CAREU U1 LITE PLUS
User Guide

Version: 0.1

Reference No.: AVL

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Chapter 1 introduction.

Designed with the latest GPS technology, the CAREU U1 LITE PLUS delivers positioning message by wireless transmission to GIS platform, and then helps back-end users proceed with the analysis and the applications of vehicle transport, management, anti-theft, security and tracking.

A microcontroller can probe location and command data at regular intervals, derive actions from location, peripheral and control data, and execute such actions. Peripheral data indicates the status of various peripherals connected to and/or controlled by the device. Among the best features of the CAREU U1 LITE PLUS Vehicle Tracker, in particular, they transmit data in ASCII mode (Intellitrac X Series compatible mode) or binary mode.

1.1 Features

- SMS,GPRS/UMTS/HSPA TCP/UDP, USSD, FTP
- Real-time tracking (Time, Distance Interval or Intelligent Mode, and Heading)
- Firmware upgrade over the air (form FTP)
- Journey report wireless download
- Battery low alert
- Geofence reports
- Mileage reports
- User-defined reports
- 6-Axis Sensor
- NMEA-0183 Output for Navigation
- GPS Antenna Destroyed Alarm
- CAN BUS interface (optional)

1.2 Scope

This document will guides you to start the CAREU U1 LITE PLUS Vehicle Tracker. However,as this document contains basic device configuration only, please see the CAREU U1 LITE PLUS Protocol Document for the advanced information.

1.3 Overview

Device Overview
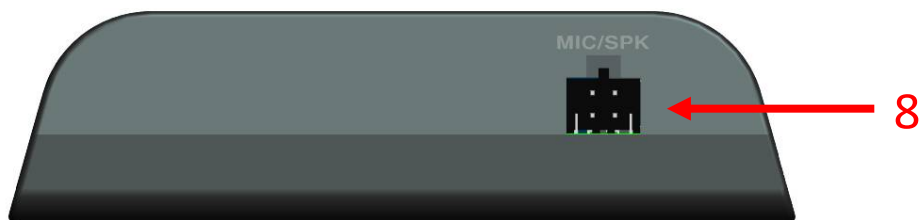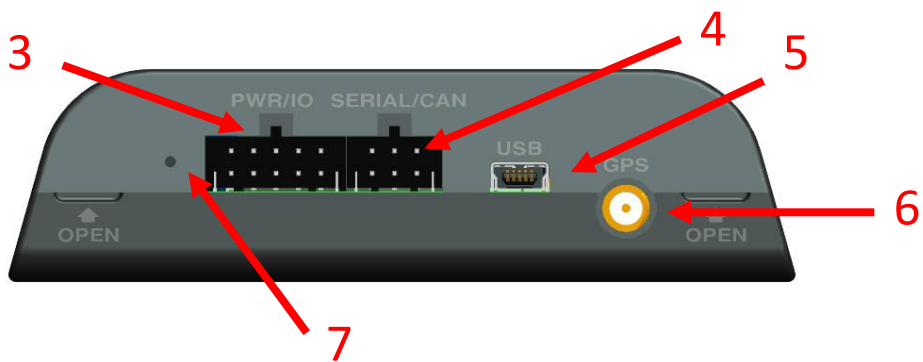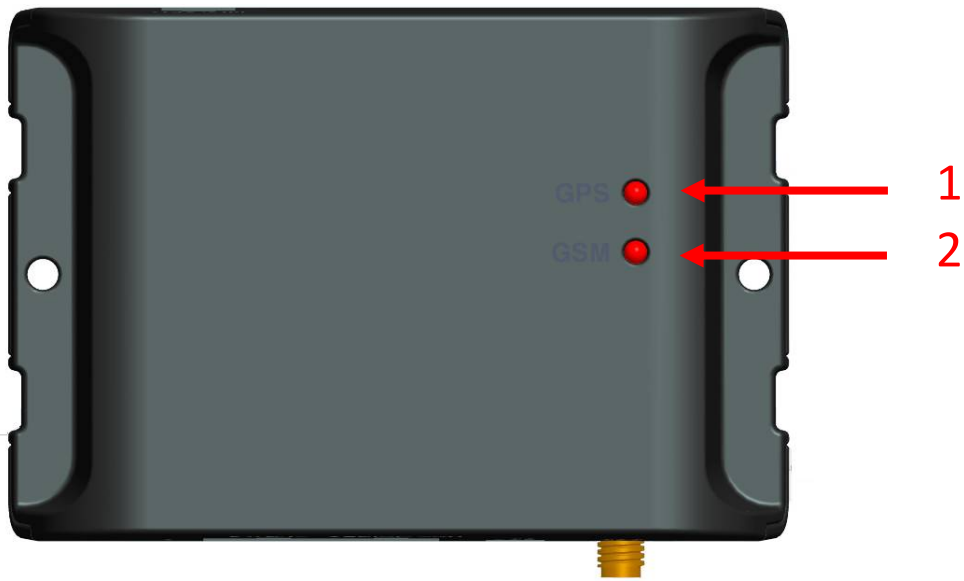
1. **GPS LED**
2. **GSM LED**
3. **Power & I/O Connector**
4. **RS-232/CAN Connector**
5. **USB Connector**
6. **GPS Antenna Connector**
7. **Reset Switch**
6. **Speaker/MIC Connector**

