
IntelliTrac A1-lite Series



User Guide

Version: V0.1
Date: 26 May 2010
Status: Preliminary

General notes

With respect to any damages arising in operation with the described product or this document, S&T shall be liable according to the General Conditions on which the delivery of the described product and this document are based. This product is not intended for use in life support appliances, devices or systems where a malfunction of the product can reasonably be expected to result in personal injury. S&T customers using or selling this product for use in such applications do so at their own risk and agree to fully indemnify S&T for any damages resulting from illegal use or resale.

Information in this document is subject to change without notice at any time.

Copyright notice

Copying of this document and giving it to others and the use or communication of the contents thereof, are forbidden without express authority. Offenders are liable to the payment of damages.

© Systems & Technology Corp. All rights reserved



Systems & Technology Corp. © 2010

This document contains confidential, restricted, and proprietary information. The document has been prepared for the exclusive internal use of certain designated S&T employees and may not be duplicated or distributed, in whole or in part, without the prior, written consent of an authorized officer of S&T.

Table Of Contents

- 1. Introduction..... 1**
 - 1.1 Scope 1
 - 1.2 About IntelliTrac A1-lite 2
 - 1.3 Hardware Architecture 3
 - 1.4 Related Documents 4
- 2. Basic Operations 4**
 - 2.1 Hardware Installation 4
 - 2.2 Connectors Pins Assignment 6
 - 2.3 Device Configurations 7
 - 2.4 Communication Settings 11
 - 2.5 GPS Tracking Configurations..... 13
 - 2.6 Firmware Upgrade 15
- 3. Technical Specification for IntelliTrac A1-lite..... 16**
- 4. About Systems & Technology Corporation..... 17**

Systems & Technology Corp.

1.Introduction

Thank you for your purchasing IntelliTrac A1-lite GPS Vehicle Tracking device. The benefits are:

- Improve Safety
- Ensure Security
- Good efficiency on Fleet management and Dispatch solution
- Asset and resource management
- Economic operation and improving productivity
- Keep the Journey record for future analysis or accident report
- Where is the Car? When it will arrive? What is its speed now?

1.1 Scope

The purpose of this document is to describe how to getting started with the IntelliTrac A Series devices. The document contains basic configuration. For advanced users, please refer to the IntelliTrac A Series Protocol Document for detailed information.

1.2 About IntelliTrac A1-lite

The IntelliTrac A1-lite GPS Unit wirelessly transmits location, peripheral, and vehicle control data to a control center. Location data, including speed, direction, mileage, and altitude, is provided by an onboard GPS receiver. Wireless transmission is achieved using an onboard GSM/GPRS module. A microcontroller is used to poll location and command data at regular intervals, derive actions based on location, peripheral, and control data, and execute those actions.

One of the best feature of A series AVL is that they can transit data on ASCII mode or Binary mode.

Peripheral data indicates the status of the various peripherals that are connected to and/or controlled by the unit. Peripherals include, but not limited to, door locks/un-locks , starter interrupt, ignition, battery, engine and panic button.

Firmware on the device applies intelligent filtering to overcome coverage limitations for both GPS and GSM/GPRS networks.

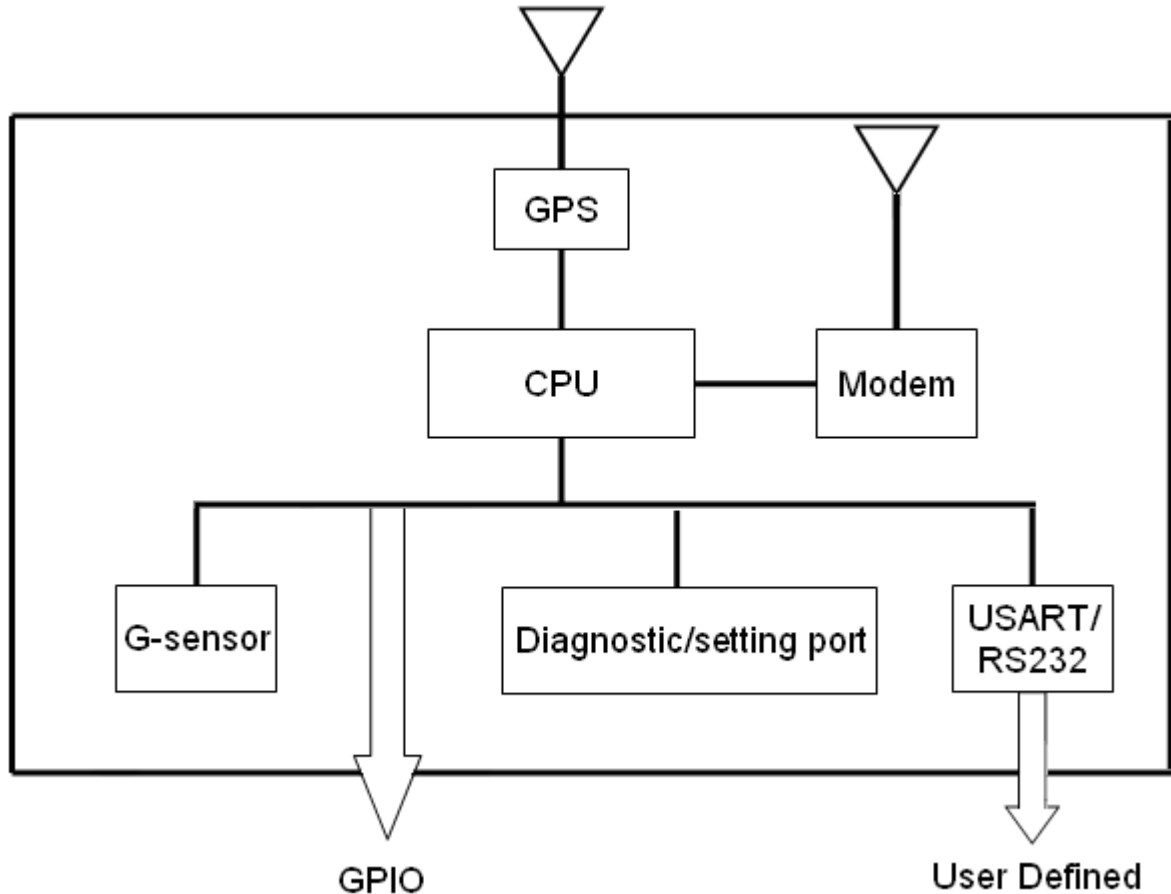
Motion sensor is used to control the status of the unit, either sleep, idle, or full power, there by controlling the amount of current the unit consumes.

