Automatic vehicle locator Model:AVL-850

Java platform

GPRS+GPS

User's Manual

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MADE IN TAIWAN

Version History

Date	Version	Description of change	Author
2008-08-12	1.0	Original	NED

Content

1. Introductions

1.0 Overview

AVL-850 is a versatile and economical platform for mobile positioning applications. It integrates UniTraQ GPS module with Quad-band 850/900/1800/1900GSM/GPRS communication module and powerful microcontroller all onto a single board.

It is enclosed in a solid casing for easy installation. AVL-850 provides reliable Real Time vehicle GPS positions anytime anywhere in the world, providing the correct position and status of vehicles from remote locations onto computer displayed maps. Benefits such as increased fleet efficiency, improved public and driver safety, better emergency response time, enhanced fleet control, and good public relations are all realized through the proper implementation of AVL-850 system.

The AVL-850 system takes advantage of JAVA machine to transmit NMEA message to 24-hrs Control Center by Packet-Switch for monitoring through either GPRS or SMS massage system. Control center sets command by sending commands for monitoring through GSM system or Internet access.

1.1 Features

- Supports Quad band 850/900/1800/1900 MHZ operation
- JAVA platform
- Java MIDP_2.0 virtual machine for easy and fast application development
- GPRS multi-slot class 10 and mobile station class B
- Integrated TCP/IP stacks
- SMS transfer via GSM/GPRS
- Remote control via SMS
- Real-time GPS tracking
- Real-time vehicle status monitoring
- Dual data communication capability through GPRS and SMS
- Supports speaker and microphone interface
- 6 Bi-directional digital IO ports with voltage protected up to 40V
- RS232 interface with DB9 connector for Java program updating
- Power supply and low battery detection acknowledge
- 4 LED indicators for power, battery charger in progress, GSM/GPRS and GPS status
- Built-in 1100mAh Recharge battery

1.2 Applications

- Security (cash carrier vehicle and police vehicle)
- Commercial vehicle monitor and driver performance monitor
- Fleet management
- Logistics
- Rental car monitoring and theft recovery
- Emergency (ambulance and fire engine)
- Hazardous waste management

1.3 Optional java program

- Data logger in flash mode
- Up to 5 SMS numbers for emergency report
- Self geofence and out of range alert
- Speed detection
- OTA firmware upgrading
- GPS reporting internal user programmable
- System status report(IO,power,battery)
- Security administration

1.4 Electrical Specifications

1.4.1 General Specifications

Parameter	**specification**
Platform	Java, MIDP 2.0
Power Supply	9~60 VDC
Power Consumption	Power down 50uA
	Sleep mode 3mA
	GPRS class 10(Ave) 600mA
Firmware Upgrade	RS232 interface or by the air interface
Function Setting	RS232 interface or by the air interface
SIM card type	1.8V, 3V
LED Status Indicator	Main Power/ Battery charge in progress/GPRS/GPS
Serial port interface	RS232 interface with DB9 connector
Digital GPIO	6 Bi-directional digital IO ports with voltage protected up to 40V

1.4.2 GPRS/GSM Specifications

Parameter	**specification**
Frequency	Quad band 850MHz/900MHz/1800MHz/1900MHz
Output Power	Class 4(2W) for EGSM 850 and 900 Class 1(1W) for GSM 1800 and 1900
Protocol support	TCP/UDP/PPP
GPRS Multi-slot	Class 10
GPRS Mobil station	Class B
Coding scheme	CS1,CS2,CS3,CS4
PBCCH support	Yes
USSD support	Yes
Downlink/ Uplink max.	85.6Kbps/42.8 kbps

1.4.3 GPS Specifications

Parameter	specification
Transmission data	NMEA 0183 Ver3.01
Receiver channels / Fixing method	44 channels
Acquisition sensitivity	-137 dBm
Tracking sensitivity	-158 dBm
Receiver frequency	1575.42MHz L1 C/A Code
Accuracy (1)Position (2)Datum	 5m CEP WGS-84
Time To First Fix (1)Cold start (2)Warm start (3)Hot start	 45Sec(typ) 35Sec(typ) 1Sec(typ)
Dynamic condition	4G (39.2m/sec^2)
Interface	UART
Operational Limits (1) Altitude (2) velocity	 < 18,000m < 500m/s
Bit rate	4800 bps
Start bit	1 bit
Stop bit	1 bit
Data bit	8 bit
Parity	None
Output sentences	GPGGA/GPGSA/GPGSV/GPRMC
Refresh time	1Sec

1.5 RS232 Interface

AVL-850 offers RS232 interface and RS232 to meet the requirements of TIA/EIA-232-F. RS232 interface is a command and data interface which allows users to download Java firmware and set functions.

1.6 Antenna Interface

1.6.1 GPRS/GSM Antenna Connector

AVL-850 offers a SMA type connector which must be connected to an external passive antenna.

1.6.2 GPS Antenna Connector

AVL-850 offers a SMA type connector which must be connected to an external active antenna. The connector receives RF signal input and antenna power supply.

1.7 LED Indicator

1.7.1 Main Power Indicator

For the Main Power Indicator through **red** LED, detailed information is shown in the following table.

LED mode	**Operation status**
On	Main power on
Off	Main power off

1.7.2 Backup Battery Charger Indicator

For the Main Power Indicator through **yellow** LED, detailed information is shown in the following table.

LED mode	**Operation status**
On	Backup battery charge in progress
Off	Backup battery charge complete

1.7.3 GPS Status Indicator

For the GPS status indicator through **green** LED, detailed information is shown in the following table.

LED mode	Operation status
2 sec On /2 sec Off	Searching satellite
1 sec On /1 sec Off	Tracking satellite

1.7.4 GSM/GPRS Status Indicator

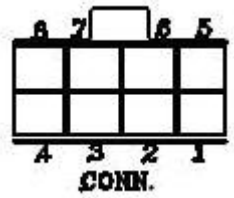
For the GPRS/GSM status indicator through **green** LED, detailed the information is shown in the following table.