1.4 Hardware Architecture

As hardware is concerned, the CAREU U1 LITE PLUS is comprised of a micro-controller, regulator, GPS receiver, 2G/3G modem, G-Force sensor, flash memory data storage.

● Users can connect PC's Hyper Terminal to the diagnostic setting port for the AVL configuration.

● G-Sensor is for car accident prevention, car tow-away warning and power management.
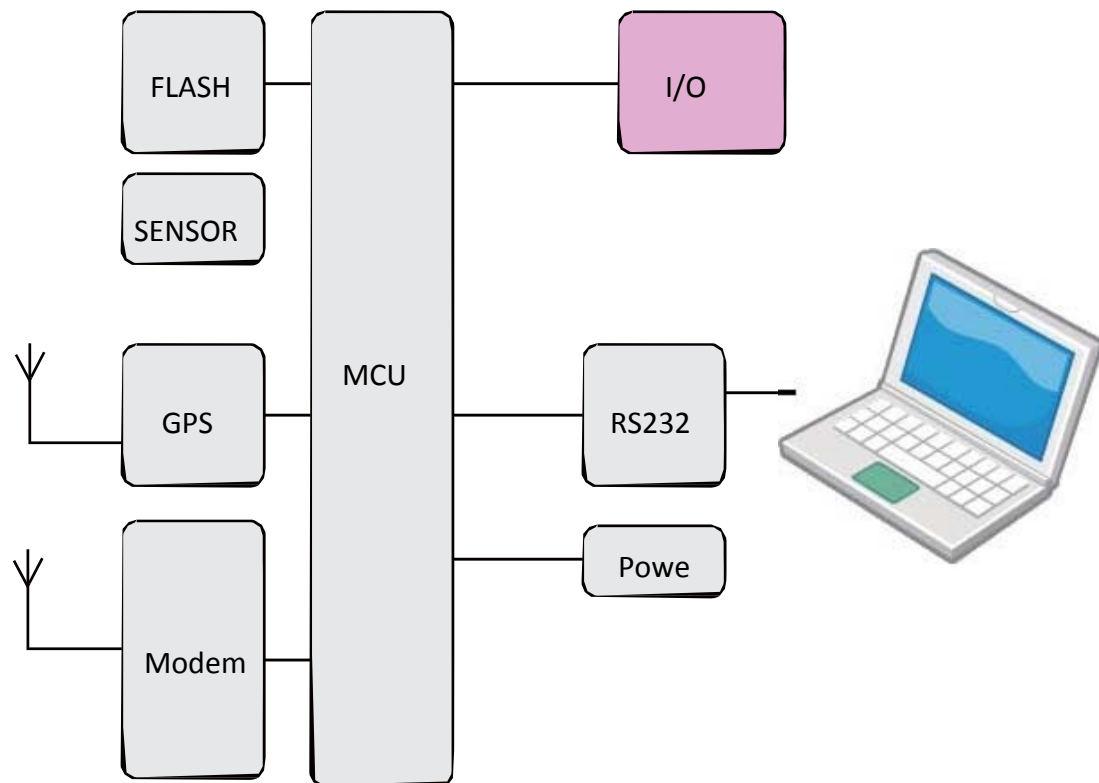
1.5 Related Document

