iBT-GPS Solar Bluetooth GPS Data Logger

User's Manual

Published on 12-July-2007

8029603001A

Table of Contents

Chapter 1 Before you begin

1.1 Note and Warning

- iBT-GPS uses Lithium battery. If iBT-GPS is used in temperature lower than -10℃ or higher than 60℃, its battery charging capability will decrease. Please leave the iBT-GPS far from heat or high temperature environment. In addition, do not expose your iBT-GPS in temperature higher than 140℉/60℃. If you do not follow these rules, the battery inside iBT-GPS may overheat, explode or burn itself, and this will lead to very serious damage. The Lithium battery inside the iBT-GPS should be recycled.
- While in the hospital, turning off the iBT-GPS is recommended. Wireless GPS receiver may interfere with medical equipments which use radio frequency.
- For a long period not using iBT-GPS, take out the battery and store it in dry/cool places.
- For safety, keep the iBT-GPS and all accessories out of children's reach.
- The manufacturer assumes no responsibility for any damages and loss resulting from the use of this manual, or from deletion of data as a result of malfunction, dead battery, or from misuse of the product in any way.
- Use only the supplied and approved accessories. Unauthorized accessories, modifications or attachments could damage the iBT-GPS, and may violate regulations governing radio devices.

- Use a dry, clean soft cloth to clean the unit. Do not use harsh cleaning solvents, chemicals, or strong detergents.
- Do not attempt to open the iBT-GPS yourself. Unauthorized hacking may damage the unit, and void your warranty.

1.2 Introduction

This iBT-GPS logger features an all-in-one, cost-effective portable GPS logging solution. With its on-board memory, it allows you to log your routes by ways of time/ distance/ speed. Through user friendly software utility, it shows your track on Google Earth. Thanks to the Solar energy the receiver can be used for more than 35 hours in full operation or permanent in standby mode. This data logger is small and robust, ideal to carry everywhere for applications such as route tracking, mountain climbing or fleet management.

1.3 Features

1. MTK GPS chipset **32** channels.
2. 35+ hrs operation time.
3. Embedded with **8Mb** memory for saving up to 50,000 way points.
4. Dual modes for both route recording and navigation.
5. Smart power saving function and Solar energy for **35+** hours operating continuously.
6. Smart auto sleep & wake up mode and Solar energy for **permanent** power on standby.

7. Tracks can be shown on Google Earth.
8. WAAS and EGNOS supported for better accuracy.
9. Support NMEA-0183 GGA, GSA, GSV, RMC, VTG, GLL.
10. Fully compliant with Bluetooth V1.2
11. Support NMEA compliant mapping softwares like TomTom, Route66…etc.
12. 3 recording methods: by time, by distance or by speed.

1.4 Applications

- Route recording
- Business trip expense management
- Fleet management
- Driving behavior monitoring
- Saving of Point of Interest

1.5 Appearance

1. DC jack (mini USB type)
2. **Power & Log Button**
3. Battery status LED (red/green)
4. Bluetooth status LED (blue)
5. GPS status LED (orange)
6. Log status LED (blue)
7. Internal GPS antenna
8. **Solar Cell: Auxiliary power source**

1.6 Power & Log Button

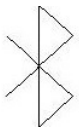
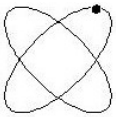
Power Switch	
Power On	To turn on the power, please click and hold for 3 second, then you can see the blue LED and orange LED turning on.
LOG Enable	To enable LOG mode, please click the Log Button, then you can see the blue Log status LED blinking. Enable log mode, navigation function is supported as well.
Log Disable	To disable LOG mode, please click the Log Button again, then you won't see the blue Log status LED blinking.
Power Off	To turn off the power, please click and hold for 3 seconds, then you can see the blue LED and red LED blinking 3 times.

Difference between LOG disable and LOG enable:

LOG disable	You can use the iBT-GPS as a Bluetooth GPS receiver to navigate when you have a Bluetooth enabled PDA/ Smartphone in your car. But the logging is off.
LOG enable	In this mode iBT-GPS works as a logger, navigation function is supported as well.

