

AS3/AS3E User Manual

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1. Notification

1.1. Disclaimer

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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. Overview

From the following diagram, the AS3/AS3E GPS receiver receives incoming signals from each orbiting satellite. These signals consist of information such as satellite's position and the time that the signal was transmitted by each satellite. The receiver analyzes these data in order to determine how far away each satellite is and it uses the triangulation method to calculate the vehicle's exact position. Once the positioning data along with other event data are gathered, they will be transmitted to the service center across a Mobile network or via SMS. The communication is bidirectional, which means you can control the AS3/AS3E remotely across a Mobile network or via SMS.



System Architecture

3. Installation

3.1. Package Content

When you open the package, please verify that you received the following device and accessories:

AS3/AS3E Device * 1
GPS Antenna * 1



Power/IO Cable * 1



• Magnet Mount Kits (Optional)





3.2. Power I/O Connector

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



The following table describes the function of each pin.

Power	I/O Connector			
Pin#	Function	Color	Designation	Note
1	Main power input	Red	PWR	DC 9V~40V input
2	ACC Input	Yellow	ACC	Ignition status positive trigger input
3**	General Input2 (Default)	Green	IO1	Positive trigger input
	Analog Input1			Analog input (DC0V~40V)
	1-Wire Protocol Input *			1-Wire Data input
	RS232 Transmit data			See <u>Chapter 5.1</u>
4**	General Input1	Blue	IO2	Negative trigger input
	General Output1 (Default)			Open collector output (Max.300mA)
5**	General Input3	White	IO3	Negative trigger input
	General Output2 (Default)			Open collector output (Max.300mA)
	RS232 Receive data			See <u>Chapter 5.1</u>
6	Power ground	Black	GND	

* The 1-Wire® Protocol supports up to three 1-Wire[™] devices simultaneously, which means you can have one (iButton®, DS1990A) and two 1-Wire[™] temperature sensor probes (DS18B20).

** You may configure the <u>AT\$IOCG</u> command to change these specific I/O pins to any of those functions mentioned as above.



Please do not connect a positive voltage to any output pin!

3.3. Internal Connectors and LED indicators

The following figure shows the internal connectors and its functionality.



• SIM Socket:

The AS3/AS3E supports a SIM card with either of these two operating voltages: 1.8V (ISO/IEC 7816-3 class C) or 3V (ISO/IEC 7816-3 class B).

• RS232 Switch:

The pin#3(Green) and pin#5(White) of power I/O connector can be used for either general I/O or RS232. The RS232 switch is used for the configuration. See table below for detail description:

Mode	Switch setup	Description
RS232 Mode		Pin#3(Green) and Pin#5(White) are acting as RS232 Tx and Rx. This is manufactory default mode.
I/O Mode		Pin#3(Green) and Pin#5(White) are acting as general I/Os.

Power off the device and make sure the wire connection before adjust RS232 switch.



• LED Indicators:

LED	Indication	Description		
	Solid On	In full operation mode		
PWR (Green)	1 blink (0.1 sec.) in every 10 sec.	In sleep mode		
	1	GPS module off, External power lost, running o		
	r sec. On, r sec. On	backup battery		
	0.7 sec. On, 0.7 sec. Off	Searching for GPS signal		
GFS (Red)	Solid On	Position get fixed		
	Off	3G module off		
	0.7 sec. On, 0.7 sec. Off	Searching for 3G signal		
SG (Red)	0.2 sec. On, 2 sec. Off	Registered on 3G 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. The PIN will be validated 3 times and if it fails the last attempt, including the first inserting time, the SIM card will be locked. Once the SIM is locked, you need to contact your 3G carrier for the PUK in order to unlock the SIM card using your cell phone.



3.4. DB9 Connector Wiring Diagram

For connecting the device to PC when configuration is needed, the following diagram shows how to solder/connect the DB9 connector.

3.4.1. Using ATrack Serial Cable

Material needed: ATrack Serial Cable x 1, AS3 Power I/O cable x 1

1. Cut the ATrack Serial Cable and peel the Green, White, and Black wires as shown:



2. Peel the AS3 Power I/O Cable (Green, White, and Black wires) as shown:





3. Connect two cables together with Green – White, Black – Black, White – Green as shown:



Note: The Ground (Black) wire might need to be connected to the power supply ground as well so the voltage level is based on the same ground.

