



Skypatrol SP9700 User Manual v1.0

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Instructions Of Safety

- By following these instructions, requirements and recommendations one can avoid dangerous situations. You must read these instructions carefully and follow them strictly before operating the device.
- The device with internal battery for long-time storage need regularly be charged to avoid over-discharge and it should be stored in a dry and cool place, if the storage time is longer than two months.
- Do not remove the device without authorization.
- The device has light detection sensor. Ensure the device and installation plane fit fully when you install it.
- Before demounting the device from the vehicle, disconnect it's all connections.

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1. SP9700 Introduction

SP9700 is a richly functional GPS tracker, which is mainly used for asset management. It features low power-consumption, high-grade waterproof. Product can choose the built-in high capacity rechargeable lithium battery or 4XCRA battery or Boston battery, free choice as your requirement. The device has abundant function, support Bluetooth configuration, APP to browser drive trajectory and other Bluetooth accessories control functions. Support movement, stillness, harsh brake, collision and turnover detection etc.

- Multi permission management.
- Support multiple data interaction: GPRS data interaction, Bluetooth data interaction, administrator data interaction and user data interaction.
- Upload fixed time data, fixed distance data, fixed angle data, event and dynamic data.
- Flexible configure single event, combined event and the later generated action.
- 28 polygons and 128 circle geo-fence, associated with speed, time and HDOP.
- Magnet configure working mode.
- Read, import and switch configuration profile, to realize different configuration apply for different scenes.
- Upgrade version both in local and OTA.
- Configure device location, emergence accidents and whitelist of SOS event.
- Anti-jamming.
- Auto-calibration time, Time zone and daylight saving time.
- Process private time
- 3 axis/6 axis acceleration sensor is optional, achieve movement, emergency driving behavior (harsh brake, harsh accelerate and harsh turning), accident (turnover and collision) and others event detection.
- Over-speed monitoring, mileage statistics, engine running time statistics.
- Power supply monitoring, low power consumption.
- Configure parameter over the air.

2. SP9700 Specification

Physical	Dimensions	103.5 (L)*93 (W)*37 (H)mm (with consolidated shell) 100 (L)*55 (W)*32 (H)mm	
	Weight	319.5g (with consolidated shell and battery) 260.5g (with battery only)	
Environment	Working temperature	-10 ~ +50°C (CR123A dry battery) American Boston battery: Changing: -20°C ~ +60°C Discharging: -40°C ~ +70°C	
	Humidity	100%RH @ 50°C non-condensing	
	Waterproof and dustproof	IP67	Dustproof: prevent outside thing intrusion, and can completely prevent dust. IP6 Waterproof: Short-term immersion under atmospheric pressure, when the shell temporary immersion in the 1 m deep water will not cause harmful effects. IP-7
	Shock & Vibration	U.S. Military Standards 202G and 810F, SAE J1455	
	EMC/EMI	SAE J1113; FCC-Part 15B	
	RoHS	Compatible (optional)	
	Bluetooth	4.0 (configuration/upgrade)	
CPU	ARM Cortex M3		
Communication Mode	GPRS/EDGE and TCP/UDP/SMS		
Flash memory	64Mbit		
Power supply	Working voltage	6-36V	
	Replaceable battery	4X CR123A dry battery American Boston battery	
Power	Normal mode	<100mA 12V	
	Power saving mode	<20mA 12V	

