

AL7 User Manual

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Table of Contents

1.	Notification	3
	1.1. Disclaimer	3
	1.2. Copyright	3
	1.3. Warning	3
2.	Introduction	4
3.	System Architecture	5
4.	Installation	6
	4.1. Package Content	6
	4.2. SIM Card Installation	6
	4.3. Power I/O Connector	7
	4.4. USB Port and Driver Installation	8
	4.5. LED Indicators	9
5.	Configuration	
	5.1. Connect a Device Using HyperTerminal	10
	5.2. Connect a Device to a Remote Server	14
6.	AT\$IOCG Command Reference	
	6.1. Configure or Query I/O Pin Characteristics	15
7.	Firmware Upgrade	16
8.	Appendix	
	8.1. FCC Regulations	
	8.2. Hardware Specification	19



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. Introduction

Congratulations on your purchase of the ATrack AL7 Vehicle/ Motorcycle Telematics device. The AL7 is equipped with state of the art Mobile and GPS technology, providing the most reliable up to date tracking information of your vehicle's current position or movement status. In addition to this, vehicle/ motorcycle tracking can be combined with a variety of customized events based on your needs.

3. System Architecture

From the following diagram, the AL7 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 (e.g. GPRS/CDMA/UMTS) or via SMS. The communication is bidirectional, which means you can control the AL7 remotely across a Mobile network or via SMS.



System Architecture

4. Installation

4.1. Package Content

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

• AL7 Device * 1





• USB Cable * 1

4.2. SIM Card Installation

The AL7 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). To install a SIM card, please loosen the screws and remove the cover.



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4.3. Power I/O Connector

The following table describes the function of each bare wire.

Power I/O Connector						
Pin#	Function	Color	Designation	Note		
1	Main power input	Red	PWR	DC 6V~32V DC input		
2	Power ground	Black	GND			
3	ACC Input	Yellow	ACC	Ignition status positive trigger input		
4**	General Input1 (Default)	Green	IN1/1W	Negative trigger input		
	1-Wire Protocol Input *			1-Wire Data input		
5**	General Input2	Brown	IN2/O1/AI	Positive trigger input		
	General Output1 (Default)			Open collector output (Max.300mA)		
	Analog Input1			Analog input (DC3V~40V)		
6**	General Input3	Gray	IN3/02	Negative trigger input		
	General Output2 (Default)			Open collector output (Max.300mA)		

* 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. **Note: Please do not connect a positive voltage to any output pin!!!**



4.4. USB Port and Driver Installation

The following figure shows the position of USB port on device.



Double click the USB driver VCP_V1.3.1_Setup/ VCP_V1.3.1_Setup_x64. Then, click the Finish button to complete the process.



4.5. LED Indicators

The following figure shows the location of the device LEDs.



LED	Indication	Description
	Solid On	In full operation mode
	1 blink (0.1 sec.) in every 10	In cloop mode
PWR (Green)	sec.	in sieep mode
	1 coc On 1 coc 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 for GPS signal
GFS (Reu)	Solid On	Position get fixed
	Off	GSM module off
	0.7 sec. On, 0.7 sec. Off	Searching for 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. 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 GSM carrier for the PUK in order to unlock the SIM card using your cell phone.



5. Configuration

You may be able to explore great features on the AL7 through AT commands. The commands can be sent to a device via USB, SMS or Mobile network (e.g. GPRS/CDMA/UMTS). The following diagram shows how to configure a device with Hyper terminal via USB.

5.1. Connect a Device Using HyperTerminal

The following example shows how to connect the AL7 through HyperTerminal. You may use other popular terminal emulators such as Putty or Tera Term Pro to establish a console session with the AL7.

(1)	Run HyperTerminal	and select the correct	COM port and click	on the [Configure	.] button.
-----	-------------------	------------------------	--------------------	-------------------	------------

🥙 СОМ1_57600 - НурегТе			<u> </u>
<u>File E</u> dit <u>V</u> iew <u>C</u> all <u>T</u> rans	sfer <u>H</u> elp		
🗅 😅 🛛 🍘 🕈 🗎	r 🗳		
	Connect To	? ×	
-	Сом1_57600		
	Enter details for the phone nur	mber that you want to dial:	
	⊆ountry/region:	v	
	Enter the area code without th	ie long-distance prefix.	
	Arga code:		
	Phone number:		
	Connect using: COM1	•	
	Configure	B	
	Detect Carrier Loss Use country/region code a Redial on busy	nd area code	
		OK Cancel	
Disconnected A	uto detect Auto detect SCR	OLL CAPS NUM Capture	Print echo



(2) Port Settings should be as follows. Click on the **[OK]** button to close the Properties window.

