

TZ-AVL201

GPS Tracker

User Guide V1.0.2

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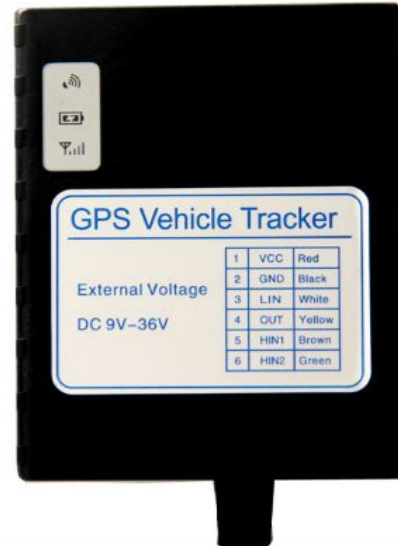
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1 Product Overview

Thank you for purchase our new charming product AVL201. The AVL201 is a GPS/GPRS based personal tracking unit, it provides an easy way to track your targets, for emergency and provide a reliable and accurate location information via SMS or GPRS to send to the cell phone or computer.

AVL201 has the following functions and Key feature

- Tracking via SMS or GPRS TCP communication
- Current location report
- Tracking by time interval
- Emergency alert
- Geo-fencing control
- Rechargeable internal battery
- Waterproof :IP67



2. For Your Safety

Read these simple guidelines. Not following them may be dangerous or illegal. Read the full user manual for more information.

Switch on safely	Do not switch on the unit when wireless phone use is prohibited or when it may cause interference or danger.
Switch off in hospitals	Follow any restrictions. Switch the unit off near medical equipment.
Switch off in aircraft	Follow any restrictions. Wireless devices can cause interference in aircraft.
Switch off when refueling	Do not use the unit when at a refueling point. Do not use near fuels or chemicals.
Switch off near blasting	Follow any restrictions. Do not use the unit when blasting is in progress.
Qualified service	Only qualified personnel can install or repair this unit.

3. AVL201 Characteristics

Item	Specification
Charging Voltage	DC 9-36V
Dimension	87mm*67mm*21mm
GSM module	GSM 850/900/1800 /1900Mhz (Custom)
Flash Memory	512K

GPS Sensitivity	-162Db
GPS Frequency	L1, 1575.42 MHz
C/A Code	1.023 MHz chip rate
Channels	20 channel all-in-view tracking
Position Accuracy	10 meters, 2D RMS
Velocity Accuracy	0.1 m/s
Time Accuracy	1 us synchronized to GPS time
Default datum	WGS-84
Reacquisition	0.1 sec., average
Hot start	1 sec., average
Warm start	38 sec., average
Cold start	42 sec., average
Altitude Limit	18,000 meters (60,000 feet) max.
Velocity Limit	515 meters/second (1000 knots) max.
Jerk Limit	20 m/sec
Operating temperature	-20° to 60° C
Humidity	5% to 95% Non-condensing
Voltage	Rechargeable 320mAh battery (3.7V)
Work time	5 hours in normal mode
LED	3 LEDs to show GPS,GSM,Charger status

4. Getting Start

This section will describe how to setup your AVL201 after installation.

4.1 Hardware Features

AVL201 includes:

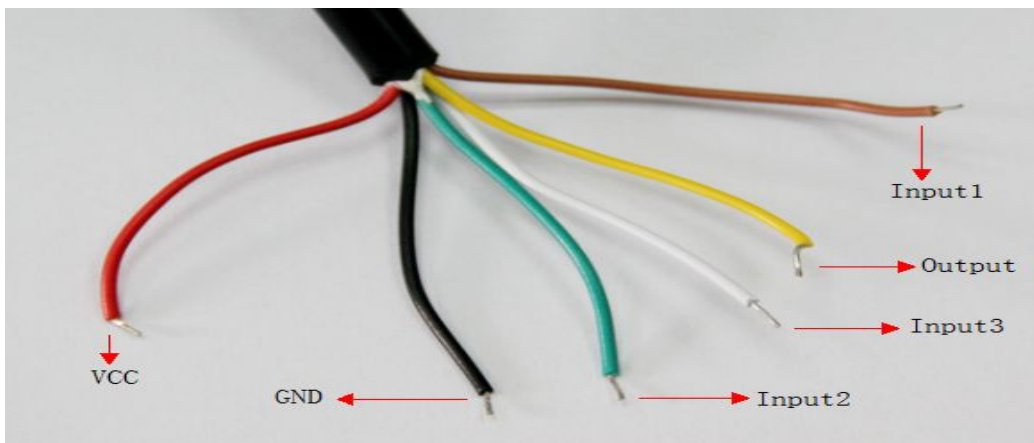
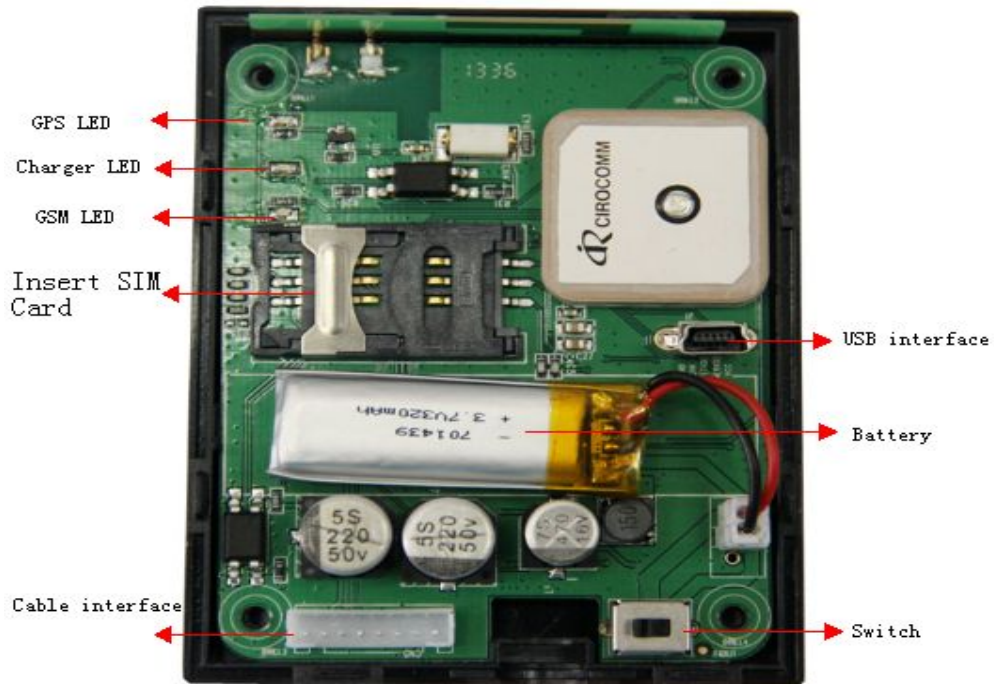


