



AU7

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. Hardware

2.1. Package Content

Each package contains the following device/accessories:

- Device * 1



- GPS Antenna * 1



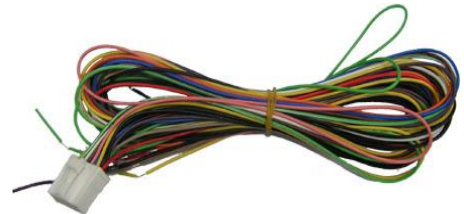
- Serial Cable * 1



- GSM/UMTS Antenna * 1

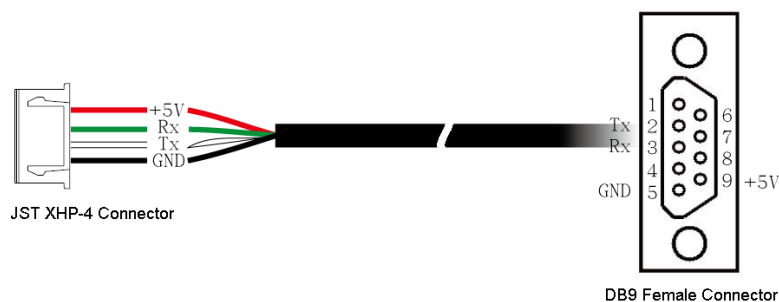


- Power/IO Cable * 1



2.2. Pin Assignments

2.2.1. Serial Cable (JST Female Connector to DB9 Female Connector)



The Pin 9 is a power output port to provide a 5V, 300mA power source for accessory that connects to the serial port. If the connected accessory requires more power, please use external power source instead.

2.2.2. Device I/O Ports

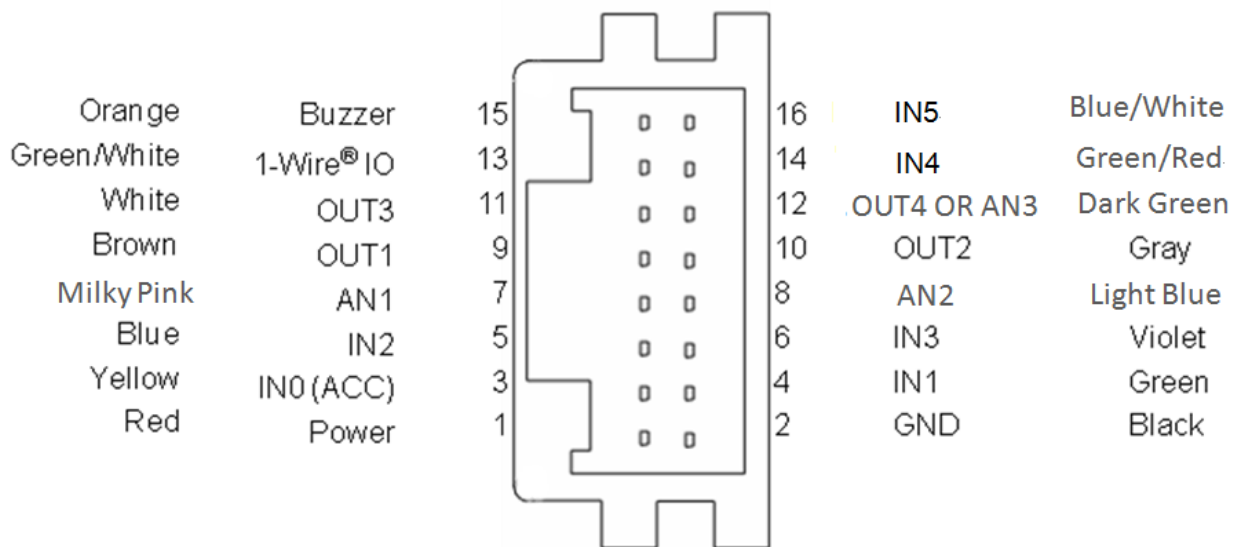
To support a wide range of hardware applications, the AU7 is equipped with a large number of inputs and outputs.