Backup battery and tamper sensing GPS Antennas are primarily used to indicate loss of Main Power and loss of GPS antenna connectivity.

Device supports Over-the-air firmware upgrade to deliver added functionality without physically touching the device once installed.

1.3 Hardware Architecture

The IntelliTrac A1-lite hardware includes Micro-controller, GPS receiver, GSM/GPRS modem, G-Force sensor, I/Os interfac.



- User can use PC HyperTerminal connect to the Diagnostic / setting port to configure the AVL.
- The G-Sensor is used for car accident. Car tow-away warning and power management.
- GPIO can be used to connect to any customer monitoring points (door switch, anti-thief) or Actuators.
- RS232 Expansion port .
- RTOS OPTION: We will have A1, A3 professional version with Real Time operation system in JAN.2010.

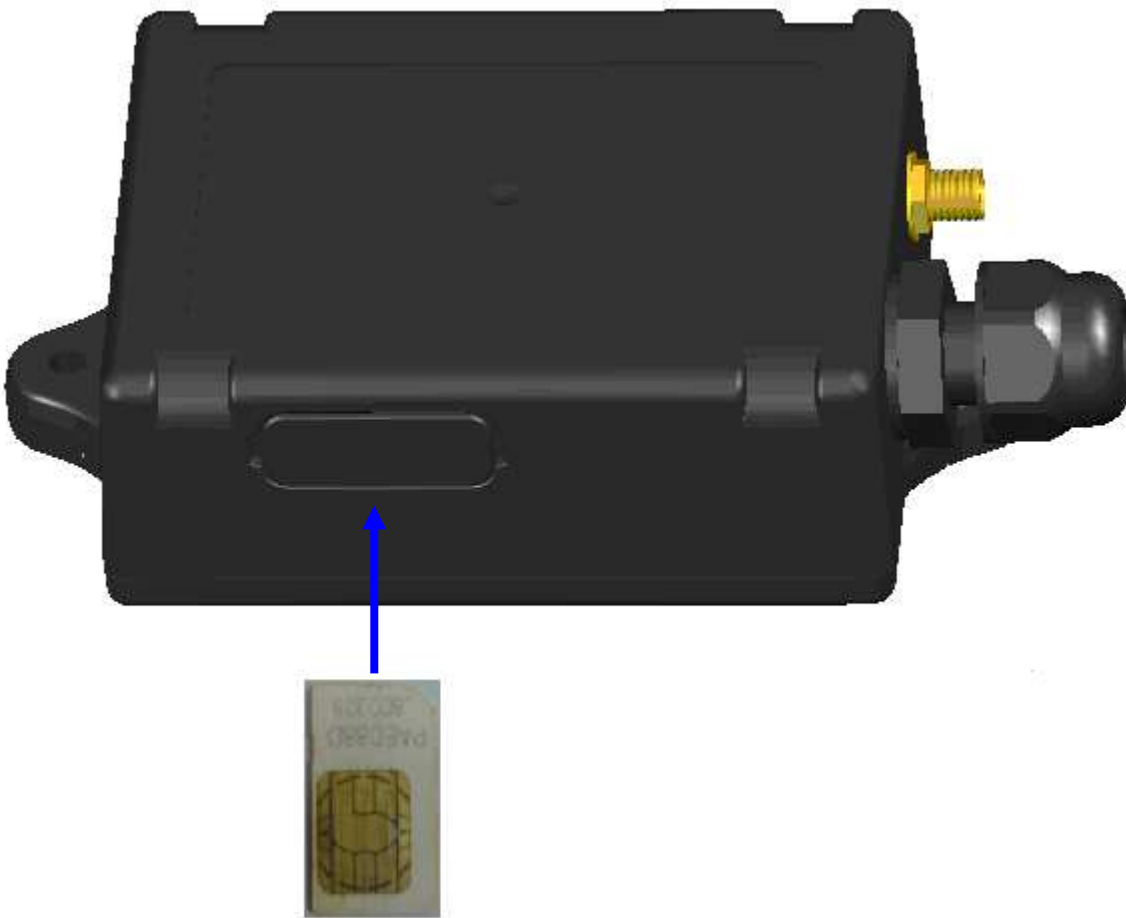
1.4 Related Documents

[1] IntelliTrac A Series Protocol Document Basic Operations

1.5 Hardware Installation

(1) SIM Card Installation

- Press yellow button to eject the SIM card holder.
- Put the SIM card on the SIM card holder.
- Insert the SIM card holder to the device correctly.