AVL201

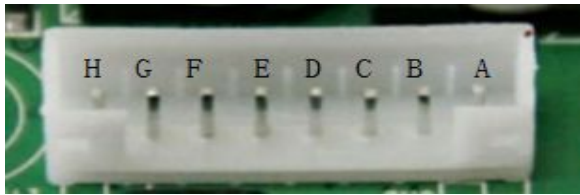
USB Cable

CD

4.2 Light and Button Functionality



AVL201 I/O Port



NO.	port	function
A	I/O 1	VCC
B	I/O 2	GND
C	I/O 3	GND
D	I/O 4	Digital Input 3
E	I/O 5	Digital Output
F	I/O 6	RESERVE
G	I/O7	Digital Input 1
H	I/O8	Digital Input 2

Notes: The sequence of the 8 sockets in the diagram are for the corresponding sockets in the above picture. Please do not confuse the direction, the Switch is the right side of I/O Sockets. The function is as below:

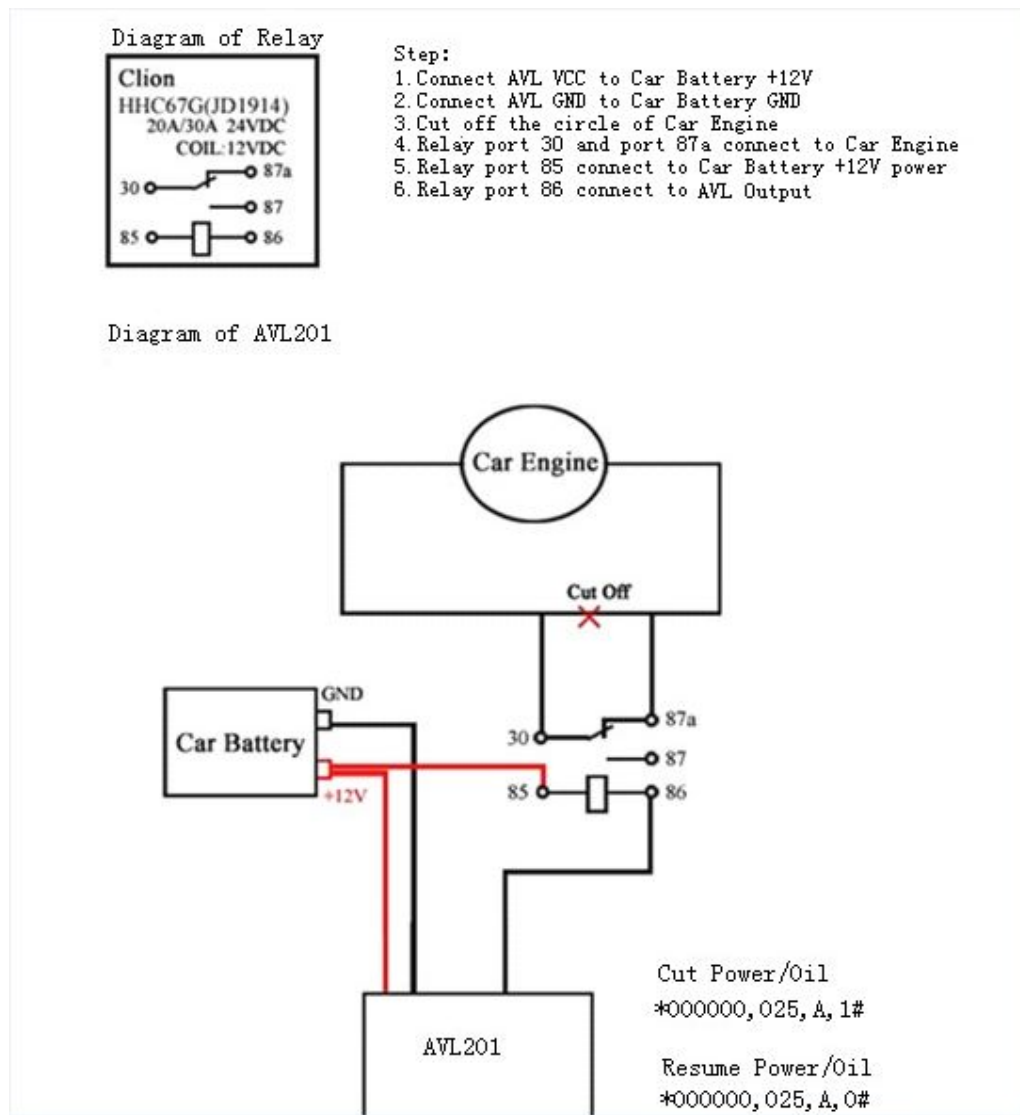
NO.	Function
I/O 01	The anode of power input socket
I/O 02	GND, use for input GND
I/O 03	GND, use for input GND
I/O 04	When this cable is connected to GND(port 02), Device will send a GPRS alarm data to Server. Alarm type is “01”
I/O 05	Using a phone can set the voltage value of the digital output through “025” instruction, high or low, by virtue of it, user can remote Control the Car window or door close/open
I/O 07	When this cable is connected to high, Device will send a GPRS alarm data to Server. And when connect is lose , Device also will send a GPRS alarm data to server, alarm type is “50”, “51”, through it , user can monitor the status of ignition or Car window status *At present, most of customers use this cable to connect to the engine of car.
I/O 08	The function is similar as I/O 07,alarm type is “52”, “53”

LED Status

Blue LED - indicating GPS status	
Flashing (on for 0.1 second and off for 1seconds)	AVL201 has a GPS fix
Off	AVL201 has no GPS fix

Green LED - indicating GSM status	
On	One call is coming in
Flashing (on for 0.1 second and off for 2.9 seconds)	AVL201 is connected to the GSM network
Flashing (on for 1 second and off for 2 seconds)	AVL201 is not connected to the GSM network

Connect Relay to control the Car Oil/Power (Port 5)



4.3 First Use

Please read this manual before using your AVL201.

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4.4.1 Ensure that your AVL201 has a working SIM installed.

- Check that the SIM has not run out of credit (Test the SIM in a phone to make sure it can send and receive SMS)

- Check that the SIM Lock code is turned off

- If you require the function of sending an SMS location report to the authorized phone number when it makes a call to the AVL201, please make sure the SIM installed supports displaying caller ID.

