



AS700 / Solar Powered Asset Tracker

User Manual V03 (DVT) June 17th, 2024



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1. Notification

1.1. Disclaimer

This document, and all other related products, including device, firmware, and software, are exclusively developed by ATrack Technology Inc.

Due to the continuous developments and improvements of device functionalities, changes in the protocol, specification, and firmware functions are subjects to change without notice. ATrack Technology Inc. reserves the right to modify all documentations based on its own timelines. Document modification notices will be released to ATrack Technology Inc.'s customers upon completion.

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1.2. Copyright

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1.3. Warning

1. Connecting of the input wires 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 qualified knowledge of understanding electrical behaviors. An experienced technician with

knowledge of installing audio system, relay wiring, or any electronic system in vehicle is highly recommended to perform installation.

2. While doing any operation without cover, please wear anti-static gloves/rings to avoid the damage of Electrical Static Discharge.
3. Suggest to clean the solar panel surface periodically to ensure it gets sufficient sunlight for recharging.
4. Do not mix with other battery. This battery cannot mix with deposal or twice- recycled batteries in use. Otherwise, for its abnormal charge and discharge, it will cause over-heated, distort, smoke or burning.
5. Keep the battery out of children's reach and prevent them biting or swallowing the battery.
6. Do not insert the battery onto the charger for a long time. If charging beyond the normal time, the battery is still in the charger, please stop charging. The abnormal charging will cause battery over-heated, distort, smoke or burning.
7. Do not put into microwave stove or any other pressure apparatus. Take the battery away from the cellular phone or the charger if it is instant heated or leak-out (or odors) and depose it. The bad battery will causes over-heated, smoke or burning.

Caution: When connecting the AS700 harness, make sure the harness is wrapped/isolated well in order to avoid water leaking from the harness.

1.4. Product name and Model name

Product name	Model name
Solar Powered Asset Tracker	AS700



1.5. Contact Manufacturer

Company name: ATrack Technology Inc.
Address: 8F., No. 13, Ln. 120, Sec. 1, Neihu Rd., Neihu Dist., Taipei City 11493, Taiwan (R.O.C.)
Sales
Phone: +886-2-27975852 ext. 286
E-Mail: smd@atrack.com.tw
Technical support
Phone: +886-2-27975852
E-Mail: tsd@atrack.com.tw

1.6. CE Representatives (CE Cert. have been processing)

The followings are authorized to represent ATrack Technology, in compliant to CE regulation.



Company: APEX CE SPECIALISTS GMBH
Address: Habichtweg 1 41468 Neuss Germany
E-Mail: Info@apex-ce.com



Company: APEX CE SPECIALISTS LIMITED
Address: 89 Princess Street, Manchester, M1 4HT, UK
E-Mail: Info@apex-ce.com

1.7. Regulatory statement and RF exposure statement.

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.

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.



FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. For portable operation, this device has been tested and meets FCC RF exposure guidelines. When used with an accessory that contains metal may not ensure compliance with FCC RF exposure guidelines.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- 1) L'appareil ne doit pas produire de brouillage;
- 2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Ni ATrack Technology Inc. ni les sociétés affiliées ne sont responsables envers l'acheteur de ce produit ou envers des tiers en ce qui concerne les réclamations pour dommages, pertes, coûts ou dépenses encourus par l'acheteur ou des tiers résultant d'un accident, d'une mauvaise utilisation ou d'une utilisation

**AS700**

incorrecte de ce produit ou résultant de modifications ou de réparations non autorisées du produit, ou du non-respect des consignes d'utilisation et de maintenance fournies par le fabricant.

Ce manuel de l'utilisateur est un document sans valeur contractuelle. Sous réserve d'erreur et de modification.

Caution: Exposure to Radio Frequency Radiation

1. To comply with the Canadian RF exposure compliance requirements, this device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

Attention: exposition au rayonnement radiofréquence

1. Pour se conformer aux exigences de conformité RF canadienne l'exposition, cet appareil et son antenne ne doivent pas être co-localisés ou fonctionnant en conjonction avec une autre antenne ou transmetteur.
2. For portable operation, this device has been tested and meets RF exposure guidelines when used with an accessory that contains no metal. Use of other accessories may not ensure compliance with RF exposure guidelines.
2. Pour portable utilisation, cet appareil a été testé et respecte les directives sur l'exposition aux RF lorsqu'il est utilisé avec un accessoire sans métal. L'utilisation d'autres accessoires peut ne pas garantir la conformité aux directives d'exposition aux RF.