3.4.2. Connecting DB9 Female Connector

Material needed: AS3 Power I/O cable x 1, DB9 Female connector x 1





3.5. GPS Antenna Installation

The AS3/AS3E determines its position by communicating with Global Positioning Satellites through an external GPS antenna. The location where the AS3/AS3E GPS antenna is installed will have great effect in the overall performance of the GPS receiving. Please note that the following interior conditions may cause bad GPS reception when a GPS antenna is installed inside interior of vehicle:

- Windows with metallic tint
- Windshield mounted radio antenna
- Windows with solar reflective covers
- The MP3 FM transmitter may interfere with GPS reception



3.6. Mounting Methods

The AS3/AS3E can be either surface or magnet mounted by using appropriate screws.

3.6.1. Surface Screw Mount

Use two #10 screws (diameter=4.8mm) to fix AS3/AS3E on a surface.



3.6.2. Magnet Mount

Use magnet mount kits to install magnets on AS3/AS3E device.





4. Configuration

You may explore great features on the AS3/AS3E either through AT commands or the AK Series Configure Tool. The commands can be sent to a device via RS232, SMS or Mobile network .

4.1. Set up a Device Using the AK Series Configure Tool

Before running the AK Series Configure Tool, make sure your device is connected to a PC/laptop via RS232. The AK Series Configure Tool provides a user-friendly intuitive interface that enables you to quickly and easily set up those basic parameters. Please refer to our AK Series configure Tool user manual for details.





The following example shows how to connect the AS3/AS3E through HyperTerminal. You may use other popular terminal emulators such as Putty or Tera Term Pro to establish a console session with the AS3/AS3E.

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

COM1_57600 - HyperTerminal			<u>- 0 ×</u>
<u>File Edit View Call Transfer He</u>	p		
🗅 🛎 🞯 🌋 🗈 🎦 😭			
	Connect To	?×	
-	COM1_57600 Enter details for the phone number that you	want to dial;	
	Country/region:	_	
	Enter the area code without the long-distance	e prefix.	
	Area code:		
	Phone number:		
	Connect using: COM1		
	Configure		
	Use country/region code and area code Redial on busy		
	ОК	Cancel	
Disconnected Auto detec	t Auto detect SCROLL CAI	PS NUM Capture Print ech	10 //



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

🇞 СОМ1_57600 - Нурег	Terminal							- 🗆 🗵
<u>File E</u> dit <u>V</u> iew <u>C</u> all <u>T</u> r	ansfer <u>H</u> elp							
COM1_57600 - Hyper File Edit Yiew Call In C C A A A A A A A A A A A A A A A A A A	Terminal ansfer Help COM1 Prop Port Setting	erties s per second: 5 Data bits: 8 Data bits: 1 Stop bits: 1 Flow control: N	7600	▼ ▼ ▼	? ×			
Disconnected	Auto detect	Luto detect	SCROLL	CAPS	NUM	Capture	Print echo	

(3) Click [File]→[Properties]

🦓 COM1_57600 - НурегТе	erminal	۱
<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 a		1
<u>N</u> ave Save As		
Page Set <u>u</u> p		
<u>P</u> rint		
Properties		
Exit Alt+F4		
	·	
<u> </u>		-
Displays the properties of the cur	rent session	
		_



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

🇞 COM1_57600 - HyperTerminal	
<u>File Edit View Call Transfer H</u> elp	
🗅 🗃 🍘 🕈 🗈 🎦 🖆 COM1 Properties	
Connect To Settings Function, arrow, and ctrl keys act as Image:	
Connected 00:03:37 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Prin	nt echo 🛛 🖊

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

COM1_57600 - HyperTerminal File Edit View Call Transfer Help	_ II X
Image: Construction of the second	
Connected 00:08:33 Auto detect 57600 8-N-1 SCROLL CAPS NUM	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 - HyperTermi	nal							
<u>File Edit View Call Transfer</u>	<u>H</u> elp							
🗅 🗃 🍘 🔏 🗈 🎦 🖆	1							
[
\$SYSMSG: Bootloader	V1.01RC							
\$SYSMSG: Startup AS3	Rev.1.0	0						
			RODOLL					
Connected 00:22:45 Auto d	letect 5	7600 8-N-1	SCROFT	CAPS	NUM	Capture	Frint echo	- //.