- 6 Digital Inputs (IN0, IN1, IN2, IN3, IN4 and IN5): IN0, IN1 and IN4 are positive triggers (Triggering Voltage Range: 3.7 ~ 40V). IN0 is dedicated to ACC (Ignition). IN2, IN3, and IN5 are negative triggers (Triggering Voltage Range 0 ~ 0.8V). These triggers can be used in the following application areas: engine detection, car door open/close detection, and Panic Button in case of any emergency.
- 3 Digital Outputs (OUT1, OUT2, and OUT3): They are normally used for engine or ignition immobilization. Please refer to our AU7 Quick Start Guide for details on how to set up relays for these applications. These digital outputs are open collector type. When in the “ON” state, these outputs are grounded (GND). When in the “OFF” state, it forms an open circuit. **Note: Please do not connect a positive voltage any output pin!!!**
- 2 Analog Inputs (AN1 and AN2): Each input is usually connected to an external temperature sensor or fuel level sensor. The voltage range of AN1 is 0 ~ 40V 12-bits resolution. The voltage range of AN2 is 0 ~ 5V 12-bits resolution.
- 1 Digital Output/Analog Input (OUT4/AN3): This port may be configured as a digital output or analog input through the AT\$IIOCG command. The voltage range of AN3 is 0 ~ 40V 12-bits resolution. Refer to the AT\$IIOCG command reference section for details. **Note: Please do not connect a positive voltage to an output pin!!!**
- 1-Wire[®]: it uses a single wire to transmit both data and power. You may use 1-Wire[®] to connect up to five devices, for instance, one iButton[®] and four temperature sensors.

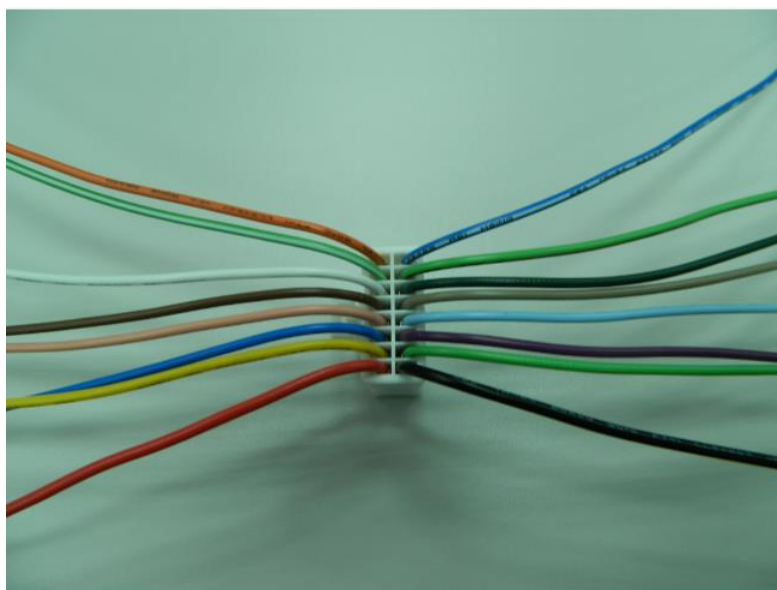
Compatible Devices Supported by 1-Wire® Application

Family Code	Model
01h	DS1990A (iButton)
28h	DS18B20 (Temperature Sensor)