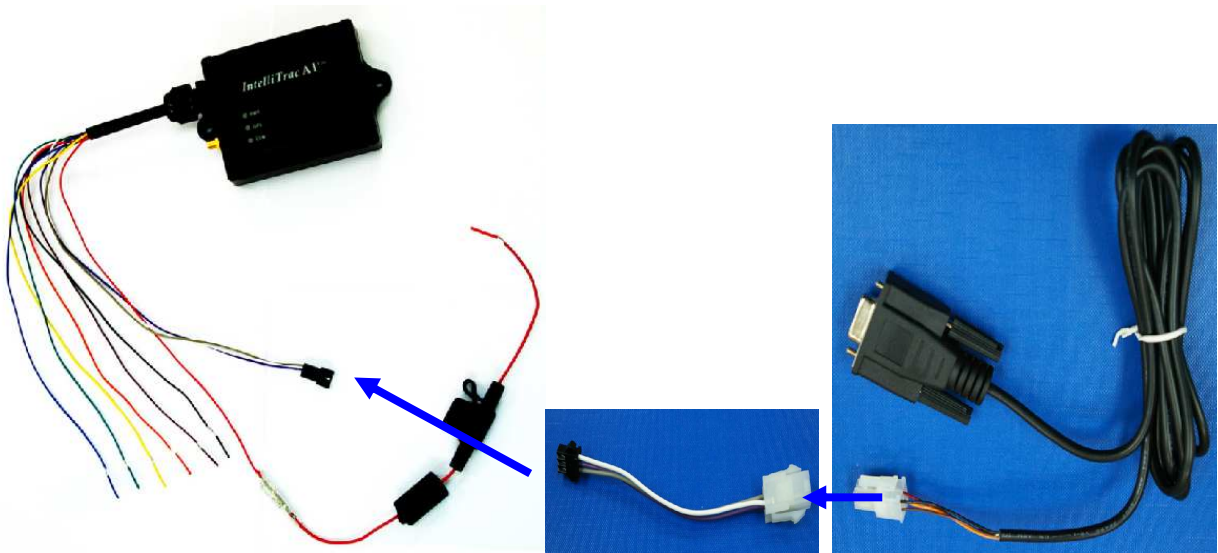
(2) GPS Antenna Installation

- Connect the GPS antenna to the right-down corner SMA connector.
- Recommended mating torque for the SMA connector is 7-10 inch pounds (80-110 N.cm).



(3) Power, RS-232 and I/O Cable Installation

- Connect 4-wires power cable to the device, The D-SUB can be connected to the COM port of PC.
- Connect 8-wires cable to the device. And plug on a DC power supply (8~30V) and I/O.



1.6 Connectors Pins Assignment

PWR / IO Connector

Pin#	Signal Name	Description	IO	Electrical Characteristic
1	DC IN	Red	I	$V_I = \text{DC8 to 30V}$, $I_{\text{normal}} = 70\text{mA @12V}$
2	GND	Black	—	
3	Ignition	Brown	I	$V_{IH\text{min}} = 30\text{V}$, $V_{IL\text{max}} = 6.8\text{V(High Active)}$
4	Output1	Orange	O	$I_{\text{max}} = 300\text{mA}$
5	Input1	Yellow	I	$V_{IH\text{max}} = 30\text{V}$, $V_{IL\text{max}} = 0.7\text{V}$
6	Output2	Green	O	$I_{\text{max}} = 300\text{mA}$

SERIAL Connector

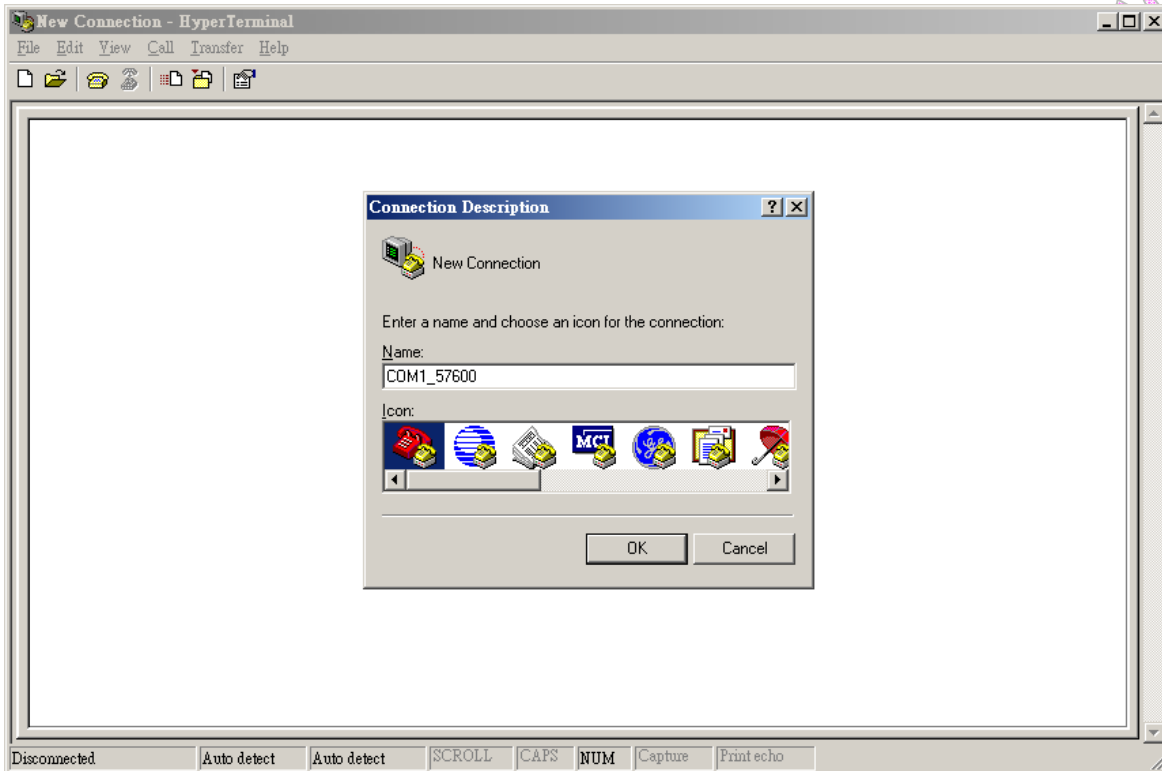
Pin#	Signal Name	Description	IO	Electrical Characteristic
1	Vout	Blue	O	$V_o = 5.0\text{V}$, $I_{\text{max}} = 250\text{mA}$
2	TX1	Purple	O	
3	RX1	Gray	I	
4	GND	White	—	