4.4.2 Charge the tracker for at least 2 hours in power-off status using the wall charger or car charger.



5. Track by SMS and GPRS

5.1 Track by SMS

1. -Track on demand- Reply with longitude, latitude, speed and date

Send the following SMS to your AVL201

Command: *<password>,<000># /* 000000 is the default password */

For example: *000000,000#

AVL201 will respond with a SMS with format as follows::

Lat: +2232.723 N

Long: +11403.534 E

Spd: 000km/h

Fix: A

Sat: 04

HDOP: 01.2

GSM: 20

Batt: 04.10V

Mile: 0.0000

Time: 12/03/10 09:50:34

2. -Content Description:

Lat: +2232.723 N

North latitude — Latitude = 22 degree – 32.723 cent

Long: +11403.534 E

Eastern longitude — Longitude = 114 degree – 03.534 cent

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Spd: 000km/h

The speed of the tracker, the unit: KM/h

Fix: A

The tracker received the GPS signal.

About Fix: V — have not get the GPS signal.

Sat: 04

Received the GPS signal of four satellite

HDOP: 01.2

The horizontal dilution of precision (HDOP)

GSM: 20

The GSM signal of value

Sometimes, the tracker maybe could not send the GPRS successful when the value below than 10.

Batt: 04.10V

The voltage of the interior battery. When the voltage higher than 3.40V, the tracker works normal.

Mile: 0.0000

The odometer between every GPRS interval times.

Time: 12/03/10 09:50:34

The GMT times.

3.-After we get the message, we can track on the map:

Type as the following picture shows:

You can type: 22 32.723N 114 03.534E

Google maps



Or you can use local map software on PDA or car navigation to input the coordinates.

5.2 Track by GPRS between Server and Tracker

5.2.1 ID Number

We use the IMEI number of the GSM module as the ID to identify the different devices.

5.2.1 Set APN

Command: *\$\$\$\$\$,011,APN,Username,Password#

Description: Set APN details for the tracker

Note:

1. APN username and password are optional. If no APN username and password required, just input APN only.
2. APN default as “cmnet”.

5.2.2 Set Socket

Command: *\$\$\$\$\$,015,M,IP,PORT#

Description: Set the IP and Port for tracker for GPRS communication.

Note:

1. M is the mode,1 for domain, 0 for IP.
2. IP is your server's IP or domain name.
3. Port : [1,65534]

Example:

*000000,015,1,tracking.tzonedigital.com,3509#

*000000,015,0, 113.105.152.6,3509#

5.2.3 Set the interval of the GPRS

Command: *\$\$\$\$\$,018,XXX,YYY#

Description: This command set the time interval to send the GPRS date.

Note:

1. XXX is the time interval to send the GPRS date, the unit is second, X=0, means stop to send GPRS.
2. YYY is the times to send the GPRS data, Y=0 means stop send interval GPRS 0 times; Y=999, means continue send the GPRS date all the time.

Example:

*000000m,018,60,100# mean send the interval GPRS 100 times every 60 second.

The server gets all the messages, and show it on the webpage.



6. Main function

6.1 *Geo-fence alarm*

You can set a geo-fence for the device, if the device in or out of the fence, it will send a alarm message.

6.2 *Other useful function*

- **Get current location:**
*\$\$\$\$\$,000#
- **Get the IMEI from the device:**
*\$\$\$\$\$,801#
- **Reboot the device by SMS:**
*\$\$\$\$\$,991#
- **Initialization the device**
*\$\$\$\$\$,990,099#

7. The format of the GPRS

The GPRS command server sent to device must be 8-bit ASCII format. The GPRS command must be same as sms command in this user guide.

The data of the device send to the server:

Format: \$\$ (2 Bytes) + Len (2 Bytes) + IMEI (15 Bytes) + | + AlarmType (2 Bytes) + GPRMC + | + PDOP + | + HDOP + | + VDOP + | + Status (12 Bytes) + | + RTC (14 Bytes) + | + Voltage (8 Bytes) + | + LACCI (8 Bytes) + | + Temperature (4 Bytes) | + Mile-meter (14 Bytes) + | Serial (4 Bytes) + | + Checksum (4 Byte) + \r\n (2 Bytes)