🧞 СОМ1_57600 - Нуреі	Terminal					
<u>File Edit V</u> iew <u>Call T</u> r	ransfer <u>H</u> elp					
□ ☞ ☜ ઢ ▫▫ ៥	<mark>구 [</mark> 유] COM1 Pro	perties			?×	
-	Port Settin	igs				
	B	its per second:	57600	_	Bits per second:	57600
		<u>D</u> ata bits:	8	•	Data Bits:	8
		<u>P</u> arity:	None	•	Parity:	None
		Stop bits:	1		Stop Bits:	1
		<u>9</u> (0) bits: [1		Flow Control:	None
		Elow control:	None	Restore Default	s line	
Disconnected	Auto detect	Auto detect	SCROLL	CAPS	UM Capture Print	techo //

(3) Click on [File]→[Properties]

🍓 COM1_57600 - НурегТе	rminal
<u>File E</u> dit <u>V</u> iew <u>C</u> all <u>T</u> ran:	sfer Help
<u>N</u> ew Connection	l 🗳
<u>O</u> pen	
<u>S</u> ave	
Save <u>A</u> s	
Page Set <u>u</u> p	
Print	
Properties	
Exit Alt+F4	
Displays the properties of the curr	rent session
- aparto de proportes el lle cel	



(4) Click on the **[Settings]** tab and click on the **[ASCII Setup...]** button.

🇞 COM1_57600 - HyperTerminal	
<u>File E</u> dit <u>V</u> iew <u>Call T</u> ransfer <u>H</u> elp	
🗅 🗃 🍘 🐉 💷 🎦 🖆 COM1 Properties 🛛 ? 🗙	
Connect To Settings Function, arrow, and ctil keys act as I erminal keys Windows keys Backspace key sends © I til+H Del C trl+H, Space, Ctrl+H Emulation: Auto detect Terminal Setup Cglors Telget terminal ID: ANSI Backscroll buffer lines: S00 Play sound when connecting or disconnecting Allow gemote host initiated file transfers Egit program upon disconnecting Input Translation OK Cancel 	
Connected 00:03:37 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture P	rint echo 🛛 🖊

(5) Check the following options and click on the **[OK]** button.

COM1_57600 - HyperTerminal	×
COM1_57600 - HyperTerminal	×
OK Cancel Connected 00:08:33 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Print echo	•



(6) Power ON the device and the startup message will be displayed on the screen. You may type some AT commands to query the device afterwards. Please refer to the ATrack Protocol Document for details.

COM1_57600 - HyperTern File Edit <u>V</u> iew Call <u>T</u> ransfer	n inal r <u>H</u> elp							<u> </u>
D 🛩 🍘 🕉 🗈 🛅 🛙	9							
SYSMSG: Bootloo \$SYSMSG: Startu	ader Rev p AK7 Re	.1.09RC v.0.03						
Connected 00:22:45	o detect 57	7600 8-N-1	SCROLL	CAPS	NUM	Capture	Print echo	

5.2. Connect a Device to a Remote Server

The GPRS or UMTS connection can either be enabled by typing the AT\$GPRS command. Once enabled, the ATrack ServerTool is then installed on a Windows PC in order to communicate with the AL7 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 AL7 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 : ATSinfo	Host Port: 6553 0=?	30 Unit ID : 35259	9042023874 🗸	Open Send	Close	Exit
Despond Message				Cond		
Original Data	SE AES Key	Position Fo	ormat : ASCII v	Unix TimeStamp	ACK Cle	ar Content
1:02:15 => @P,C254; 11:02:11 => @P,E3E0,1 11:02:08 => @P,3C29; <	137,327,352599042023 37,326,352599042023 137,325,352599042023	1874,20130703113859,3 874,20130703113859,2 1874,20130703113859,3	20130704030214,20130 20130704030210,20130 20130704030207,20130	704030214,1215626 704030210,12156264 704030207,1215626	43,25083616,0,2,5 43,25083616,0,2,5 43,25083616,0,2,5	86,990,1,1 84,990,1,1(83,990,1,1 v
Readable Data						
11:07:57 => @P,0B1A, 11:07:53 => @P,1A09, 11:07:49 => @P,DEFF, < arsed Data	136,415,35259904202 136,414,35259904202 136,413,352599042023	3874,20130704030755 3874,20130704030751, 1874,20130704030748,	,20130704030755,2013(20130704030751,20130 20130704030747,20130	0704030755,121.562 0704030751,121.562 704030747,121.562	624,25.083501,0,2 624,25.083501,0,2 524,25.083501,0,2	,68.4,1.2,1 ,68.3,1.4,1, 68.2,1.2,1, ↓
Custom Inf	io :		Apply	N	lap Clear	Content
Unit ID	GPS DateTime	RTC DateTime	Send DateTime	Longitude	Latitude	H
352599042023874	20130704030803	20130704030803	20130704030803	121.562624	25.083501	
٢						>



