

# User Manual

## AX11

V05

Mar. 17, 2020



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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

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

## 1.4. Document Amendments

Rev.	Pub. Date	Comments	F/W Version
V05	Mar. 17, 2020	<ul style="list-style-type: none"> <li>Added "Configuration" chapter.</li> <li>Added buzzer indication "Long Beep 1 time (G-Sensor Calibrated)" in Buzzer Operation</li> <li>Reformed page layout</li> </ul>	
V04	Feb. 13, 2020	<ul style="list-style-type: none"> <li>Rearrange the layout and add Volvo/Mack cable</li> </ul>	
V03	Jun. 21, 2019	<ul style="list-style-type: none"> <li>Previous version</li> </ul>	

**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.

## 2. Installation

### 2.1. Package Content

Verify that you received the following items in the package:



1x AX11 Device

### 2.2. Optional Accessories

The optional accessories are:



Low Profile OBD-II Extension Cable



OBD-II Y Cable



OBD-II to 9-PIN J1939/J1708 Adapter Cable



OBDII to 9-PIN J1939/J1708 Y-cable



OBDII to 6-PIN J1708 Cable



Volvo/Mack Cable



RS3A: Mini USB to RS232 Adapter



RS4A:  
Mini USB to RS232 Adapter + Digital Cable



RS5A: 1x Mini USB to 1 Digital Adapter



USB Cable

## 3. Hardware Features

### 3.1. OBD-II Protocol

There are five signaling protocols that are permitted with the OBD-II interface. Most vehicles have been implemented with only one of the protocols. The AX11 features a superior protocol detection algorithm that ensures the device connects reliably even to vehicles that do not fully conform to the OBD-II standards.

The AX11 supports the following legislated OBD-II protocols:

- J1850 PWM (Ford vehicles)
- J1850 VPW (GM vehicles)
- ISO9141-2 (Asian, European, Chrysler vehicles)
- ISO 14230-4 KWP
- ISO 15765-4 CAN (11/29 bit ID, 250/500 Kbaud)

### 3.2. J1939 Protocol

The feature of J1939 should be enabled manually by **AT\$OBDS** and **AT\$FMSC**. Please refer to **ATrack Protocol Document** for more detail.

### 3.3. J1708 Protocol

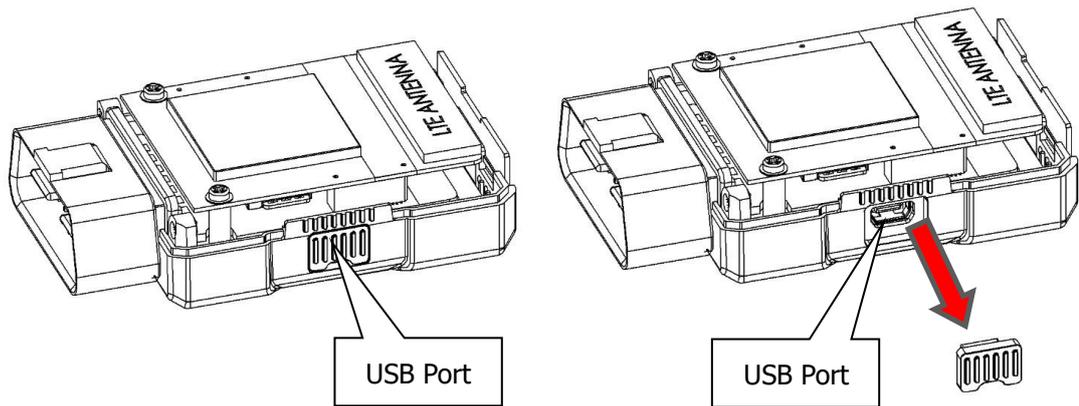
The feature of J1708 should be enabled manually by **AT\$OBDS** and **AT\$1708**. Please refer to **ATrack Protocol Document** for more detail.

### 3.4. Mini USB Port and Driver Installation

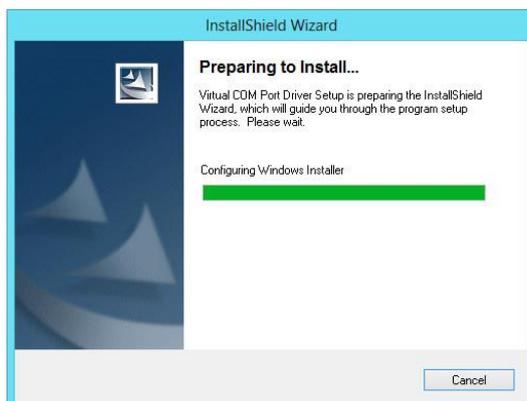
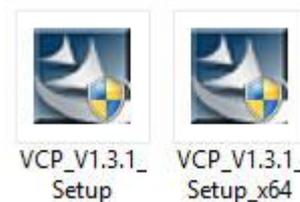
The Mini USB connection is used for the following purposes: configuring parameters and firmware upgrade.

When the AX11 is connected to your laptop/PC via a Mini USB cable, the OBD-II and GSM/GPRS functions are switched off unless the main power is applied to the AX11 at the same time.

The following figure shows the position of AX11's USB port.



Double click the USB driver **VCP\_V1.3.1\_Setup** or **VCP\_V1.3.1\_Setup\_x64**. Then, click the **[Finish]** button to complete the process.



### 3.5. Buzzer Operation

The internal buzzer of AX11 can be configured to sound by any event or triggered by a remote server command. Please refer to **ATrack Protocol Document** for details.

When a device is configured and plugged into an OBD-II DLC connector, it performs some basic function tests. You can simply verify whether it is installed properly or not via buzzer indication. Please refer to the following table for details:

Buzzer Indication	Description
Short Beep 1 Time	Device Power ON
Short Beep 2 Times	OBD/J1949/J1708 Protocol found
Short Beep 3 Times	GSM/GPRS Connected
Short Beep 4 Times	GPS Fixed
Long Beep 1 Time	G-Sensor Calibrated

### 3.6. Power Supply

The AX11 device is connected to the OBD-II SAE J1962 connector of a vehicle and draws power from the OBD port. No additional power cabling is required for the operation. If the OBD port of a vehicle is covered or you need to install AX11 in another place for better GPS reception, the optional low profile OBD-II extension cable is required.

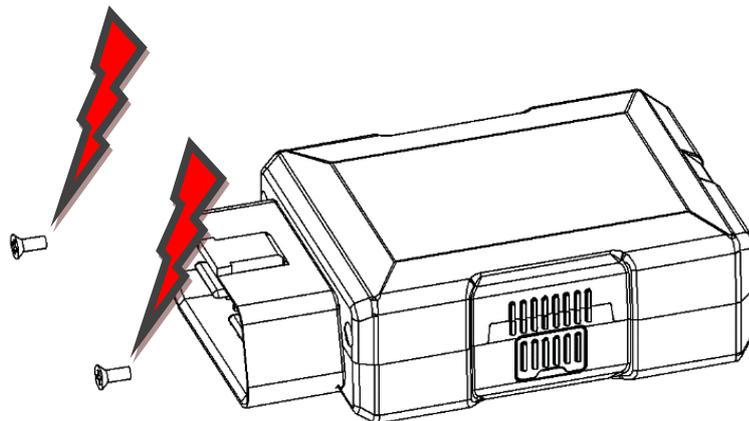
### 3.7. SIM Card Installation

The AX11 supports installing one SIM card of either these two operating voltages: 1.8V (ISO/IEC 7816-3 class C) or 3V (ISO/IEC 7816-3 class B).