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```
$$A7355296038400938|AA$GPRMC,055605.000,A,2232.5946,N,11403.9026,E,0.00,,14071
0,,*18|02.5|02.3|01.0|000000000000|20100714055605|03780000|25337837|0000|0.0000
|0205|D410
```

Note: All multi-byte data is based on high-byte first, low-byte after for organization in this protocol.

Code	Explanation
\$\$	2Bytes, indicates header of command from tracker unit to call centre, in ASCII code (hex is 0x24).
Len	2Bytes, indicates length of all command, including header and end (the array is first high to low).
IMEI	15Bytes, at most 20 bytes.
Alarm type	2Bytes, the GPRS data trigger type.
DATA	GPRMC string
	PDOP
	HDOP
	VDOP
	Status (12bytes)
	RTC (14bytes)
	Voltage(8bytes)
LACCI	Location information elements (AGPS)
Temperature	Temperature information
Milemeter	Mileage data
Serial ID	4bytes, sign every GPRS data, the range is [0001-9999], then circle it again from 0001 to 9999.
Checksum	2Bytes, means CRC check of all the data ahead, CRC-16 modbus (Polynomial = 0xA001, initialize data is 0xffff) checksum, not including its own byte and end characters. For example: (hex format) 24 24 00 11 13 61 23 45 67 8f ff 50 00 80 43 0d 0a 0x8043 = CRC-16 modbus (24 24 00 11 13 61 23 45 67 8f ff 50 00).
\r\n	2Bytes, end char (hex format is 0x0d,0x0a).

Format: \$\$ (2 Bytes) + Len (2 Bytes) + IMEI (15 Bytes) + | + AlarmType (2 Bytes) + GPRMC + | + PDOP + | + HDOP + | + VDOP + | + Status (12 Bytes) + | + RTC (14 Bytes) + | + Voltage (8 Bytes)

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|+ LACCI(8 Bytes) + | + Temperature(4 Bytes) | +Mile-meter+| +Serial(4 Bytes) + | + Checksum
(4 Byte) + \r\n(2 Bytes)

- Alarm type
 - 0x01 IO-3 Open
 - 0x42 Out Geo-fence Alarm
 - 0x43 Into Geo-fence Alarm
 - 0x50 IO-1 Close
 - 0x51 IO-1 Open
 - 0x52 IO-2Close
 - 0x53 IO-2 Open
 - 0x60 Begin Charge
 - 0x61 End Charge
 - 0x77 Angle Alarm
 - 0xAA Interval GPRS data
- Status(12 Bytes) —— Status:
 - Byte 01 —— Input 3
 - Byte 02 —— (reserve)
 - Byte 03 —— Input 1
 - Byte 04 —— Input 2
 - Byte 05 —— (reserve)
 - Byte 06 —— (reserve)
 - Byte 07 —— (reserve)
 - Byte 08 —— (reserve)
 - Byte 09 —— (reserve)