16-pin male on-board Power I/O Connector



16-pin female Power I/O Cable



2.3. LED Indications

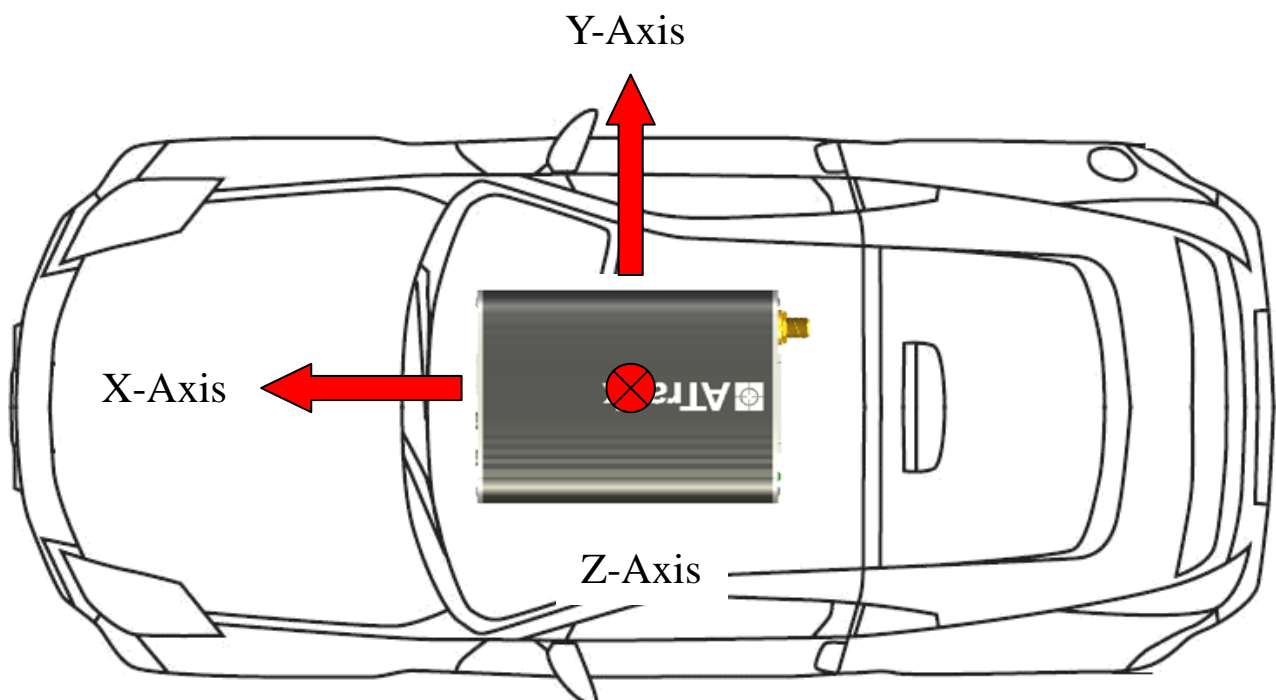
The following table describes LED states:

LED	Indication	Description
PWR (Green)	Solid On	In full operation mode
	1 blink (0.1 sec.) in every 10 sec.	In sleep mode
	1 sec. On, 1 sec. Off	GPS module off, External power lost, running on backup battery
GPS (Red)	0.7 sec. On, 0.7 sec. Off	Searching for GPS signal
	Solid On	Position get fixed
GSM (Red)	Off	GSM module off
	0.7 sec. On, 0.7 sec. Off	Searching for GSM signal
	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.

2.4. Device Installation

When installing the AU7 onto a vehicle, please make sure that the XYZ-position of the device follows the exact same directions as shown below. The G-Sensor operates in such a way in order to detect harsh driving events. The forces in each axis are used to determine the status of harsh driving events. If the following installation is not practicable, it is advised to use the GPS for detecting harsh driving as an alternative.



1. **Note: When installing the device, the vehicle should be parked on a horizontal place (not tilted). Then, the device should be installed parallel to the vehicle body and fixed with a mounting bracket or double-sided adhesive to ensure that the G-Sensor works properly.**
2. **Note: It is strongly recommended that an automobile technician is required to be involved for the above installation.**

3. Firmware Upgrade

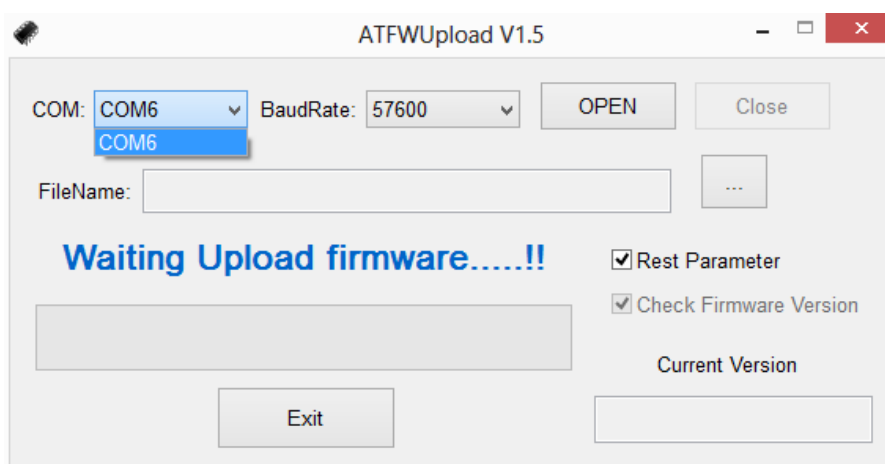
In this section, we are going to demonstrate how to do firmware upgrade on the AU7 via the serial connection. Before doing the upgrade, connect the serial cable between the JST XHP-4 output connector and the serial communication port (e.g. COM1 or COM2) on your PC. You may use a USB to serial port converter in case your PC doesn't have any COM port.