4.3. Connect a Device to a Remote Server

The GPRS or UMTS connection can either be enabled by typing the AT\$GPRS command or thorough the AK Series Configure Tool. Once enabled, the ATrack ServerTool is then installed on a Windows PC in order to communicate with the AS3/AS3E remotely via a GPRS or UMTS network. The ServerTool is a remote server application, which is mainly used for parsing data by translating binary formats into readable formats or other testing purposes. Port forwarding is required if the PC is located behind a Broadband router or any other firewall device or if it has third-party firewall software installed. The communication is bidirectional, which means you can issue any AT command to the AS3/AS3E by clicking the Send button. Please refer to the following snapshot and the Port forwarding website: http://portforward.com/ for details.

		ServerTo	ol V0.57 - 65530		-	
Packet Type : TCP Command : AT\$inf	Host Port: 655	30 Unit ID : 35259	9042023874 🗸	Open	Close	Exit
Deepond Meesage				00110		
Original Data	SE AES Key	Position Fo	ormat : ASCII v	Unix TimeStamp	ACK	Content
1:02:15 => @P,C254, 1:02:11 => @P,E3E0, 1:02:08 => @P,3C29,	137,327,352599042023 137,326,352599042023 137,325,352599042023	3874,20130703113859,3 874,20130703113859,2 3874,20130703113859,3	20130704030214,20130 20130704030210,201307 20130704030207,20130	704030214,12156264 704030210,12156264 704030207,12156264	3,25083616,0,2,586, 3,25083616,0,2,584, 3,25083616,0,2,583,	990,1,1 990,1,1(990,1,1
eadable Data						-
1:07:57 => @P,0B1A i1:07:53 => @P,1A09 i1:07:49 => @P,DEFF, <	,136,415,35259904202 ,136,414,35259904202 136,413,35259904202	3874,20130704030755 3874,20130704030751 3874,20130704030748,	,20130704030755,20130 ,20130704030751,20130 20130704030747,20130	0704030755,121.5626 0704030751,121.5626 704030747,121.5626	24,25.083501,0,2,68 24,25.083501,0,2,68 24,25.083501,0,2,68	8.4,1.2,1 8.3,1.4,1, .2,1.2,1, ↓ >
arsed Data Custom In	fo :		Apply	Ma	ap Clear Co	ntent
Unit ID	GPS DateTime	RTC DateTime	Send DateTime	Longitude	Latitude	H
352599042023874	20130704030803	20130704030803	20130704030803	121.562624	25.083501	
<						>



5. AT\$IOCG Command Reference

5.1. Configure or Query I/O Pin Characteristics

Command Description						
This command is used to set or query the I/O port characteristics of the AS3/AS3E. It is recommended to disconnect all						
I/O connections prior to changing the I/O characteristic in order to avoid damage to the I/O port.						
Syntax						
Write Command AT\$IOCG= <io1>,<io2>,<io3></io3></io2></io1>						
Response	\$OK					
Read Command	AT\$IOCG=?					
Response	\$IOCG= <io1>,<io2>,<io3></io3></io2></io1>					
Parameter Descript	ion					
Parameters	Description	Data Type	Default			
<io1></io1>	I/O configuration on Pin#3 (Green wire)	U8	1			
	1: Input2 (VSS ,Pulse counter)					
	3: Analog Input		1			
	4: 1-Wire Data					
<io2></io2>	I/O configuration on Pin#4 (Blue wire)	U8	2			
	1: Input 1					
	2: Output 1					
<io3></io3>	I/O configuration on Pin#5 (White wire)	U8	2			
	1: Input 3 (RPM)		1			
	2: Output 2					
Example						
(1) Change all ports to input	uts:					
AT\$IOCG=1,1,1						
(2) Change Pin#3 to 1-Wire Data input						
AT\$IOCG=4,2,2						
(3) Change Pin#4 and Pin#	(3) Change Pin#4 and Pin#5 to digital inputs, and Pin#3 to analog input:					
AT\$IOCG=3,1,1						
Remark						



6. Firmware Upgrade

The device firmware can be upgraded via RS232 or through the FTP protocol. Following is an example of firmware upgrade via RS232.

(1) Run the AK Series Configure Tool and click on the **[Connect]** button.