LED mode	Operation status
Off	GSM/GPRS is not running
64 ms On / 3000 ms Off	Logged to network (monitoring control channels and user interactions). No call in progress.
64 ms On / 300 ms Off Flashing	Indicates GPRS data transfer:
64 ms On / 800 ms Off	GPRS does not find the network

1.8 External Connection

Pin	Signal	Type	Description
1	Digital_ I/O1	I/O	Bi-directional I/O
2	Digital_ I/O 2	I/O	Bi-directional I/O
3	GND	GND	GND
4	Vcc	Vcc	Connection to car ACC (9~40 VDC)
5	Digital_ I/O 3	I/O	Bi-directional I/O
6	Digital_ I/O 4	I/O	Bi-directional I/O
7	Digital_ I/O 5	I/O	Bi-directional I/O
8	Digital_ I/O 6	I/O	Bi-directional I/O

Front view of External Connect



1.9 Mechanical specification

Parameter	Specification
Dimension	85 mm(L) X62.5 mm(W) X 28 mm(H)
Weight	110g

1.10 Environment specification

Parameter		Specification
Temperature	Operating	-20℃ to +60℃
	storage	-40℃ to +80℃

1.11 Package List

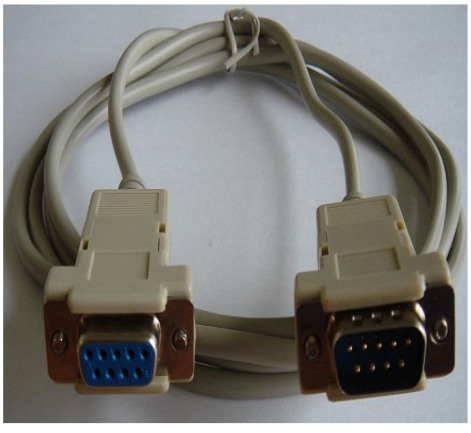
Before getting started, please make sure you have the following devices, programs and accessories.

1. AVL-850 AVL device x 1
2. GPS antenna x 1
3. GSM/GPRS antenna x 1
4. CD-ROM contains server program and related documents x 1
5. Power cord (without cigarette lighter socket) x 1
6. RS-232 cable x 1 (option)
7. Power cord with cigarette lighter adapter x 1 (option)
8. Earphone x 1 (option)

AVL – 850

GPS antenna

GSM antenna



RS-232 cable

Power Cord

Earphone

Power cord with cigarette lighter Adapter

2. Hardware Installation

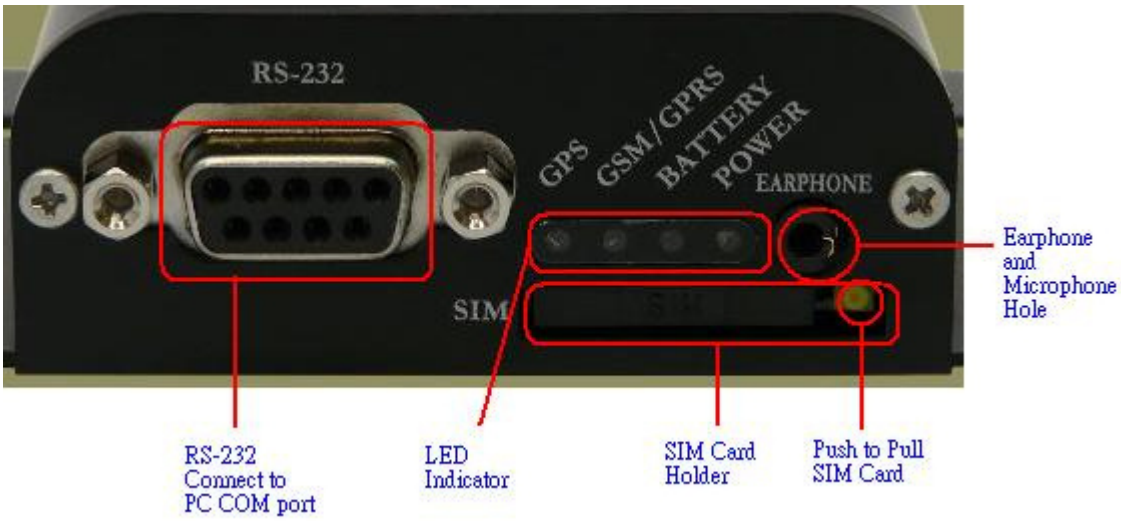
2.1 Precaution

1. Check if all parts are included as the Package List.
2. Prepare a SIM card and use a mobile phone to unblock the SIM PIN code. Be sure that if use the SIM card can dial out or receive calls without problem.

2.2 Panel Introduction

2.2.1. Front Panel

2.2.2. Rear Panel



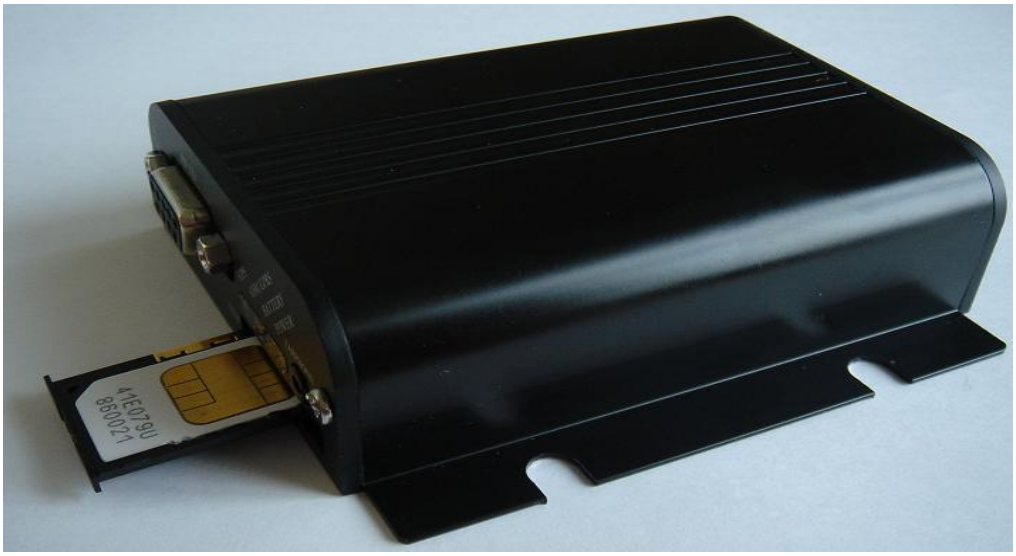
2.3 GSM Antenna Installation

Connect and fasten the GSM antenna to the unit, as shown in the figure.

PS : Be sure it is under the GSM service area.

2.4 SIM Card Installation

Insert the SIM card by sliding it into the card holder slot, as shown in the figure.



PS. If you want to replace the SIM card, press the push button and pull out the holder.

Be sure the SIM card can support the GPRS service.

2.5 GPS Antenna Installation

The GPS antenna is used to receive the satellite signal in the sky. It should be placed on where it will have an unobstructed view of the sky, such as the windshield.

2.6 Power Supply Installation

Simply connect the power cord to the power cord connector on the front side of the device. There is a power switch on the front side of the device, and you can turn it on/off by this switch.

2.7 LED Status Indication

1) After connected the power cord connector and turn the power switch on, the RED LED of power will light up.
2) The Green LED of GPS will flash while being active.
3) The Green LED of GSM/GPRS will flash when sending or receiving messages.
4) Being during charging status, the Orange LED will light up.

2.8 Check AVL by SMS

1) After the Hardware Installation is done. You can send the "***24709#**" by SMS to the installed device, and the position information included the latitude and longitude data will be response to you by the received AVL device.

