

# AK1 User Manual

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## 1. Notification

#### 1.1. Disclaimer

This document, and all other related products, such as device, firmware, and software, is developed by ATrack Technology Inc. thoroughly. At the time of release, it is most compatible with specified firmware version. Due to the functionalities of the devices are being developed and improved from time to time, the change in the protocol, specification, and firmware functions are subjects to change without notice. ATrack Technology Inc. is obligated to modify all the documentation without the limitation of time frame. A change notice shall be released to ATrack Technology Inc. customers upon the completion of document modification.

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#### 1.3. Warning

Connecting the wire inputs can be hazardous to both the installer and your vehicle's electrical system if not done by an experienced installer. This document assumes you are aware of the inherent dangers of working in and around a vehicle and have a working understanding of electricity.



## 2. Hardware

### 2.1. Package Content

Each package contains the following device/accessories:

• Device \* 1 (one of the devices below)





•GPS Antenna \* 1 for AT1EONLY



• Serial Cable \* 1

Power/IO Cable \* 1



#### 2.2. SIM Card Installation

The AK1 supported 1.8V/3V universal SIM card which provided by worldwide GSM operators. Unscrew the SIM cover on the button of the AK1 device for SIM card installation.





### 2.3. Power I/O Connector

The following figure shows power I/O connector and its pin number of AK1



The following table shows its function of power I/O connector

Power I/O Connector						
Pin#	Function	Color	Designation	Note		
1	Main power input	Red	PWR	DC 9V~40V input		
2	Power ground	Black	GND			
3	ACC Input	Yellow	ACC	Ignition status positive trigger input		
4	General Input1	Green	IN1	Negative trigger input		
5	General Output1	Brown	O1	Open collector output (Max.300mA)		
6	General Output2	Gray	O2	Open collector output (Max.300mA)		

Positive Inputs: ACC (Triggered when connects to V+ range from 3.7 ~ 40V)

Negative Inputs: IN1 (Triggered when connects to ground range from 0.8 ~ 0V)

All outputs are open collector type (grounded when enabled) with max. sink current of 300mA.



### 2.4. Serial Port Connector

The following figure shows serial port connector and its pin number of AK1



The following table shows its function of serial port connector

Serial Port Connector					
Pin#	Function	Color	Designation	Note	
1	Power Ground	Black	GND		
2	RS232 Transmit data output	White	тх		
3	RS232 Receive data input	Green	RX		
4*	+5V Output for external accessories	Red	+5V	DC5V Max.300mA Output	

\* Note that the +5V output pin cannot connect to the other power source or short circuit to power ground. If the connected accessory requires more power, please use external power source instead.

The following figure shows the wire diagram of serial cable.



**DB9** Female Connector



### 2.5. GPS Antenna

The AK1 determines its position by communicating with the Global Positioning Satellites through GPS antenna. The location where the AK1 is installed will have great effect in the overall performance of the GPS receiver. The AK1 device has an internal GPS antenna but it is not a water proof design. Therefore, it shall not be installed outside of cabin or with the possibility of being splashed by water or rain . Ideally the label of AK1 should facing up (towards the sky) after the installation, such that the top of the device has a clear view of the sky. Mounting in this orientation provides optimum GPS signal reception.



Please note that the following interior conditions may cause bad GPS reception of AK1:

- Your vehicle has metallic window tint
- Your vehicle has a windshield mounted radio antenna
- Your vehicle has a solar reflective window





### 2.6. LED Indicators

The following figure shows the location of the device LEDs.



LED	Indication	Description	
	Solid On	In full operation mode	
$DW(P_{(Croop)})$	1 blink (0.1 sec.) in every 10 sec.	In sleep mode	
PWR (Green)	1 000 On 1 000 Off	GPS module off, External power lost, running on	
	r sec. On, r sec. On	backup battery	
	0.7 sec. On, 0.7 sec. Off	Searching GPS signal	
GPS (Red)	Solid On	Position get fixed	
	Off	GSM module off	
	0.7 sec. On, 0.7 sec. Off	Searching GSM signal	
GSM (Red)	0.2 sec. On, 2 sec. Off	Registered to GSM network	
	2 blinks in every 2 sec.	Connected to GPRS network	
	Continuous blinking	SIM PIN Error	

*Note:* In the case of SIM PIN Error, the device will check the AT\$SPIN every 10 minutes and try to access the SIM again. If the PIN is not corrected within 3 times of checking, including the first inserting time, the SIM card will be locked. Once the SIM is locked, you need to contact your GSM carrier for the PUK to unlock the SIM card on a cellular phone.



## 3. Configuration

The device can be configured its parameters and behaviors by using AT commands. Please refer to ATrack Protocol Document for details. The device AT commands can be sent through RS232 port, SMS or GPRS TCP/UDP.