CAREU U1 LITE PLUS Protocol Document

Chapter 2   Taking a Tour of CAREU U1 LITE PLUS
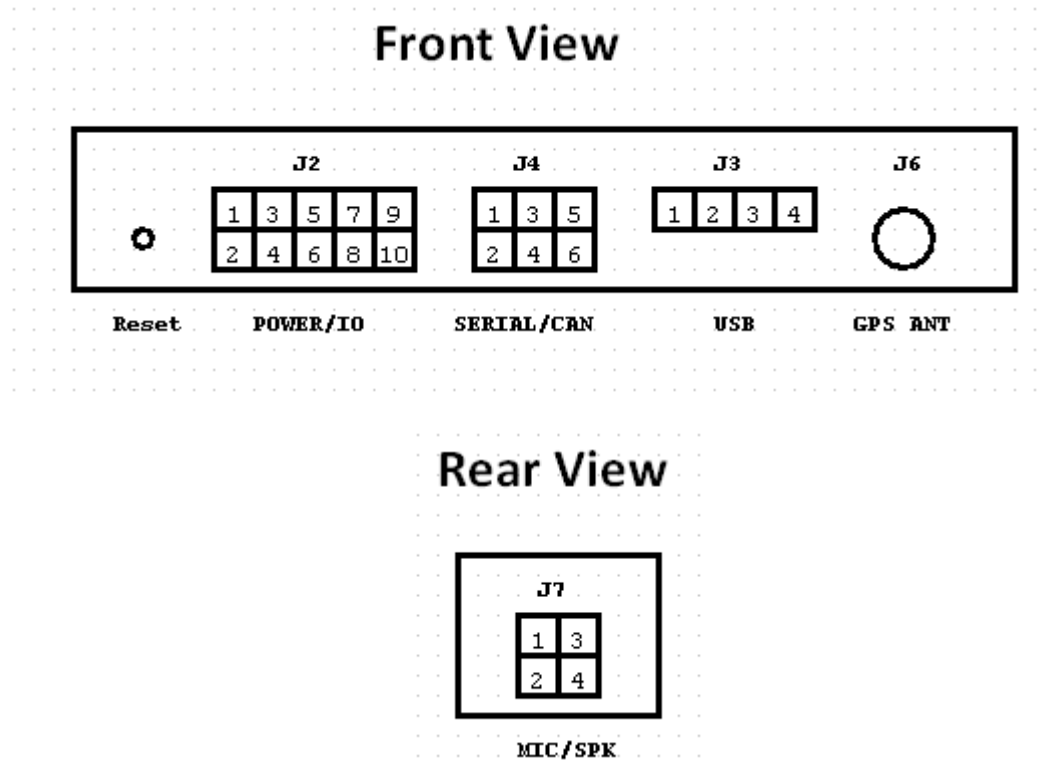
2.1 Dimensions

Dimensions (L x W x H): 105.5mm x 72mm x 28.5mm

2.2 PIN Assignment

PWR/IO Connector

Pin#	Signal Name	Description	IO	Electrical Characteristic
1	DC IN	Power supply input	I	DCIN = DC 8V to 30V,
2	GND	Signal ground	G	
3	Ignition	Ignition(ACC) Input	I	DC Vin = +30 ~ +7.5V (Active high)
4	Output1	Open-Drain output	O	Imax = 750mA
5	Output2	Open-Drain output	O	Imax = 750mA
6	Input 1	Negative Trigger	I	Low Active
7	Input 2	Positive Trigger	I	High Active
8	Input 3	Negative Trigger	I	Low Active
9	1-Wire	1-Wire Data	I/O	
10	Analog Input1	Analog Input1	I	Voltage Range DC 0~+30V

Serial/CAN Connector

Pin#	Signal Name	Description	IO	Electrical Characteristic
1	RS232-TX	RS232 Data output	O	
2	RS232RX	RS232 Data Input	I	
3	Vout	Supply voltage output	O	$Vo = 5V \, (Vout \, Total \, Imax = 500mA)$
4	GND	Ground	G	
5	CAN_H	CAN_H	I/O	
6	CAN_L	CAN_L	I/O	

MIC/SPK Connector

Pin#	Signal Name	Description	IO	Electrical Characteristic
1	MIC+	Microphone Input	I	
2	MIC-	Microphone Input	I	
3	SPK+	Audio output	O	
4	SPK-	Audio output	O	