Mobile phone sends SMS to AVL

The AVL will response the GPS information to AVL by SMS

3 AVL Configuration Setting

3.1 Click on the AVL Setting.txt for configuration setting.

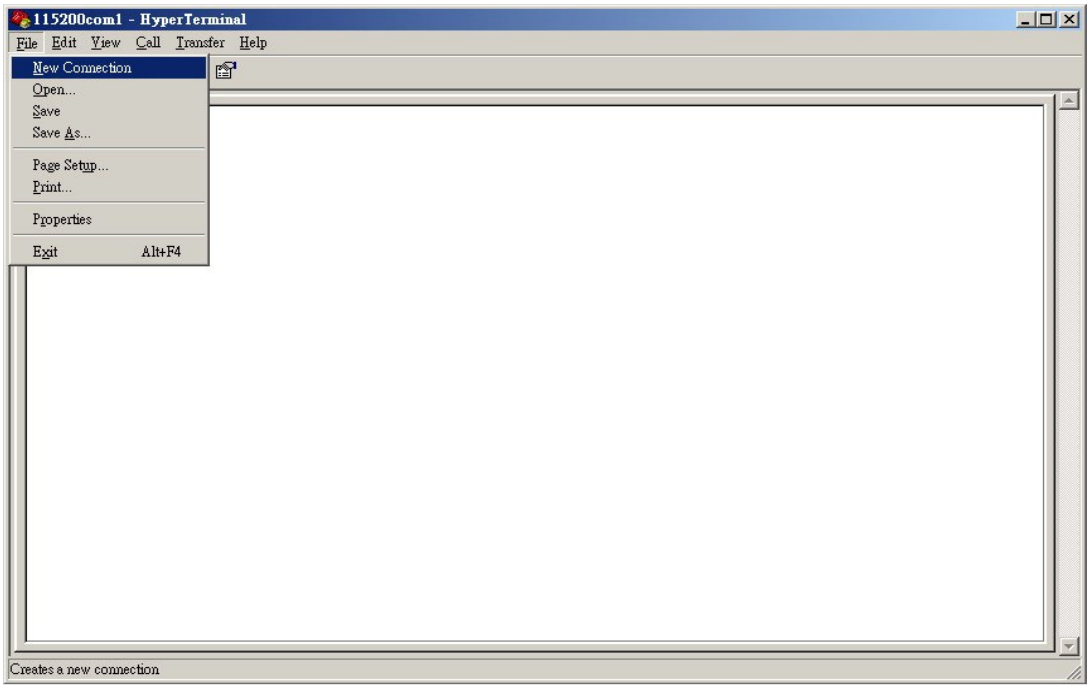
3.2 Set up the GPRS APN, Server Fix IP(TCP IP) and Port Number (TCP Port).

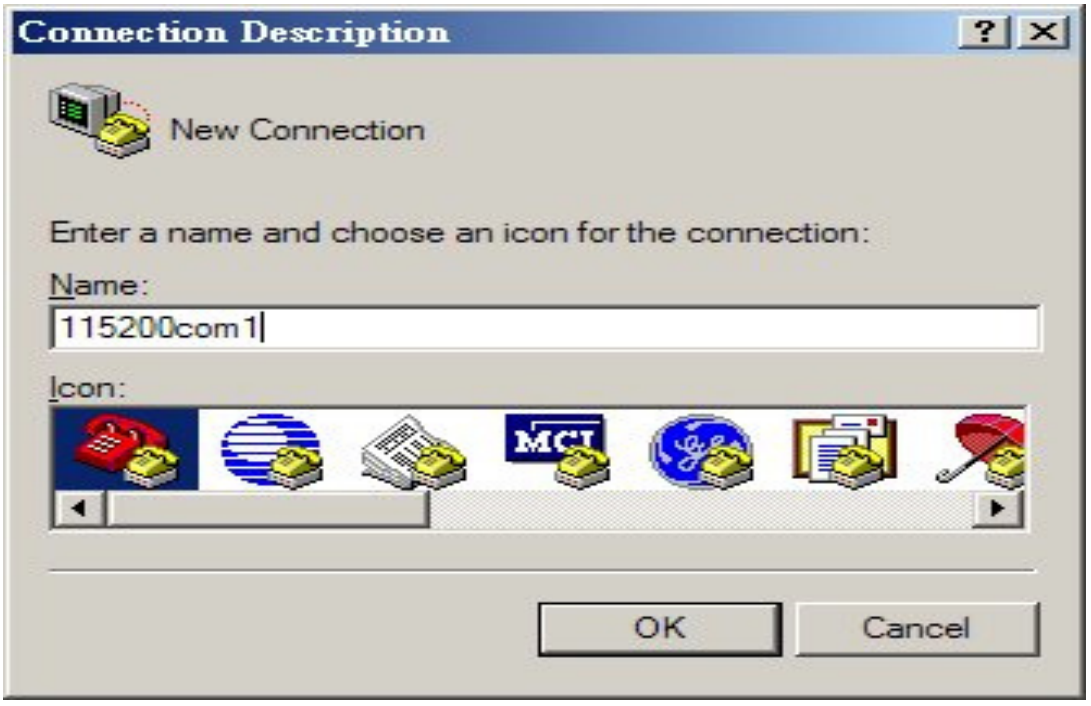
PS: Please check with your SIM card service provider for the service APN.

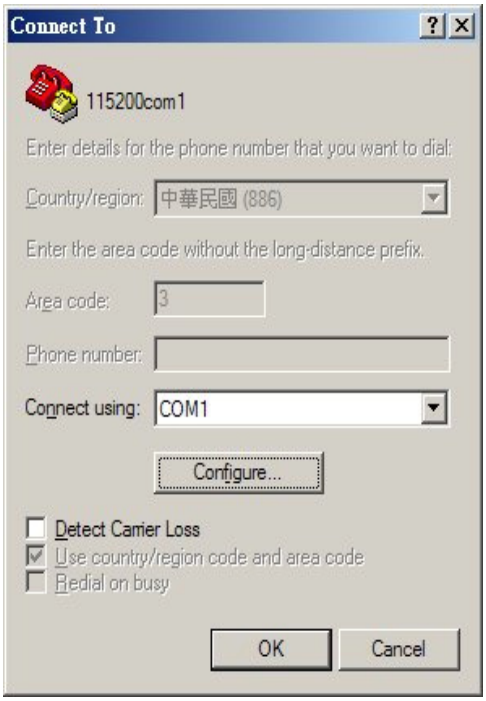
3.3 Save the configure file (setting.txt) to the computer.