 - Byte 10 —— (reserve)
 - Byte 11 —— output
 - Byte 12 —— (reserve)
- Voltage(8 Bytes) ——Value of the voltage:
 - Format: ABBBBIII
 - A —— Charge Status (0 = Off Charge , 1 = On Charge)
 - BBB —— Battery Voltage (For example, 367 means 3.67V)
 - III —— Input Charge Voltage (For example, 1251 mean 12.51V)
 - DDDD —— ADC1 collect (For example, 1251 means 12.51V) (reserve)
- LACCI(8 Bytes) —— Location information elements:
 - Format: LLLLCCCC
 - LLLL —— Location area code
 - CCCC —— Cell ID
- Temperature(4 Bytes) —— Temperature (reserve for the device has no temperature sensor):
 - Format: STTT
 - Precision is 0.1°C
 - The first byte “S” mean sign, such as “0/1/-”

- Eg: 0345 mean +34.5°C, 1234 mean +123.4°C, -123 means -12.3°C
- Mile-meter(14 Bytes) —— Location information elements:
 - Format is AAAA.BBBBKm.
 - Four bytes after the radix point.
- Serial(4 Bytes) —— Serial number:
 - Format: SSSS
 - Every time reboot the device or reset,the serial number will initialize to 0001.
 - Every GPRS message send out will add one
 - After the serial number to 9999, restart from 0001 again

8. SMS instruction list.

If you want to know more about the AVL201, and design your special AVL201, you can refer to the SMS instruction list.

\$\$\$\$\$\$ is user's password, and initial password is 000000

	SMS Instruction	Format	Note
1	Request one position	*\$\$\$\$\$,000#	
2	Modify user password	*\$\$\$\$\$,001,@#@#@#@#	\$\$\$\$\$\$ is old password @#@#@#@# is new Password
3	Set the time intervals of position notice SMS The Position SMS will send to the preset SOS number.	*\$\$\$\$\$,002,X,Y#	X (Max 3 Digital) =0, Stop send position SMS =[1,60000] Time interval (Unit: mins) Y (Max 3 Digital) =[1,999) times send SMS Y=0, Disable this function Y=999, continue send SMS
4	Set a preset phone & SMS number for time intervals of position notice SMS	*\$\$\$\$\$,003,0,1,CallNumber, SMS Number#	send time intervals of position notice SMS to the preset SMS Number Notice :Tel Number and SMS Number (must <25 digits)