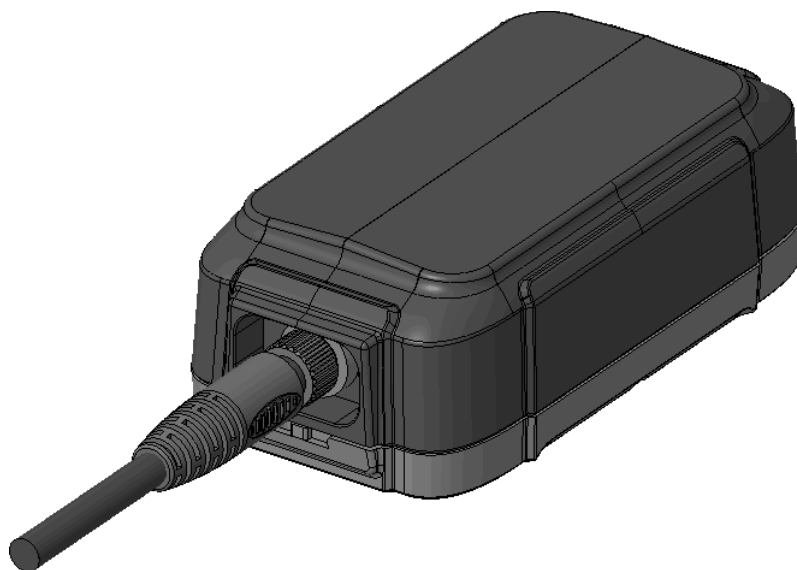
consumption	Low-power- consumption mode (only power by lithium battery)	<100 μ A	
Communication	Data support	SMS, TCP, UDP	
	GSM/GPRS Quad Band	850/900/1800/1900 MHz	
	3G Dual Band (US)	850/1900 MHz (optional)	
	3G dual band (Europe)	900/2100 MHz (optional)	
	GSM/GPRS output power	Class 4 (2W) for 850 / 900 bands Class 1 (1W) for 1800 / 1900 bands	
	GSM/GPRS Fallback	GPRS Class 10	
	HSPA Data Rate	5.76Mbps UL/7.2Mbps DL (optional)	
GSM	Sierra module	2G/3G/HSPA/4G(LTE)	
GPS	Location technology	Ublox7 series, support GPS and GLONASS <ul style="list-style-type: none"> • First locate time<300S • Cold startup time<39S • Hot startup time<5S • Locate frequency=1S 	
	Accuracy	SBAS 2.0m CEP	
	Sensitivity	-162 dBm	
	Assist GPS	Support	
Sensor	Accelerate sensor	Built-in	3D/6D optional
	Temperature sensor	Built-in	
Input/Output	LED	3 LEDs	GSM/GPS/Power
	Charge cable (IO cable)	Two point charging Cord	
	Digital input/output	1 digital input	
Connection &SIM card	Connect type	6pin	
	GPS antenna	Built-in	
	GSM antenna	Built-in	
	SIM card	Built-in (USIM card)	

3. Product Overview

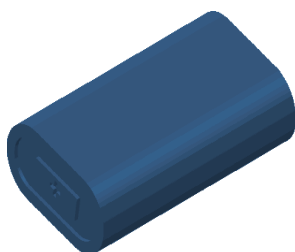
3.1 Check package

Before using, please check out the package and make sure the following items have been included with your device. If anything is missing, please contact your supplier.

① Standard Part List



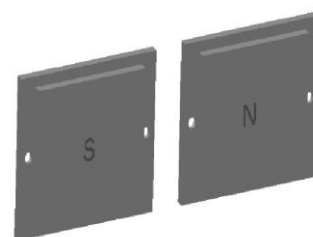
Main unit



Lithium Battery

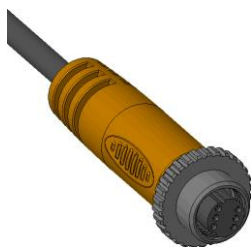


Consolidated Button Shell



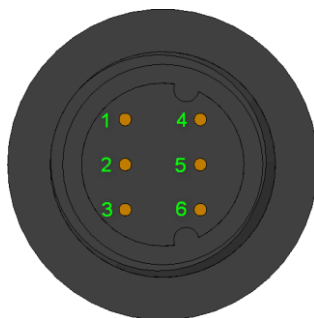
Magnet

② Optional Part List



IO cable

3.2 Interface definition



The definition of interface as following shown:

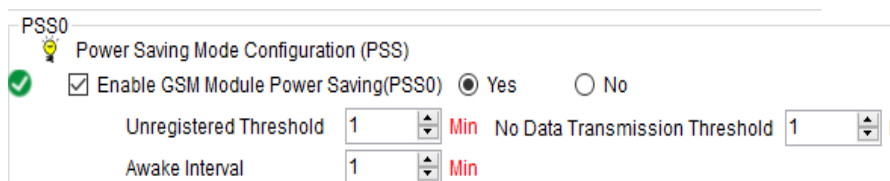
PIN	Name	Color	Definition
1	IN1	White	IN1 can be configured as ACC
2	VCC	Red	DC 12V
3	GND	Black	Ground
4	OUT	Blue	Output port
5	RxD	Green	TTL UART(Rx/Tx)
6	TxD	Yellow	TTL UART(Rx/Tx)

3.3 DMD working mode

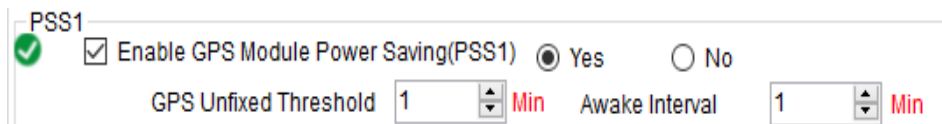
DMD mode name No.	TCP while moving (SVP0)	TCP while stop (SVP1)	Time for move to stop (STP)	Extend set flash(EFM)	SMS while moving if TCP timeout	SMS while stop if TCP timeout	SMS+GPS move alarm	SMS+GPS parking alarm	SMS+GPS internal battery low power alarm (3.7 V)	SMS+GPS external power off alarm	SMS+GPS RS disassembly alarm	SMS+GPS RS Installation alarm	GSM working time without data	GPS working time without data	GSM search time	GPS search time
0 (web-tracker with moving trigger and just LBS position)	60 sec only LBS	24h only LBS	180 sec	Real time data prior	-	24h (User0, User1)	-	-	yes (User0, User1) GPRS	-	yes (User0, User1) GPRS	yes (User0, User1) GPRS	180 sec	off	180 sec	off
1 (web-tracker with moving trigger)	60 sec+angle 10' GPS & LBS	24h GPS & LBS	180 sec	Real time data prior	-	24h (User0, User1)	-	-	yes (User0, User1) GPRS	-	yes (User0, User1) GPRS	yes (User0, User1) GPRS	180 sec	30 sec	180 sec	300 sec
2 (web-tracker with moving trigger and GSM delay)	60 sec+angle 10' GPS & LBS	24h GPS & LBS	180 sec	Real time data prior + GSM delay	-	24h (User0, User1)	-	-	yes (User0, User1) GPRS	-	yes (User0, User1) GPRS	yes (User0, User1) GPRS	180 sec	30 sec	180 sec	300 sec
3 (web-snooper with move and parking alarms)	24h GPS & LBS	24h GPS & LBS	300 sec	Real time data prior	-	24h (User0, User1)	yes (User0, User1) GPRS	yes (User0, User1) GPRS	yes (User0, User1) GPRS	-	yes (User0, User1) GPRS	yes (User0, User1) GPRS	180 sec	30 sec	180 sec	300 sec
4 (web-snooper)	24h GPS & LBS	24h GPS & LBS	-	Real time data prior	-	24h (User0, User1)	-	-	yes (User0, User1) GPRS	-	yes (User0, User1) GPRS	yes (User0, User1) GPRS	180 sec	30 sec	180 sec	300 sec