1.8. Document Amendments

Rev.	Pub. Date	Comments	F/W Version
V01	Dec 20 2023	<ul style="list-style-type: none">Initial release	N/A
V02	May 27 2024	<ul style="list-style-type: none">Added warning when attaching the harness.Modified 3.1 screws specification description.Added Chapter 3.8 Caution on Utilizing Relay.Modified Chapter ordering (Configuration & Connecting AS700 Using ACT Tool)	N/A
V03	June 17 2024	<ul style="list-style-type: none">Added Contact Manufacturer informationDigital Input 12-24Vdc, 250mAPhysical mounted ≤ 2 mType C 5Vdc, 1A (USB-C Charging)Added FCC/IC regulatory and RF exposure statement	N/A

Note: For the F/W Version column with specific firmware number, it means the modification(s) on the Comments column is done on this corresponding firmware version (and the versions thereafter). Please make sure you upgrade the firmware to the specified version before applying any changes made in this protocol.

1.9. Caution

- When user changes the \$FORM setting while there are still queued reports inside memory, those queued reports [with previous format] will be deleted in order to remain integrity.
- For Reports generated After powering-up and Before GPS-fixed, their GPS Time & RTC Time will be counted from 1970/01/01 & 2021/01/01 accordingly.



2. Product specification

CELLULAR	
AS700	LTE FDD Cat.1
	B1, B2, B3, B4, B5, B7, B8, B9, B12, B13, B14, B18, B19, B20, B25, B26, B28
Data Support	UDP / IP, TCP / IP, MQTT
Antenna	Embedded cellular antenna

GPS	
Receiver Type	99 channel engine
Location Technology	GPS & GLONASS
SBAS Support	WAAS, EGNOS, GAGAN, MSAS
Tracking Sensitivity	-165dBm
Acquisition Sensitivity	-149dBm
Location Accuracy	2.5m CEP 50%
Antenna	Internal

INPUTS/OUTPUTS	
Digital Inputs	1-Wire Interface
Digital Outputs	12-24Vdc, 250mA
1-Wire Interface	1 (Driver ID, Temperature sensors)
LED Indicators	Internal x1 (Battery Level Indicator) External x1 (Operating Indicator)



INPUTS/OUTPUTS	
Bluetooth	Bluetooth Low Energy v4.2 Class 2

SENSORS	
Accelerometer	3-axis $\pm 16g$
Tamper Detection	Support

ELECTRICAL	
Operating Voltage	12V/24V Vehicle system
Current Consumption	Deep Sleep Mode $< 22 \mu A$
Battery	3.7V 8000mAh

MEMORY	
Internal Flash Memory	16 Mbits

ENVIRONMENTAL	
Operating Temp	$-40^{\circ}C$ to $+80^{\circ}C$ (Charging $-20^{\circ}C$ to $+55^{\circ}C$)
Humidity	95%RH @ $50^{\circ}C$ non-condensing
Vibration/Shock	MIL-STD-810H
IP Rating	IP68, IP69K



PHYSICAL	
Dimension	216 mm x 89 mm x 30 mm (8.50" x 3.50" x 1.18")
Weight	540g (1.2lb)
Enclosure	UV-Resistant PC
Mounting Method	Screw Mount, Bolts
Mounted	≤2 m

CONNECTORS	
SIM Card Socket	Mini SIM(2FF)
USB-Type C	Battery recharge and configuration 5Vdc, 1A(USB-C Charging)

DEVICE MANAGEMENT	
Configuration	ADM (ATrack Device Management) by Bluetooth/USB-Type C
Firmware Update	ADM (ATrack Device Management) by Bluetooth/USB-Type C

3. Installation

3.1. Package Content

Verify that you received the following items in the package:



1x AS700 Device
(External Power Cable optional)



4x Screws M5.0x19mm
for mounting tracker to wood surface



4x Screws M4.8x19mm
for mounting tracker to Metal surface





3.2. Optional Accessories

The optional accessories are:




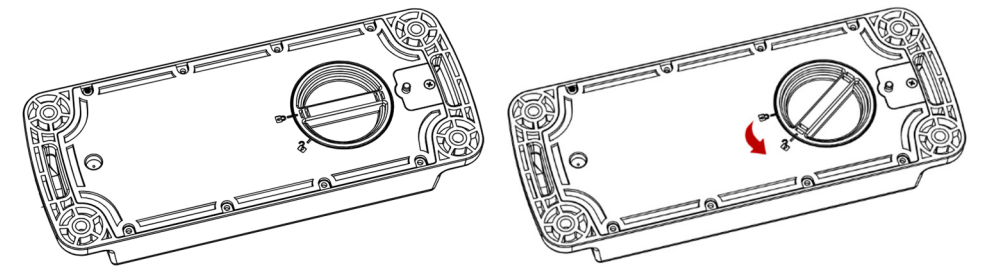
1x USB (Type A) 4pin to USB (Type C)
for configuring AS700

3.3. SIM Card Installation

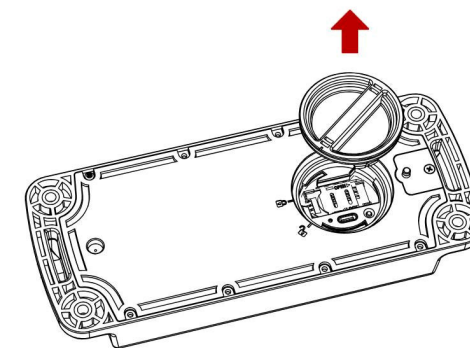
AS700 supports installation of one Micro SIM card. To install a SIM card, please follow the instruction below to remove the cover and insert the SIM.