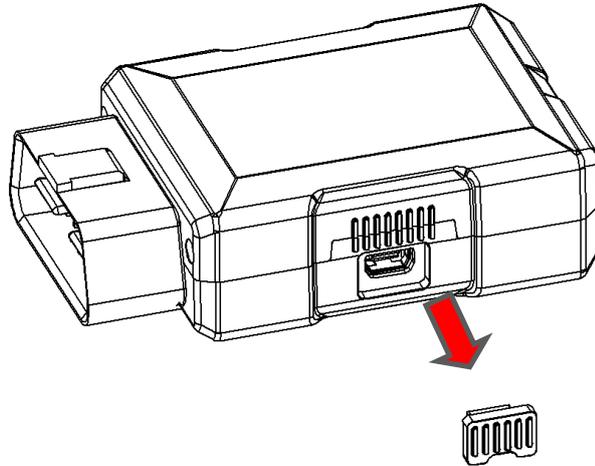
The SIM socket can be found after the battery is removed as shown below:

**To install SIM card:**

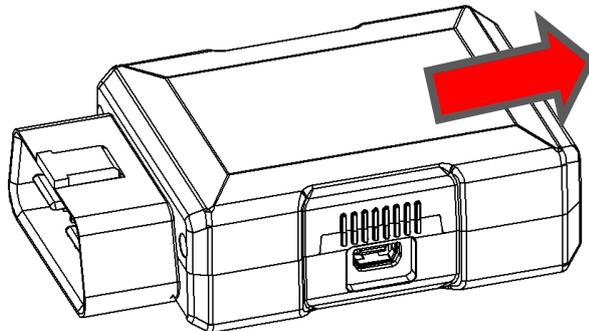
1. Remove the screws.



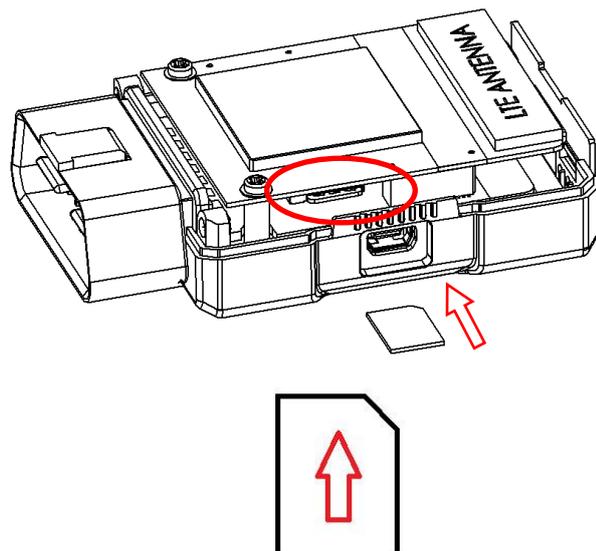
2. Remove the dust cap.



3. Remove the cover.



4. Install SIM card.



### 3.8. LED Indication



The following table describes the LED states:

LED	Color	Indication	Description
OBD J1939 J1708	Green	Solid OFF	OBD/J1939/1708 Protocol Not Found
		Fast Blinking	OBD/J1939/1708 Data Transmission
		Blinking Every 10 Sec.	Deep Sleep Mode
GPS	Blue	Solid OFF	GPS Power OFF
		Blinking Every 1 Sec.	GPS Not Fixed
		Solid ON	GPS Location Fixed
WWAN	Red	Solid OFF	GSM Power OFF
		Blinking Every 1 Sec.	GSM No Signal
		Blinking Every 2 Sec.	GSM Registered
		Blinking Twice Every 2 Sec.	GPRS Connected
		Solid ON	Server Connected

## 4. Bluetooth (Optional)

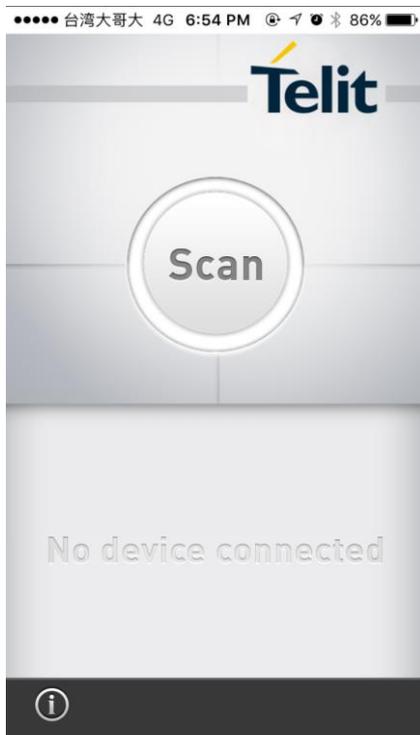
### 4.1. AT\$BTEN Query or set the Bluetooth connection property

Command Description			
This command is used to set Bluetooth Low Energy (single mode) configuration.			
Syntax			
Write Command	AT\$BTEN=<Mode>,<"Password">,<"Name">,<Position Format>,<Format Filter>,<"Custom Info">,<"JData Fields">,<ZData Fields>,<Timeout>,<Retry>,<ReportACK>		
Response	\$OK		
Read Command	AT\$BTEN=?		
Response	\$BTEN=<BT Mode>,<"Password">,<"Name">,<Position Format>,<Format Filter>,<"Custom Info">,<"JData Fields">,<ZData Fields>,<Timeout>,<Retry>,<ReportACK>,<Module Version>,<Mac Info>		
Parameter Description			
Parameters	Description	Data Type	Default
<Mode>	Setup BT reporting mode <ul style="list-style-type: none"> <li>• 0: Follow AT\$TRAC setting</li> <li>• 1 ~ 255: Reporting Interval in seconds</li> </ul>	U8	0
<"Password">	Setting for BT connection password. <b>Note:</b> If it is empty, no password is required when pairing process is taken.	String(6)	""
<"Name">	Setting for BT names when searching for device.	String(10)	""
<Position Format>	Setup report format. <ul style="list-style-type: none"> <li>• 0: ASCII</li> <li>• 1: Binary</li> </ul>	U8	0
<Format Filter>	Setup if ATrack standard format or custom format should be used to construct the report. If custom format is set, the device will send the report in the order of <Header><"Custom Info"><"JData Fields"><"ZData Fields"> <ul style="list-style-type: none"> <li>• 0: ATrack standard format</li> <li>• 1: Custom format</li> </ul>	U8	0
<"Custom Info">	Append or setup custom report format. If <Format Filter> is set to 0, variables specified in this field will be appended to the ATrack standard format string. Refer to ATrack AX11 Protocol Document <b>AT\$FORM</b> command pages for available % variables.	String(100)	""