Connectors pin definition

Device Configurations

For the first installation, some basic parameters should be set before installation. The device parameters can be set through RS-232 port by using HyperTerminal program. Please see below for the HyperTerminal settings:

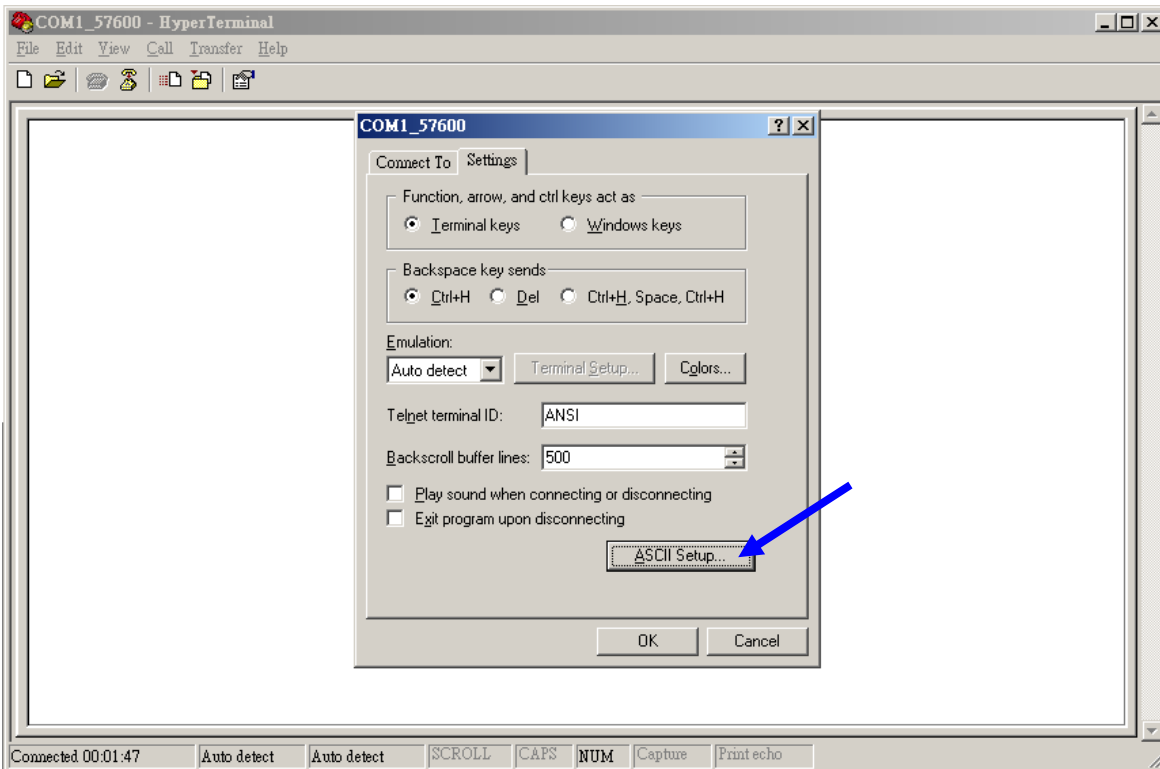
(1) Open HyperTerminal



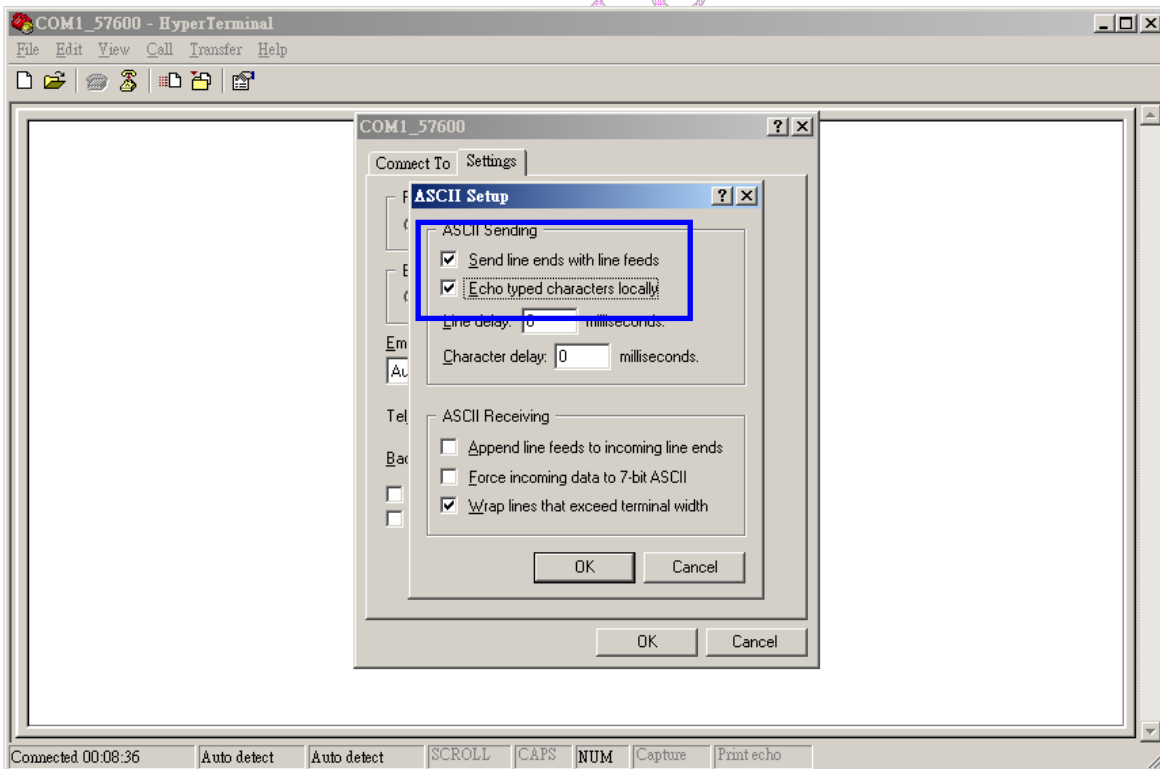