AS700

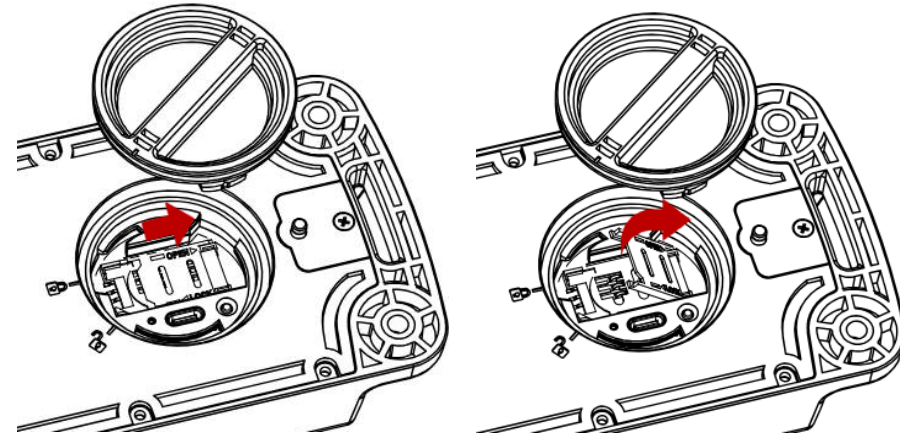
1. Turn the Knob to  mark



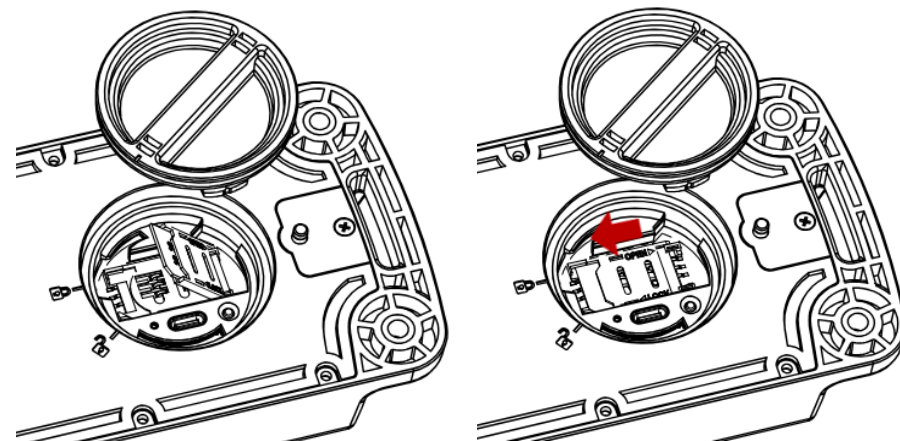
2. Pull up the Knob cover




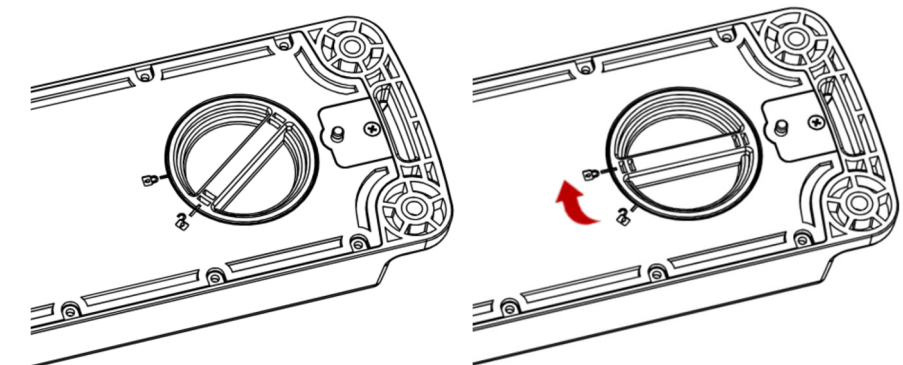
3. Slide down the SIM holder and flip it up slightly



4. Insert the Micro SIM as below. Flip the cover back, and slide it until a “click” sound is heard.



5. Close the knob cover and Turn the Knob to  mark.



3.4. Power on/off

Before the AS700 can be shipped to customers, the AS700 needs to be in the “Shipping mode”.

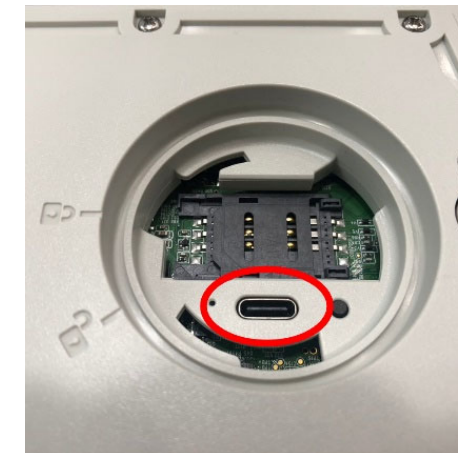
1. Power on:
 - To Press and hold the button (see chapter 2.7) for 3 seconds to switch the device to ON. When the device is successfully switched to ON, the LED (Green) will stay lit for 1 second, indicating that the device is ON.
 - Can also turn on the device directly by plugging in the USB (Type C). After successful power ON, it will begin charging.
2. Power off:
 - To Press and hold the button for 3 seconds to switch to OFF. The device will completely OFF, and the device will enter shipping mode.
 - When successfully switched to OFF, the LED (Green) will stay lit for 3 seconds, indicating that the device is OFF.

3.5. Configuration Port and Setting

The USB (Type A) 4pin to USB (Type C) cable is used to connect to the socket inside the AS700 and PC for configuring parameters and firmware upgrade. When the configuration cable is connecting to your PC/laptop, a "USB Serial Port" will show up in the device manager. This will be used as serial port to communicate with AS700. Please note down the COM port in order to select it correctly when using a terminal emulator.

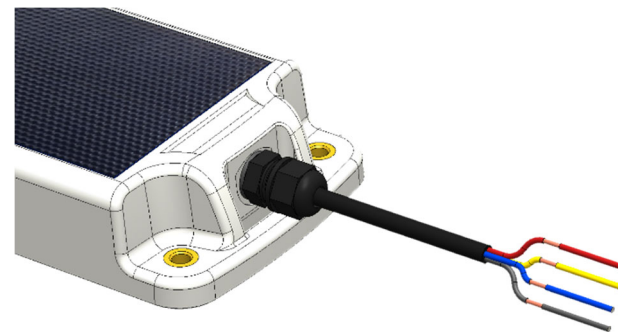
- > Imaging devices
- > Intel WiUSB
- > Keyboards
- > Mice and other pointing devices
- > Monitors
- > Network adapters
- ✓ Ports (COM & LPT)
 - USB Serial Port (COM2)
 - USB Serial Port (COM4)
 - USB Serial Port (COM8)
- > Print queues
- > Processors
- > Sensors

Next, connect the USB (Type A) 4pin to USB (Type C) cable as shown below.



3.6. Power I/O Pin Assignment (External Power Cable Optional)

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



Pin 1	Pin 2	Pin 3	Pin 4
Red	Yellow	Blue	Black

The following table describes the function of each bare wire.