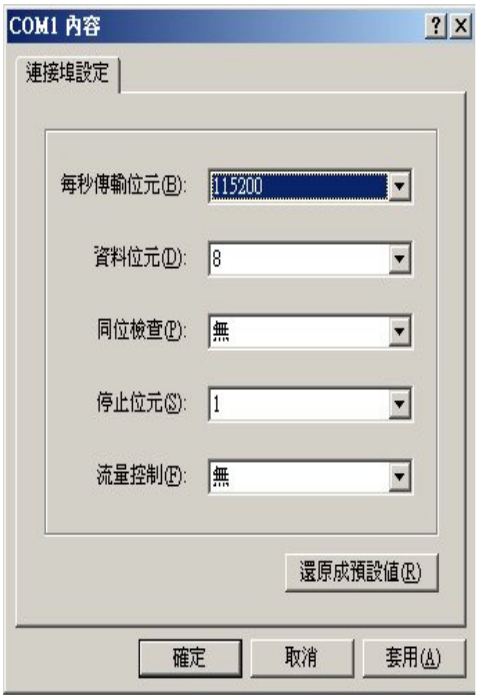
3.4 Connect to the COM port of the computer with RS-232 cable.

Run Hyper Terminal in Windows, and set up with baud rate 115200, 8 data bits, None parity check, 1 stop bit, no flow control.





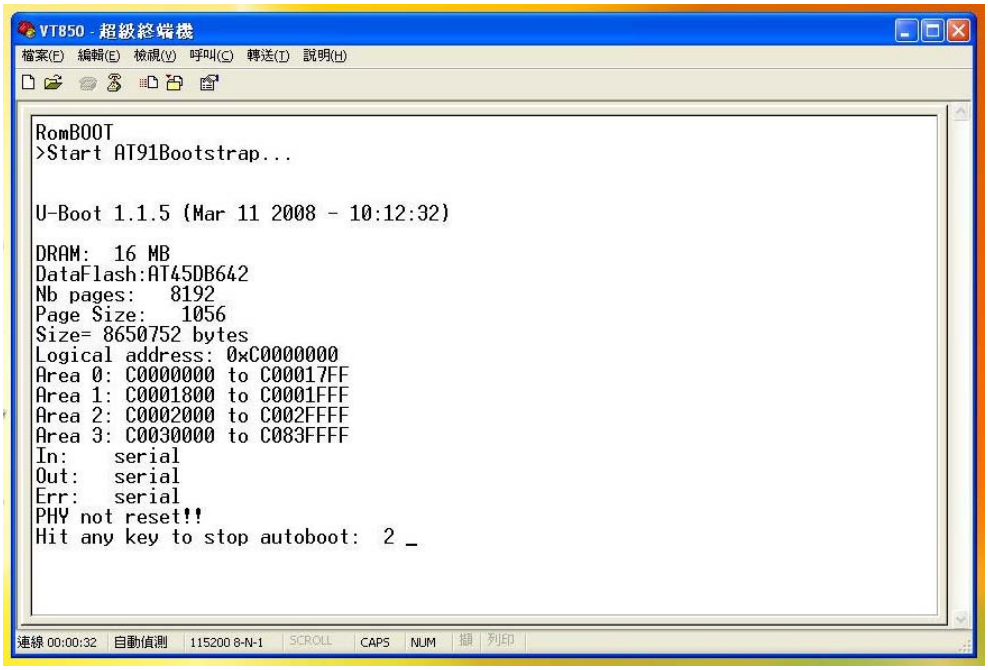




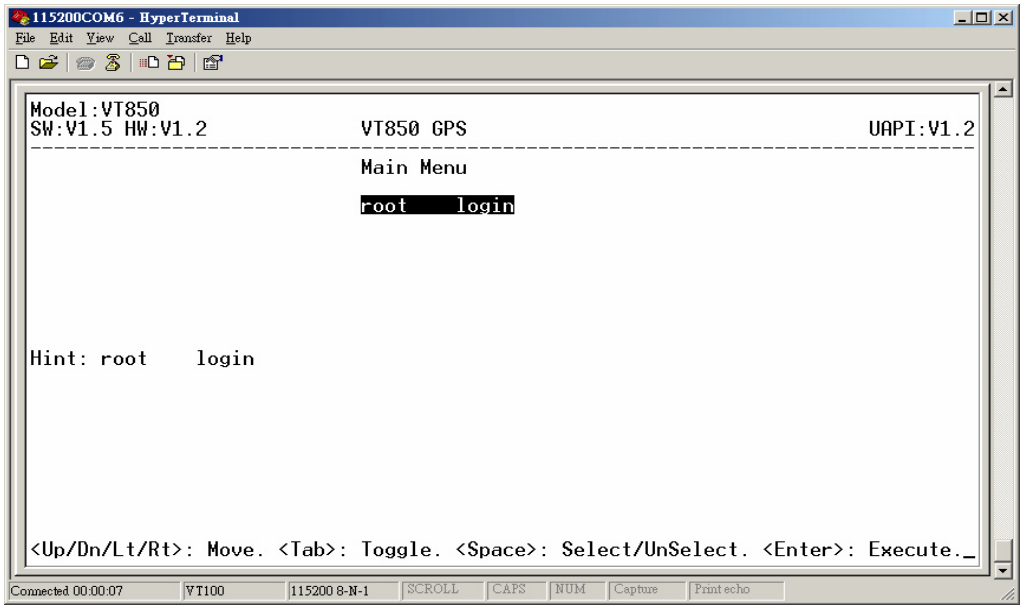
3.5 Download the above configure file (setting.txt) to the AVL.

PS: Please refer to the **Menu User Guide.doc** in detail.

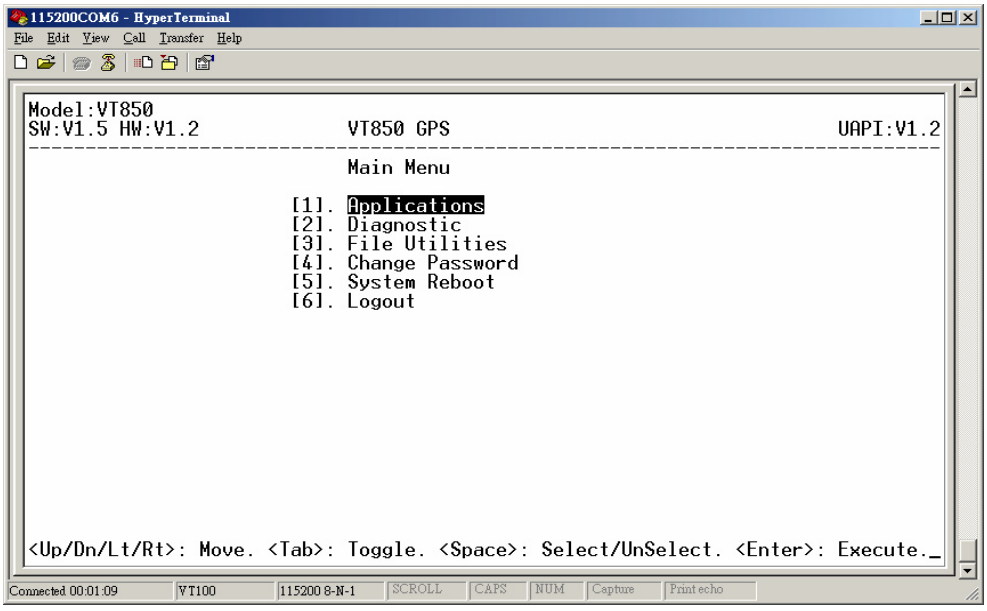
Turn the AVL's power switch on, wait for the boot procedure.