(2) Choose correct COM port

(3) Baud Rate→57600bps, Data Bits→8, Parity→None, Stop Bits→1, Flow Control→None

(4) Choose [File]→[Properties] and click [ASCII Setup...]

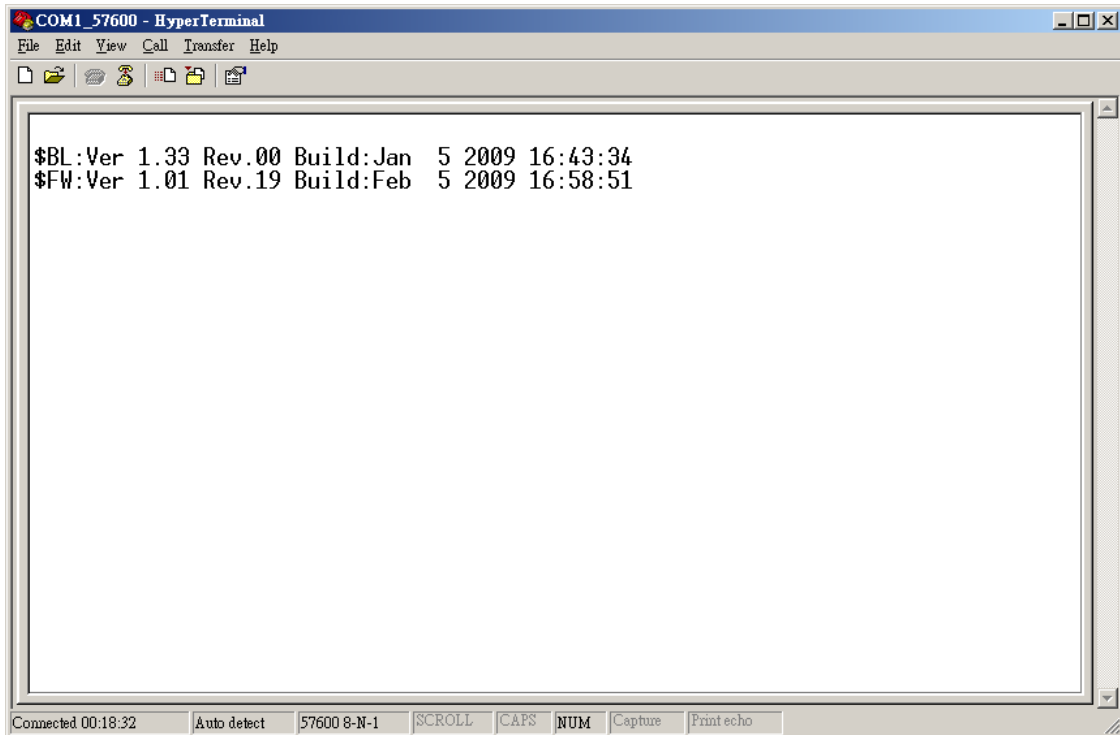


(5) Checked below ASCII Sending options



- (4) Connect D-Sub connector to your PC and power on the device.

The device startup message will be shown on the HyperTerminal.