3.1. Firmware Upgrade via RS232

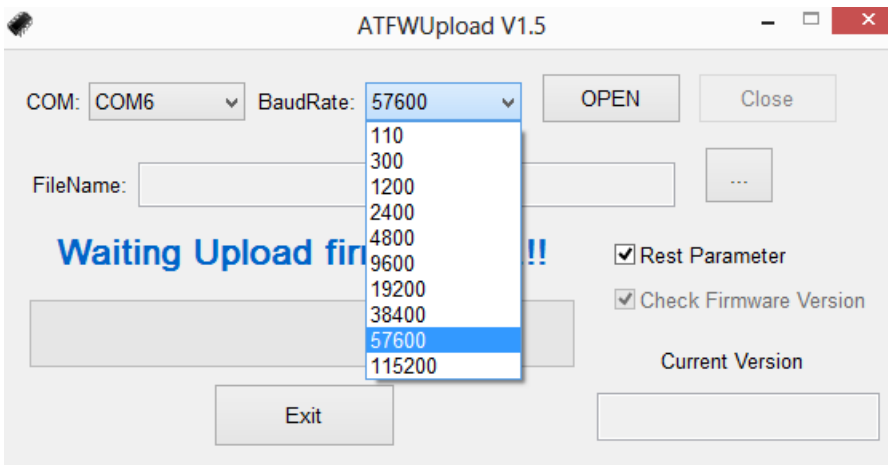
(1) Run the **ATFWU**upload program by double-clicking on it.



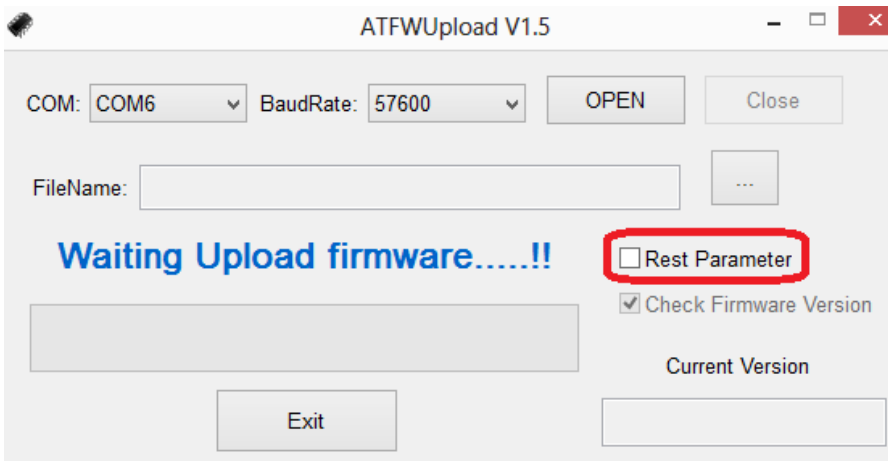
(2) Select the correct COM port.