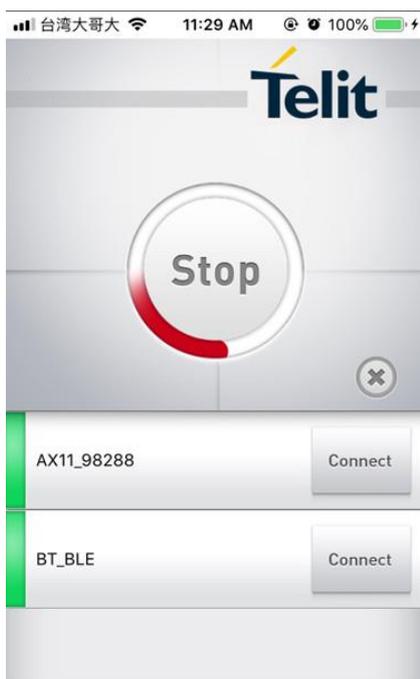
<"JData Fields">	Append or setup custom report format. If <Format Filter> is set to 0, variables specified in this field will be appended to the ATrack standard format string. Refer to ATrack AX11 Protocol Document <b>AT\$FMSC</b> command pages for available % variables.	String(100)	""
<"ZData Fields">	Append or setup custom report format. If <Format Filter> is set to 0, variables specified in this field will be appended to the ATrack standard format string. Refer to ATrack AX11 Protocol Document <b>AT\$1708</b> command pages for available % variables.	String(100)	""
<Timeout>	The timeout in seconds for each data transmission retries.	U8	10
<Retry>	The number of data sending retries in case of transmission failure.	U8	3
<ReportACK>	Specify if an Acknowledge is required or not. If the ACK is required, device will wait for the ACK and then send out next report. If no ACK is received within <Timeout> value for <Retry> + 1 times, the device will reset BT module. The external BT device should try to connect again in such case. Reports not acknowledged will be queued and wait for next connection. <ul style="list-style-type: none"><li>• 0: ACK not required</li><li>• 1: ACK required</li><li>• 2: Queue mechanism disabled</li></ul>	U8	0
<b>Example</b>			
<ul style="list-style-type: none"> <li>• Setup reporting interval as AT\$TRAC, connection password "123400", and Device name as "future": <code>AT\$BTEN=0,"123400","future"</code></li> <li>• Setup reporting interval to 5 seconds, no connection password, device name as "AX11BT", and enable report ack: <code>AT\$BTEN=5,"","AX11BT",,,,,,1</code></li> <li>• Setup binary format data, reporting interval to 3 seconds, no connection password, device name as "AX11GW", and adding multiple % variables for OBDII data: <code>AT\$BTEN=3,"","AX11GW",1,,"%RP%SD%TR%EL%ET%FC%VN%MF%MP%IA"</code></li> <li>• Setup custom format with above 3<sup>rd</sup> condition and J1939 data: <code>AT\$BTEN=3,"","AX11GW",1,1,"%RP%SD%TR%EL%ET%FC%VN%MF%MP%IA", "%JO1%JO2%JO3%JO4"</code></li> </ul>			
<b>Remark</b>			
<input checked="" type="checkbox"/> MEMO <input checked="" type="checkbox"/> SERIAL <input checked="" type="checkbox"/> SMS <input checked="" type="checkbox"/> GPRS			

## 4.2. Demo APP

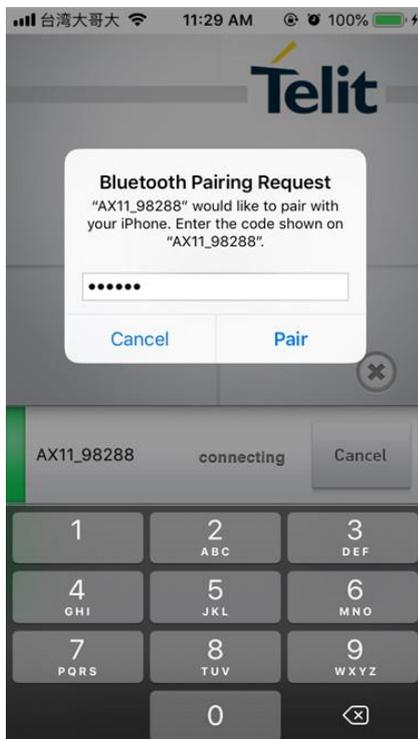
1. Please download "**Terminal IO**" from either **Apple Store** or **Google Play**. And you can see the screen below when you open the APP.



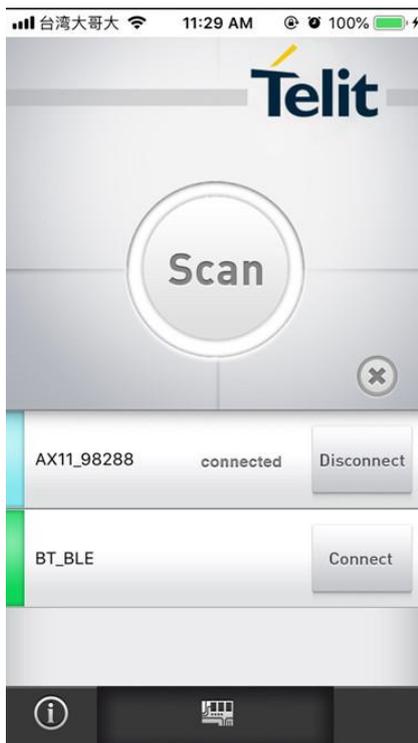
2. Press the [**Scan**] button to scan AX11. The default name "**AX11\_last\_5\_digits of IMEI**" should be found and shown in the list. And, press the [**Connect**] button to get the connection established.



- After the [**Connect**] button is pressed, the connecting process will be executed immediately. And, the message box of **Bluetooth Pairing Request** should be popped up in short. The default password is "000000".



- The icon at the bottom can be seen if the connecting process is successfully finished. Please press the icon to jump into next page.



5. With a proper configuration, the position report can be obtained by the APP via Bluetooth.



### **4.3. SDK for Android and iOS APP**

Please contact your technical consultant at ATrack for the SDK document.

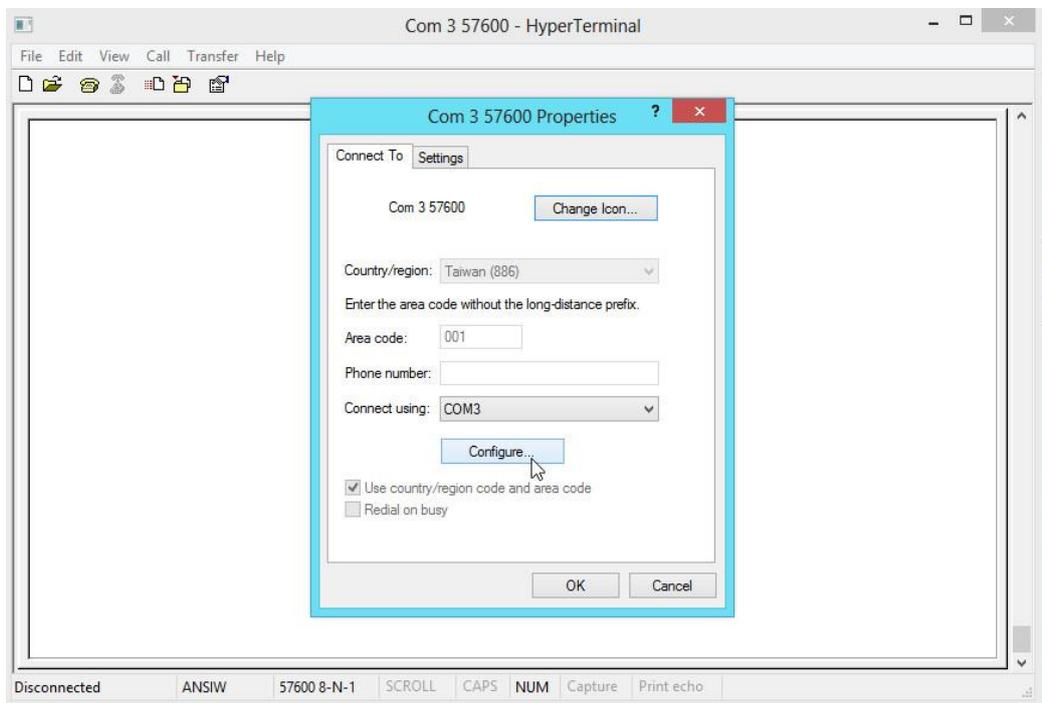
# 5. Configuration

You can explore many of AX11’s great features through AT commands. The commands can be sent to AX11 via USB, SMS or cellular network (e.g. GPRS/CDMA/UMTS).