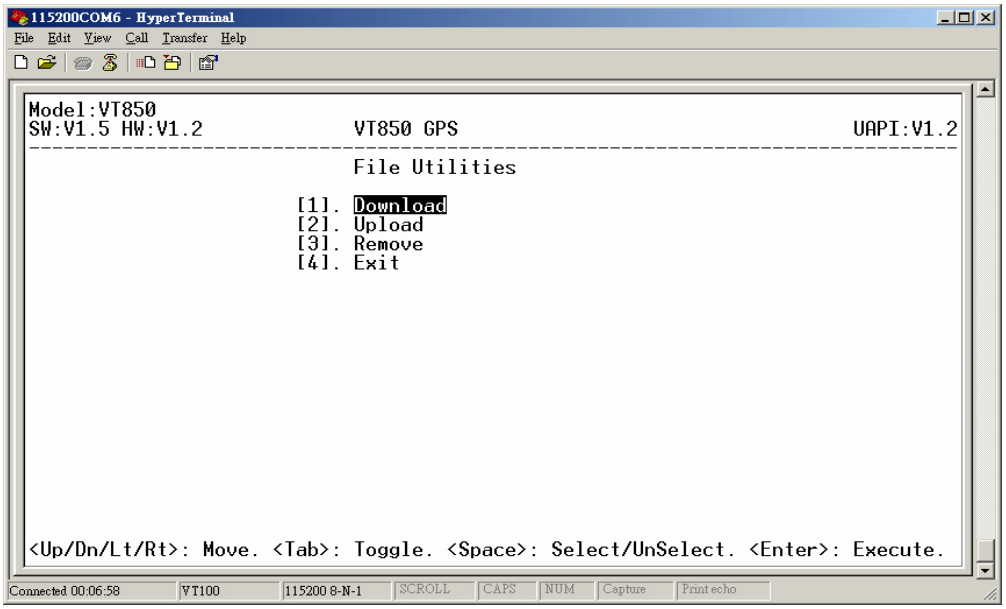
While in Menu state, type “**root**” and Enter to login.



Move down to select “**File Utilities**”.

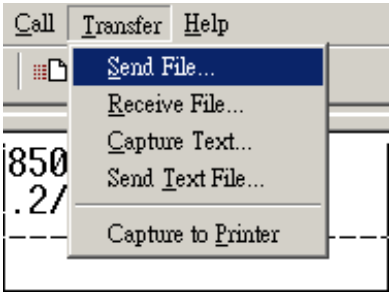


Select the “**Download**” and press Enter,

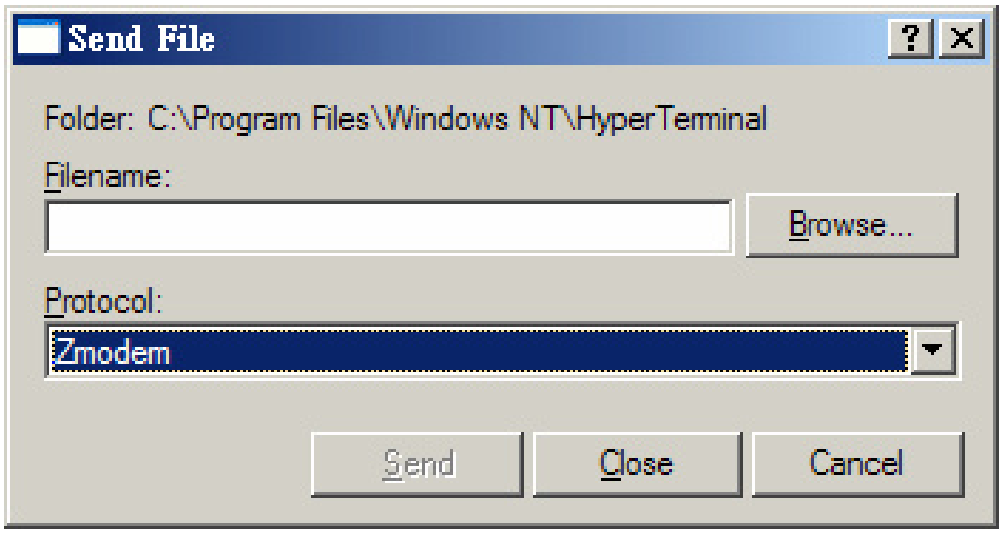


From the top toolbox,

Select “**Transfer**” -> “**Send File**”,

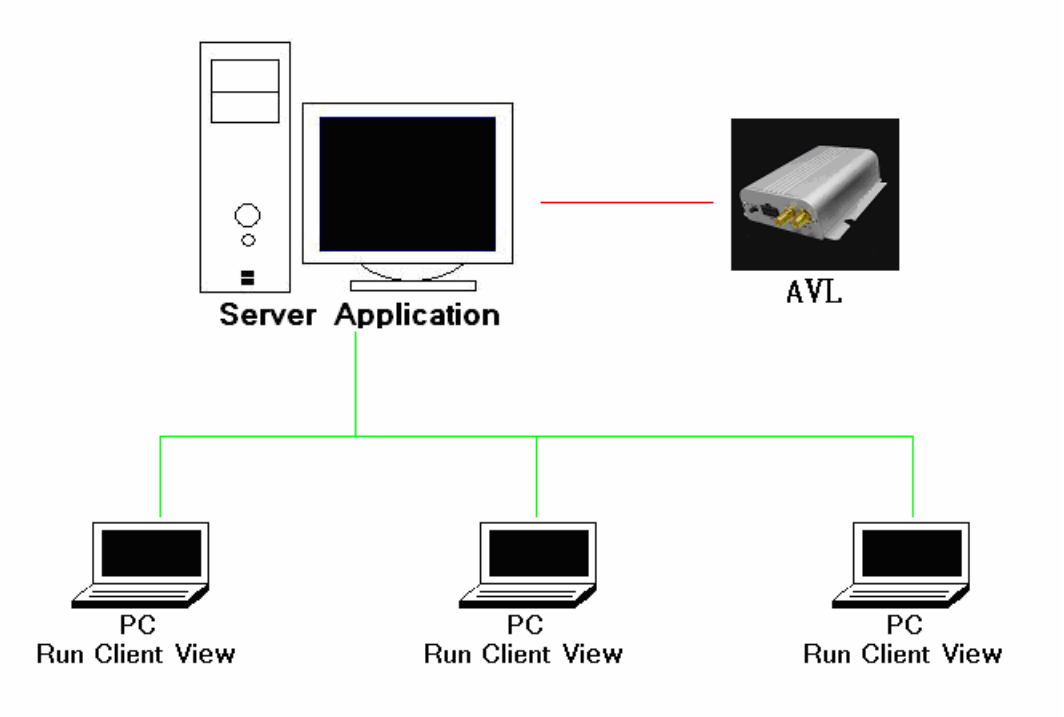


Input the “**Filename**” and choose the “**Zmodem”** protocol.
Then, click on “**Send**” to download the file from computer
to AVL.