1.7 LED Display

The Bluetooth GPS data logger has 4 LED lights, one is Bluetooth Status LED, the 2nd one is Battery Status LED, the 3rd one is GPS Status LED/ Memory used LED, the 4th is is LOG Status LED:

Category	SYMBOL	COLOR	STATUS	Function
Bluetooth Status LED		Blue	Always on:	Bluetooth on, but not connected to any Bluetooth devices yet
			Slowly blinking:	Sleeping mode (1 time / 5 seconds)
			Quickly blinking:	Bluetooth is connected and ready for data transmission (1 time / 2 seconds)
Battery Status LED		Red	Blinking:	The battery is too low
		Green	Light On:	The battery is charging
		Green	Blinking:	The battery is fully charged
GPS Status LED		Orange	Always on:	Acquiring satellites, GPS position not fixed
			Quickly Blinking:	GPS position is fixed, Navigation
		Blue	Slowly Blinking:	The memory space is too low (20% left now)
			Solid	The memory is full and stop
LOG Status LED		Blue	Slowly Blinking:	LOG enable

Chapter 2 Getting Started

2.1 Checking the package content

Congratulations on your purchase of the iBT-GPS with built-in **solar charger**. Before you start using iBT-GPS, please make sure if your package includes the following items. If any item is damaged or missing, please contact your dealer at once.

- Solar Energy Bluetooth GPS Date Logger - iBT-GPS x 1
- USB to mini-USB cable x 1
- Traveler Power Adapter x 1 (optional)
- DC cigarette lighter adapter x 1
- Lithium rechargeable battery x 1
- CD Tool x 1 (user manual, software utility)
- Quick start guide x 1
- PU anti-slip pad x 1
- Hook and Cord Set x 1

*Unit package contents may vary depending on countries without prior notice.

2.2 Getting Started

Please follow the procedure step by step.

Step 1 Charging Your Battery

To charge your iBT-GPS data logger, you have to plug your USB cable into the power source. Charging time is about 3~4 hours and you can charge from PC/ Notebook's USB HOST or from cigarette-lighter in car.

For the 1st time you use the iBT-GPS, please charge battery until it is full (the green LED blinks). The LED that represents the battery is the icon (shown in below).

- If the LED is red, that means battery power is critically low. Charge immediately.
- If the LED is green, that means battery is charging now.
- If the green LED is blinking, that means battery is fully charged.

Step 2 Turning on the power / perform LOG

Power off (Before)

Power on (After)

Data record

Power Button	
Power On	To turn on the power, please click and hold for 3 second, then you can see the blue LED and orange LED turning on.
LOG Enable	To enable LOG mode, please click the Log Button, then you can see the blue Log status LED blinking. Enable log mode, navigation function is supported as well.
Log Disable	To disable LOG mode, please click the Log Button again, then you won't see the blue Log status LED blinking.
Power Off	To turn off the power, please click and hold for 3 seconds, then you can see the blue LED and red LED blinking 3 times.

Difference between LOG disable and LOG enable:

LOG disable	You can use the iBT-GPS as a Bluetooth GPS receiver to navigate when you have a Bluetooth enabled PDA/ Smartphone in your car. But the logging is off.
LOG	In this mode iBT-GPS works as a logger, navigation function is

enable	supported as well.

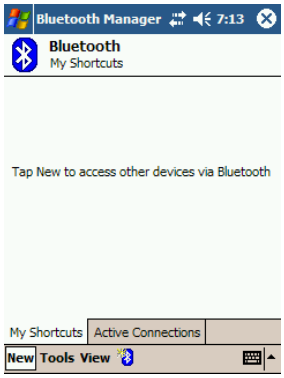
**For further function to download your routes to PC, please refer to Chapter 3.

Step 3 Connecting your handheld device with iBT-GPS

Please refer to the user manual of PDA to enable the Bluetooth connectivity. If the connection between your device and iBT-GPS is successful, the blue LED of iBT-GPS will be blinking.