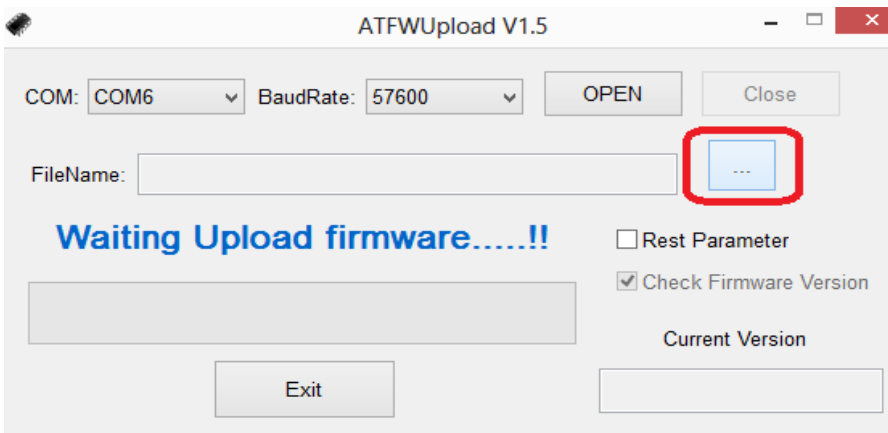
(3) Set the console baud rate to **57600**.



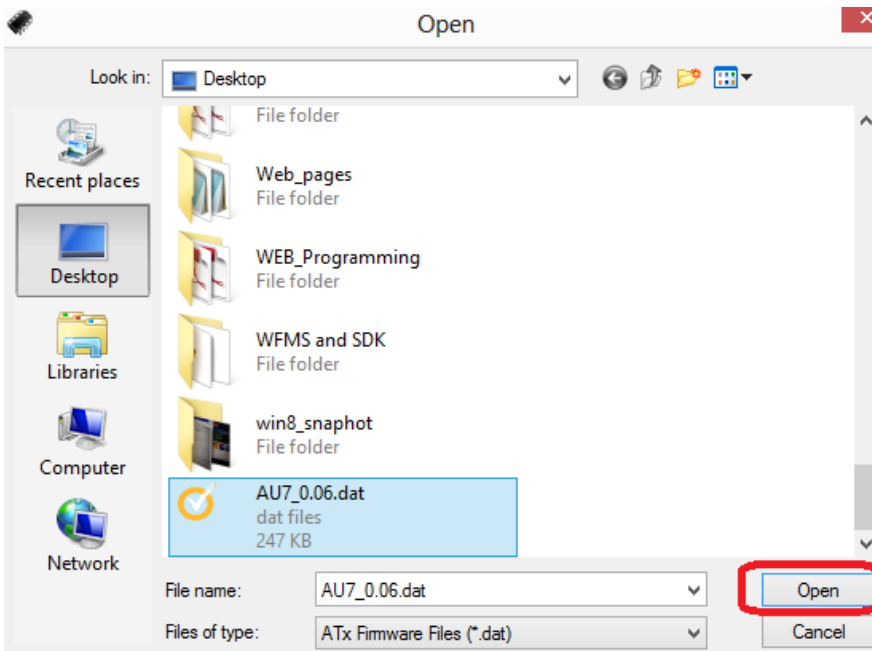
(4) Un-tick the check box next to **Rest Parameter**.



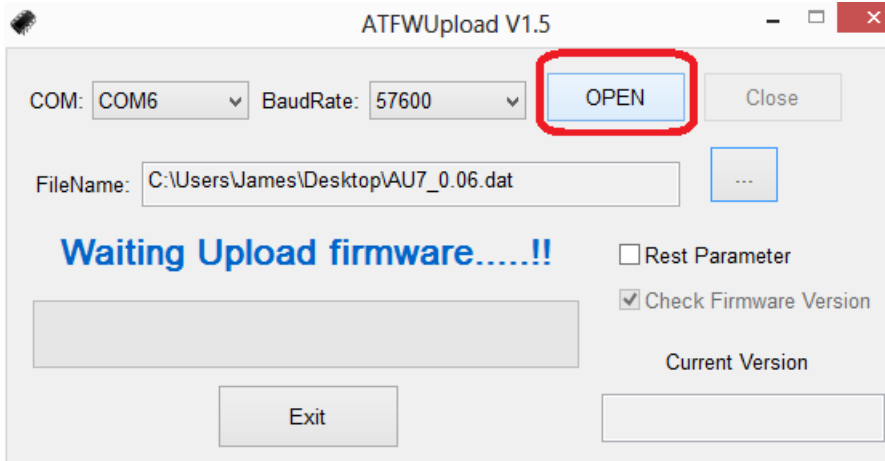
(5) Click on the [...] button to browse the firmware file where you saved.