4 Software Installation

4.1 Overview



The AVL contains the GSM/GPRS module and will send the location information to the Server.

The Server should be installed on a stand-alone computer as a middle ware to control and manage several AVLs. Meanwhile, the client Viewer can be installed on other computers as a supervisor over the client/server architecture.

4.2 Requirements

1) Make sure the SIM card has been installed into the AVL, and the GPRS function is not blocked.

2) **Fix IP Address** is required. The AVL will send the GPS data and necessary information to the Server by GPRS.

PS: The default IP is 59.124.169.114 and default port is 4000, it can connect to our Server for your testing.

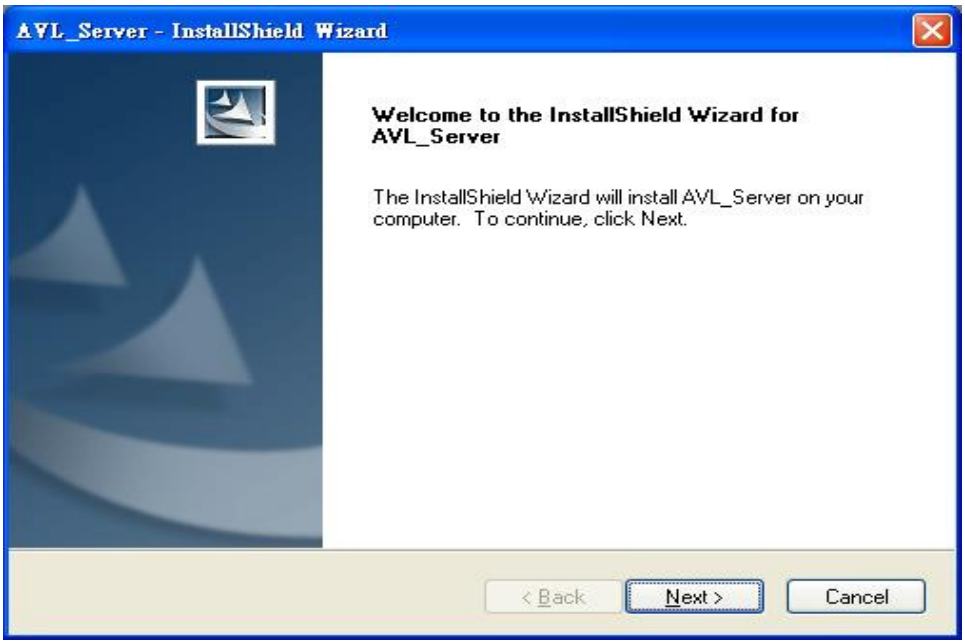
3) The PC system requirements as the following:

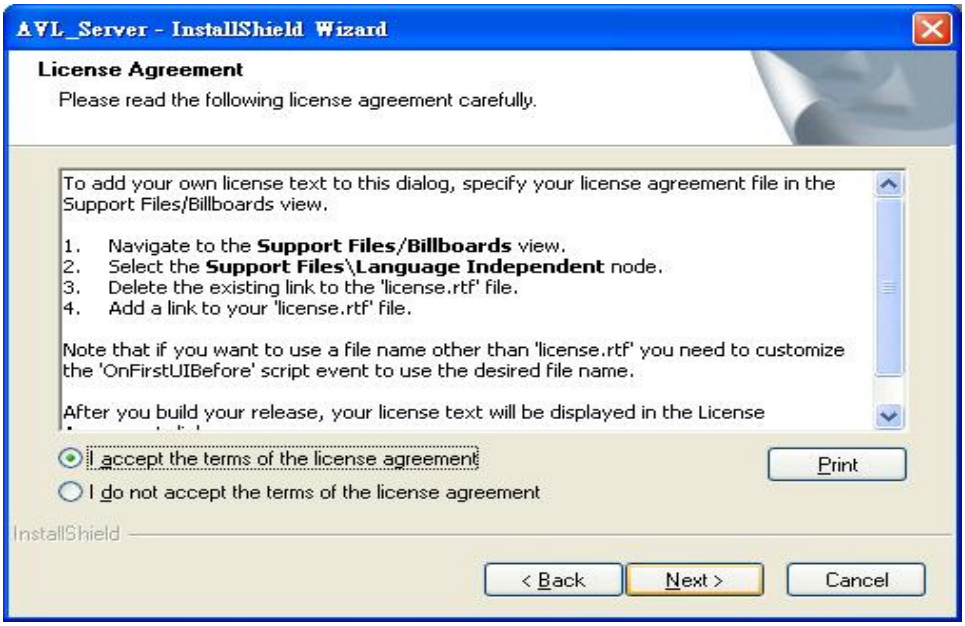
- Operating system: Windows 2000 or XP.
- CPU: Intel Celeron 2.0 above.
- Hard disc: 2.0GB above.
- Memory: 256MB above.
- Ether Port (LAN Port): 10/100MBPS above.