Chapter 3 Getting Started with CAREU U1 LITE PLUS

To install the the CAREU U1 LITE PLUS device, follow the instructions below for basic operations

3.1 Device Configuration

1. Connected the serial port 1 to PC COM port

2. In Windows desktop, click Start **| All Programs | Accessories | Communications | HyperTerminal**.

3. If you are prompted to input the information of your location, complete them to proceed.

4. On the **File** menu of **HyperTerminal**, click **New Connection**.

5. In the **Name** box, type a name that describes the connection. In the Icon box, click an appropriate icon. Press the **OK** button to proceed.
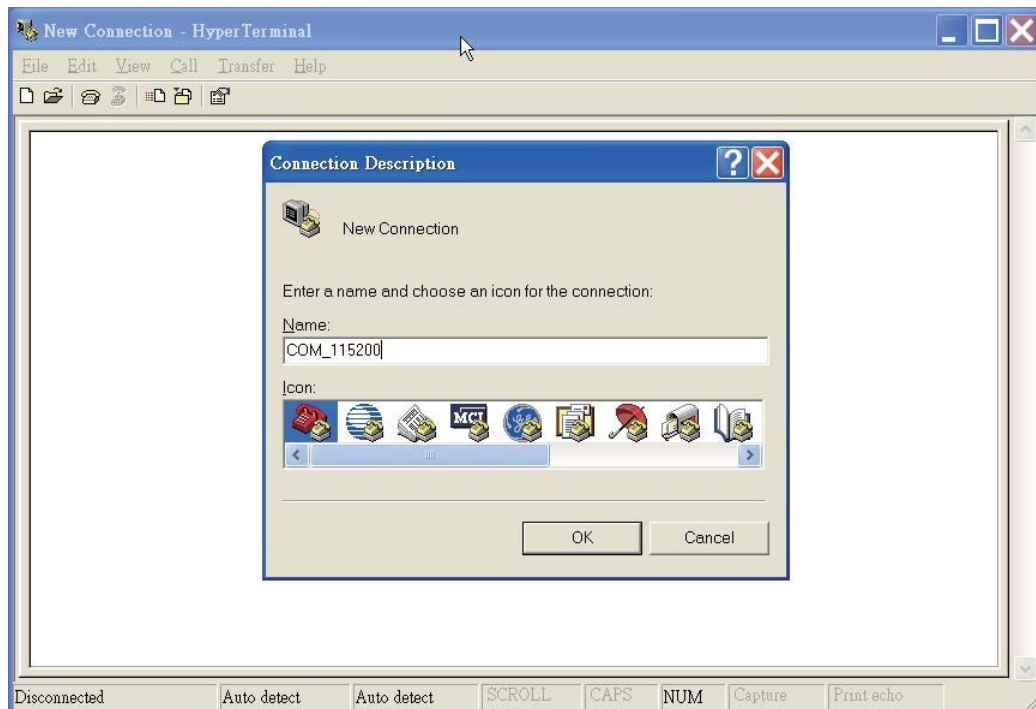
6. For Com port properties, configure as follows: Baud Rate --> 115200 bps
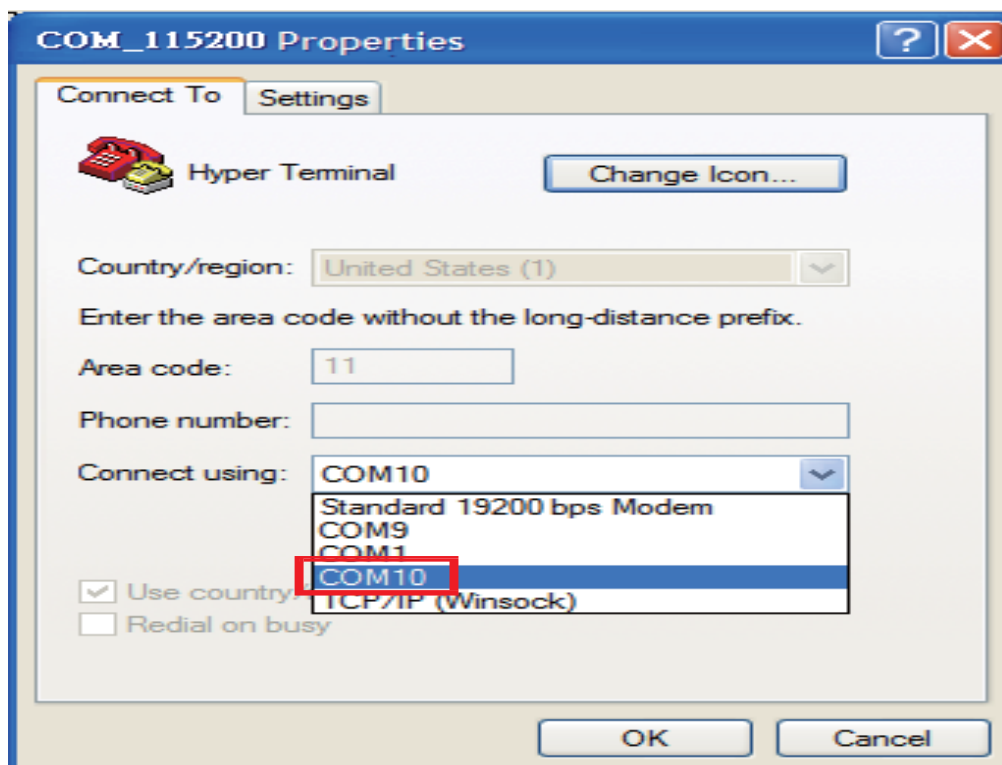
    Data Bits --> 8

