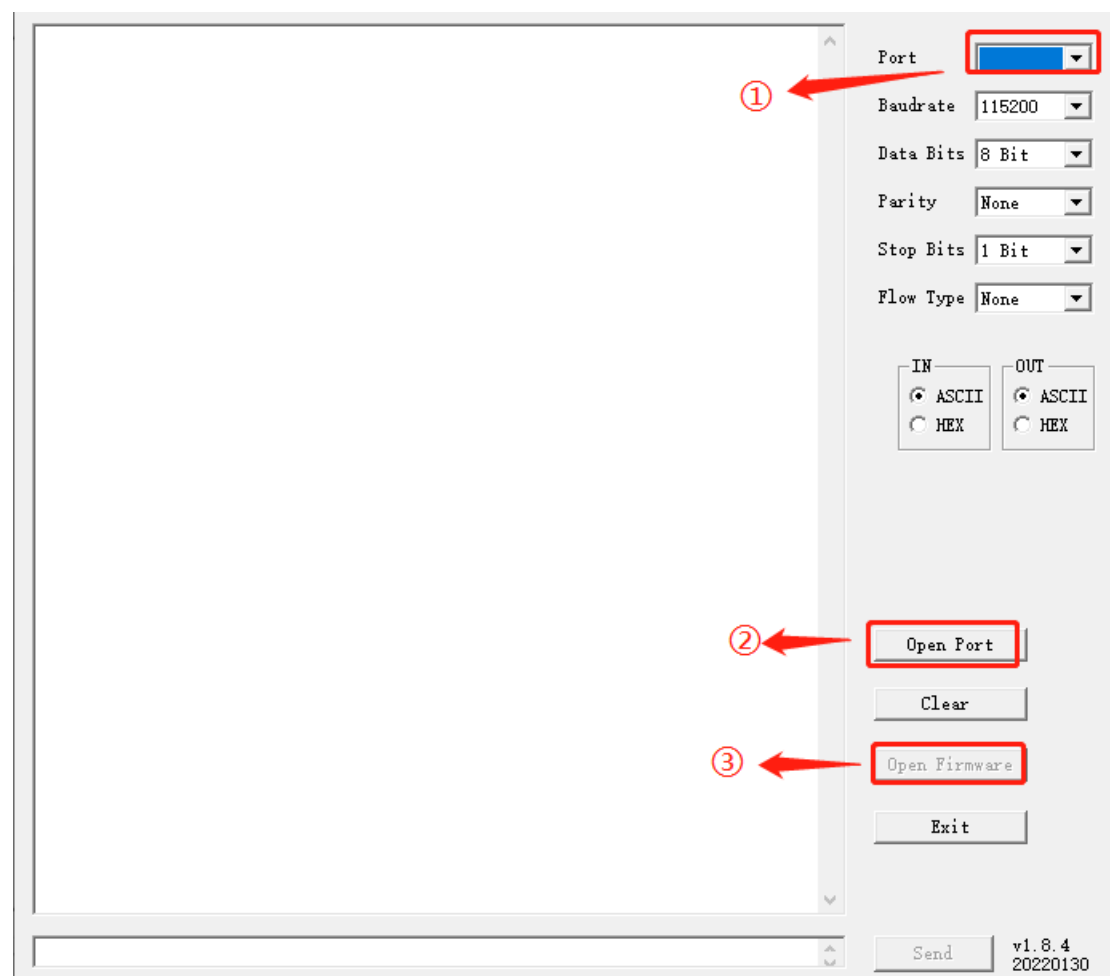


Figure 3

Select the upgrade file and click Open, see Figure 4 below.

