

Automatic vehicle locator odel:VT-850WS

Java platform

GPRS+GPS



User's Manual

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MADE IN TAIWAN



Version History

| Date | Version | Description of change | Author |
|------------|---------|---------------------------------|--------|
| 2009-04-23 | 1.0 | Original | Julie |
| 2009-07-30 | 1.1 | P26 Change Tracker Server | NEO |
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1. Introductions



1.0 Overview

VT-850WS 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. VT-850WS 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 VT-850WS system.

The VT-850WS 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

Automatic vehicle locator VT-850WS



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
- 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 down 50uA | |
| Power Consumption | Idle mode 80mA | |
| | GPRS class 10(Ave) 150mA | |
| 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 | |
| | 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 Dowor | 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 | 65 channels | |
| Acquisition sensitivity | -137 dBm | |
| Tracking sensitivity | -158 dBm | |
| Receiver frequency | 1575.42MHz L1 C/A Code | |
| Accuracy | | |
| (1)Position | 5m CEP | |
| (2)Datum | WGS-84 | |
| Time To First Fix | | |
| (1)Cold start | 45Sec(typ) | |
| (2)Warm start | 35Sec(typ) | |
| (3)Hot start | 1Sec(typ) | |
| Dynamic condition | 4G (39.2m/sec ²) | |
| Interface | UART | |
| Operational Limits | | |
| (1) Altitude | < 18,000m | |
| (2) velocity | < 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

VT-850WS offers RS232 interface and RS232 meets 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. The RS232 portcan be connect to other devices for data transmission too.

1.6 Antenna Interface

1.6.1 GPRS/GSM Antenna Connector

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

1.6.2 GPS Antenna Connector

VT-850WS 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 | Indicates GPRS data transfer: | |
| Flashing | | |
| 64 ms On / 800 ms Off | GPRS does not find the network | |

1.8 External Connection

| Pin | Signal | Туре | 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°C to +60°C |
| | storage | -40°C to +80°C |

1.11 Package List

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

- 1. VT- 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)







VT – 850

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GPS antenna



GSM antenna



RS-232 cable



Power Cord



Earphone



Power cord with cigarette lighter Adapter

2. Hardware Installation

2.1 Precaution

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- 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





Automatic vehicle locator VT-850WS

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

- 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

 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.exe for configuration setting.

Select VT-850WS (or VT-850) in Module field.

PS: Please refer to the **Configure information Introduction** in **AVL Setting.doc** in detail.

| 🗤 unitraq avl s | ting | | | |
|--|--|--------------------------------------|-----------------|----------------------|
| Module | VT850ss VT850ss | to Set <u>D</u> efault | 🗖 Load From AVL | 🗖 Save To AVL |
| AVL Com Port | COM4 Rate | 115200 💌 | Stop Run Java | Set Run <u>J</u> ava |
| Load File Name | C:\Unitraq\AVL\AVL_Setting\AVLSetting_ | _v0.1\config.txt | | Auto Load |
| <u>B</u> asic Net <u>w</u> ork | Phone & SMS Alarm ID Pins Alarr | n <u>N</u> ame A <u>V</u> L Com Po | ort Messages | |
| APN | internet | | | |
| APN Name | anyone | APN Password | something | |
| TCP IP | 0.0.0.0 | TCP Port | 4000 | |
| UDPIP | 0.0.0.0 | UDP Port | 2100 | |
| GPS Interval | 15 | Minimum is 3, Unit is | second | |
| | | | | |
| Save File Name ONLINE AND AND A REPORT OF THE ADDRESS OF THE | | | | |
| CLICI IN MAINE | C.Touriad AAAE Security AAE Security | vo. nconngss.od | | |
| Message | Finish saving file. | | ☐ Auto Save | .jni File Exit |



3.2 Click on the Network, and 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.

| Basic Network | Phone & SMS Alarm Log Geof | ence Alarm <u>N</u> ame A | AVL Com Port Messages |
|---------------|----------------------------|---------------------------|-----------------------|
| (APN) | internet | | |
| APN Name | anyone | APN Password | something |
| | 0.0.0.0 | (TCP Port) | 4000 |
| UDPIP | 0.0.0.0 | UDP Port | 2100 |
| GPS Interval | 15 | Minimum is 3, Unit is s | second |
| | | | |

3.3 Save the configure file (config.txt or configss.txt) to the computer.

Click on "Save", the dialog will show and you can select the configure file to save. Consequently, the name and path will be displayed on "Save File Name".