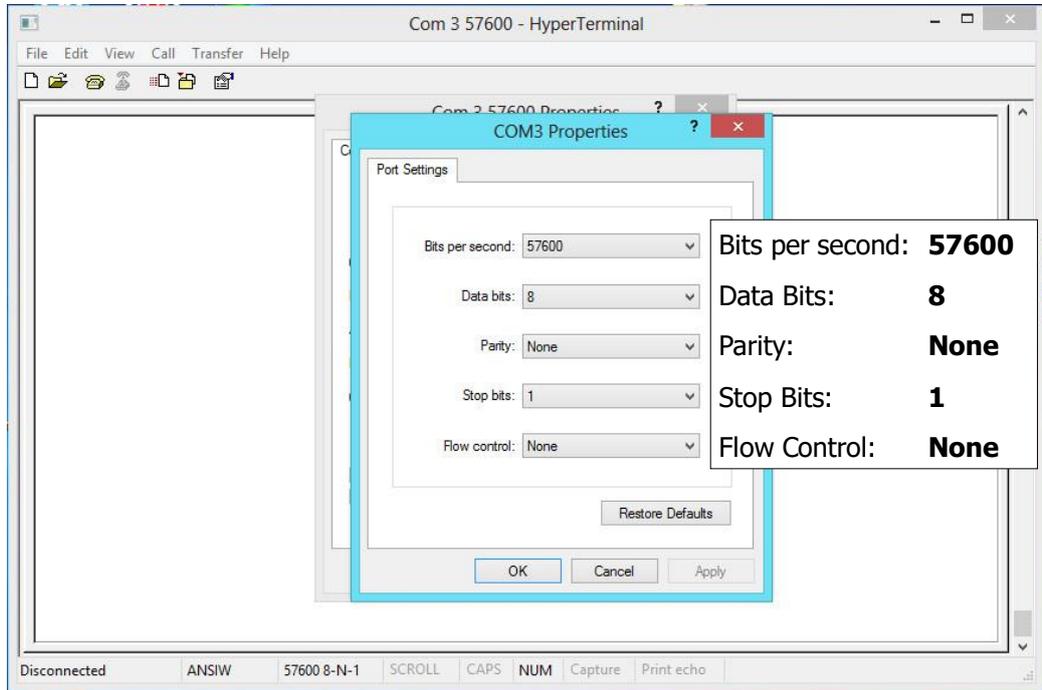
## 5.1. Connecting a Device Using HyperTerminal

The following example shows how to connect the AX11 through HyperTerminal. You may use other popular terminal emulators such as **Putty** or **Tera Term Pro** to establish a console session with the AX11.

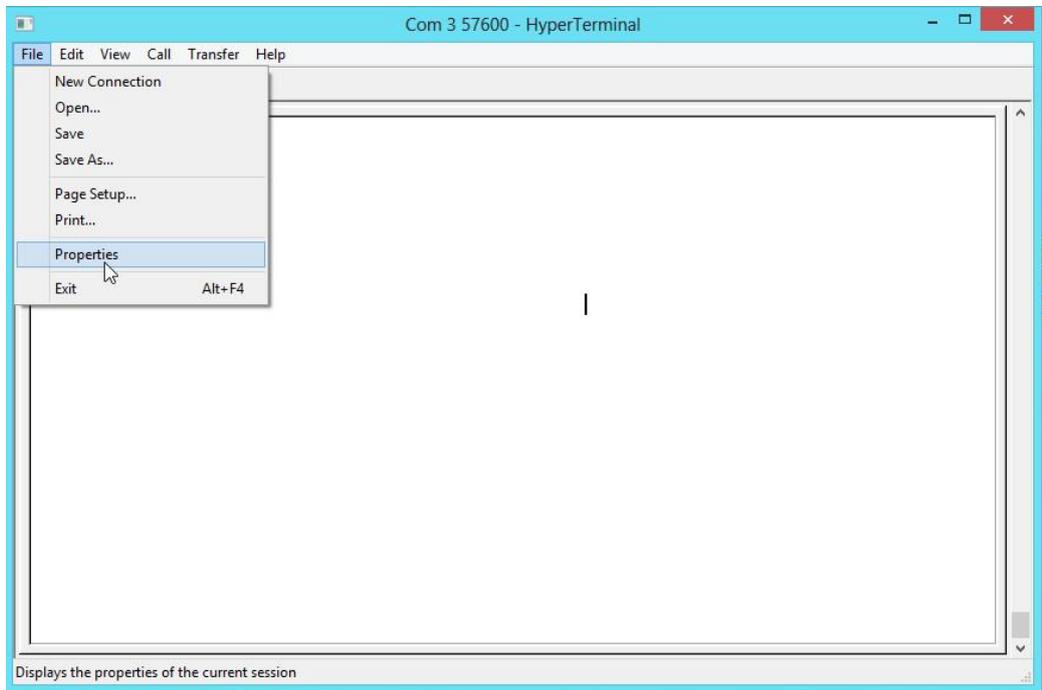
1. Run HyperTerminal, select the correct COM port, and click on the [**Configure...**] button.



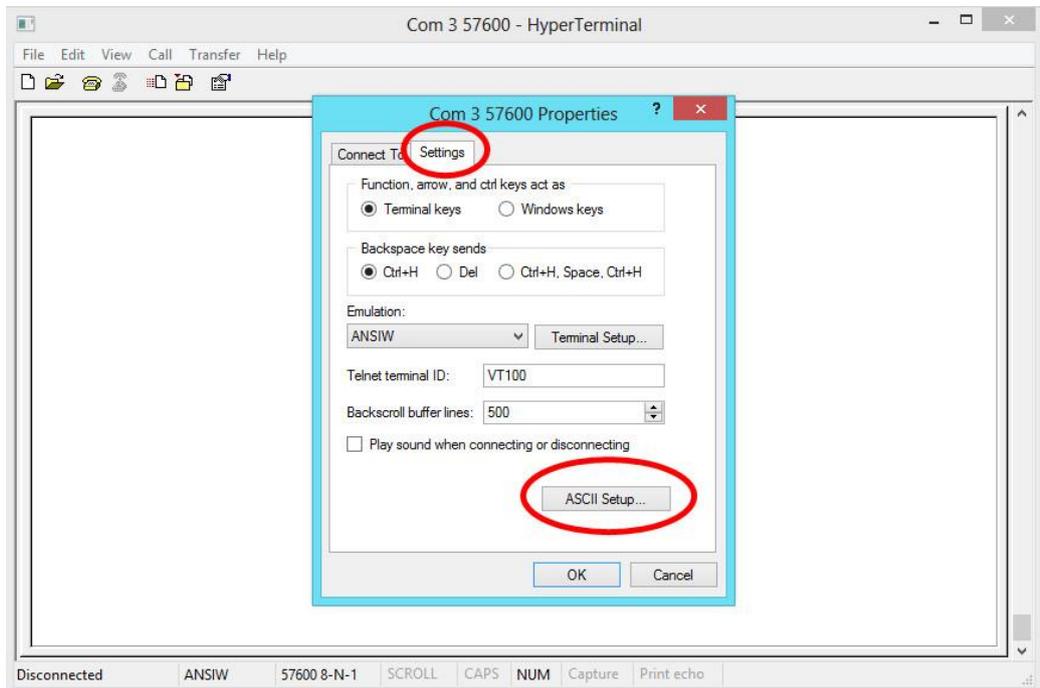
- The **Port Settings** should be as follows. Click on the [OK] button to close the **Properties** window.