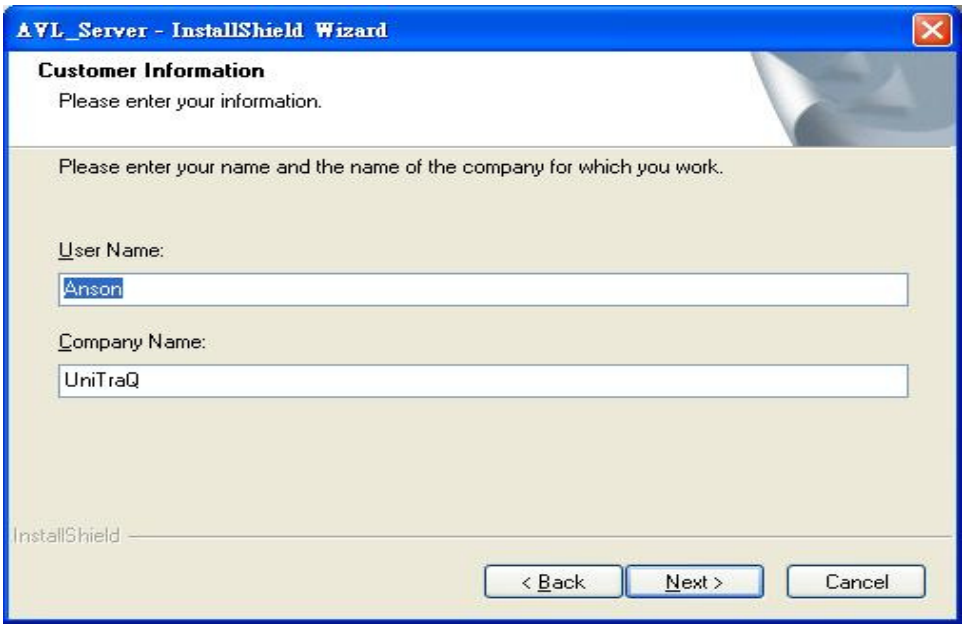
4.3 Server Installation

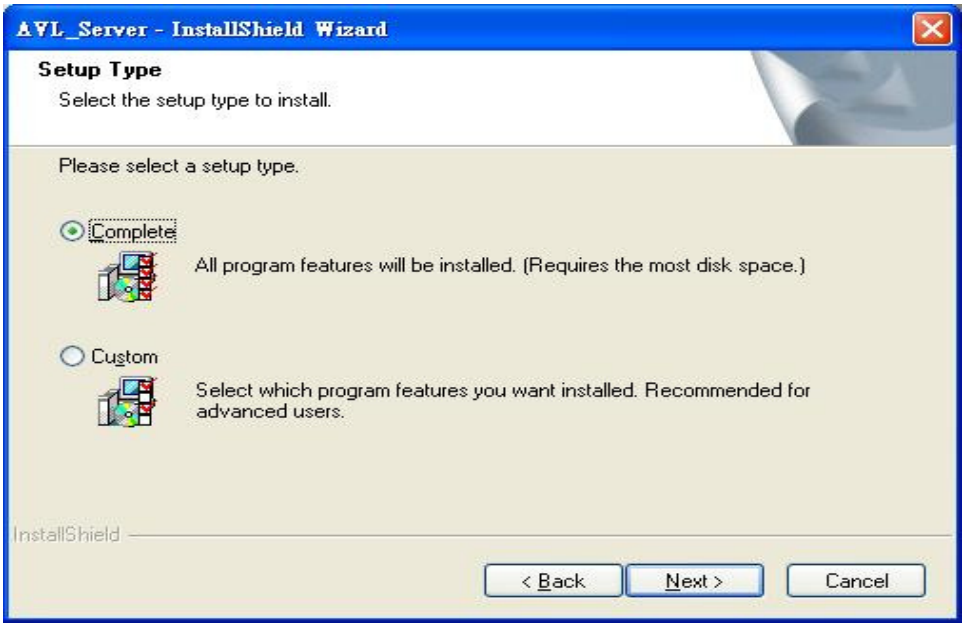
1) Insert the CD-ROM into your CD drive, wait for the auto-run and main page.

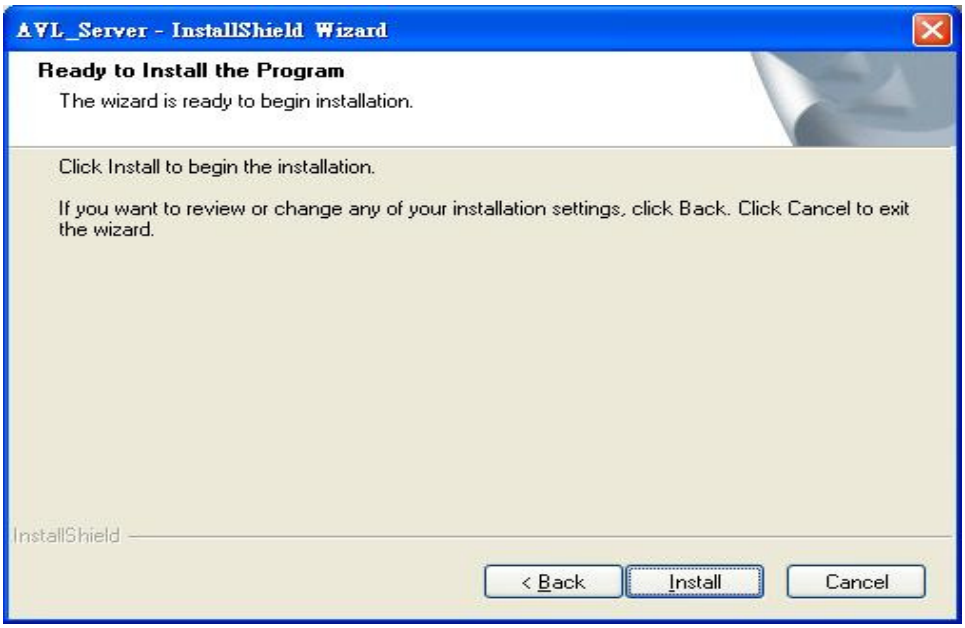
2) To install the Server to your computer.