| Save File | | | | | ? 🔀 |
|------------------------|--------------------|--------------------|---|---------|--------------|
| Save <u>i</u> n: | tempfile | | - | 🗢 🗈 💣 🎰 | |
| My Recent Documents | Config | | | | |
| My Documents | | | | | |
| My Computer | | | | | |
| S | | | | | |
| My Network Places | File <u>n</u> ame: | config | | - | <u>S</u> ave |
| | Save as type: | Text files (*.txt) | | - | Cancel |





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

| 🍓 115200com1 - HyperTe | minal |
|--|-------------------|
| <u>File E</u> dit <u>V</u> iew <u>C</u> all <u>T</u> ran | sfer <u>H</u> elp |
| <u>N</u> ew Connection | |
| <u>O</u> pen | [2] |
| <u>S</u> ave | |
| Save <u>A</u> s | |
| Page Set <u>u</u> p | |
| Print | |
| Properties | |
| Exit Alt+F4 | |
| | |
| | |
| | |
| | |
| | |
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| | |
| | |
| | |
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| | |
| | |
| | |
| | |
| <u> </u> | |
| Creates a new connection | |



| Connect Io ?× | COM4 Properties | ? 🛛 |
|--|-------------------------|------------|
| 115200com1 | Port Settings | |
| Enter details for the phone number that you want to dial: | <u></u> | |
| Country/region: 中華民國 (886) | Bits per second: 115200 | ~ |
| Enter the area code without the long-distance prefix. | Data bits: 8 | ~ |
| Phone number: | <u>Parity:</u> None | ~ |
| Connect using: COM1 | Stop bits: 1 | ~ |
| Configure | Flow control: None | ~ |
| Detect Carrier Loss Use country/region code and area code <u>B</u> edial on busy | <u>R</u> estor | e Defaults |
| OK Cancel | OK Cancel | Apply |

3.5 Download the above configure file (configss.txt or config.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.

| RomBOOT >Start AT91Bootstrap | |
|--|--|
| U-Boot 1.1.5 (Mar 11 2008 - 10:12:32) | |
| DRAM: 16 MB DataFlash:AT45DB642 Nb pages: 8192 Page Size: 1056 Size= 8650752 bytes Logical address: 0xC000000 Area 0: C0000000 to C00017FF Area 1: C0001800 to C0001FFF Area 2: C0002000 to C002FFFF Area 3: C0030000 to C003FFFF In: serial Out: serial Err: serial | |
| PHY not reset!! Hit any key to stop autoboot: 2 _ | |
| | |

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While in Menu state, type "root" and Enter to login.

OUniTraG

Move down to select "File Utilities".

| 🏀 115200COM6 - HyperTerminal | |
|--|-----------|
| <u>File Edit Yiew Call Iransfer Help</u> | |
| | |
| | |
| Model:VT850 | |
| SW:V1.5 HW:V1.2 VT850 GPS | UAPI:V1.2 |
| Main Menu | |
| [1]. Applications [2]. Diagnostic [3]. File Utilities [4]. Change Password [5]. System Reboot [6]. Logout | |
| | |
| <pre><up dn="" lt="" rt="">: Move. <tab>: Toggle. <space>: Select/UnSelect. <enter>:</enter></space></tab></up></pre> | Execute |
| Connected 00:01:09 VT100 115200 8-N-1 SCROLL CAPS NUM Capture Print echo | |





OUniTraG

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.

O Uni TraQ

| Send File | ? × |
|--|----------------|
| Folder: C:\Program Files\Windows NT\HyperT | eminal |
| <u>F</u> ilename: | |
| | <u>B</u> rowse |
| <u>P</u> rotocol: | |
| Zmodem | |
| | |
| <u>S</u> end <u>Close</u> | Cancel |



Automatic vehicle locator VT-850WS

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 Tracker Server

1) Click on the Tracker Server.exe to run the Server application.



Tracker Server.exe



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

| Tracker Server - [TCP Server] | | |
|---|---|---------------------|
| Tracker List Unknown | Server Setting Tracker Command Google Map | |
| Show Type Current C Warning 0 / 5 State - All | Server IP Server Port | (4000 |
| 10-2 10-3 | Hide Main Item Info | |
| 10 - 4 10 - 5 10 - 6 | | |
| Geofence Power | | |
| Disable WD | | |
| Hide Act Btn | | |
| | | |
| | Clear | |
| □ All <u>±</u> <u>=</u> Count 0 / 10 | Tracker Type AVL Start Server Start G-Map : | Start G-Earth Close |
| Run - TCP Server | | 2009/11/24 10:23:26 |

3) Run Start Server





OUniTro



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

5 Reference Documents

- VT 850WS Data Sheet
- AVL Setting User Guide
- AVL Menu User Guide
- Tracker Server User Guide





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