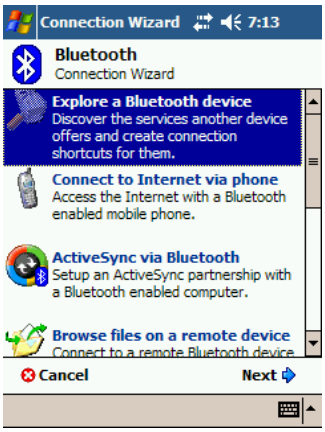
Below, we provide a common procedure of software installation to set up your PDA. (For other PDA, the steps may be different. Bluetooth Manager is a popular program used on Bluetooth device.)

-->

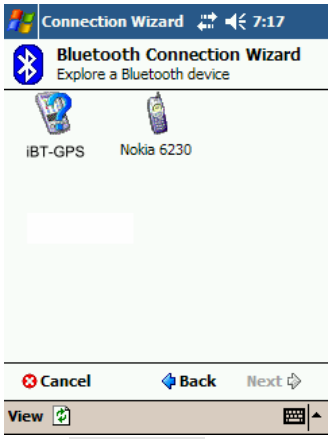


Start -> Bluetooth Manager New

1. Open “Bluetooth Manager” on your pocket pc, and establish a new connection.



-->



Explore A Bluetooth device ->Next

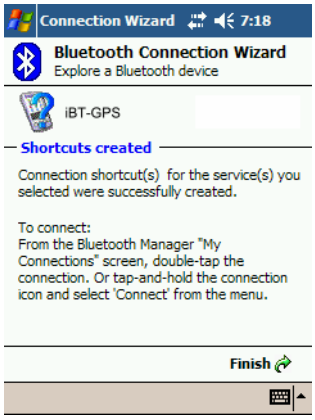
Tap iBT-GPS

2. Explore a Bluetooth device, and find the "iBT-GPS"

Passkey 0000 (if your PDA asks for the passkey)

3. (Optional)

-->

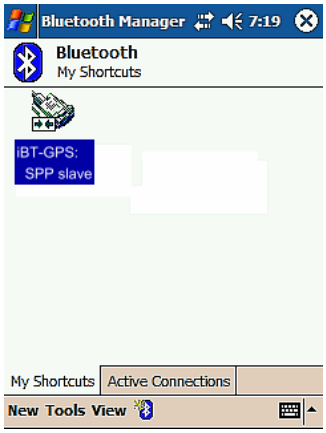


Select SPP slave->Next

Finish

4. Connect to Serial Port Profile (SPP) Slave

-->



Tap and Hold iBT-GPS: SPP slave, Connect

Done

5. Finish Bluetooth Manager Setup

Step 4 Loading your GPS mapping or routing software
You should have mapping software on your PDA/ Smartphone/ laptop or you need to install it before using the iBT-GPS for navigation.

Step 5 Starting the application
Select the correct COM port & baud rate within the application

Note: The Bluetooth device in most of the applications has an "auto-detect" feature so that you do not need to select the Baud Rate.

2.3 Helpful Tips

- It’s better to turn off the iBT-GPS when you don’t use it, or the serial Flash's life can’t last long.
- Some vehicles having heavy metallic sun protecting coating on windshields may affect GPS signal receptions
- Driving in and around high buildings may affect GPS signal receptions.
- Driving in tunnels or indoor park may affect signal receptions.
- In general, any GPS receiver performs best in open space where it can see clean sky. Also weather will affect GPS reception – rain & snow contribute to worse sensitivity.
- Low battery of a PDA or of an iBT-GPS may affect signal receptions.
- Please check the correct “COM” and “Baudrate” of your PDA.
- iBT-GPS output data updates every second, therefore the actual position and the position shown in your map may have slight time delay. This may happen when you drive at higher speed or make a turn around a corner.
- Note that iBT-GPS may not work indoors where it can not see the sky.
- For the 1st time you use the iBT-GPS, it will take 1 to 3 minutes to obtain the satellite constellation information and fix your position, this is called “Cold Start”. If you replace the battery, iBT-GPS will do Cold Start again.
- If your iBT-GPS can’t fix your position for more than 20 minutes, we suggest you change to another spot with open space and then try again.