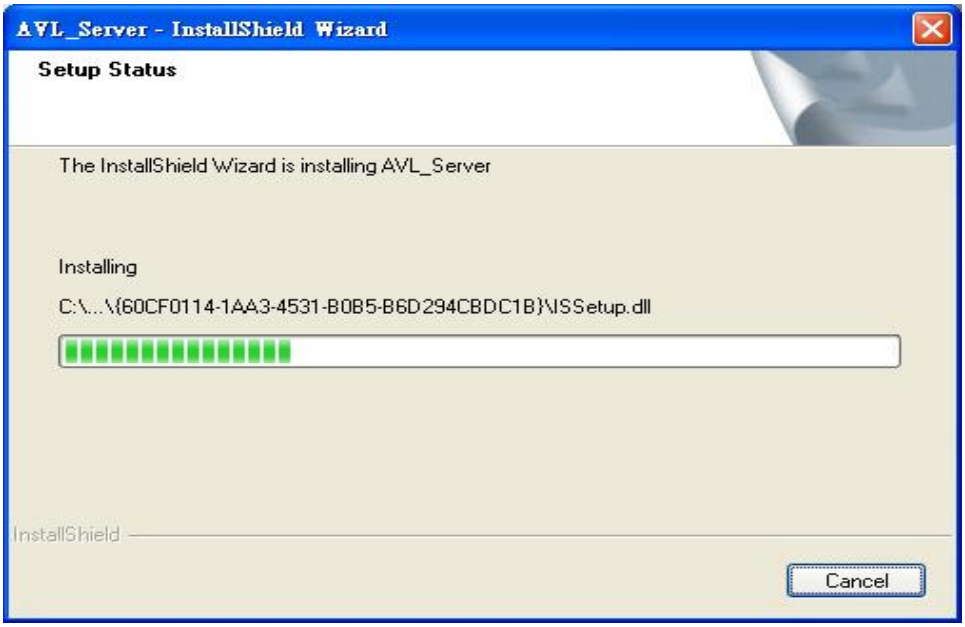


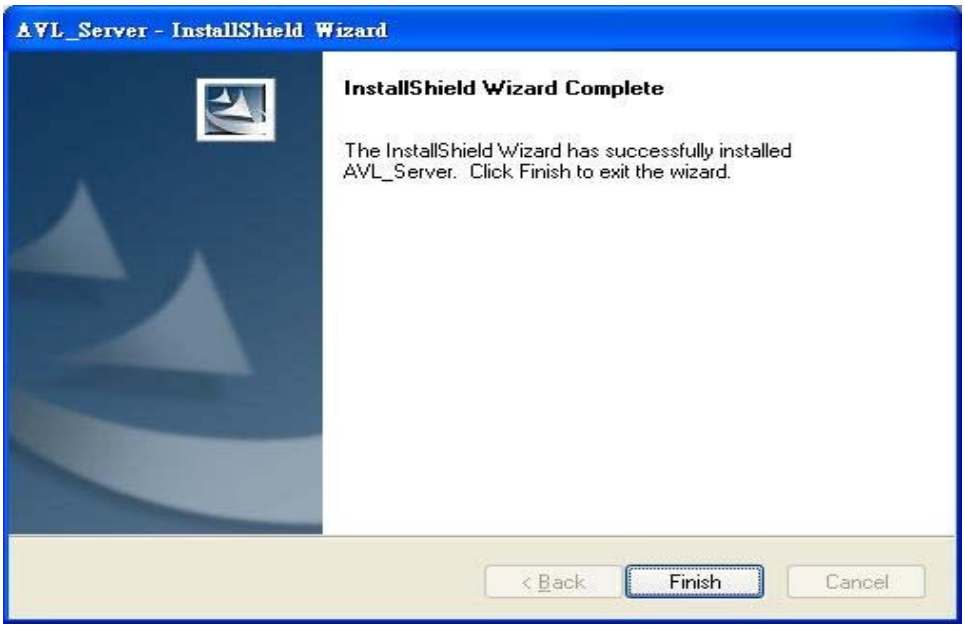



AVL_Server - InstallShield Wizard
Customer Information
Please enter your information.
Please enter your name and the name of the company for which you work.
User Name:
Anson
Company Name:
UniTraQ
InstallShield
< Back
Next >
Cancel


AVL_Server - InstallShield Wizard
Setup Type
Select the setup type to install.
Please select a setup type.
Complete
All program features will be installed. (Requires the most disk space.)
Custom
Select which program features you want installed. Recommended for advanced users.
InstallShield
< Back
Next >
Cancel


AVL_Server - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

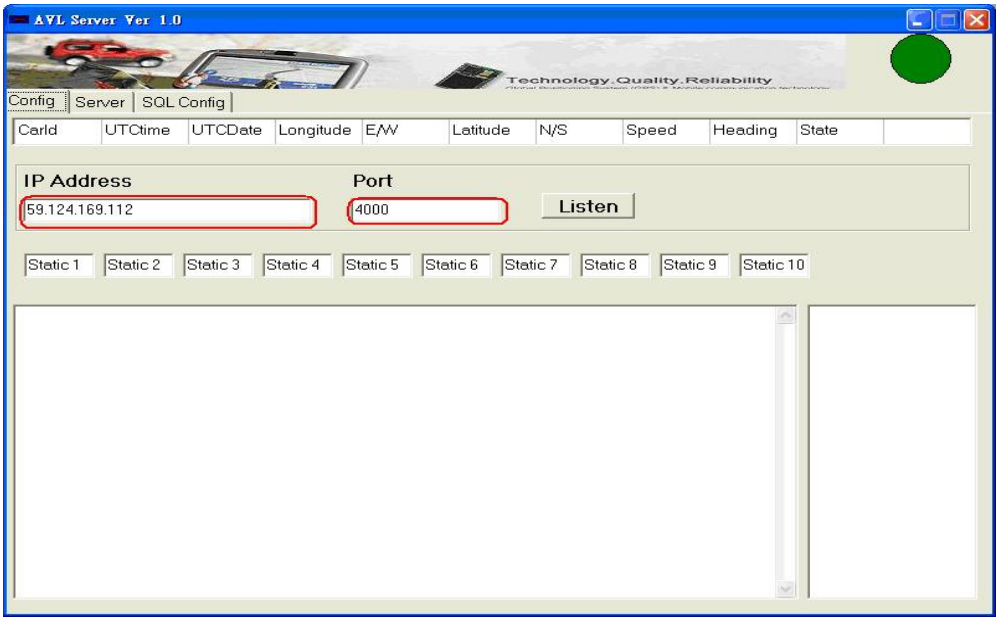

AVL_Server - InstallShield Wizard
Setup Status
The InstallShield Wizard is installing AVL_Server
Installing
C:\...\{60CF0114-1AA3-4531-B0B5-B6D294CBDC1B}\ISSetup.dll
InstallShield
Cancel



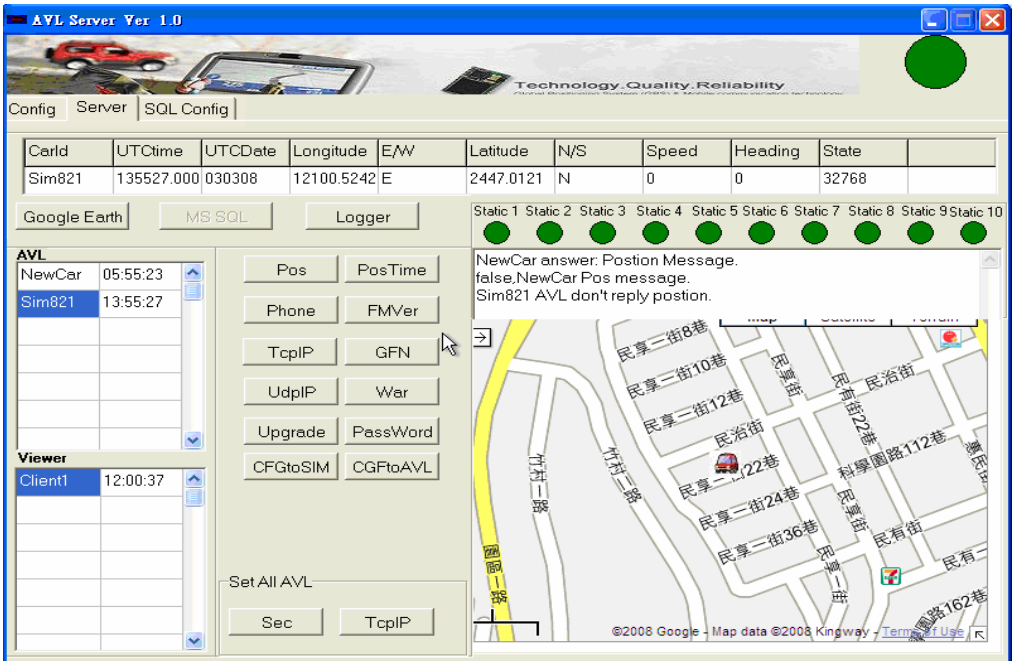
3) Click on the AVL Server.exe to run the Server application.

AVL Server.exe

Input the **IP**, **Port number** for Server and click on "**Listen**".



Click on the “**Server**”,



4) Please refer to the **AVL Server user guide.doc** in detail.

5 Reference Documents

- AVL – 850 Data Sheet
- AVL Setting User Guide
- AVL Menu User Guide
- AVL Server User Guide

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