5	Set Geo-fence alarm When the AVL201 move out preset scope, AVL201 will send one Geo-fence GPRS data to the Preset Server.	*\$\$\$\$\$,006,Lat,Long,R,X,Y#	Lat=[-9000.0000,+9000.0000] Long=[-18000.0000,+18000.0000] R=[1,4294967295] is for Geo-fence radius X=[10,360] is for time interval send

			<p>alarm message. Y=0, Disable GEO-fence alarm. Y=1, Into GEO-fence alarm. Y=2, Out of GEO-fence alarm. Turns on Geo-fencing alarm. When the tracker moves in/out the preset scope,it will send an GPRS alarm to the server. Note: Make sure the position of north latitude and east longitude set it (+),otherwise set it (-) Format:+AABB.BBBB</p>
6	Set APN,Username,Password	*\$\$\$\$\$\$,011,APN,Username,Password#	<p>APN : APN string (must < 28 chars) User name: Your username (must < 28 chars) Password: Your password (must < 28 chars) * If haven't username or password, then left it blank. For example: *000000,011,CMNET,,## (It haven't username and password)</p>
7	Set IP Address & port number	*\$\$\$\$\$\$,015,0,IP(DN),PORT#	<p>IP : xxx.xxx.xxx.xxx or DN: Domain Name PORT : [1,65535]</p>
8	Set the time intervals of GPRS Data	*\$\$\$\$\$\$,018,X,Y#	<p>X (3 Digital) =0 stop send time interval GPRS =[10,999] Time interval (UnSit: sec) Y (3 Digital) =0, stop send time interval GPRS = [1,999] After send YYY times stop. =999, continue send GPRS un-stop</p>
9	Set the GPRS mode	*\$\$\$\$\$\$,019,X#	<p>X=0, Use the UDP mode X=1, Use the TCP mode</p>
10	Enable/Disable I/O port	*\$\$\$\$\$\$,025,A,Y#	<p>Y=0,Out port A is high (the circuit will restore) Y=1,Out port A is low (the circuit will be cut off) eg: *000000,025,A,1# Circuit to port 5 will be cut off</p>
10	Reading the IMEI number	*\$\$\$\$\$\$,801#	<p>This command to ask AVL201reply the IMEI number and the firmware of</p>

			version.
11	Initialization Tracker	*\$\$\$\$\$,990,099#	It will set all parameter to factory default value (Excluding the Password).
12	Reboot by SMS command	*\$\$\$\$\$,991#	It will reboot the AVL201 by this SMS command.
13	Clear data flash	*\$\$\$\$\$,500#	Clear stored in the flash memory inside the machine
14	Map Link	*\$\$\$\$\$,100#	the device will reply a sms link .after clicking the sms link, you will get a segment of google map for the device location on your cell phone.