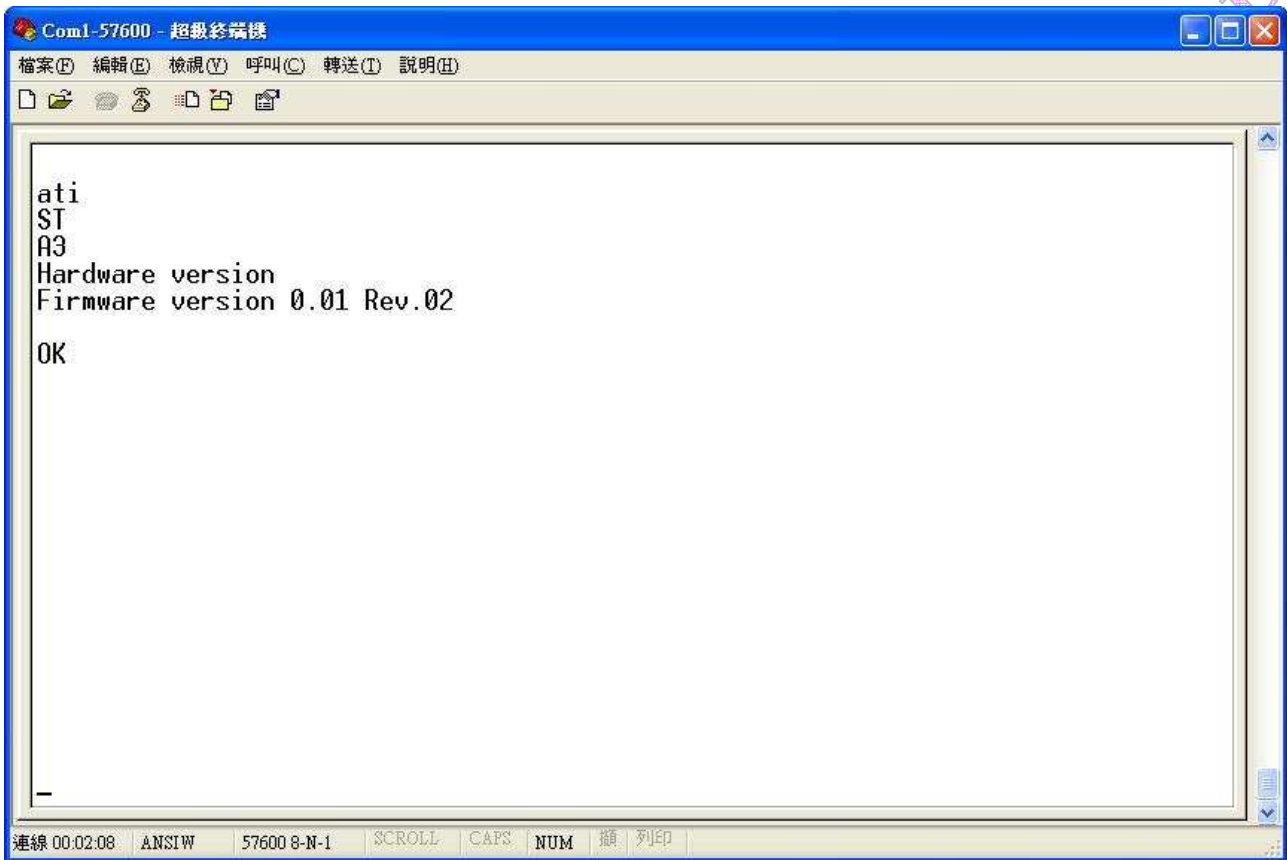


The screenshot shows a HyperTerminal window titled "COM1_57600 - HyperTerminal". The window has a menu bar with "File", "Edit", "View", "Call", "Transfer", and "Help". Below the menu bar is a toolbar with icons for file operations. The main text area displays the following startup messages:

```
$BL:Ver 1.33 Rev.00 Build:Jan 5 2009 16:43:34  
$FW:Ver 1.01 Rev.19 Build:Feb 5 2009 16:58:51
```

At the bottom of the window, there is a status bar with the following information: "Connected 00:18:32", "Auto detect", "57600 8-N-1", "SCROLL", "CAPS", "NUM", "Capture", and "Print echo".

- (5) Type AT! command and press [Enter] key, the hardware and firmware version will be shown on the HyperTerminal. If the HyperTerminal is shown like below, that means connection between the device and PC is working properly. It is ready to send all configuration commands from now on.



The screenshot shows a HyperTerminal window titled "Com1-57600 - 超級終端機". The window contains the following text:

```
ati
ST
A3
Hardware version
Firmware version 0.01 Rev.02
OK
```

The status bar at the bottom of the window displays: 連線 00:02:08 ANSIRW 57600 8-M-1 SCROLL CAPS NUM 擴 列印

Communication Settings

There are two communication modes for the IntelliTrac A series device to communicate to the control center. One is SMS, and the other is GPRS (TCP/UDP). The device should be set communication parameters before install the device to vehicle.

(1) SMS Configuration

Setting SMS control center phone number or short code by using AT\$SMSDST command. For example, the SMS control center phone number is +886123456789, issue the AT\$SMSDST command in HyperTerminal like below:

```
AT$SMSDST=+886123456789
```

```
OK
```

Then you can try to use cellular phone or SMS gateway to send a SMS message to the A1 device.

Send a SMS message → "AT\$MODID?"

Device will response :

```
$MODID=101000001
```

```
OK
```

(Type AT&W command to save all command parameters into the non-volatile memory of the device.)

```
AT&W
```

```
OK
```

This proves the mobile phone SMS connects successfully.

(2) GPRS Configuration

Setting GPRS server using the following commands:

AT\$APN=internet,username,password (APN=internet, Username=username, Password=password)

OK

AT\$HOSTS=1,60.148.19.10 (Server IP address = 60.148.19.10)

OK

AT\$RETRY=5,10 (Message retry settings)

OK

AT\$IPTYPE=1 (Using TCP/IP mode)

OK

AT\$PORT=6000 (Host application port)

OK

AT\$GPRSEN=1 (GPRS enable)

OK

AT\$HB=60 (Heartbeat setting)

OK

(Type AT&W command to save all command parameters into the non-volatile memory of the device.)

AT&W

OK

Please refer to IntelliTrac A Series Protocol Document for detailed command descriptions.