	AK Ser	eries Configure Tool 1.01
📂 Open 💾 Sav 🎤 Connect	Read 😽 Write 🖋 Reset	Model : FW ver. : IMEI :
Unit Configuration	Unit ID Setting	
Security Setting	Set unit identification number or I	IMEI number
Unit ID Setting	Linit ID 0	
Position Format	Comment : Write <unit id=""> to 0</unit>	0 indicates the <unit id=""> is using default IMEI number of the device</unit>
RS232 Setting		
Power Management		
Battery Control		
I/O Setting		
Communication Configuration	-	
Report Configuration		
Tracking / Logging Configuration		
System Configuration		

(2) Select the correct COM port and the Baud Rate (57600) from drop-down lists. Click on the **[Ok]** button to close Setting.







(3) Click on the [Read] button to read out data from the device.



(4) From the following snapshot, the data is being read out.



Confidential Document

¢.				AK S	eries Configur	e Tool 1.01	
📂 Open 💾 Save	Disconnect	💰 Rea	d 🤞 Write	🐝 Reset		Model : IMEI :	FW ver. :
Unit Configuration		Unit ID	Setting				
Security Setting		Set unit	identificatio	on number o	r IMEI number		
Unit ID Setting			2		7		
Position Format			omment : Wi	rite <l id="" init=""> ti</l>	0 indicates the	<l id="" init=""> is us</l>	ing default IMEL number of the device
RS232 Setting			onninent. wi		o marcateo tric	-011(1)- 13 03	ing deladit mich number of the device
Power Management							
Battery Control			_				
I/O Setting					Read		
				Reading			
					42%		
					Cancel		
					Gancer		
Communication Configu	uration						
Report Configuration							
Tracking / Logging Conf	figuration						
System Configuration							
COM6, 57600, connected	i						

(5) Click on the **[OK]** button to close the message box.



G			AK S	eries Configure	e Tool 1.01	
📂 Open 💾 Save	Disconnect	💰 Read 🤞 Write	🐝 Reset		Model : IMEI :	FW ver. :
Unit Configuration		Unit ID Setting				
Security Setting		Set unit identification	on number of	IMEI number		
Unit ID Setting		Unit ID 0				
Position Format		Comment : Wi	rite <unit id=""> to</unit>	_ o 0 indicates the <	Unit ID> is using	default IMEI number of the device
RS232 Setting						
Power Management						
Battery Control						
I/O Setting				Read	×	
				i Read data fi	OK	
Communication Config	juration					
Report Configuration						
Tracking / Logging Con	figuration					
System Configuration						
COM6, 57600, connecte	d					

(6) Click on [System Configuration]





¢.			AK S	eries Configure	Tool 1.01	
📂 Open 💾 Save	🏂 Disconnect	💰 Read 🤞 Write	🖋 Reset		Model : AK1 FW IMEI : 20131146989	ver.: Rev.1.03 9020131415687
Unit Configuration	_	Firmware Upgra	nde			
Communication Config	juration	Upgrade the firmwar	e of the dev	ice by serial por	t	
Report Configuration		Firmware file path :				
Tracking / Logging Con	nfiguration					Load
System Configuration						Update
System Information						
Firmware Upgrade						
COM6 57600 connecte	d					

(8) Click on the [Load...] button to browse the firmware file where you saved. In the following example, AS3/AS3E_1.04.dat is selected and click on the [Open] button to close the window.

¢		A	K Series Config	gure Tool 1.01			
📂 Open 💾 Save	Disconn	ect 💰 Read 💰 Write 💰 Res	et	Model : AK1 IMEI : 20131146	FW ver. : Rev.1.03 59890201314156	687 [.]	
Unit Configuration		Firmware Upgrade					
Communication Config	juration	Upgrade the firmware of the	device by serial	port			
Report Configuration		Firmware file path :					
Tracking / Logging Con	nfiguration				Load		
System Configuration					Update		
System Information			0	pen			×
Firmware Upgrade	e e) 🔿 👻 🕆 📕 🕨 AK		ب	Search AK		ρ
		rganize v New folder			8=		
		Name		Date modified	Type	Size	•
		AK11.04.dat		2013/2/23 下午 07	dat files	245	κΒ
COM6, 57600, connecte	d	File name: AK1_1.0	4.dat	~ [Firmware File (*.c Open	dat) Cancel	▼

(9) Click on the **[Update]** button to upgrade the firmware.