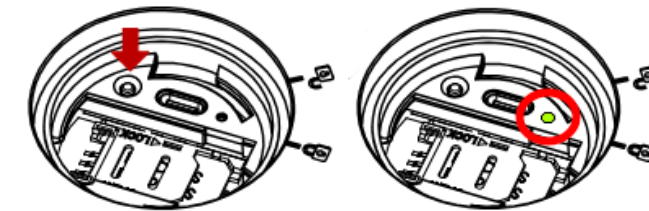
Pin#	Function	Color	Designation	Description
1	Power Source	Red	PWR1	Primary power source: Support Input 12/24V system, 500mA voltage range: 9~32V
2	ACC/ Power Source 2	Yellow	ACC/ PWR2	ACC Input or Secondary Power source support Input 12/24V system, 500mA voltage range: 9~32V
3	OUT/1-Wire	Blue	IO	1-Wire could be supported in external power and battery mode Digital out (Max. sink current 500mA)
4	GND	Black	GND	Ground



DO NOT connect a POSITIVE voltage to any output pin!

3.7. LED Indication

Press the button to make LED blink.



The following figure shows the LED location of inside AS700.

Operating mode:

LED	Color	Indication	Description
Battery Capacity	Green	LED Flash 1 time 500ms duty cycle	1~25%
		LED Flash 2 time 500ms duty cycle	26~50%
		LED Flash 3 time 500ms duty cycle	51~75%
		LED Flash 4 time 500ms duty cycle	76~100%

Charging mode:

- When the device is in the OFF state and plugging in the USB (Type C) or external power cable, the device will turn on.
- When the device is in the ON state, Device will detect the Battery voltage first and light the LED, the behavior please refer to the below:


LED	Color	Indication	Description
Battery Charging	Green	LED continuously flash (500ms)	less than 100%
		LED Stay Steadily lit.	reaches 100%




3.8. Caution on Utilizing Relay

Refer to the table below for the pin definition of the optional relay (ordering number: **DRE12-XXX-10** for 12V relay and **DRE24-XXX-10** for 24V relay) provided by ATrack:

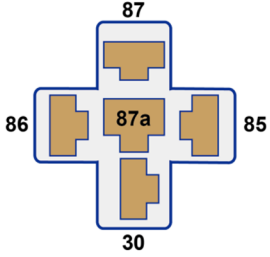
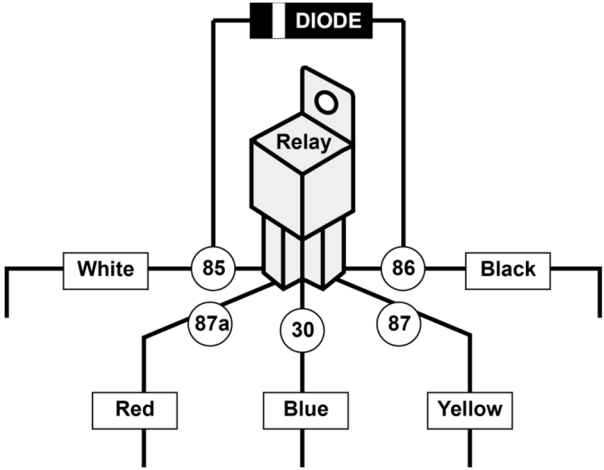
Cable Color	Cable Gauge	Relay Contact	Assignment
White	20AWG		85 Coil (+)
Black	20AWG		86 Coil (-)
Yellow	14AWG		87 Normal Open
Red	14AWG		87a Normal Close
Blue	14AWG		30 Common

- 

The DIODE connected between pin 85 and 86 is very important to protect the relay coil and the connected device. It keeps away from the possible spikes aroused by switching on/off the engine.
- 

A relay without the DIODE protection may cause damage to the relay coil and the connected device! Please proceed with care.

Note: For the relay bought from aftermarket, make sure to select the one with protection DIODE installed. As the actual wire color in the following illustration may differ, check the number inscription on the relay or the socket.