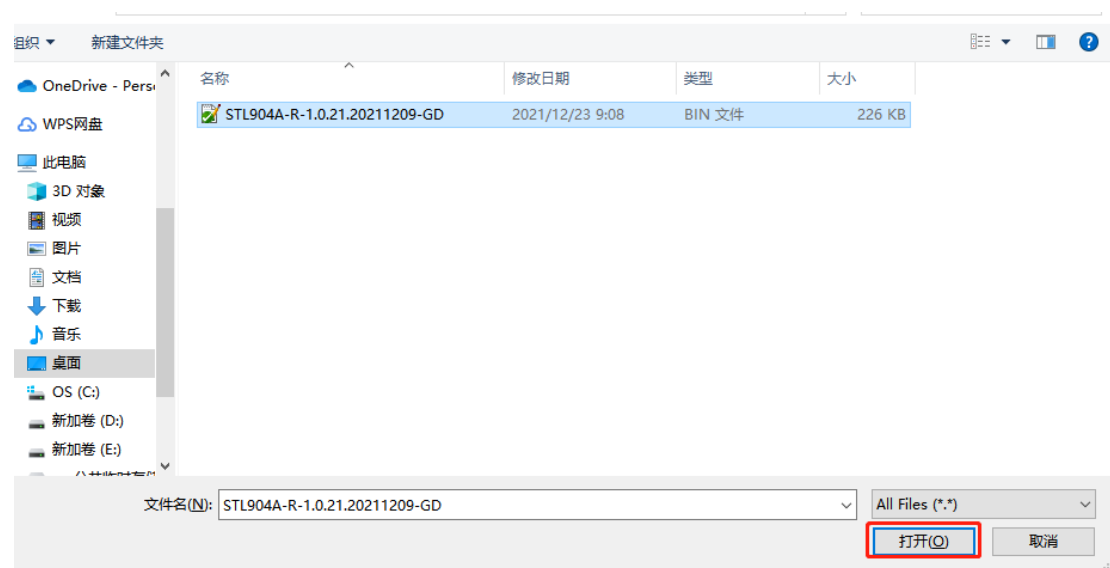


Figure 4

Click to start the upgrade as shown in Figure 5 below.

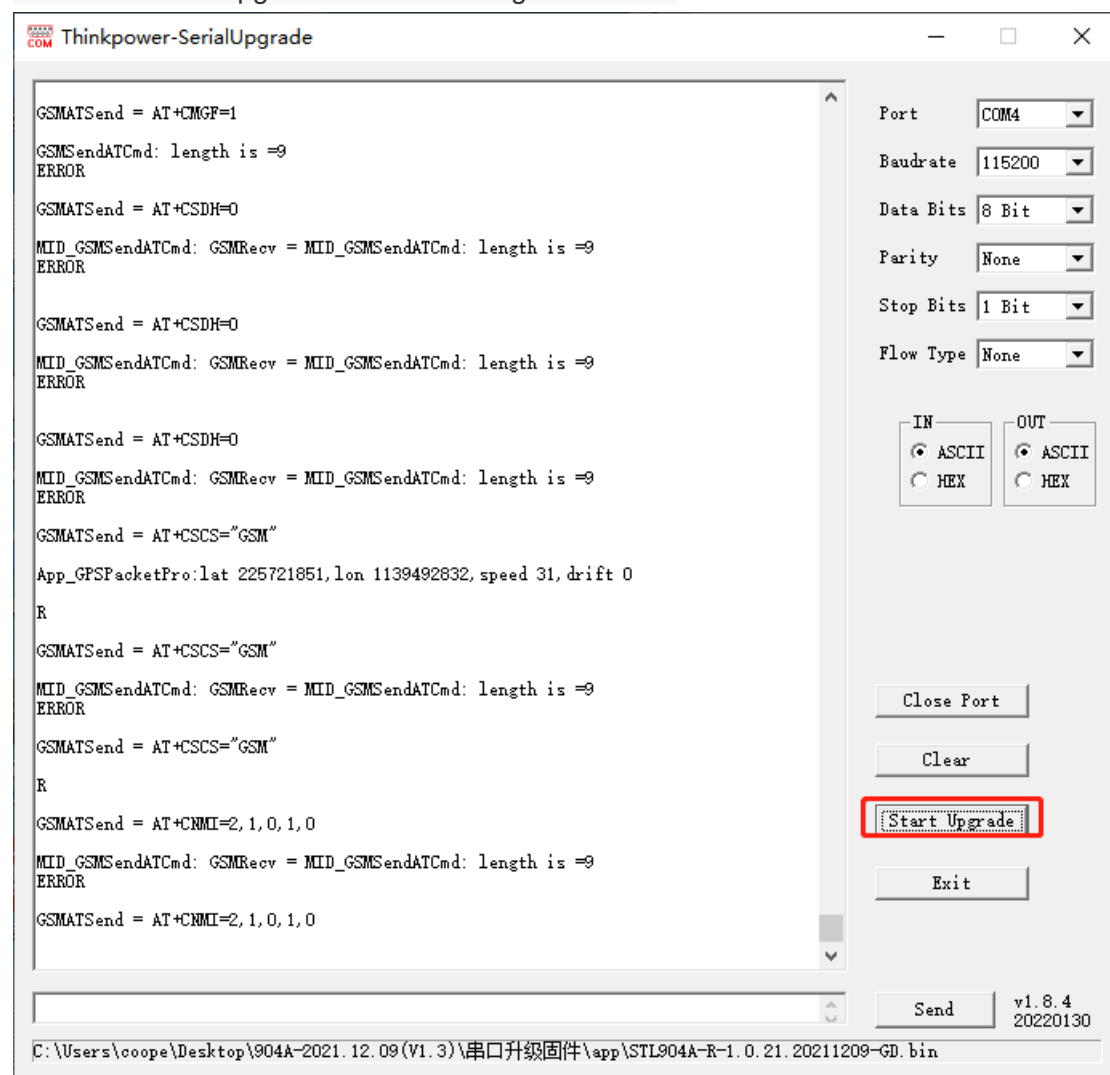


Figure 5

Upgrade progress, see Figure 6 below.