¢.	AK S	eries Configure Tool 1.01
📂 Open 💾 Save 🗦 Disconr	ect 💰 Read 💰 Write 💰 Reset	Model : AK1 FW ver. : Rev.1.03 IMEI : 20131146989020131415687
Unit Configuration	Firmware Upgrade	
Communication Configuration	Upgrade the firmware of the dev	ice by serial port
Report Configuration	Firmware file path :	
Tracking / Logging Configuration	C:\Users\James\Desktop\AK7\ AK1_	L04.dat Load
System Configuration		Update
System Information		
Firmware Upgrade		
COM6, 57600, connected		

(10) From the following snapshot, the firmware is being uploaded.

₫	AK Series Co	nfigure Tool 1.01
📂 Open 💾 Save 👂 Disconnect	💰 Read 🤞 Write 💰 Reset	Model:AK1 FW ver.:Rev.103 IMEI:20131146989020131415687
Unit Configuration	Firmware Upgrade	
Communication Configuration	Upgrade the firmware of the device by se	erial port
Report Configuration	Firmware file path :	
Tracking / Logging Configuration	C:\Users\James\Desktop\AK7\ AK1_1.04.dat	Load
System Configuration		Update
System Information		
Firmware Upgrade		
COM6, 57600, connected	upgrading	21% Cancel

(11) From the following snapshot, the device is being rebooted.



6			AK Serie	es Configure Tool 1.	01		
늗 Open 💾 Save	Disconnect	💰 Read 🤞	Write 🖋 Reset	Model : A IMEI : 20	AK1 FW ve 01311469890	er. : Rev. 1.03 20131415687	
Unit Configuration		Firmware U	pgrade				
Communication Configu	uration	Upgrade the fir	mware of the device	by serial port			
Report Configuration		Firmware file pat	th :				
Tracking / Logging Conf	figuration	C:\Users\James	Desktop\AK7\ AK1_1.04.	dat		Load	
System Configuration					Γ	Update	
System Information							
Firmware Upgrade			Uj Rebooting	99% Cancel			

(12) Click on the **[OK]** button to close the message box.

G	AK Series Configure Tool 1.01
📂 Open 💾 Save 🗦 Disconned	t Sead Write SReset Model:AK1 FW ver.:Rev.103 IMEI: 20131146989020131415687
Unit Configuration	Firmware Upgrade
Communication Configuration	Upgrade the firmware of the device by serial port
Report Configuration	Firmware file path :
Tracking / Logging Configuration	C:\Users\James\Desktop\AK7\ AK1_1.04.dat
System Configuration	Update
System Information	
Firmware Upgrade	
COM6, 57600, connected	Upgrade Firmware inished



7. Appendix

7.1. Hardware Specification

Model Number	AS3	AS3E			
Dimensions (L x W x H)	120 x 80 x 32 mm				
Housing	Flame Retardant ABS+PC (UL 94 V-0), IP67 water proof				
Operating Temperature	-20℃ ~ +60℃				
Electrical Characteristics	s				
Power Supply	8V ~ 36V DC (±20%)				
Internal Battery	2050mAh Li-ion rechargeable battery				
Cellular Network Commu	unication				
Frequency(MHz)	HSPA : Dual-band (850/1900 or 900/2	100)			
Cellular Antenna	Internal Cellular antenna				
SIM Card	1.8V/3V Mini SIM(2FF)				
GPS/GLONASS					
Receiver	66 Acquisition Channels, L1 Band, C/A	Code, -165dBm sensitivity			
Accuracy	3.0m CEP50 without SA				
Data Acquisition Rate	1Hz				
GPS Antenna	Internal GPS antenna	External GPS antenna			
GPS Data Buffer	2 MB				
Accelerometer					
3-Axis	Z,X,Y				
Resolution	±2g, 10-bits resolution				
Interface/Input /Output	*The specification shown the max. ports	s of the I/O configuration.			
	1 ACC Positive Triggered				
	*1 Digital Positive, 2 Negative Triggere	ed			
Input/Output	*2 Open-Collect Output (Max. sink cur	rent 300mA)			
	*1 Analog input (0~40VDC, 12bits reso	plution)			
	*1-Wire Protocol Supported				
	*1 RS232 interface				
Standard Accessories					
Power cable	6-wires (1.2m)				
GPS Antenna	N/A	GPS Antenna(5.0m)			

7.2. 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 generate, 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.