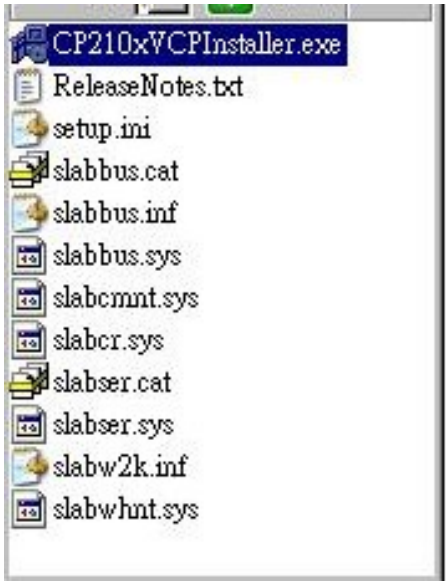
Chapter 3 Using Logger

3.1 How to connect the iBT-GPS to your PC

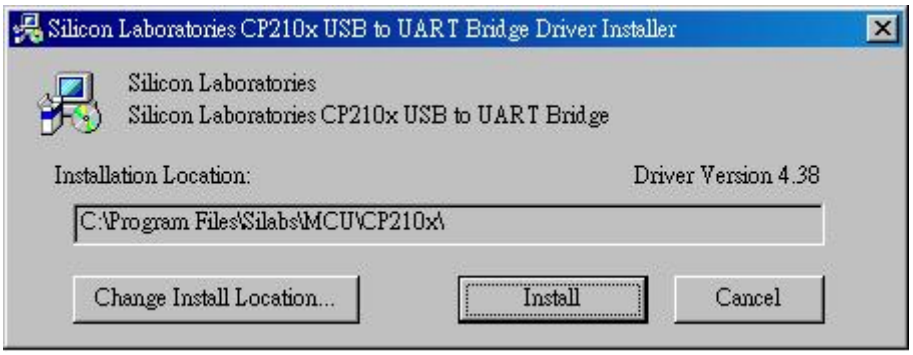
3.1.1 Driver installation

Note: These drivers are only designed for Microsoft Windows based PC only (Windows XP/ 2000/ Vista)! Therefore, Mac OS and Linux are not supported.

1、 Driver is located in “CP210x folder”. Please double click the “CP210xVCPInstaller.exe”.



2、 Click “Install”. Now installing…



3、 Complete installation, but you must restart your computer before the new settings will take effect.

User can go to the MS Windows’ device manager to see the status showing this USB device installation is completed.

Please go to check the corresponding virtual COM Port. Afterward users only have to use same COM Port in same USB port, and can directly make a connection successfully between the PC end and iBT-GPS data logger. For example, COM7.

3.1.2 Google Earth

If you computer is not yet installed with Google Earth. Google Earth has free download version, go download it in the internet first. For more information, please visit http://earth .google.com/.

3.2 Software Utility --- iBT-GPS Logger Tool

(To use a mini-USB cable to connect the iBT-GPS to your PC, you have to power on the iBT-GPS unit. Therefore, you have to switch to LOG)

Note: Please install USB Driver before you use iBT-GPS Logger Tool. For driver installation, please refer to “3.1 Drivers”.

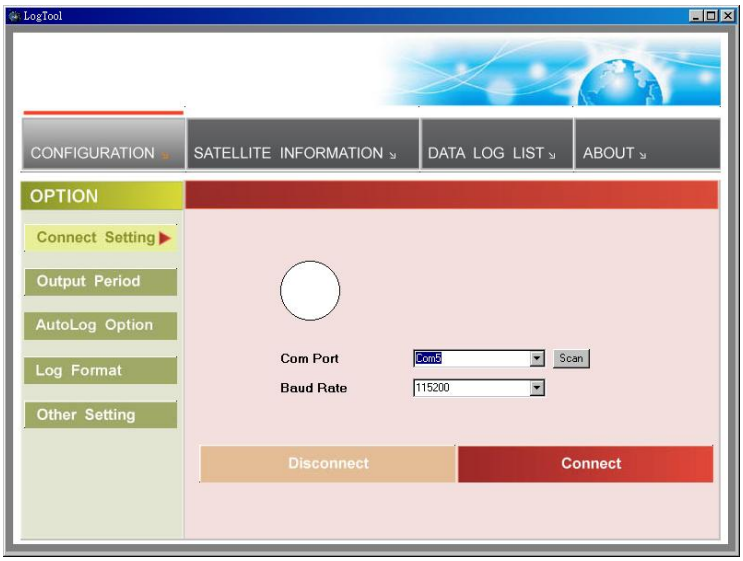
Step 1.