GPS Tracking Configurations

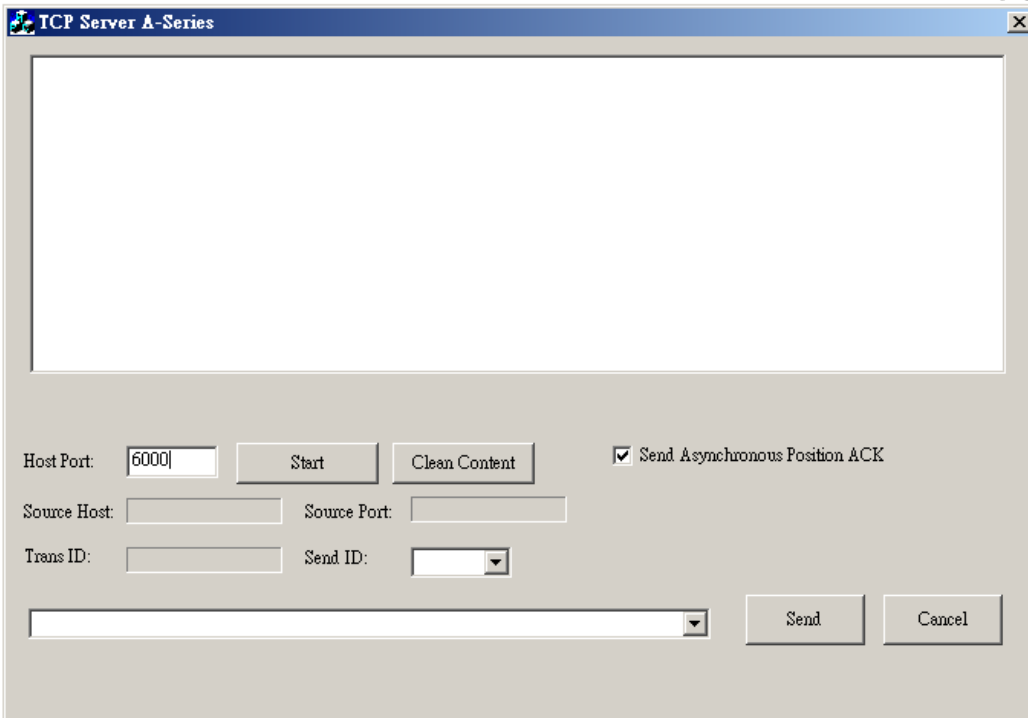
After the device communication settings are done. The remote GPS tracking function can be performed.

The GPS tracking function can be set by using AT\$PDSR command. For example,

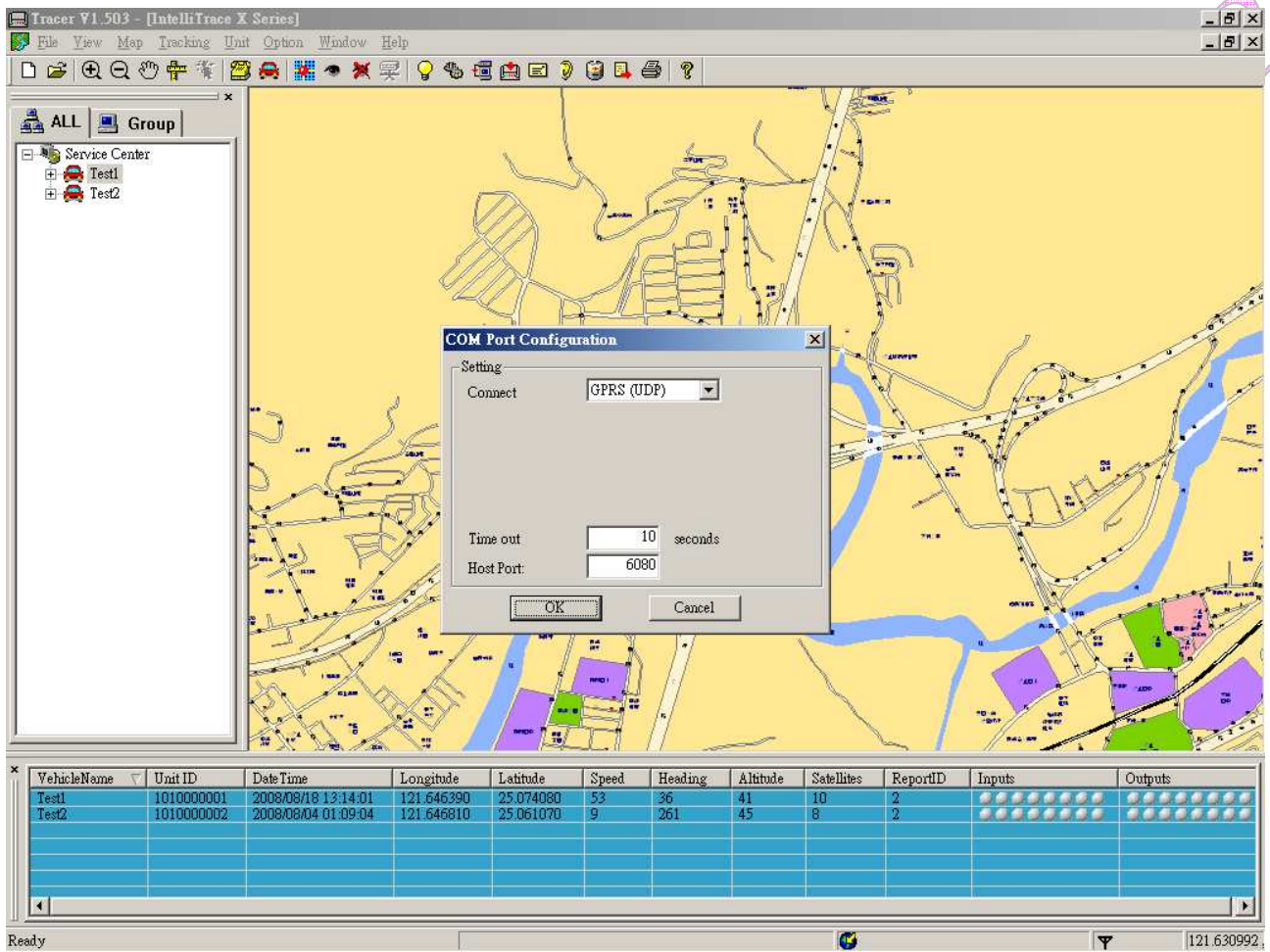
AT\$PDSR=1,30,0,2,0,0,1,1 (Tracking through GPRS by time interval 30 seconds)

OK

For the simply testing GPRS, open the TCP Server A-Series software which is provided by S&T. It is a simple server software that can wait for device connection and data.