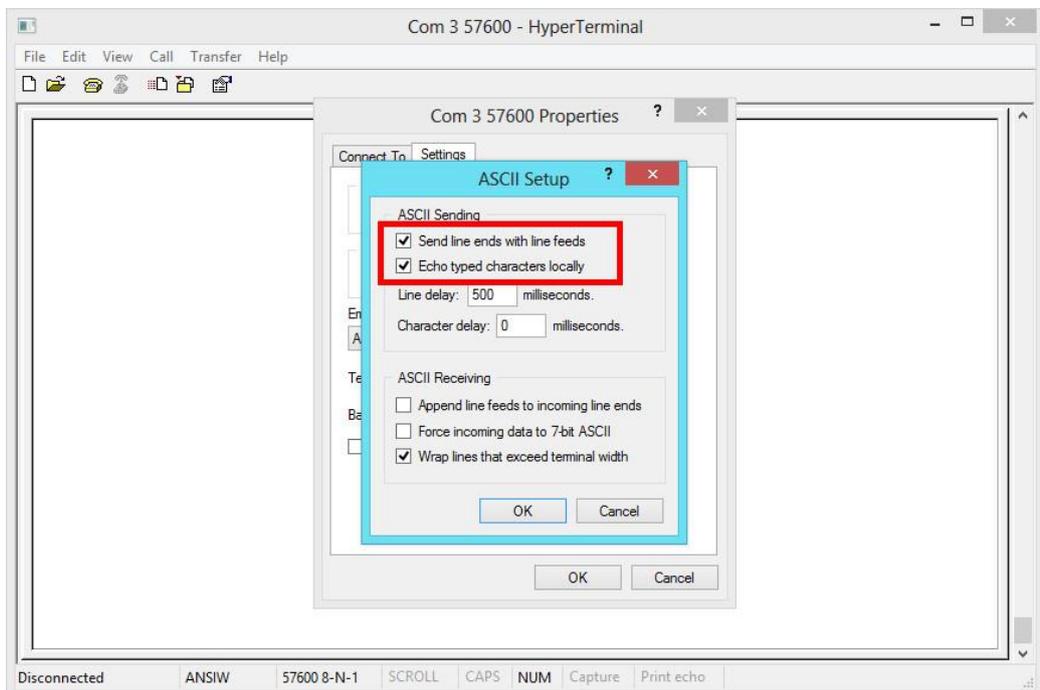
- Click on [File] → [Properties].



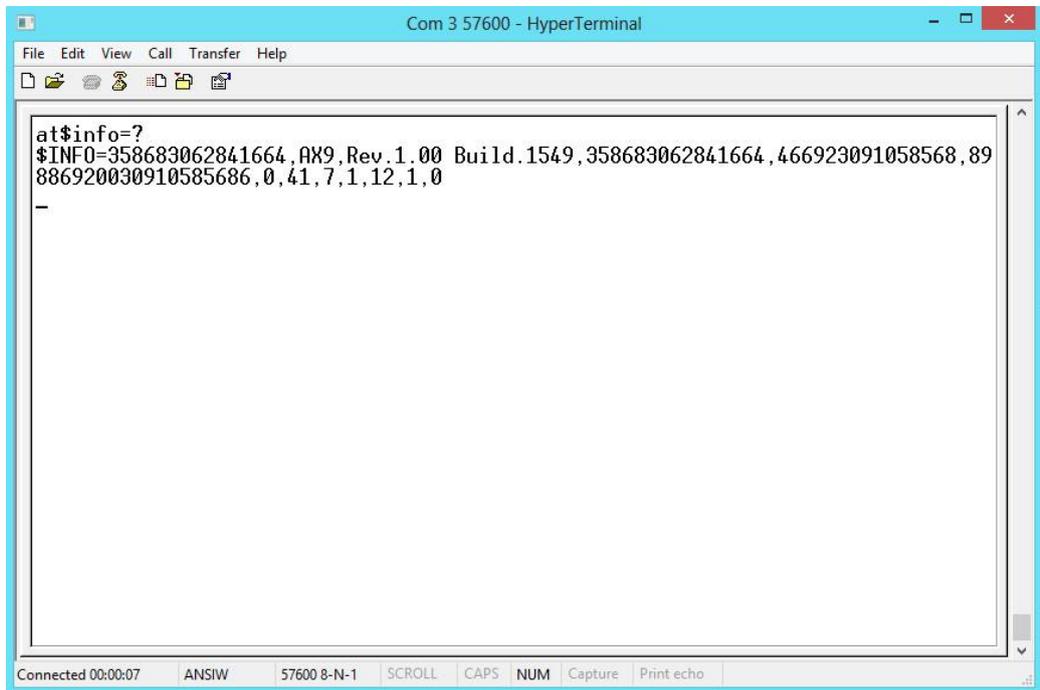
- Click on the **[Settings]** tab and click on the **[ASCII Setup...]** button.



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



6. Power up the device and you can now begin to send AT commands to query the device. Please refer to the **ATrack Protocol Document** for details.