6. AT\$IOCG Command Reference

6.1. Configure or Query I/O Pin Characteristics

Command Description						
This command is used to	set or query the I/O port characteristics of the AL7. It is recommend	led to disconne	ct all I/O			
connections prior to chan	ging 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			
<i01></i01>	1: Input1	U8	1			
	4: 1-Wire Protocol					
<io2></io2>	1: Input 2	U8	2			
	2: Output 1					
	3: Analog Input					
<io3></io3>	1: Input 3	U8	2			
	2: Output 2					
Example						
(1) Change all ports to input	uts:					
AT\$IOCG=1,1,1						
(2) Change Input1 to 1-Wire Protocol						
AT\$IOCG=4,2,2						
(3) Change IO1 and IO3 to inputs, and IO2 to analog input:						
AT\$IOCG=1,3,1						
Remark						



7. Firmware Upgrade

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

(1) Make AL7 connecting to hyper terminal and execute **AT\$FWDL**

	Com 3 57600 - HyperTerminal 🛛 🗕 🗖 🗙
File Edit View Call	Transfer Help
0 📽 💿 🐉 🛛 🖆	
AT\$FWDL \$0K CCCCCCC	
Connected 00:00:57	ANSIW 57600 8-N-1 SCROLL CAPS NUM Capture Print echo

(2) Click on [Transfer] -> [Send File]





(3) Choose **Firmware** file and **Ymodem** for Protocol.

Com 3 57600 - HyperTerminal – 🗆 🗙					
File Edit View Call Transfer Help					
AT\$FWDL \$0K CCCCCCCCCC	Send File × Folder: C:\Users\pou2100\Desktop Filename: C:\Users\pou2100\Desktop\AX7T_0.61B1545.dt C:\Users\pou2100\Desktop\AX7T_0.61B1545.dt Browse Protocol: v Send Close Cancel Close				
Connected 00:01:53 ANSIW 576	00 8-N-1 SCROLL CAPS NUM Capture Print echo				

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

E File Edit View Call Transfer Help D 2 2 2 3 □D 2 2 2 2 D 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Com 3 57600 ·	- HyperTerminal		 ×
\$0K CCCCCC_	Ymodem file sen	d for Com 3 57600		
Sending	C:\Users\pou2100\Desktop\			
Packet:	165 Error checking	CRC File size:	217K	
Retries:	0 Total retries	: 0 Files:	1 of 1	
Last ent	r			
File:		155K of 2	217K	
Elapsed	00:00:08 Remaining	: 00:00:03 Throughput	: 19840 cps	
		Cancel	cps/bps	
				Ļ
Connected 00:00:27 ANSIW 57600	B-N-1 SCROLL CAPS	NUM Capture Print e	cho	

(5) Click the firmware is updated successfully by AT\$INFO=?.



8. Appendix

8.1. 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 can generate, use and radiate 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.



8.2. Hardware Specification

Model Number	AL7(2G)	AL7(UA)	AL7(UE)	AL7(UG)	AL7(CV)	AL7(CS)	
Dimensions (L x W x H)	88 x 65 x 25 mm						
Weight	149 g						
Housing	Flame Retardant ABS(UL 94 V-0), IP67 Water Proof						
Operating Temperature (w/o battery)	-40°C ~ 85°C (-40°F ~ 185°F)						
Electrical Characteristics							
Power Supply	6V ~ 30V DC						
Current Consumption	Operating : Max.70mA@12V, Deep Sleep Mode : 2.17uA@12V						
Cellular Network Commu	nication						
Technology	GSM/GPRS WCDMA/HSPA				CDMA2000 1xRTT		
	850/900	850/1900	900/2100	800/850	800/1900)	
Frequency(MHz)	1800/1900			900/1700			
,				, 1900/2100			
Carrier Support	MorldWido	LISA/Canada		Morld Mide	Varizon	Sprint	
			EU/APAC	Quad band		Sprint	
Collular Antonna	Quad-band 850/1900 900/1800 Quad-band N/A						
Beceiver	56 Channels	-161dBm (GP	s) /_158 dBN		racking so	ncitivity	
Δοτικάτον	2 5m CEP (G	1010000000000000000000000000000000000	ΈΡ (GLONΔ9		Tacking se	IISILIVILY	
Data Acquisition Rate	y 2.5111 CEP (GPS) / 4.0111 CEP (GLONASS)						
Antenna	Internal GPS	/ GLONASS an	tenna				
GPS Data Buffer Capacity	2 MB						
Accelerometer							
3-Axis	Z,X,Y						
Resolution/Sample Rate	±16g, 400Hz						
Device I/O port							
ACC Input	1 Positive						
*Digital Input	1 Positive and 1 Negative triggered						
*Digital Output(Option)	2 Open-collector output						
*Analog Input(Option)	3~40VDC, 12 bits resolution						
*1-Wire [®] Interface	Support up to 1 Dallas-Key (iButton [®]) and 2 temperature sensors				rs		
USB 1 micro USB inside the case for device configuration							
Standard Accessories							
USBCable Length 1.2m							
Backup Battery	Internal 3.7V 920mAh Rechargeable Lithium-ion Battery						