15	OutA Change switch	*\$\$\$\$\$,116,A#	A=1, active 117 command set . A=0, Don` t active 117 command set
16	Set OutA Change	*\$\$\$\$\$,117,A,B,C,D#	A=[0,999]km/h , the threshold of speed. B=[0,60000] ms, the interval of outA off C=[0,60000] ms, the interval of OutA on D=[0,99], the times of OutA change If the speed is lower than, the OutA will off B seconds, then restore C seconds, repeat it D times. <i>*note: because of the safety, you had better set the parameter like this: *000000,117,60,500,3000,5#</i>
17	According to the digital input1 state decided to time intervals of GPRS Data	*000000,156,X,Y#	X=0, Disable this function(Default) X=1, Active this function. Y=[1,60]/minutes, Input1 have not detection to high level (engine off) time interval,If a high voltage is detected, the machine according to the 018 instructions to send data
18	Reboot time	*\$\$\$\$\$,600,X,Y#	X=0,Disable this function (Default) X=1, Active this function. Y= [10,9999]/ Minutes, Reboot time interval
19	data flash switch	*\$\$\$\$\$,601,X#	X=0,Disable data flash function X=1,enable data flash function (Default)

9. Q&A

1. Question: Unit will not turn on

Answer: 1) Battery needs to charge.

Resolution: 1) Recharge the unit for 2 hours.

2. Question: Turn on the unit, and come into sleep mode.

Answer: 1) The battery needs to charge

2) The device needs to initialize after update new firmware.

Resolution: 1) Charge the unit.

2) Please don't turn off and on after you update the new firmware.

3. Question: Unit will not reply with SMS

Answer: 1) The unit don't register the GSM network.

2) The signal is poor

3) Wrong password or wrong command format

4) The SIM is AVL201 has run out of credit

Resolution: 1) Check the SIM card has enough money for work.

2) Check the unit registers the GSM network.

3) Please care about the command format, attention it is “,” not a “, ”.

4. Question: GSM function can't work normal

Answer: 1) There is no GSM signal.

2) Not insert the SIM card

3) SIM card has PIN code active

4) SIM card damaged

5) Battery is low

Resolution: 1) Compare with a mobile to check the GSM signal.