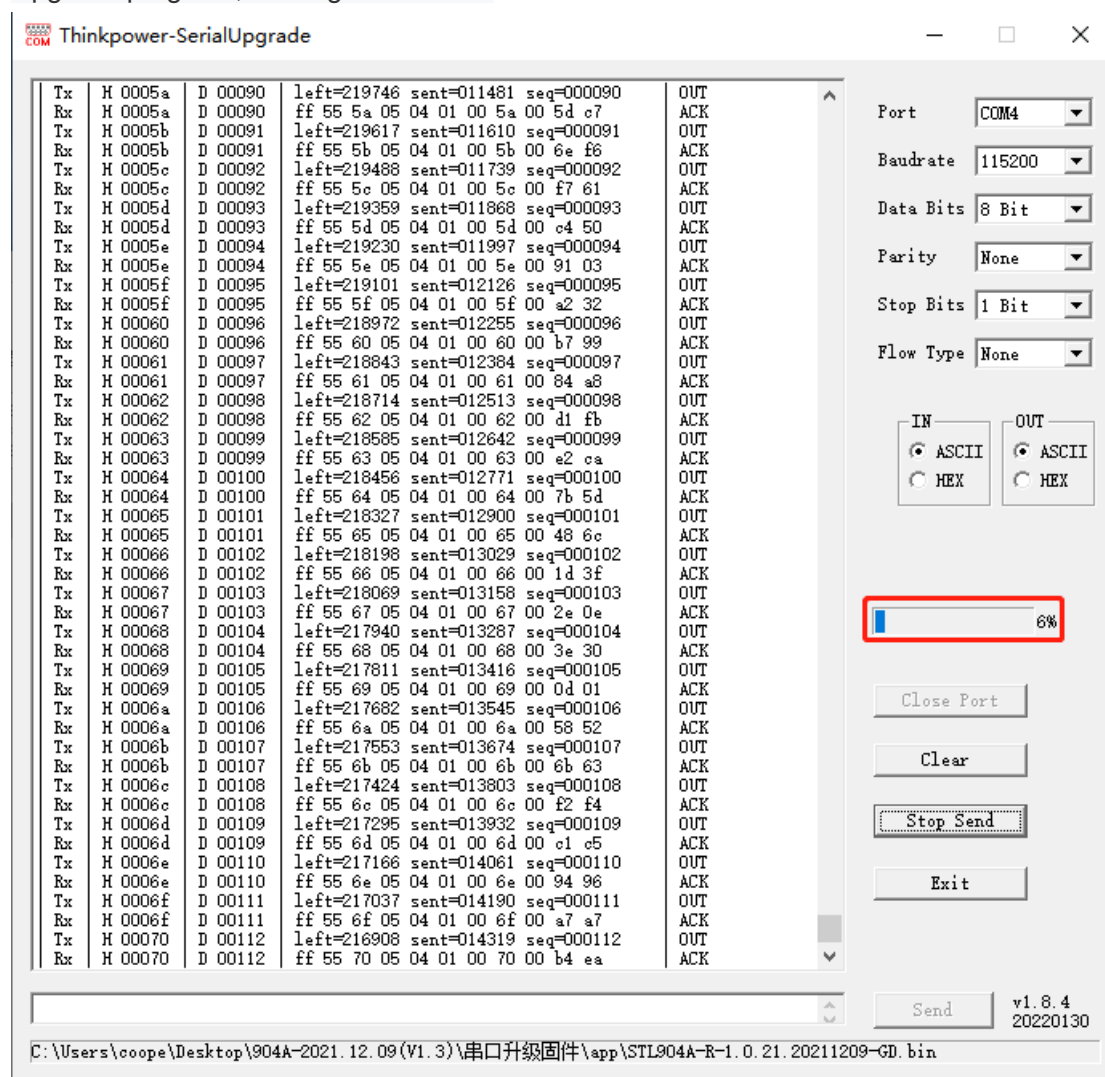


Figure 6

Upgrade succeeded, see Figure 7 below.