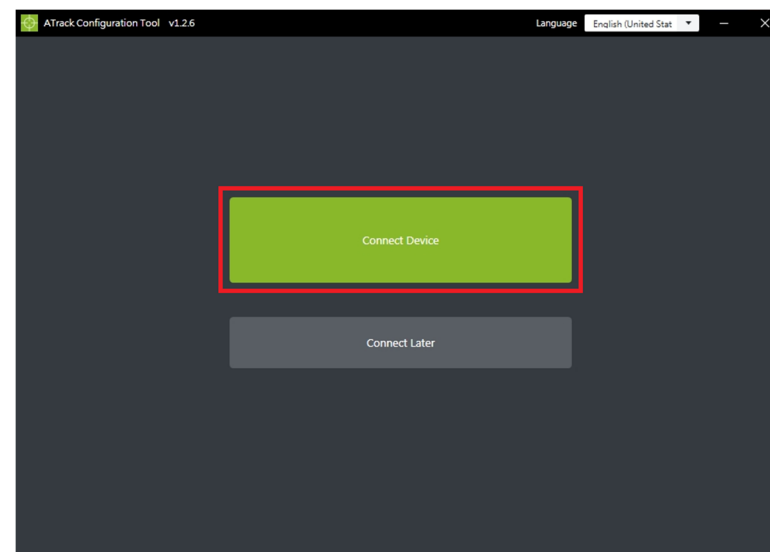




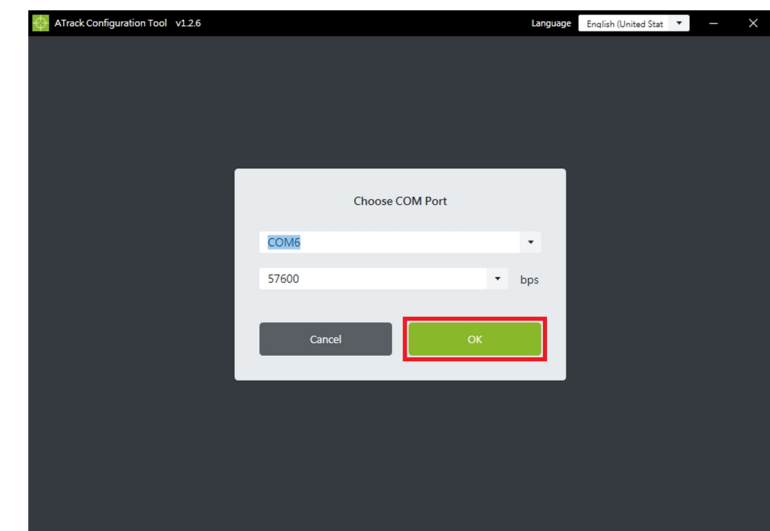
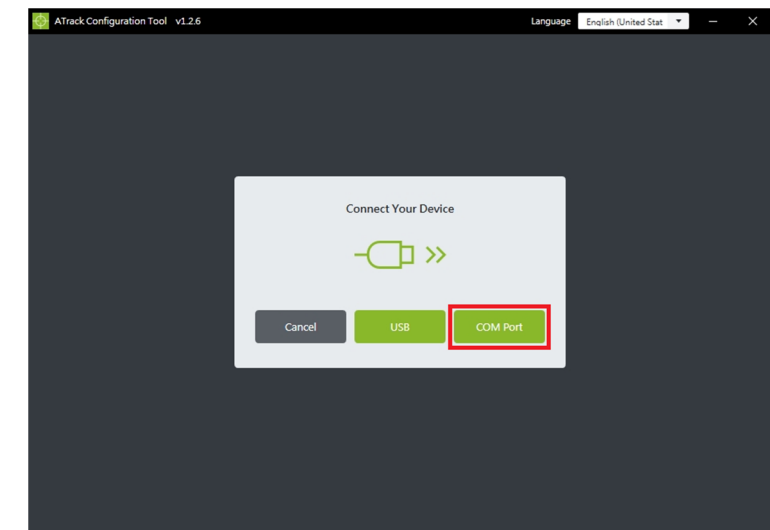
3.9. Connecting AS700 Using ACT Tool (no support ACT for DVT phase)

The following example shows how to connect the AS700 through ACT Tool.