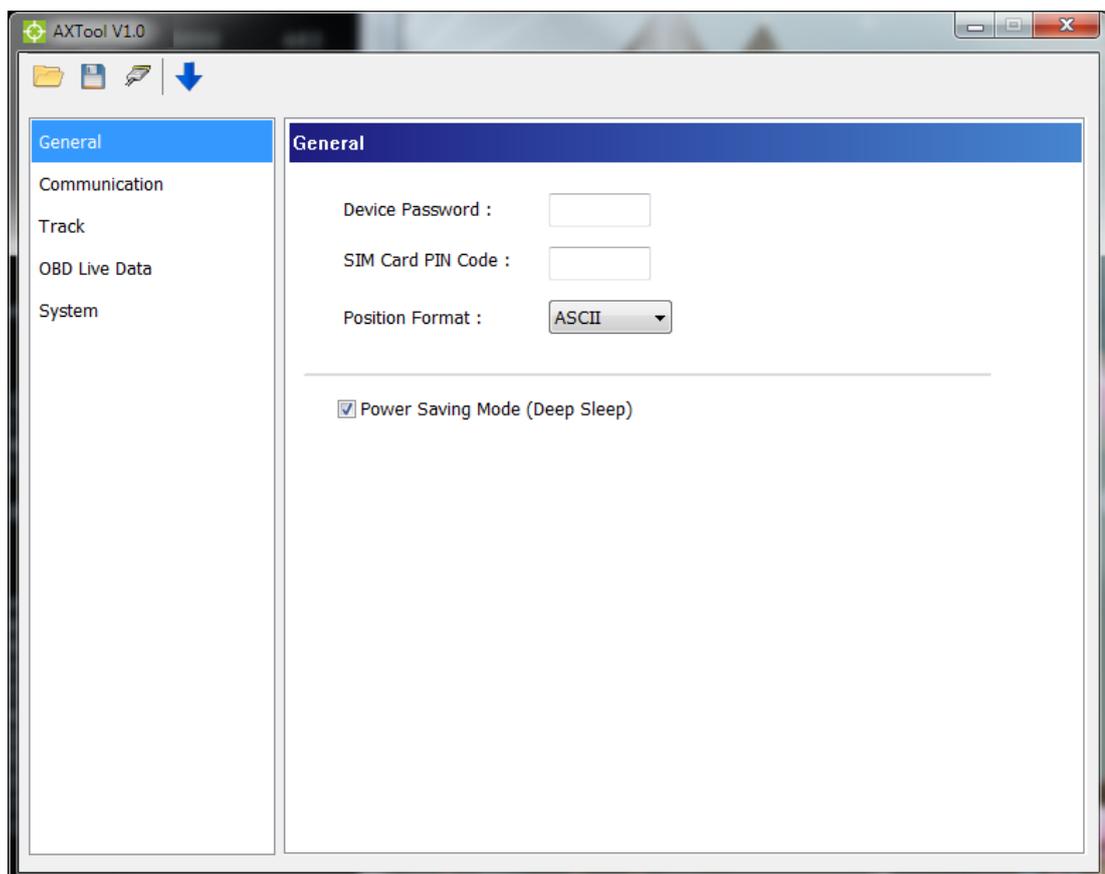


## 5.2. Connecting a Device Using AXTool

The AXTool is a simple configuration tool which is useful for users to configure the basic settings of the AX11. For advanced configurations, please refer to the **ATrack Protocol Document** for details.

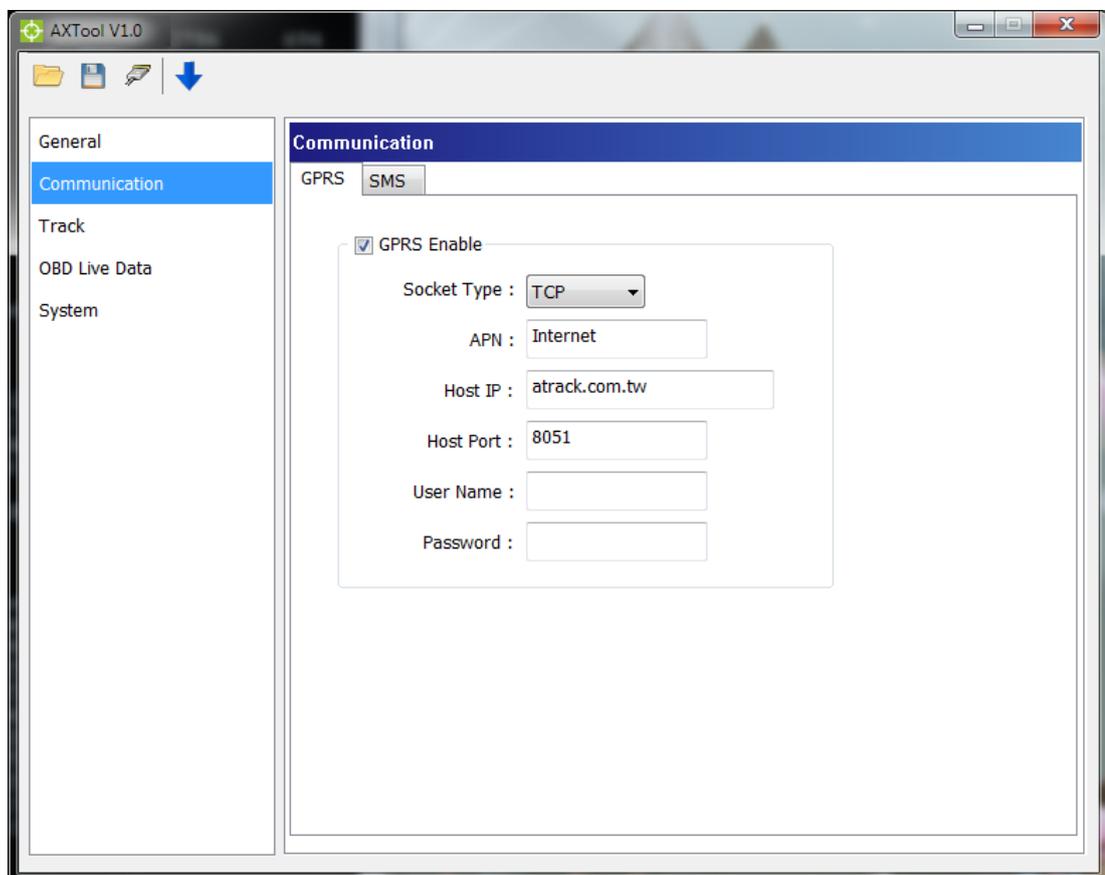
### 5.2.1. General Setting

- **[Device Password]**: The device password is used for protecting device configurations. You can have the maximum of 6 characters.
- **[SIM Card PIN Code]**: Enter the PIN code of a SIM card if you have a PIN code enabled.
- **[Position Format]**: Select position format for all reports.
- **[Power Saving Mode]**: Enable/Disable the power saving mode. When the power saving mode is enabled, the AX11 device will go into deep sleep mode after 1 minute of engine off.



### 5.2.2. Communication Setting

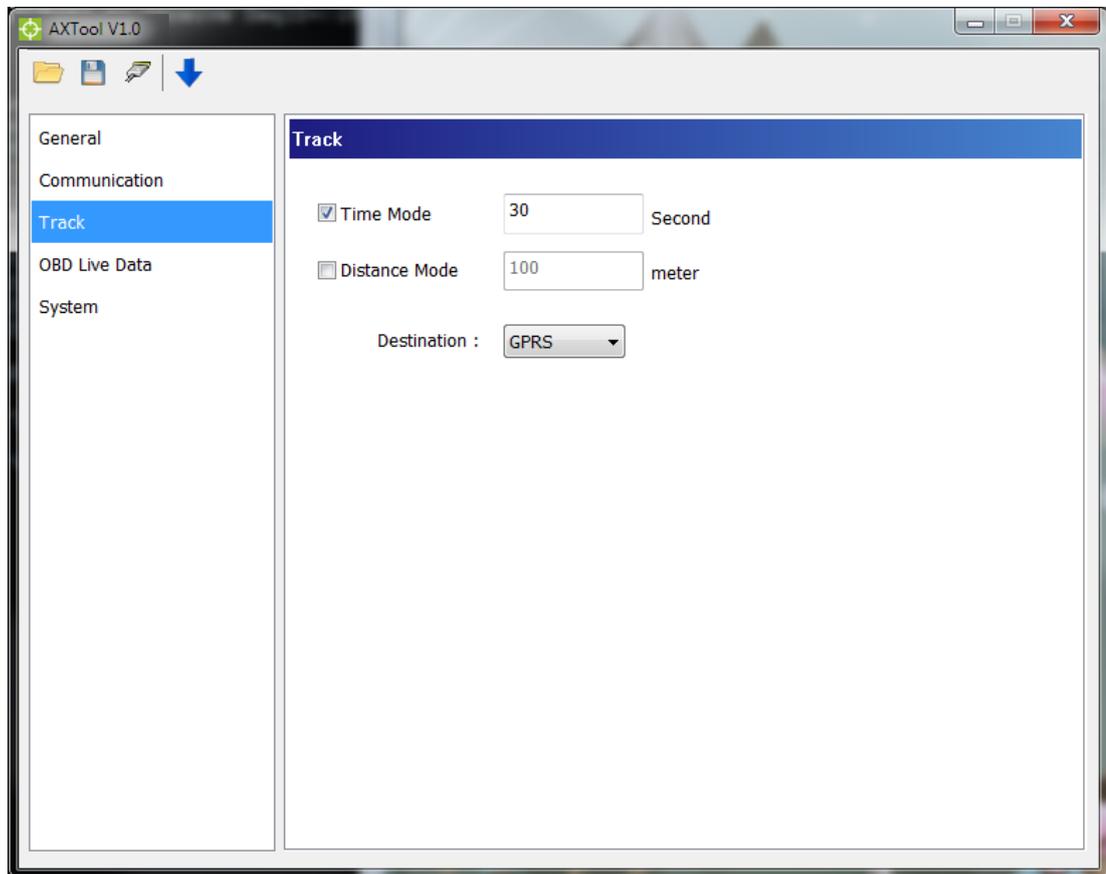
- **[GPRS Enable]**: Enable GPRS communication
- **[Socket Type]**: Select TCP or UDP for GPRS communication
- **[APN]**: Access Point Name for GPRS connection. (Please contact your cellular network carrier for the information)
- **[Host IP]**: Enter the IP address or domain name of host server
- **[Host Port]**: Enter Port number of the remote host server
- **[User Name]**: The GPRS user name. (Please contact your cellular network carrier for the information)
- **[Password]**: The GPRS password. (Please contact your cellular network carrier for the information)