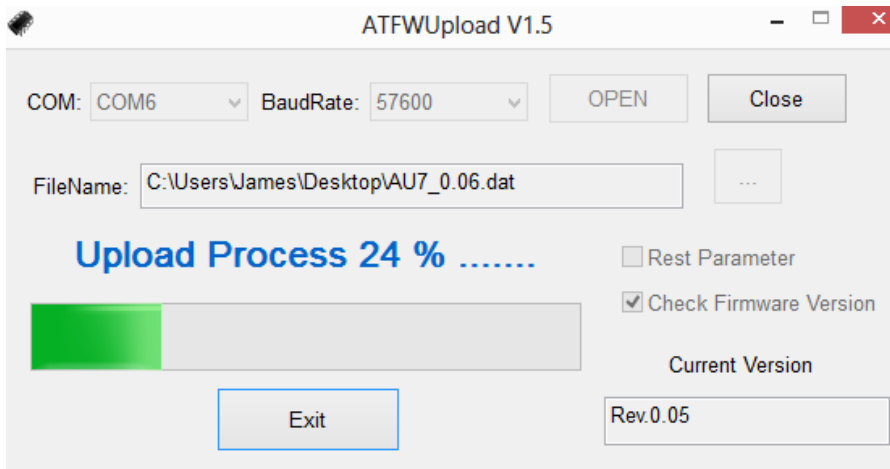
(6) Select the firmware file "AU7_0.06.dat". Click on the **[Open]** button.



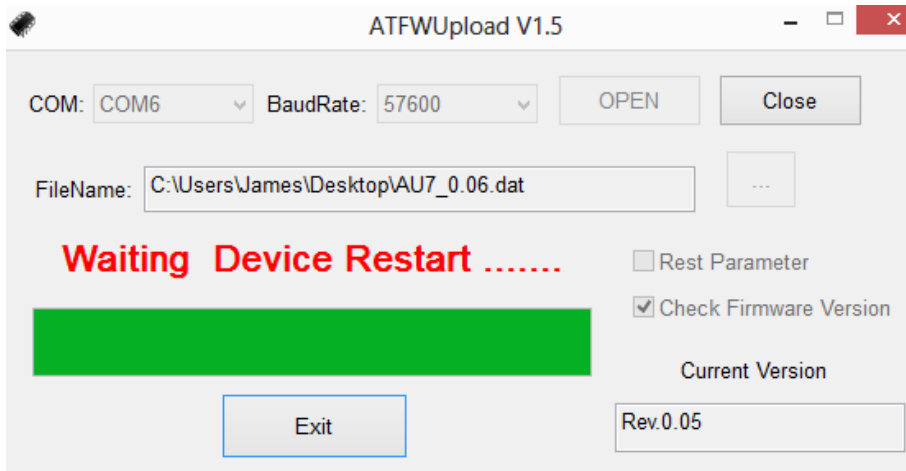
(7) Click on the **[Open]** button and power on the AU7. In this example, the AU7 is connected to a DC 12V power supply.



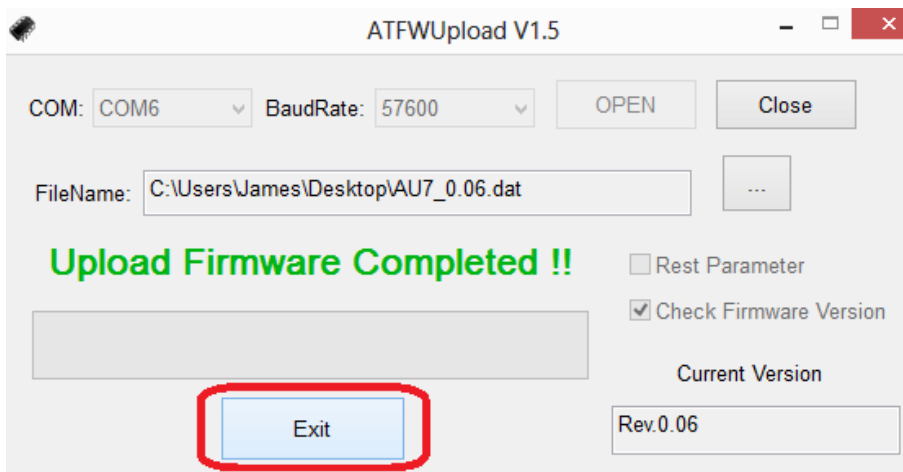
(8) The firmware is being uploaded.