5 (web-tracker with external power)	30 sec+angle 10' GPS & LBS	600 sec GPS & LBS	180 sec	Real time data prior	-	-	-	-	yes (User0, User1) GPRS	yes (User0, User1) GPRS	yes (User0, User1) GPRS	-	-	-	-	-
6 (web-tracker with external power, move and parking alarms)	30 sec+angle 10' GPS & LBS	600 sec GPS & LBS	300 sec	-	-	-	yes (User0, User1) GPRS	yes (User0, User1) GPRS	yes (User0, User1) GPRS	yes (User0, User1) GPRS	yes (User0, User1) GPRS	-	-	-	-	-
7 (spy web-tracker)	60 sec+angle 10' GPS & LBS	12h GPS & LBS	180 sec	Real time data prior (upload 12h timer)	-	12h (User0, User1)	-	-	yes (User0, User1) GPRS	-	yes (User0, User1) GPRS	yes (User0, User1) GPRS	180 sec	30 sec	180 sec	300 sec
8 (spy web-snooper with 1h mode0)	1h GPS & LBS	12h GPS & LBS	180 sec	Real time data prior (upload 12h timer)	-	12h (User0, User1)	-	-	yes (User0, User1) GPRS	-	yes (User0, User1) GPRS	yes (User0, User1) GPRS	180 sec	30 sec	180 sec	300 sec
9 (web-snooper with 1h mode0)	1h GPS & LBS	24h GPS & LBS	180 sec	Real time data prior	-	24h (User0, User1)	-	-	yes (User0, User1) GPRS	-	yes (User0, User1) GPRS	yes (User0, User1) GPRS	180 sec	30 sec	180 sec	300 sec
10 (web-tracker with moving trigger, move and parking alarms)	60 sec+angle 10' GPS & LBS	24h GPS & LBS	300 sec	Real time data prior	-	24h (User0, User1)	yes (User0, User1) GPRS	yes (User0, User1) GPRS	yes (User0, User1) GPRS	-	yes (User0, User1) GPRS	yes (User0, User1) GPRS	180 sec	30 sec	180 sec	300 sec
11 (web-tracker with moving trigger, move and parking alarms, GSM delay)	60 sec+angle 10' GPS & LBS	24h GPS & LBS	300 sec	Real time data prior + GSM delay	-	24h (User0, User1)	yes (User0, User1) GPRS	yes (User0, User1) GPRS	yes (User0, User1) GPRS	-	yes (User0, User1) GPRS	yes (User0, User1) GPRS	180 sec	30 sec	180 sec	300 sec