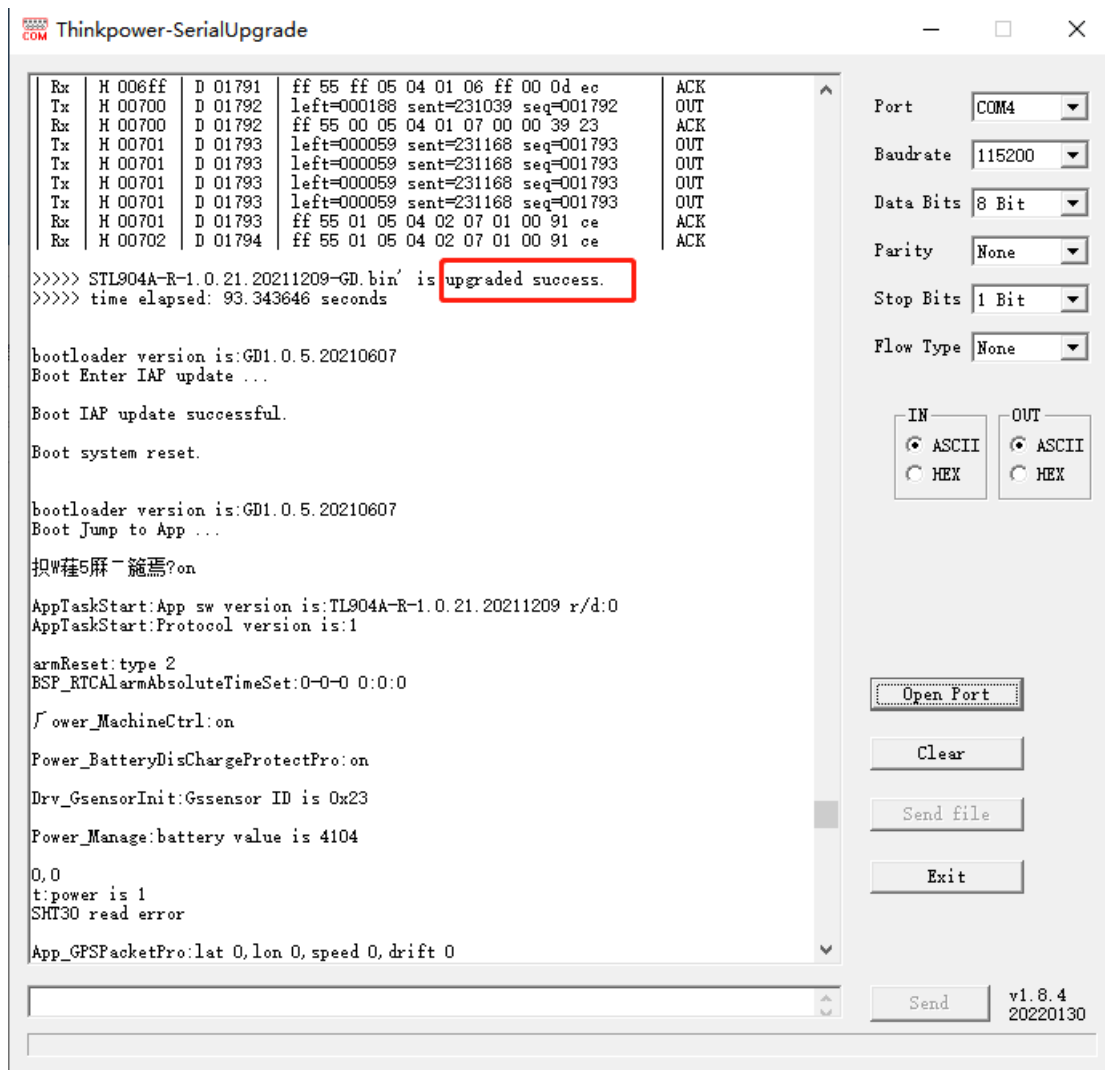


Figure 7

8.2 FTP Upgrade

8.2.1 SMS Upgrade Command

Send SMS via mobile phone to the device in use.

format:

\$password update [firmware-category]

description:

update firmware.

Ex: 123456 update app

8.2.2 Serial Shell Upgrade Command

Format:

update app

8.3 Online Confirmation

8.3.1 Equipment

Check the LED light indication when the SIM card is installed on the device, and judge whether the device is on line by observing the status of the LED light. The specific status of the light is shown in the specification.

8.3.2 Platform

Log in to the appropriate data platform for device data upload confirmation, see *Flespi Use Tutorial* for details.