2) Make sure you insert a SIM card and the SIM can work.

3) Remove the PIN code of the SIM card.

4) Charge the unit to ensure the GSM start working.

5. Question: Can't receive the GPS

Answer: 1) Unit doesn't have a open sky

2) Bad GPS reception

3) Battery is low

Resolution: 1) Move the unit to an open sky. Tall buildings, trees, cloud or heavy rain will case the bad GPS reception.

2) Place the front side of the unit towards sky.

3) Charge the unit and get enough power for the unit working.

6. Question: Can't connect the server via the GPRS.

- Answer:**
- 1) SIM card in AVL201 doesn't support GPRS function.
 - 2) The APN is not correct.
 - 3) Incorrect IP and Port
 - 4) GSM signal is weak.

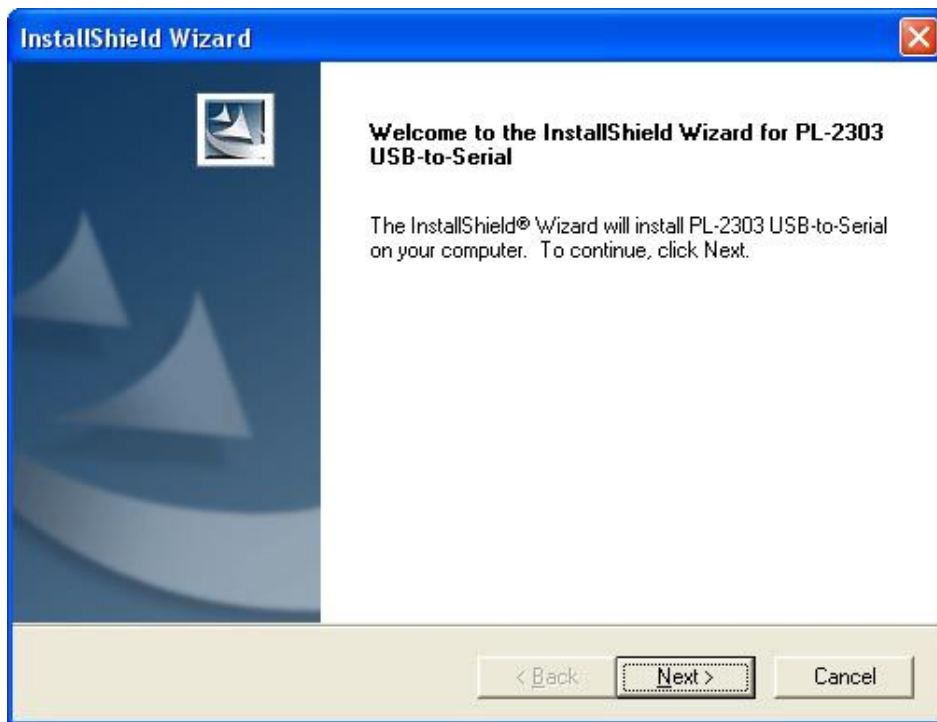
- Resolution:**
- 1) Open the GPRS function for the SIM card.
 - 2) Make sure the APN correct.
 - 3) Get the correct socket of the server.
 - 4) Move the device to a good GSM signal area.

10. Update the firmware of the AVL

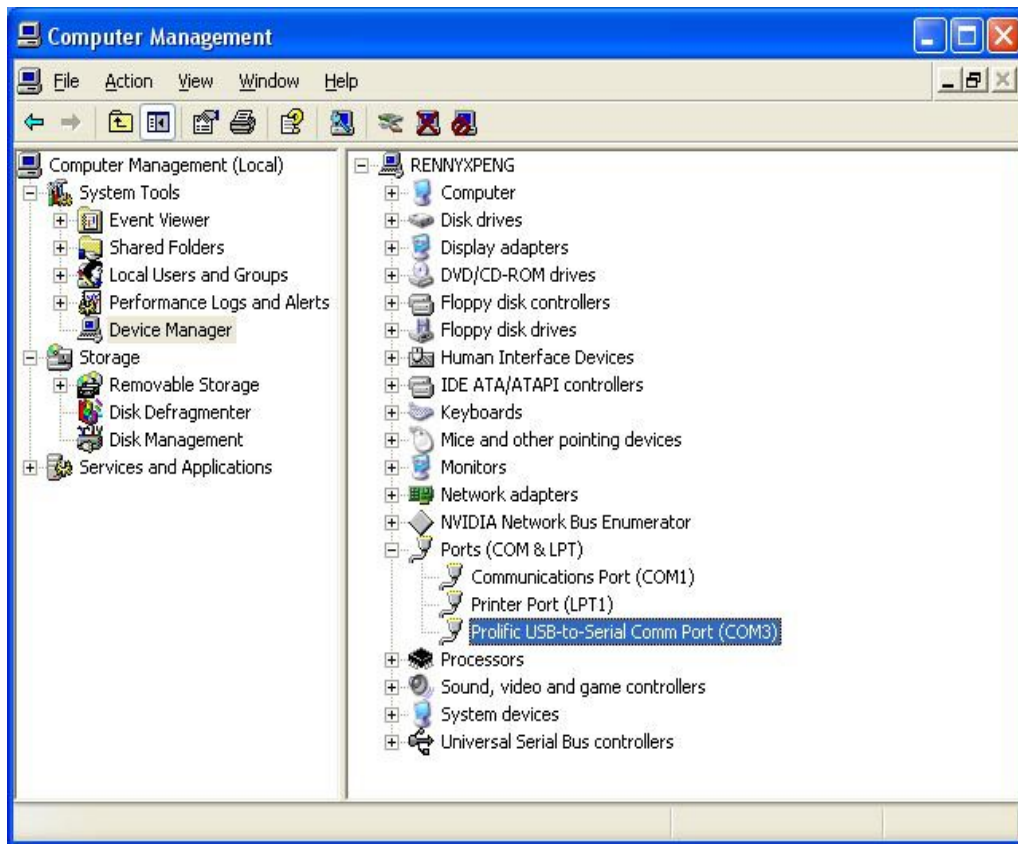
Update User Guide

1) Install RS232 cable driver

A. At the first, Install the Driver for "USB Converter"



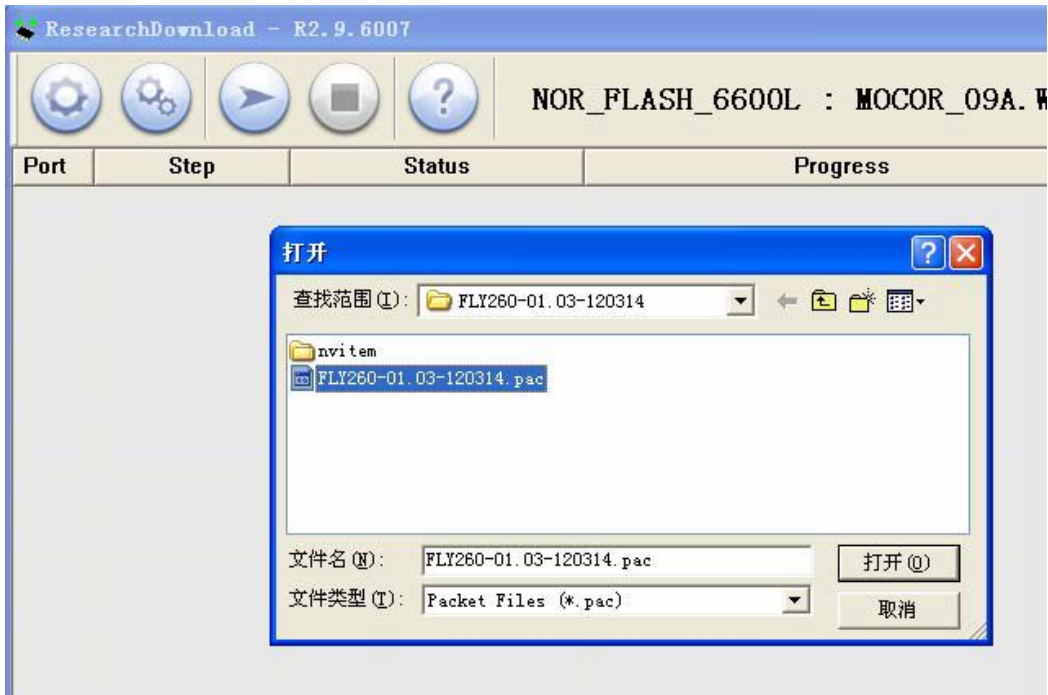
B. Connect the GT unit to PC through RS232 cable, View the com port that the cable used



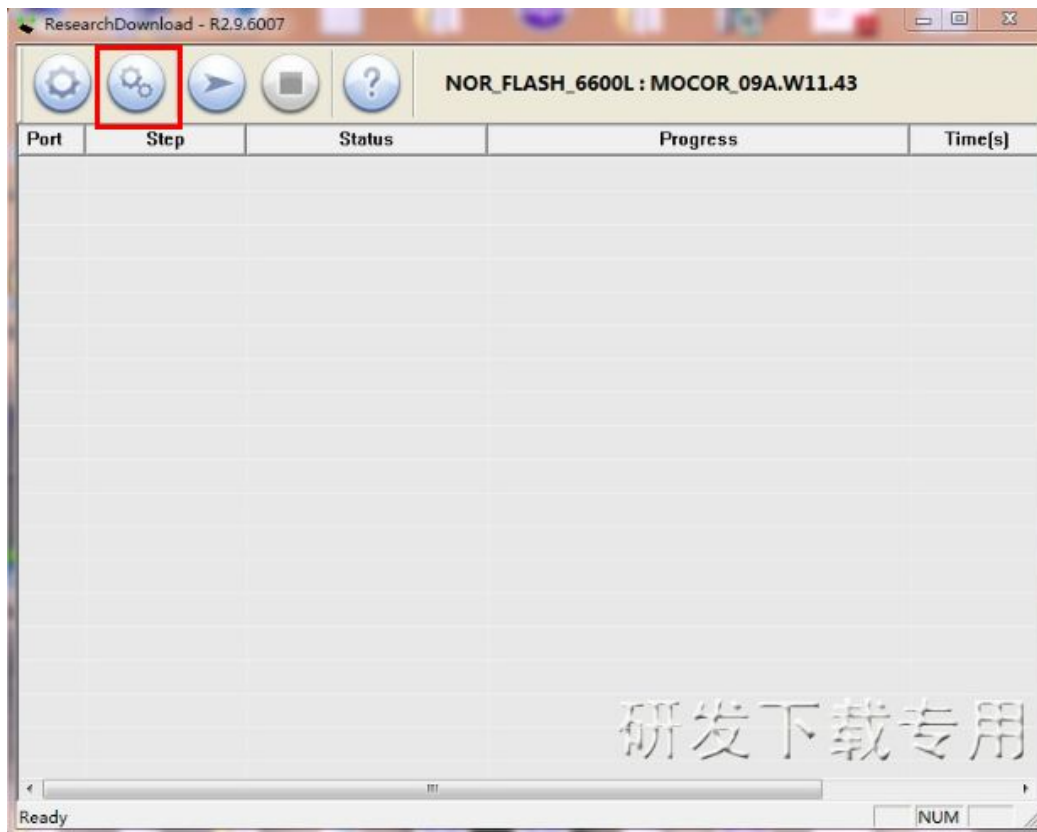
2) Run FLY260 Floader_R2_9_6007.exe program, the interface is as follow, click the button in the red pane.



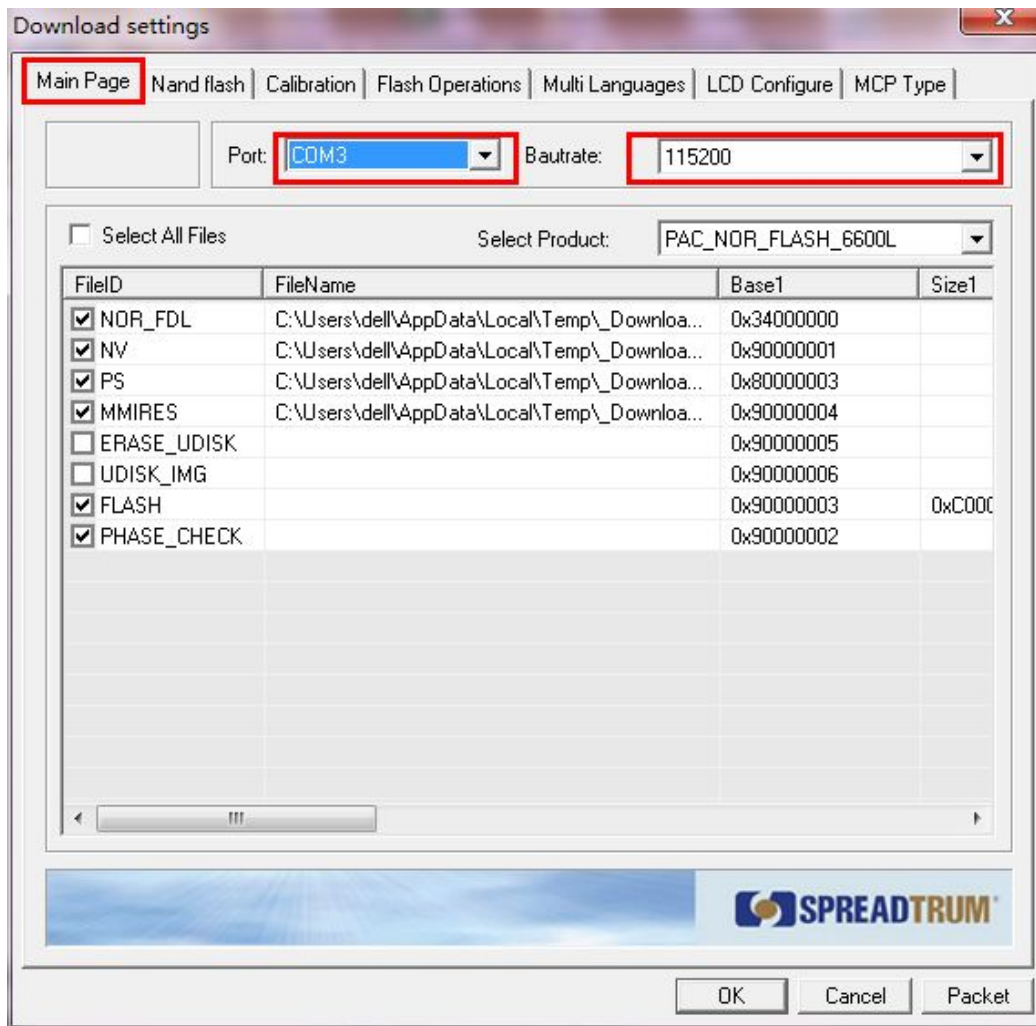
3) You will see the following interface, select the program file (XXXXX.pac) that need to be updated.



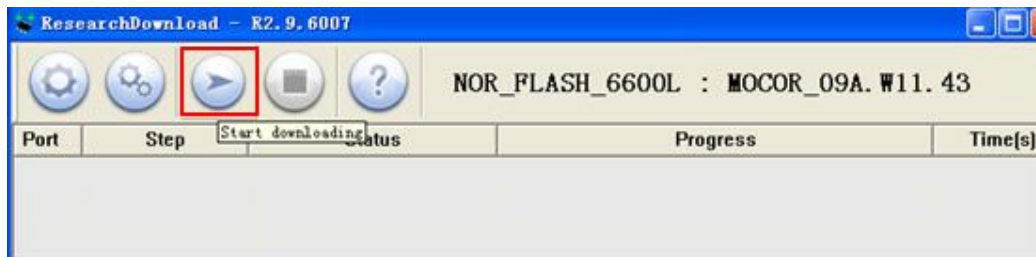
4) Click the button in the red pane.



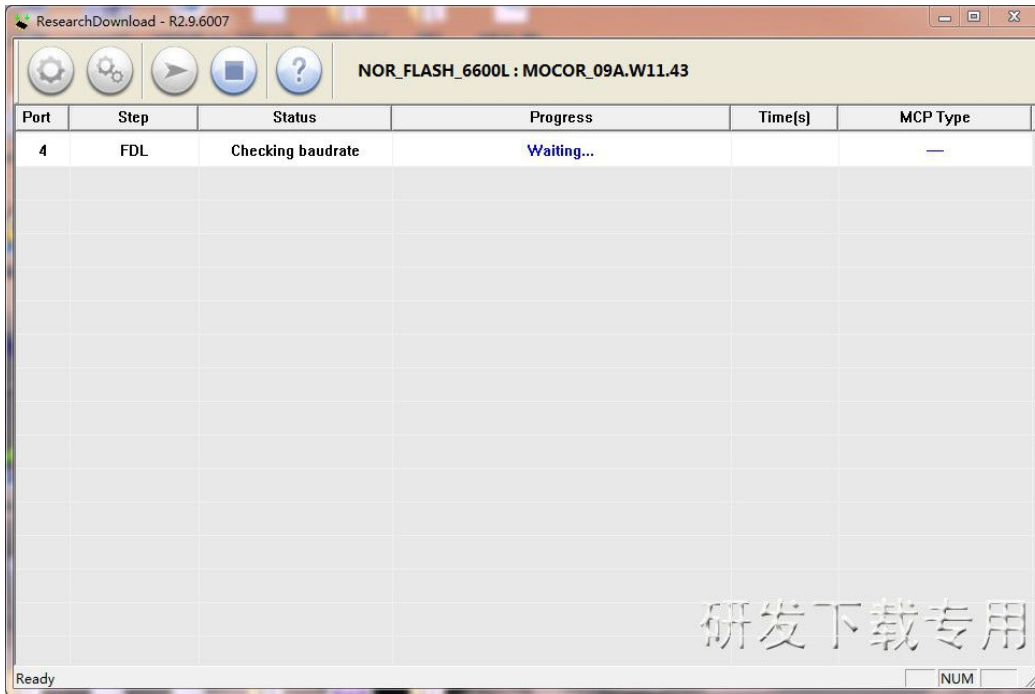
5) Choose the Com Port that the RS232 Cable used



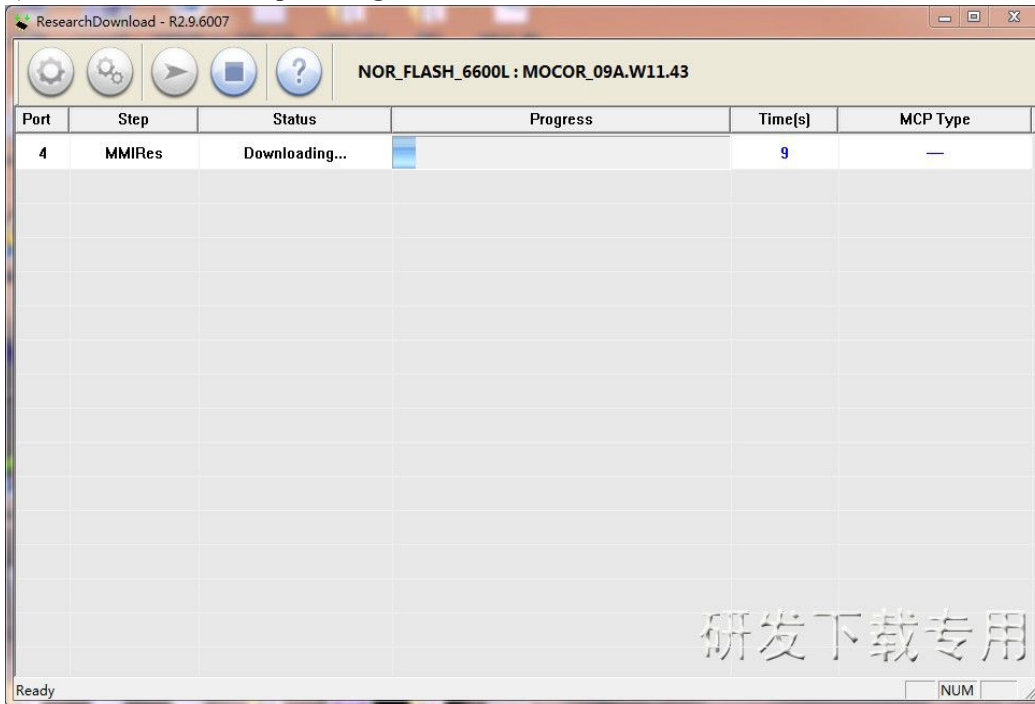
6) Click the button in the red pane.



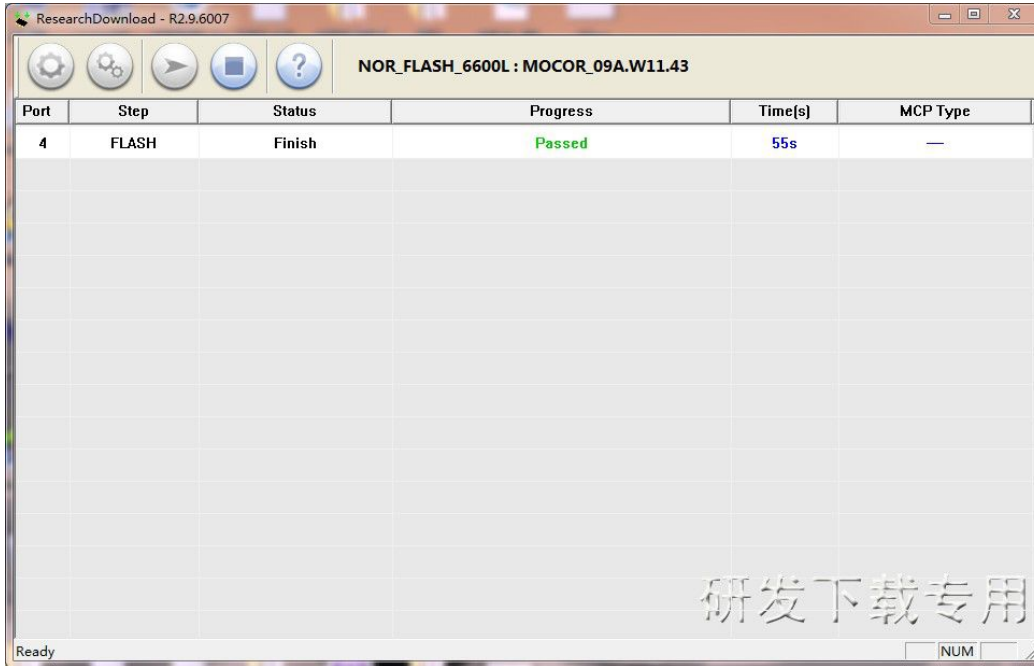
7) You will see the following interface .



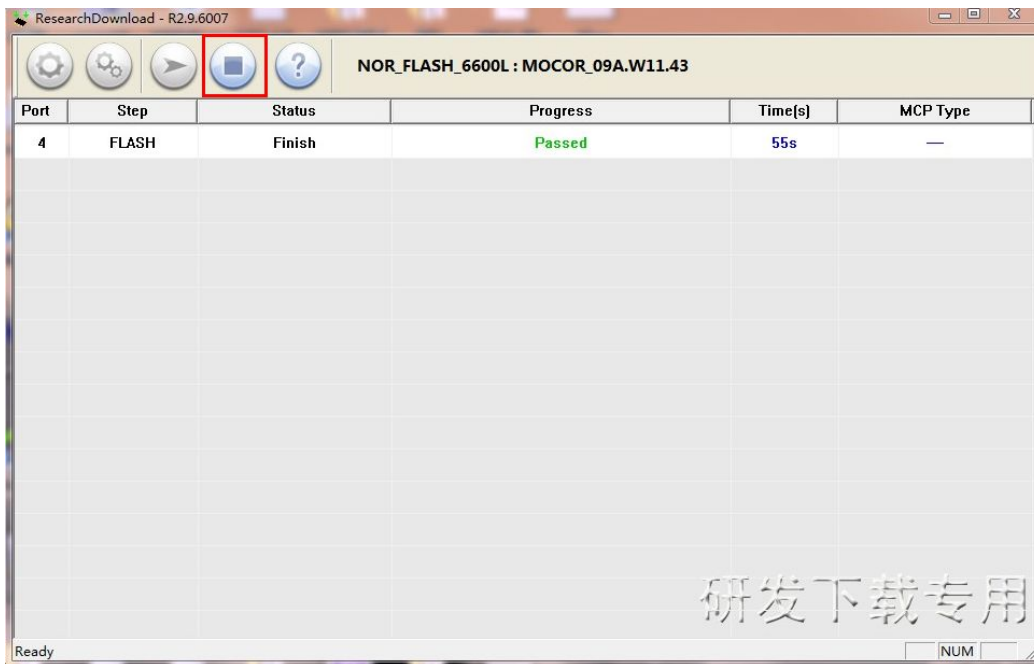
8) Restart the module, update begins, the interface is as follow.



9) Update complete, the interface is as follow:



10) Then click the stop button in the red pane of the following picture, Update complete.



11) Restart the module.