    Parity --> None

    Stop Bits --> 1

    Flow Control --> None

7. In the connection that you have just set up, click **File | Properties**. Select the **[Connect To] tab**. From the **[Connect using]** drop down list, select the correct com port.

8. In the **File** menu, click **Properties**. Click the **[Settings]** tab. Press the **ASCII Setup** button.
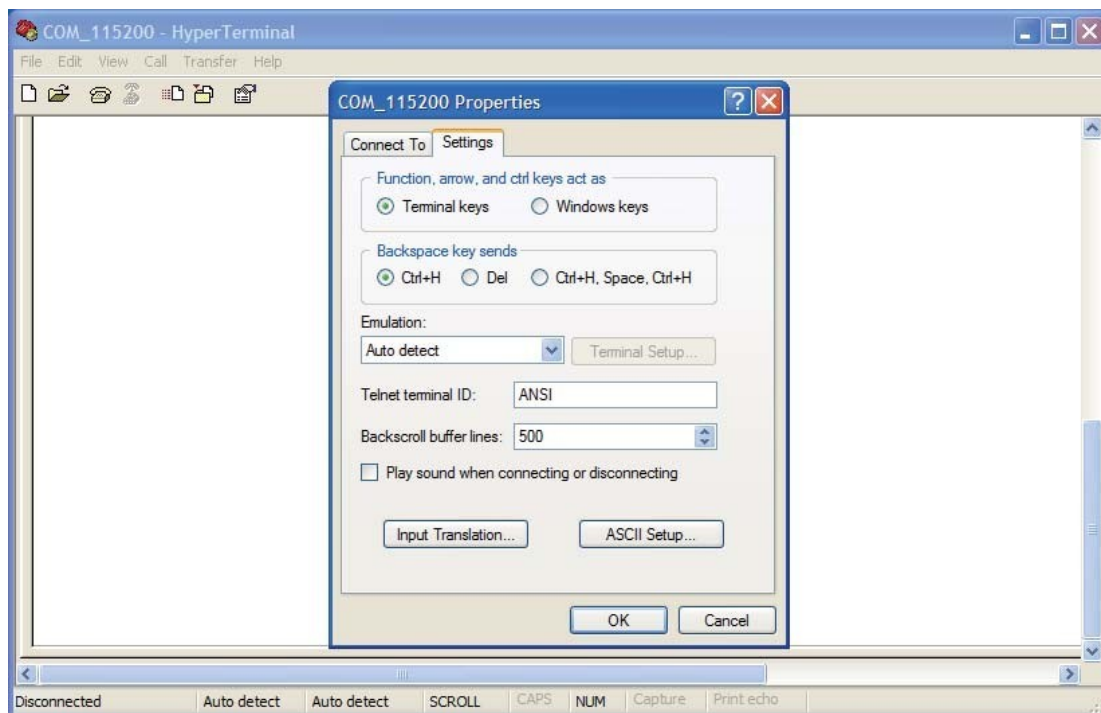
9. In the **[ASCII Sending]** group box. Select both **Send line ends with line feeds** and **Echo typed characters** locally. Press the **OK** button.