Notes:

1. For SVP0 and SVP1, the data format should be HEX.
2. GSM working time without data (No data transmission) and search time (unregistered threshold) :



3. GPS



working time without data (Awake Interval) and search time (unfixed threshold):

4. GSM delay when start moving:

When device start moving - wake up only GPS, but GSM wake up after 600 sec to upload position data and be on-line till device goes in parking mode. This setting ake device invisible for GSM-detectors from start and protect device from detection.

4. Installation

4.1 Dismantle

1) Open device cover, use screw driver screw all screw, as follow shows:



2) Open device cover



- 3) Open card slot and insert SIM card, notice the card direction



- 4) Close card slot, it should connect the power connector when **First** time using.



- 5) Connect USB cable and use configuration tool to configure device.



- 6) Close device cap and screw all screws



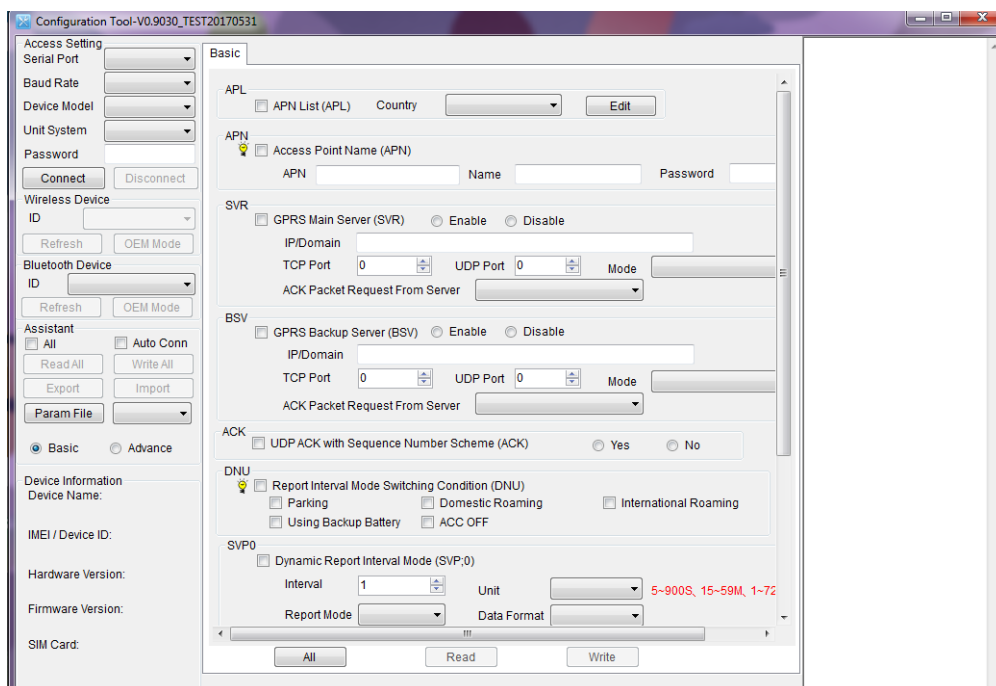
4.2 Configure device

- a) Open the configuration tool By double click "Configuration Tool"

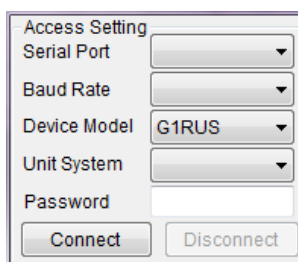


Note: if there is an error or you are unable to open the file, please install "Microsoft .NET Framework" 4.0 or latest version in your computer.

Software interface is as below.



- b) Connect the device to your computer. Choose the correct serial port and device mode, and then click 'connect'.



- c) Input your desired parameters and click 'write' to write all of the data to device.

4.3 Install magnet

- 1) For only magnet, it can choose to screw screws to consolidate device or just directly paste it to device, as follow shows:



- 2) For magnet with consolidated shell, screw both sides' screws after put on the consolidated shell, as follow shows:



5. IO port configure

5.1 Input port configure

SP9700 possess one default input port which can be configured as digital input port. Setup/query working mode of digital input port IN1 by using DIM command: Example:

DIM; 2 Response: DIM; 2

Digital input port can be configured as engine detect mode.

5.2 Output port configure

SP9700 possess one default output port, the port can be configured as digital output port. Configure the output way and parameter of OUT1 by using DOM command: Example:

DOM;4;1;3;10;0;1 response: DOM:4;1;3;10;0;1
 DOM;5;3;1;10;1;0 response: DOM:5;3;1;10;1;0

Configure output port as mode 4, start by low level and end by high level, the pulse width of high level as 250ms while low level as 750ms and output ten times this wave.

Configure output port as mode 5, start by high level and end by low level, the pulse width of high level as 750ms while low level as 250ms and output ten times this wave.

To guarantee that output can power-off safely when connect circuit breaker, it will limit the output speed. Example:

DOP; 40 response: DOP:40

Only valid digital port output when driving speed lower than 40KM/H.

Enable output port working as preset mode by using DOO command. Example:

DOO; 5 response: DOO:5

It will immediately output as DOM; 5 setup.

6. Common words

Set your cell phone number as User0 or User1. This will allow you to send SMS commands to control and receive messages from the device.

6.1 Set user phone number

Command:

UNO command is to set 2 users' phone numbers. Both users have the same authorization. With the correct password, any phone number is able to use this command. User0's factory default password is "1234", User1's factory default password is also "1234".