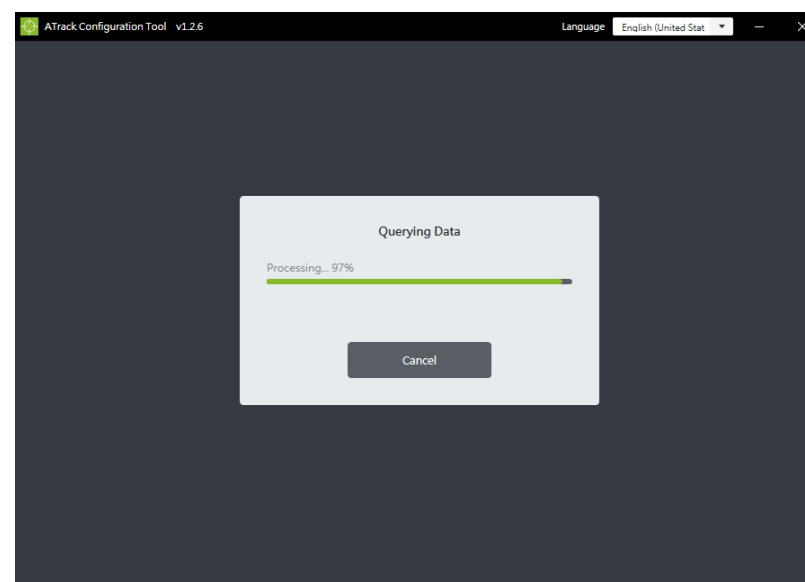
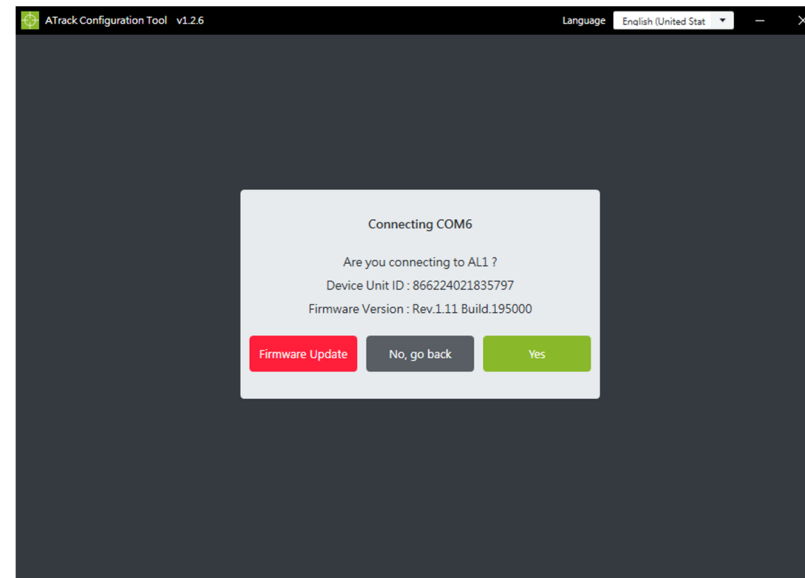
1. Run ACT Tool and click on the [Connect Device].



2. Click on the [COM Port] and select the correct COM port with Baud rate 57600 (default).



- Click on the [Yes] and wait until the querying data process is done.



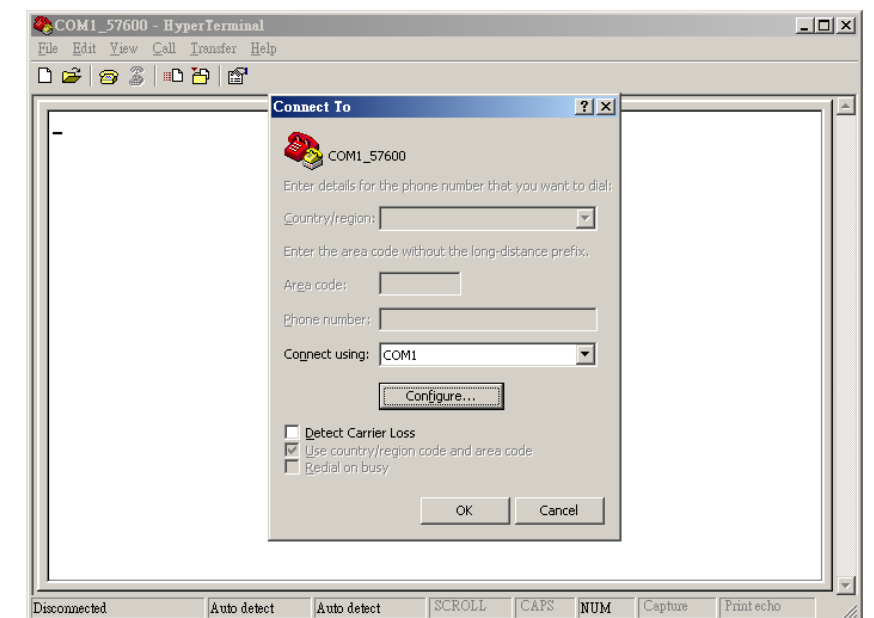
4. Configuration

You may explore great features on the AS700 through AT commands either over the direct serial connection or remote via SMS/GPRS. The command syntax for direct or remote connections is the same. Each command should be following the specified format in the Protocol Document, and the command shall end with carriage-return and line-feed characters.