For advanced testing, open the IntelliTrac Tracer software and set communication port properly. The device will start to connect to the Tracer software and report GPS tracking locations.

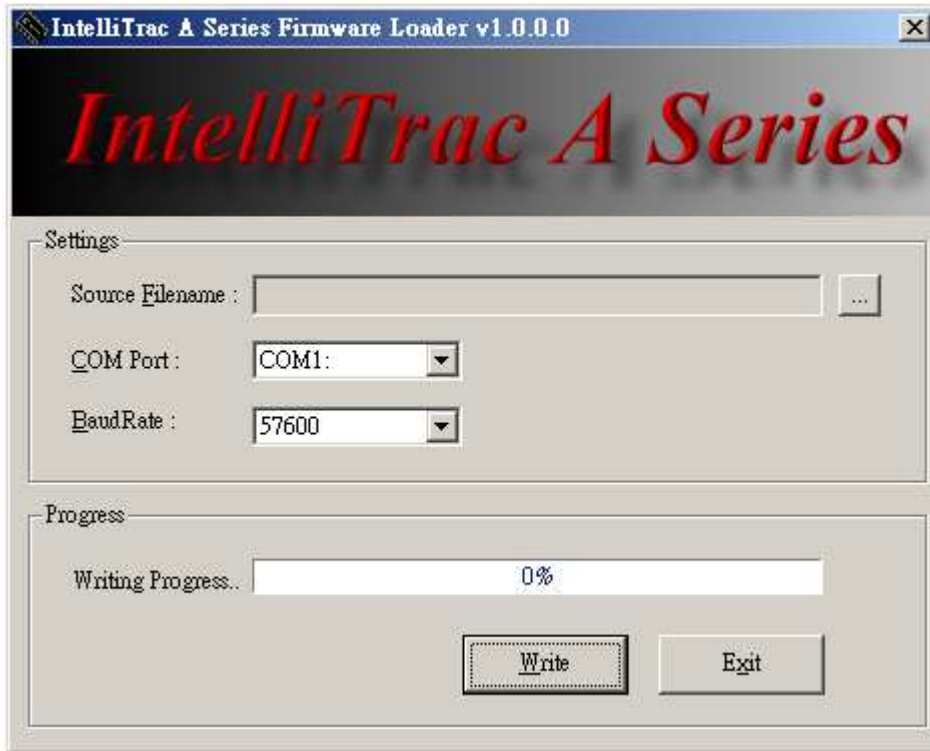


Systems

Firmware Upgrade

The IntelliTrac A Series device firmware is updated through the serial interface. The firmware update of the device can be performed with the IntelliTrac A series firmware loader tool provided by S&T. It runs on Windows based PCs. Please see the following step-by-step upgrade procedure.

- (1) Connect the RS232 cable between device and PC.
- (2) Turn on the device.
- (3) Run AseriesLoader.exe, the following window is displayed.



- (4) Click [...] button to open firmware file which provide by S&T
- (5) Click Write button and start firmware programming.
- (6) When the writing progress 100% is reached, the device LEDs will start to fast blinking.
- (7) Wait until device LEDs stop fast blinking.
- (8) Firmware update complete.

2. Technical Specification for IntelliTrac A1-Lite

CHARACTERISTICS	
Dimensions (L x W x H)	135 x 70 x 35mm(With Connector)
Weight	170gm
Radio Performance	
Frequency (MHz)	Quad-Band 850/900/1800/1900MHz
Transmit Power	1W/1800MHz,1900MHz 2W/850MHz, 900MHz
GSM Functionality / GPRS	
GPRS Mode	MultiSlot Class 10/B , Mobile Station Class B
GPRS Coding Scheme	CS1,CS2,CS3 and CS4
GSM Antenna	Internal GSM Antenna
SIM Interface	Support SIM card 1.8V, 2.9V
GPS Functionality	
Receiver	12 Channels or above
Sensitivity (Tracking)	-159dBm
Antenna Type	External GPS Active Antenna , 3.3V
Connector	SMA Female
GPS Protocol	NMEA 0183 Ver3.0
Onboard Components	
MCU	32-bit Microcontroller
Data Memory	2MB flash
Motion Sensor	3-Axes Acceleration Sensor
Led Indicator	3 , Green (Power status) , Red (GPS, GSM status)
Interface I/O	
I/O Connector	1Connectors. 4pin
Serial Data I/O	RS-232 (Default 57600bps)
Inputs	2
Outputs	2
Electrical	
Power Source	DC 8V to 30V
Power Consumption	70mA @ 12V (Full power mode) 15mA @ 12V (Low power mode) 6mA @ 12V (Very low power mode)
Environment	
Operating Temperature	-20°C to +70°C

3. About Systems & Technology Corporation

IntelliTrac A-Series AVL device is produced by Systems & Technology Corporation. The company is a key developer and supplier of advanced systems in the Automatic Vehicle Location (AVL), Digital Map and Car Navigation Systems.

If you need information on other maps solutions or products, please contact us at the phone and fax numbers listed below, or visit our web sites.

Contact Information for System & Technology Corp.



S&T Web Site
Technical Support Hotline
Technical Support E-mail
Main Phone
Main Fax

<http://www.systech.com.tw>
+886-2-2698-1599
AVL@ms.systech.com.tw
+886-2-2698-1599
+886-2-2698-1211

Systems & Technology Corp.

FCC Regulations:

● This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

● This device 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 radiated 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 device complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.