#### 3.1. Connect device to HyperTerminal

The HyperTerminal is one of the most popular RS232 Terminal Emulator in Windows Platform. The other similar RS232 terminal emulator software can perform the same result. The following example shows how to connect the device to the HyperTerminal.

(1) Run HyperTerminal program and choose COM port and click [Configure...] button.

🧞 СОМ1_57600 - Нурег	Terminal						_	
<u>File E</u> dit <u>V</u> iew <u>C</u> all <u>T</u> ra	ansfer <u>H</u> elp							
🗅 😅   🌚 🌋   🗈 🗄	) 🖻							
	Connec	t To			<u> </u>			-1-
-	2	COM1_57600						
	Enter	details for the pho	one number tha	at you want	to dial:			
	⊆ounti	y/region:			~			
	Enter	he area code wit:	hout the long-o	listance pre	fix.			
	Ar <u>e</u> a c	ode:						
	Phone	number:						
	Co <u>n</u> ne	ct using: COM1			•			
			nfigure					
		tect Carrier Loss e country/region dial on busy	code and area	code				
			ОК	Cano	el			
Disconnected	Auto detect	Luto detect	SCROLL	CAPS	NUM	Capture	Print echo	1.



(2) Choose 57600,8,N,1 None flow control properties and click [OK] button.

🧞 СОМ1_57600 - Нурег	Terminal	
<u>File Edit V</u> iew <u>Call T</u> r	ansfer <u>H</u> elp	
COM1_57600 - Hyper File Edit View Call Ir Pile Edit View Call Ir Pile # # Pile # Edit -	Terminal snsfer Help COM1 Propertie Port Settings Bits per s D S	ies ?× r second: 57600 ▼ Data bits: 8 ▼ Parity: None ▼ Stop bits: 1 ▼
	Elow	v control: None
Disconnected	Auto detect Auto d	detect SCROLL CAPS NUM Capture Print echo

#### (3) Click [File]→[Properties]

🍓 СОМ1_57600 - НуретТе	erminal	×
<u>File E</u> dit <u>V</u> iew <u>C</u> all <u>T</u> rans	sfer <u>H</u> elp	
<u>N</u> ew Connection Open Save Save <u>A</u> s		4
Page Set <u>up</u> <u>P</u> rint Properties		
Exit Alt+F4		
Displays the properties of the curr	rent session	//.



(4) Click [Settings] tab and [ASCII Setup...] button

🇞 COM1_57600 - HyperTerminal	<u> </u>
<u>File Edit V</u> iew <u>Call Transfer H</u> elp	
🗅 🚘 💮 🌋 💷 🎦 🖆 COM1 Properties 🔹 💽	
Connect To       Settings         Function, arrow, and ctrl keys act as <ul> <li>I erminal keys</li> <li>Windows keys</li> </ul> Backspace key sends <ul> <li>I erminal keys</li> <li>Windows keys</li> </ul> Backspace key sends <ul> <li>I erminal keys</li> <li>Windows keys</li> </ul> Backspace key sends         I erminal Setup           Image: I translation:           Auto detect         I erminal Setup           Image: I erminal ID:         ANSI           Backscroll buffer lines:         500           Image: I erminal ID:         ANSI           Backscroll buffer lines:         500           Image: I erminal line         Egit program upon disconnecting           Image: I erminal line         Allow genote host initiated file transfers           Egit program upon disconnecting         Input Translation           Image: I erminal line         Ascell setup	
Connected 00:03:37 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture	Print echo

(5) Checked the following options and click [OK] button

COM1_57600 - HyperTerminal	
Pue       Party Cell Transfer Help         Image: Constant of the second state o	? X 
Connected 00:08:33  Auto detect  57600 8-N-1   SCROLL   CAPS  NU1	M Capture Print echo //



(6) Power ON the device. The startup message will show on the screen. The device AT command can be sent through the terminal after device startup.

🏀 COM1_57600 - HyperTerminal	
<u>File Edit V</u> iew <u>C</u> all <u>Transfer</u> <u>H</u> elp	
🗅 😅 🍘 🔏 💷 🎦  😭	
\$SYSMSG: Bootloader V1.01RC	
\$SYSMSG: Startup AT1 Rev.1.00	
	lt
Connected 00:22:45 Auto detect 57600 8-N-1 SCR	DLL CAPS NUM Capture Print echo





#### **3.2. Connect the device to the remote server**

The GPRS connection shall be enabled and configured by AT\$GPRS command. The ATrack ServerTool is a Windows-based software for GPRS connection testing. Once the GPRS has been enabled on the AK1device, the ServerTool will get connect to the AK1device.