Command format:

1. Set user0 phone number:
 < User0 Password>, UNO0 ;< new phone number>
2. Set user1 phone number:
 < User1 Password>, UNO1 ;< new phone number> Parameter description:
 <New phone number>: the length must be less than or equal 20 digits. The setting has two formats:

1. Domestic phone number: without country code.
2. International phone number: with country code. Add "+" before the numbers.
 Example:

Set user0 phone number:

Set user0 phone number:

1234, UNO0; +8613912345678 Or 1234, UNO0; 13912345678

6.2 Set user password

Command:

UPW command set user password. User0's factory default password is "1234". User1's factory default password is "1234". Changing the factory password upon first use is highly

suggested. Command format:

1. Set user0 password:
 < User0 Password>, UPW0 ;< New Password>

2. Set user1 password:
 < User1 Password>, UPW1 ;< New Password> Parameter description:
 < New Password>: Fix 4 digits, range is "0000 to 9999"

Example:

Set user0 password 1234,UPW0; 5678

6.3 Set ACK

Command:

ACK command is used for UDP response mechanism switch Command format:

Disable UDP response: ACK; 0

Data packing method is the same as before.

Enable UDP response: ACK; 1

Data packing includes sequence number and ID Parameter description:

This function needs SVR command set as UDP mode to open a response.

Example:

Enable UDP mode and open a response SVR; 183.233.129.45; 6667; 1; 1

Enable new respond mechanism ACK; 1

Configure the initial waiting reply time SVT; 1800; 15

6.4 Set position report interval to user

Command:

USP command is to set mode0 (static mode) and mode1 (dynamic mode) report interval to user, data upload and data format.

Command format:

1. Set position report interval to user0:
 <User Password>, USP0; <Mode> ;< Interval> ;< Report mode> ;< Data format>

2. Set position report interval to user1:
 <User Password>, USP1; <Mode> ;< Interval> ;< Report mode> ;< Data format>

Parameter description:

<Mode>:

“0”: Represents static upload mode

“1”: Represents dynamic upload mode.

It is valid only when DNU command enabled.

<Interval>:

Report interval, range is “30 to 900 seconds”, “15 to 59 minutes”, “1 to 720 hours”. The parameter unit definition as follows:

S: Second M: Minute H: Hour

<Report mode>:

“O”: Disable

“G”: Upload GPS information if without GPS signal, it will upload BS information, and BS information show in HEX.

(Set uploads data packet data ID “GPS data” and “GSM data” mask as1.)

“L”: Periodical voice calls (Voice monitoring).

<Data format>:

“O”: Not generate data.

“T”: Text

“W”: Map hyper link

Example:

Set User0 static report interval:

1234,USP0;0;1H;G;W

Disable User0 static report interval:

1234,USP0;1;24H;O;W

6.5 Set SIM Card APN

Command:

APN command is required for GPRS connectivity.

Command format:

< User Password>, APN ;< APN > ;< user name > ;< password >

Parameter description:

<APN>: 1 to 64 characters

<User name>: 0 to 32 characters

<Password>: 0 to 32 characters

If there is not a user name and password for APN, the command could be:

APN ;< APN>

Note: The device already contains many APNs. It will automatically identify APN information after inserting SIM card.

Example:

Set APN, user name, and password

1234,APN;CMNET;USR;PW

Query setting:

1234, APN

6.6 Set GPRS main server

Command:

SVR command is to set GPRS main server. Command format:

<User Password>,SVR;<IP address>;<TCP Port>;<UDP Port>;<Mode>;<Enable ACK>

Parameter description:

<IP address>: IP or domain name, 64 bytes maximum.

<TCP Port>: TCP port

<UDP Port>: UDP port

<Mode>:

“0”: TCP mode

“1”: UDP mode

“2”: TCP command interaction, UDP data upload mode

<Enable ACK>:

“0”: Disable UDP communicates response mechanism.

“1”: Enable UDP communicate response mechanism, this is default setting

“2”: Enabled for UDP and TCP both.

Note: <Enable ACK>: “1”:device data is send via UDP channel The server must respond with any data during ACK setting time, otherwise the device will consider the UDP disconnect and save data into internal flash storage.

Example:

Set as TCP port:

1234,SVR;114.142.154.28;3032; 0; 0 Or 1234,SVR; www.anytracking.net;3032;;0;0

Set as UDP port:

1234,SVR;114.142.154.28;;3032;1;1 Or 1234,SVR;www.anytracking.net;;3032;1;1

Delete main server:

1234, SVR;

Query setting:

1234, SVR

6.7 Set GPRS backup server

Command:

BSV command is to set GPRS backup server.