### 5.2.3. Track Setting

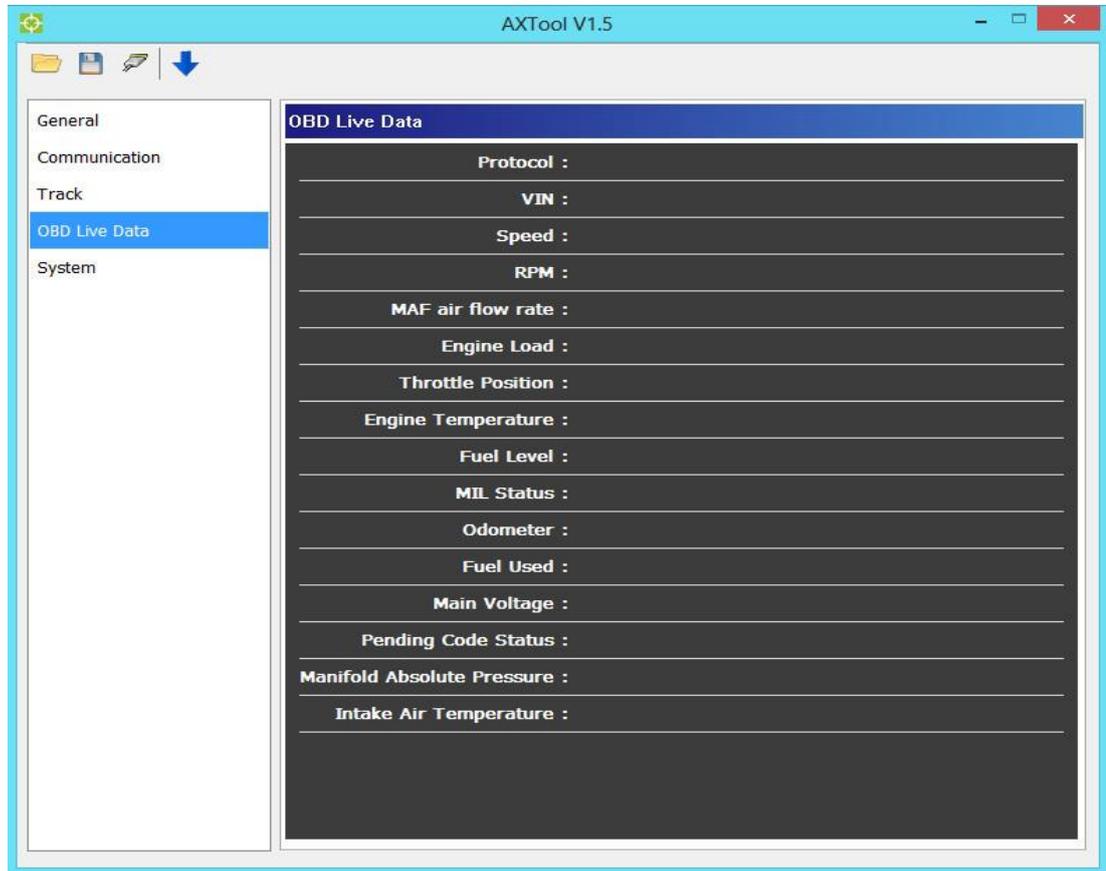
You may configure a tracking interval when the vehicle engine is ON.

When **[Time Mode]** and **[Distance Mode]** are both selected, the tracking behavior will operate in AND condition.



### 5.2.4. OBD Live Data

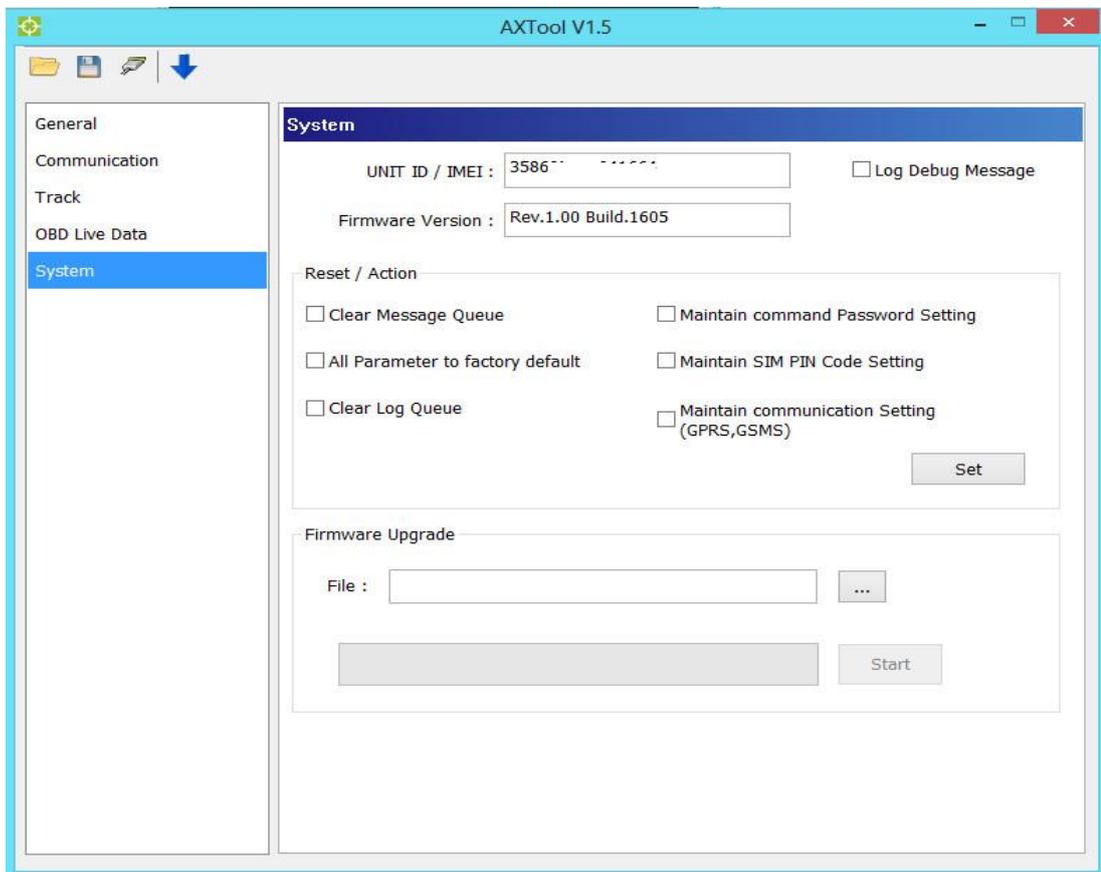
When the AX11 is connected to a vehicle's OBD-II port, you will see the OBD live data such as VIN, Speed, RPM, MAF air flow rate, Engine Load, Throttle Position, Engine Temperature, Fuel Level, MIL Status, Odometer, Fuel Used, and Main Voltage.