10. Connect your the CAREU U1 LITE PLUS device and power on,The device startup message will be displayed.

```
* * * Log ready...

* * * Check SIM card ... OK

* * * Searching PLMN ... "TW Mobile"

* * * Modem ready ...

* * * Host: 1, 60.248.29.25
* * * Connection tries: 1

* * * Remote --> AVL
0x0D 0x0A 0x43 0x4F 0x4E 0x4E 0x45 0x43 0x54 0x0D 0x0A

CONNECT

* * * Internet connection
* * * IP   : 115.81.187.168
* * * DNS1 : 61.31.233.1
* * * DNS2 : 168.95.1.1
```

11. In **[HyperTerminal]** window, type in the command "AT$VERSION?" and press
    the **Enter** key. The hardware and firmware version will show. As long as your
    [HyperTerminal]   window appears as the screenshot below, a connection
    between the device and your system has already been built up and working. It
    is time to send all configuration commands.


```
AT$VERSION?

$VERSION=v0.3.1,v0.3,uBlox G100
OK:VERSION
```

3.2 Communication Settings

The CAREU U1 LITE PLUS Vehicle Tracker communicates with your control center by either SMS or 2G/3G (TCP/UDP). Before the device is installed into a vehicle, communication parameters should be set.

1. SMS Configuration
Use AT$SMSDST command to set a SMS control center phone number or short code. For example, if the SMS control center phone number is +886123456789, the **AT$SMSDST** command to be issued into HyperTerminal should be:

AT$SMSDST=+886123456789

OK

Then you can try to use cellular phone or SMS gateway to send a SMS message to the CAREU U1 LITE PLUS device. Send a SMS message -->"**AT$MODID?**"
Device will response:
$MODID=101000001

OK

This proves a successful mobile phone SMS connection.

2.WirelessConfiguration

Set GPRS servers by using the folloiwng commands:
AT$APN=internet,username,password (APN=internet, Username=username, Password=password) OK
AT$HOSTS=1,0,60.148.19.10,6000

(Server IP address = 60.148.19.10 and Port number =6000) **OK**
AT$RETRY=5,10 (Message retry settings) **OK**
AT$IPTYPE=1 (Using TCP/IP mode) **OK**
AT$GPRSEN=1 (GPRS enable) **OK**

AT$HB=60,1 (Heartbeat setting) **OK**

Please refer to the CAREU U1 LITE PLUS Protocol Document for more command details.

3.3 GPS Tracking Configurations

After the device communication settings are done, the remote GPS tracking is ready to function. The setting of GPS tracking can be done by using **AT$PDSR** command. For example,
AT$PDSR=1,30,0,0,2,0,0,1,0 (Tracking through GPRS by time interval 30 seconds) **OK**

For simple testing GPRS, run the TCP Server U-Series software which is provided by S&T. It is simple server software that can wait for device connection and data.
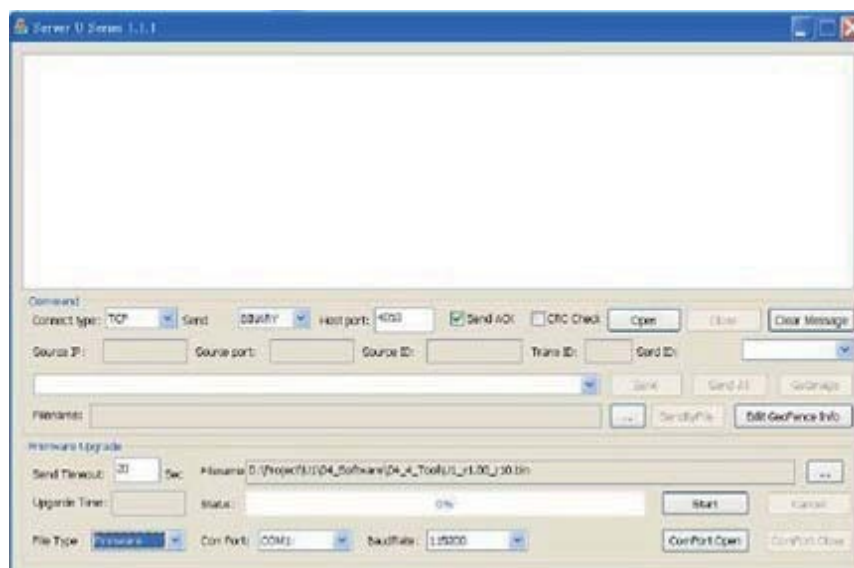
For advanced testing, you need the software Intelli TracerPlus. Please request this software through your sales contact.