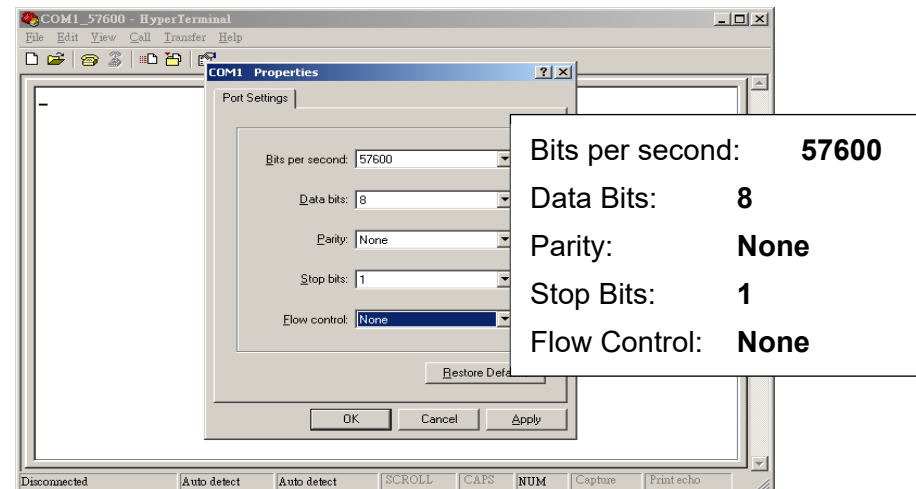
4.1. Connecting AS700 Using HyperTerminal

The following example shows how to connect the AS700 through HyperTerminal. You may use other popular terminal emulators such as **Putty** or **Tera Term Pro** to establish a console session with the AS700.

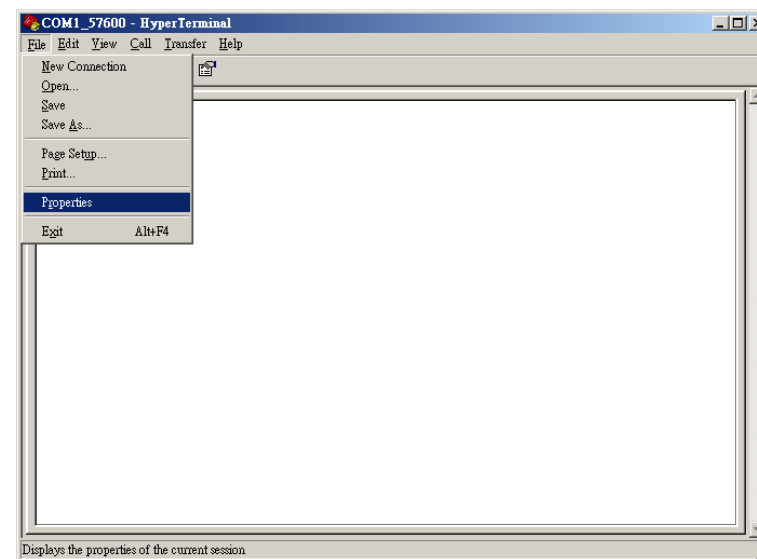
- Run HyperTerminal, select the correct COM port, and then click on the [Configure...] button.



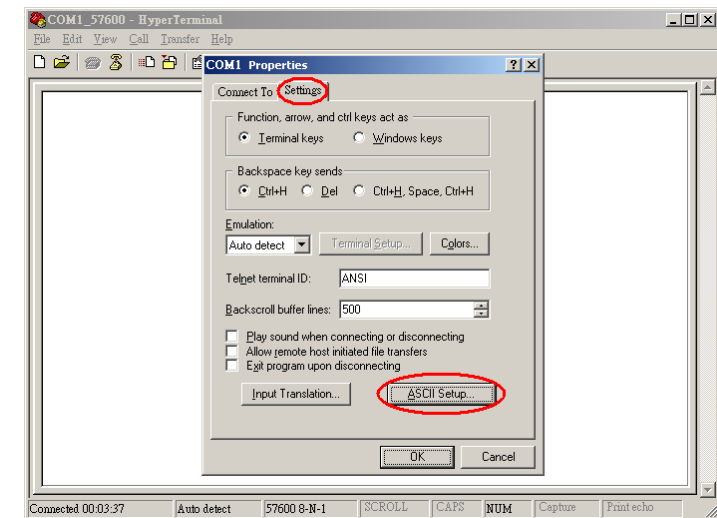
- The **Port Settings** should be as follows. Click on the [OK] button to close the Properties window.



- Click on [File] → [Properties].



- Click on the [Settings] tab and click on the [ASCII Setup...] button.



- Check the following options and click on the [OK] button.