9 Trouble Shooting

Problems	Solution
Fail to turn it on	Please check if built-in battery is charged.
The platform did not receive data	● Check if the device is correctly added to the platform. ● Check if the IP and port are configured correctly. ● Check if to reset the device after each change of IP or port. ● Check if the protocol is correctly parsed.
NO GSM signal	● Check if SIM card installed correctly. ● Check if SIM card is GSM network. ● Check if voltage of the power is normal.
NO GPS	Please check if GPS antenna connected well, and recommend GPS antenna be installed near the window glass, no metal parts can cover it to make sure better GPS signal reception.

Problems	Solution
No reply to SMS command	Password wrong or the format is wrong.
No alarm message	SOS phone number has not setup.

10 Appendix

10.1 List of Configure Commands

Command	Parameters	Details
configget	swversion	Firmware version(get only)
	sn	IMEI of device(get only)
configset configreset	password	Password of device
configallreset		Restore all configurations of device to default
configallget		list all configurations of device(Serial port only)
factory		retore all configurations of device to factory
reboot		Reset device(SMS:reset)
configget	ipaddr	IP address of platform server
	port	TCP port of platform server(1~65535)
configset configreset	heartbeatidletime	Interval of heartbeat(10~65)
	heartbeattimeout	timeout of heartbeat(10~65)
configget configset configreset	ftpipaddr	IP address or domain name of ftp server
	ftpurl	Full pathname to firmware storeage on ftp server
	ftpuser	Username to access ftp server
	ftppass	Password to access ftp server
configget configset configreset	apnname	Name string of APN
	apnusername	Username of APN
	apnpassword	Password of APN
configget configset configreset	sos	1st SOS phone
	sos1	2nd SOS phone
	sos2	3rd SOS phone
	sos3	4th SOS phone
	soswarn	switch for SOS warning, 0 dsiable, 1 enable
configget configset configreset	automonitor	Call mode, 1-monitor, 0-two-way
	smsfunc	SMS function switch, 0-OFF, 1-ON
configget	gsensorxsens	collision threshold of X-axis(16~3985 mg)

Command	Parameters	Details
configset configreset	gsensorysens	collision threshold of Y-axis(16~3985 mg)
	gsensorzsens	collision threshold of Z-axis(16~3985 mg)
	gsensorcollisionsens	Sensitive for collision(16~3985 mg)
	gsensorcollisionwarn	Switch for collision warning, 0-disable, 1-enable
	gsensorwakeupthreshold	Threshold for wakeup(16~3985 mg)
	gsensorwakeupcount	Wakeup count time(0~10000 ms)
	highgthreshold	High-G threshold(16~3985 mg)
	highgcount	High-G count time(0~2500ms)
gsenset	8 300 100 1000 60	Set group settings for wak-up(anonymous parameter list) param 1st - rangeSel param2nd- wakeupthd Param3rd- wakeupCnt param 4th - highThd param 5th - highcount
gsenget		Get group settings for wake-up
configget configset configreset	offlinefunc	Switch for temporary storage when offline
	reportmode	Report mode by bit offset 0-Disallowed 1-Report on by time 2-Report 3-Distance reporting 4 Regular & distance reporting
	reportoninterval	Report interval on wakeup(5~86400)
	reportoffinterval	Report interval on sleep(5~86400)
	reportdistance	Report distance(20~10000)
	speedingwarn	Switch for overspeed warning, 0-no, 1-yes
	speedingthreshold	Threshold to overspeed(1~150)
	speedwarnduration	Report interval on overspeed
	reportangle	Threshold to angle change(10~359)
	gpsstatechangerep	switch for GNSS status change, 0-ignore, 1-report
configget configset configreset	geofencefunc	Switch for Geofence support, 0-disale, 1-enable
	hightempvalue	Temperature alarm threshold
	highhumivalue	Humidity alarm threshold
	lowpowerwarn	Low power alarm switch
	powersafemode	Anti illegal shutdown mode. 0-off, 1-on
	antitheftfunc	Bluetooth anti loss function. 0-off, 1-on
configget	batteryreportfunc	Voltage reporting percentage.0-off, 1-on
	btkey	BLE paring key

Command	Parameters	Details
configset configreset	btscantimeout	Bluetooth scanning time threshold
	btsn1	1st SN of slave
	btsn2	2nd SN of slave
	btsn3	3rd SN of slave
	btsn4	4th SN of slave
	btsn5	5th SN of slave
	btsn6	6th SN of slave
	btsn7	7th SN of slave
	btsn8	8th SN of slave

11 FCC Statement

This equipment 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 radiate 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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.