(9) The AU7 is going to reboot after the firmware is uploaded.



(10) Once the upload process is completed, the current version shows the latest firmware version. Click on the [Exit] button to exit the program.



4. AT\$IIOCG Command Reference

Command Description			
<p>The 16-pin female power I/O cable has a dark green wire which can be used to identify this unique configurable I/O port. This port can be configured or queried through the AT\$IIOCG command. It is recommended to disconnect the I/O connection prior to changing the I/O characteristic in order to avoid any damage to the I/O port.</p>			
Syntax			
Write Command	AT\$IIOCG=<IO1>		
Response	\$OK		
Read Command	AT\$IIOCG=?		
Response	\$IIOCG=<IO1>		
Parameter Description			
Parameters	Description	Data Type	Default
<IO1>	<p>The default state of this port is OUT4. You may change it to AN3 by typing AT\$IIOCG=2</p> <p>1: Digital Output 4 (OUT4)</p> <p>2: Analog Input 3 (AN3)</p>	U8	1
Example			
<p>(1) Change Digital Output 4 to Analog Input 3 AT\$IIOCG=2</p> <p>(2) Change Analog Input 3 to Digital Output 4 AT\$IIOCG=1</p> <p>(3) Check the current state of the port AT\$IIOCG=?</p>			
Remark			
<input checked="" type="checkbox"/> MEMO <input checked="" type="checkbox"/> SERIAL <input checked="" type="checkbox"/> SMS <input checked="" type="checkbox"/> GPRS			

5. Appendix

5.1. Hardware Specification

Model Number	AU7(UA)	AU7(UE)	AU7(UG)	AU7(CV)	AU7(CS)
Dimensions (L x W x H)	100 x 65 x 26 mm				
Weight	155g				
Housing	Aluminum alloy				
Operating Temperature	-30°C ~ +80°C				
Electrical Characteristics					
Power Supply	8V ~ 40V DC (±20%)				
Current Consumption	Operating Mode : Max.100mA@12V, Deep Sleep Mode: 7mA@12V				
Backup Battery	Internal 3.7V 950mAh rechargeable Li-ion battery				
Cellular Network Communication					
Technology	UMTS/HSPA			CDMA2000 1xRTT	
Frequency(MHz)	850/1900	900/2100	800/850/900 1700/1900/2100	800/1900MHz	
Carrier Support	EU/APAC	US AT&T	World Wide	Verizon	Sprint
GSM/GPRS	Quad-Band 850/900/1800/1900MHz			N/A	
Cellular Antenna	Internal Cellular antenna				
SIM Card	1.8V/3V Micro SIM(3FF)			N/A	
GPS					
Receiver	66 Acquisition Channels, L1 Band, C/A Code, -165dBm sensitivity				
Accuracy	3.0m CEP50 without SA				
Data Acquisition Rate	1Hz				
GPS Antenna	External GPS active antenna				
GPS Data Buffer Capacity	8 MB				
Accelerometer					
3-Axis	Z,X,Y				
Resolution / Sample Rate	±16g, Max / 400Hz				
I/O Port					
ACC	1 Positive Triggered				
Digital Input	2 Positive, 3 Negative Triggered				
Digital Output	3 Open-Collect Output (Max. sink current 300mA _{MAX})				
Analog Input	2 (0 ~ 40VDC/0 ~ 5VDC, 12 bits resolution)				
Multi-Purpose Port	1 software configurable as either a digital output or an analog input				
1-Wire Interface [®]	Supported up to 1 iButton [®] and 4 temperature sensors				
Buzzer Output	1				
RS-232 Interface	1 (Configurable Baud Rate 1200bps~115200bps)				
Audio Interface	1 (Speaker and Microphone)				

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 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.