### 5.2.5. System Setting

The [**System**] setting will show the current connected device information.

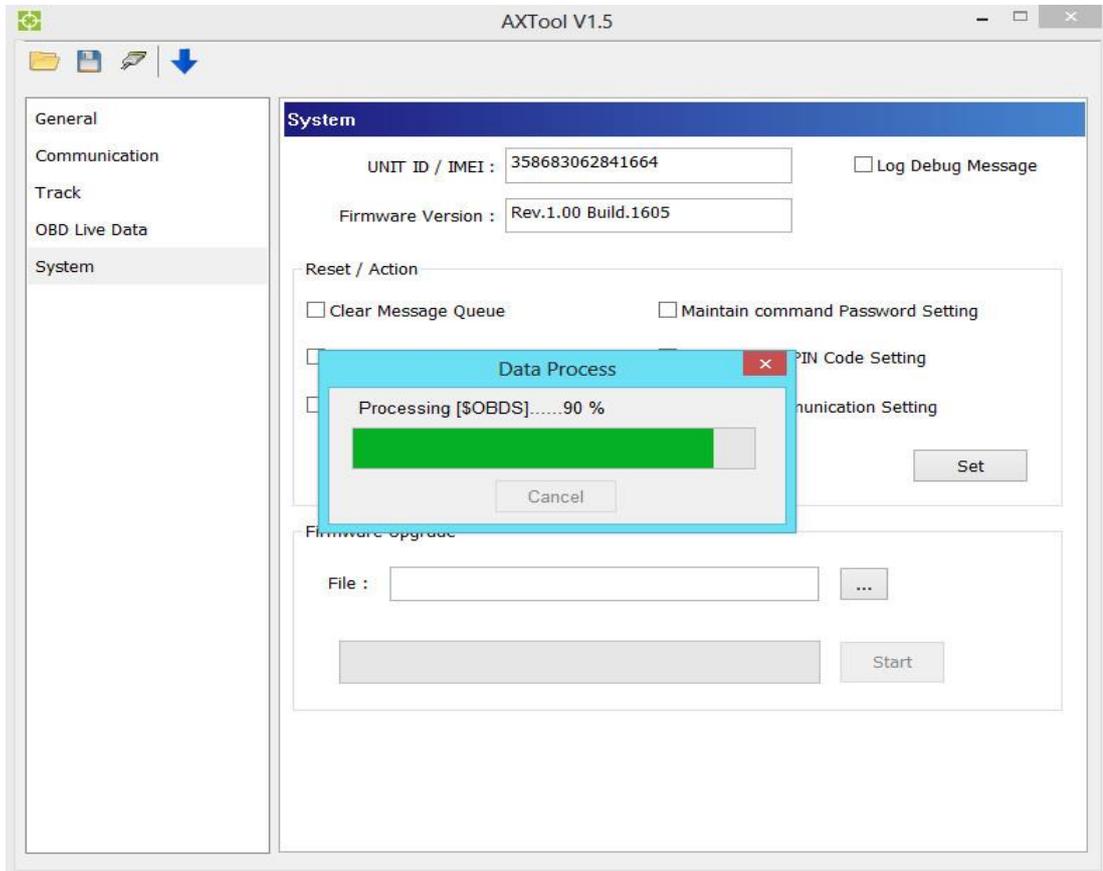
The [**Reset/Action**] function can be used to reset parameters or clear buffered messages of the device.



### 5.2.6. Uploading Setting To Device

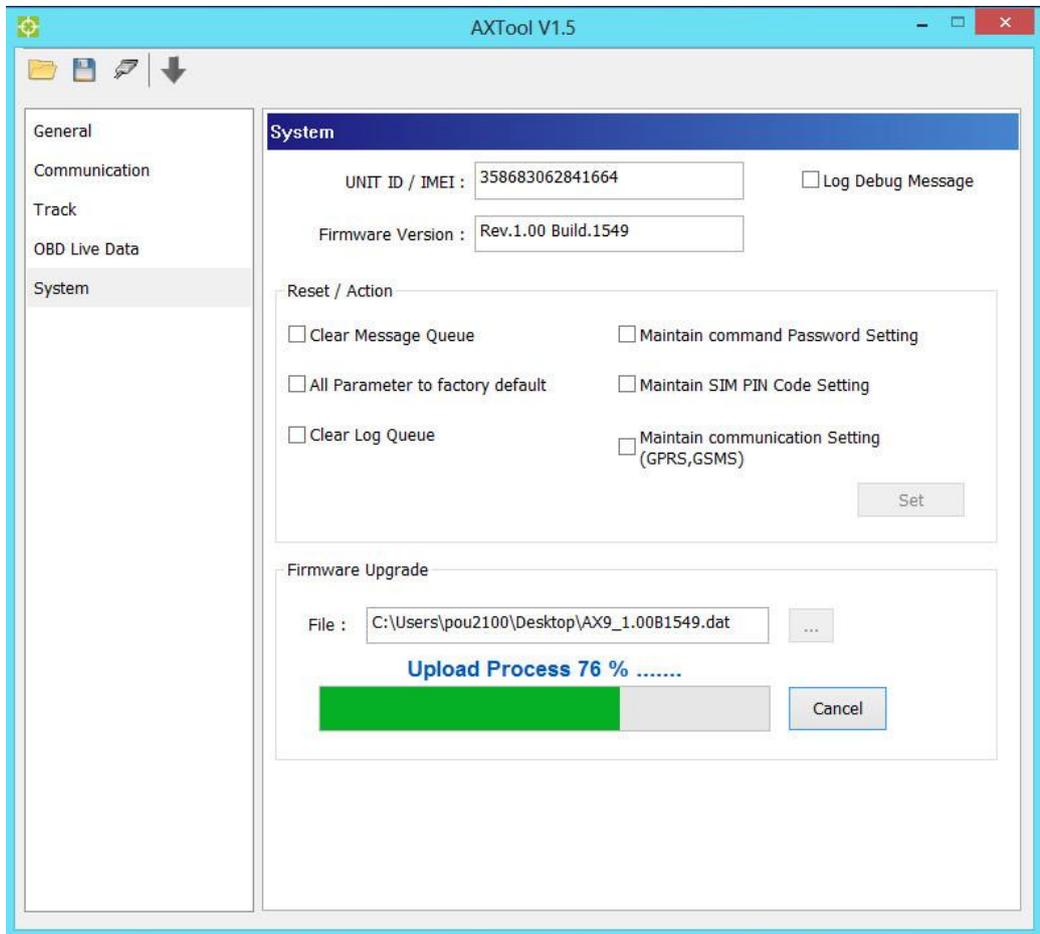
Once all the settings are entered, use the Blue Downward Arrow (↓) to upload the settings to the device.

A popup window will show the progress. When it finishes, the popup window will close.



### 5.3. Firmware Upgrade

1. Open the AXTool program and click on **[System]** on the menu. Browse the firmware file which is provided by ATrack and click on the **[Start]** button.



- When you see **"Upgrade Successfully!!"**, that means the device firmware is upgraded.