The device connects with the main server as priority. When the connection between device and main server is overtime, it will switch to the backup server. After the device is connected with the backup server reach setting time, it will try to connect with the GPRS main server automatically.

Command format:

<User Password>,BSV;<IP address>;<TCP Port>;<UDP Port>;<Mode>;<Enable ACK>

Parameter description:

<IP address>: IP or domain name, 64 bytes maximum

<TCP Port>: TCP port

<UDP Port>: UDP port

<Mode>:

“0”: TCP mode

“1”: UDP mode

“2”: TCP command interaction, UDP data upload mode

<Enable ACK>:

“0”: Disable UDP communicates response mechanism.

“1”: Enable UDP communicate response mechanism, this is default setting

“2”: Enabled for UDP and TCP both.

Note: <Enable ACK>: “1”:device data is send via UDP channel The server must respond with any data during ACK setting time, otherwise the device will consider the UDP disconnect and save data to internal flash storage.

Example:

Set as TCP port:

1234,BSV;114.142.154.28;3032;;0;0 Or 1234,BSV;www.anytracking.net;3032;;0;0

Set as UDP port:

1234,BSV;114.142.154.28;;3032;1;1 Or 1234,BSV;www.anytracking.net;;3032;1;1

Delete main server:

1234, BSV;

Query setting:

1234, BSV

6.8 Set position Report Interval to GRPS Server

Command:

SVP command is to set mode0 (static mode) and mode1 (dynamic mode) report interval to GRPS Server, upload data and data format.

Command format:

<User Password>, SVP; <Mode> ;< Interval> ;< Report mode> ;< Data format> Parameter description:

<Mode>:

“0”: Represents statics upload mode.

“1”: Represents dynamic upload mode.

It is valid only when DNU command enabled.

<Interval>:

Report interval, range is “30 to 900 seconds”, “15 to 59 minutes”, “1 to 20 hours”. The definition of parameter as follows:

S: Second M: Minute H: Hour

<Report mode>:

“0”: Disable

“G”: Upload GPS information basically, if without GPS signal, it will upload BS information, and BS information show in HEX.

(Set uploads data packet data ID “GPS data” and “GSM data” mask as 1.)

“A”: GPS and GSM information

<Data format>:

“O”: Not generate data.

“B”: HEX

“T”: Text

Example:

Set static report interval:

1234,SVP;0;30S;G;B

Set dynamic report interval:

1234,SVP;1;6H;G;B

6.9 Set product firmware upgrade

Command: FWU command is to active FOTA firmware upgrade by user phone.

Format:

<User password>, FWU

Example:
 1234, FWU
 SMS Reply:
 SP9700
 V1.00 FWU
 BAT=3.30V
 #10

FOTA upgrade will take about 10 minutes and you will receive a confirming message.

SMS reply:
 SP9700
 V1.10
 Upgrade Success!
 Ext_BAT=3.95V
 BAT=3.30V
 #11

7. User combine command

The device supports combining multiple commands through an SMS message sent to the device. The commands are separated by a comma. The maximum length of the combined command is 256 bytes. Format is as follows:

User name	Separated Comma	Command 1	Separated Comma	Command 2	Separated Comma	...	Command
1234	,	UNO;139 12345678	,	UPW; 4567	,		USPO; 1;24 H;0;W

Command Reply Explanation:

After the device receives the user's command, it will immediately process and use SMS reply to the user. Reply SMS has two types: command error, command success.

7.1 Command error SMS

Content of message	Explanation
SP9700 V1.00 ERR	Device name, Firmware version Command Error

7.2 Command success SMS

Content of message	Explanation
SP9700 V1.00	Device name, Firmware version
UPW:1234 Ext_Pwr=11.94V BAT=3.90V #3	Command Setting External power voltage Built-in battery voltage Consumed messages