	010 - 0000										
Packet Type : TCP	Host Port: 6080	Unit ID : 35259	9041643839 💌	Open	Close	Exit					
Command : AT\$GP	OS=0			Send							
Respond Message											
Original Data	SE AES Key	Position Fo	ormat: 🛛 ASCII 🔽 🔽	Unix TimeStamp 📘	ACK Clear (	Content					
20:10:07 => @P,3B9D;	97,1,352599041643839	,1336532787,1336532	836,1336532836,12156	2588,25084023,72,0,9	3,0,0,0,0,0,,0,0,						
20:09:53 => FE0200014	40AFDCA0153F0001										
20:09:50 => Connected	1 (17)										
•											
Readable Data											
20:10:07 => @P,3B9D,	97,1,352599041643839	,20120509030627,201	20509030716,2012050	9030716,121.562588,2	25.084023,72,0,9.3,0	.0,0,0,0,0,(					
20:09:53 => FE02,3525	99041643839,1										
20:09:50 => Connected	I (17)					20:09:50 => Connected (17)					
1											
						F					
<u>τ</u>						Þ					
Parsed Data						Þ					
Parsed Data	o: [		Apply		p Clear Cor	ntent					
Parsed Data Custom Info	o: GPS DateTime	RTC DateTime	Apply Send DateTime	Longitude	p Clear Cor Latitude	ntent He					
Parsed Data Custom Inf Unit ID 352599041643839	o : GPS DateTime 20120509030627	RTC DateTime 20120509030716	Apply Send DateTime 20120509030716	Longitude 121.562588	p Clear Cor Latitude 25.084023	ntent He					
Parsed Data Custom Inf Unit ID 352599041643839	0 : GPS DateTime 20120509030627	RTC DateTime 20120509030716	Apply Send DateTime 20120509030716	Longitude 121.562588	p Clear Cor Latitude 25.084023	ntent He					
Parsed Data Custom Inf Unit ID 352599041643839	0: GPS DateTime 20120509030627	RTC DateTime 20120509030716	Apply Send DateTime 20120509030716	Longitude 121.562588	Dear Cor Latitude 25.084023	ntent He					
Parsed Data Custom Infr Unit ID 352599041643839	0 : GPS DateTime 20120509030627	RTC DateTime 20120509030716	Apply Send DateTime 20120509030716	Longitude 121.562588	Dear Cor Latitude 25.084023						



## 4. Firmware Upgrade

The AK1device firmware can be upgraded by using RS232 serial port communication or GPRS FTP protocol. The following is an example for how to upgrade firmware by serial port.

(1) Run ATFWUpload program and select COM port and firmware file properly. Press [Open] button.

♦ ATFWUpload ¥1.5			
COM: COM1  BaudRate: 57600	OPEN Close		
FileName: F:\Firmware\AT1_1.03.dat			
Waiting Upload firmware!!	🗖 Rest Parameter		
	Check Firmware Version		
	Current Version		
Exit			
2) Power On the AK1device. The process will be started.			

≪ATF₩Upload ¥1.5	
COM: COM1 Y BaudRate: 57600	OPEN Close
FileName: F:\Firmware\AT1_1.03.dat	
Upload Process 34 %	🗖 Rest Parameter
	Check Firmware Version
	Current Version
Exit	

(3) After the firmware has uploaded and verified successfully, the green completed message will be shown.





## 5. Appendix

## 5.1. Hardware Specification

AK1			
Physical Characteristics			
Dimension		80 * 48 * 26 mm	
GSM Module		Quad band	
	Frequency Bands	GSM 850/900/1800/1900MHz	
GPS Module		High Sensitivity (65 Channel)	
GPS Antennas		SMA Connector Type	
Motion Sensor		Built-In	
Real-Time Clock		Built-In	
Memory Capacity		2MB	
Casing		High Heat Grade ABS	
Electrical Characteristics			
Power Source		8-40 VDC	
Power Consumption	Operational	100 mA @ 12VDC	
	Sleep	20 mA @ 12VDC	
	Deep Sleep	8 mA @ 12VDC	
I/O Characteristics			
Device I/O Ports	Positive Input	1 (Triggering voltage: 3.7 ~ 40V)	
	Negative Input	1 (Triggering voltage: 0 ~ 0.8V)	
	Negative Outputs	2 (Open Collector Type @ 300mA <sub>MAX</sub> )	
Serial	Configurable	1	
	Baud rates	1200, 2400, 4800, 9600, 19200, 38400,	
		57600, 115200 bps	
Environmental Characteristics			
Operation	Temperature	-30 ~ +70℃ (Note: Temp. up to +85℃ with	
		extreme condition)	
Storage	Temperature	-40 ~ +85℃	
	Relative Humidity	5 ~ 95%	



### 5.2. 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.

#### ▶ RF Exposure Information

This device meets the government's requirements for exposure to radio waves. This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government.

• 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.

**FCC Caution:** This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.