You can also apply for a testing account from S&T's FleetWeb solution through your sales contact.

The main page of the Intelli FleetWeb appears as below:

3.4 Firmware Upgrade

The firmware of the CAREU U1 LITE PLUS can only be updated through USB interface. With the firmware loader tool provided by S&T, firmware update can be done for

the device. Such firmware loader runs on Windows-based systems. To upgrade the firmware, follow the procedure below

1. Connect the device to your PC with the USB cable.
2. Connect the device to power.
3. Power on the device.
4. Run ServerUSeries.exe. A window displays as follows:

5. Press browse the button to browse to the firmware provided by S&T.
6. Press the Start button to run the firmware program.
7. After the writing progresses to 100%, it takes about 20 seconds for the update to completes.
8. Firmware update completes.

Chapter 4   Technical Specification

Hardware Requirements	Description
CPU	STM32F103RCT6 (ARM Cotex-M3) 72MHz STM32F105RCT6 (ARM Cotex-M3) 72MHz/CAN Version
Internal Memory	256Kbyte Flash/48Kbyte RAM
External Memory	**Default 8Mbytes, (512Mbytes for Debug only).**
Cellullar	Cellullar Module: ● Vendor: uBlox SARA-G350(2G) / SARA-U2(3G) ● Frequency: 850/900/1800/1900/2100 MHZ

	● Antenna: Internal

GPS	GPS Module:
	● Vendor: uBlox MAX-M8Q/W
	● Sensitivity: -167 dB (GPS & GLONASS)
	                         -165 dB (GPS & BeiDou)
	                         -166 dB (GPS)
	● Antenna: External
	Time to First Fix:
	  1. Cold Start: 26 Seconds at open sky (GPS & GLONASS)
	                              27 Seconds at open sky (GPS & BeiDou)
	                              29 Seconds at open sky (GPS)
	  2. Hot Start: 1 Second
	  3. Aided starts: 2 Seconds at open sky (GPS & GLONASS)
	                              3 Seconds at open sky (GPS & BeiDou)
	                              2 Seconds at open sky (GPS)

I/O(standard)	● **Analog Input x 1**
	  A. Voltage Range: 0-30 V
	  B. Resolution: 12 bit
	● **Digital Input x 4:**
	  A. 1 Postive Active(ACC)
	  B. 2 Negative Trigger
	  C. 1 Positive
	● **Digital Output x 2**
	  Sink Current=750mA Maximum

Communication Interface	RS-232 X 1 USB2.0 Full Speed CAN interface X 1 (Must to replace STM32F105xxx MCU)
1-wire	DS2482-100
Main power Remove detect	Yes
GPS open/short detect	Yes
SIM CARD	SIM Card Access: External
Battery Life	Backup Battery: 950mA
Battery Type	Lithium Ion
Sensor	● $3\ axis$ sensor for motion detection ● 6 axis (optional)
AGPS	Yes

Temperature	Operating: –20 °C to +60 °C(With Battery)
	Operating: –20 °C to +70 °C(Without Battery)
	Storage: –20 °C to +80°C
Logging	TBD positions
User Report	TBD Sets

Note: The specification herein is subject to change without prior notice.

Systems & Technology Corp. (S&T), founded in 1987, is a market leader in Automatic Vehicle Locating (AVL) solutions, Geographical Information Systems (GIS) and navigation. It has formed a professional development team to innovate the most advanced and comprehensive GPS tracking products for the customers and has built a global service network to provide non-stop services and support.

With the well-established marketing networks of over 100 distributors in the world, S&T is your trustworthy tracking solution provider. For more product information, please contact S&T by Email, phone or fax.

Web Site	http://www.systech.com.tw
Email	avl@systech.com.tw
Phone	+886 2 26981599
Fax	+886 2 26981211

Chapter 5   Regulation

Federal Communication Commission Interference 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.

This equipment 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 generates, uses and can 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 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.

FCC Caution:
- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Chapter 6   Safety Information

CAUTION
RISK OF EXPLOSION IF BATTERY IS REPLACED
BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING
TO THE INSTRUCTIONS