Double click on the icon of the logger tool “DataLog.exe”, now installing…

Step 2.

See below, four sections will display horizontally on the screen in an array from left to right as below:

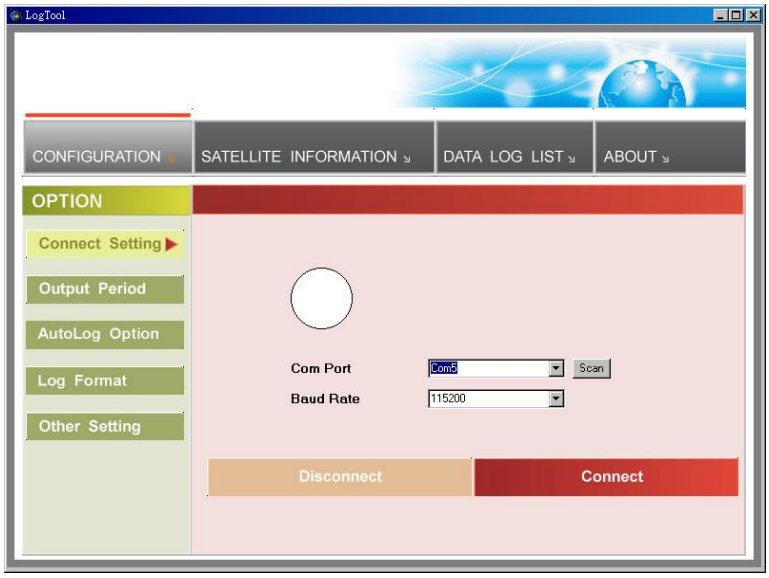
- Configuration：
  To create settings for connection/ Command setting
- Satellite Information：
  To view GPS status and perform Hot/ Warm/ Cold Start
- Data Log List：
  Download of logged data/ Use of Google earth for showing tracks
- About:
  Software version and company information...etc.



3.2.1Configuration

i. Connection Setting：

This is to build a connection between your PC and iBT-GPS data logger.



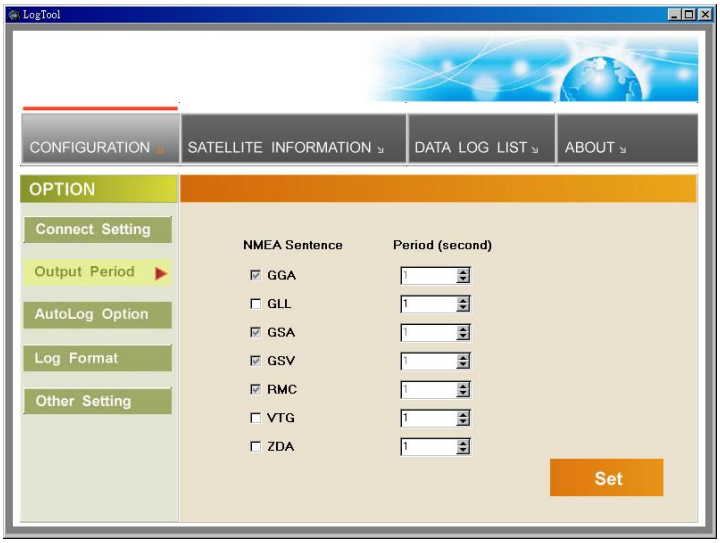
1. Please press the Scan button. Users have to pull the combo box to see all the com port resources available. This "scan" feature is to shorten the searching scope. But still you have to go to the MS Windows' device manager to find out the Virtual Com Port number of iBT-GPS data logger (check Virtual Com Port number of iBT-GPS data logger).

2. Select correct Port and set BaudRate at a fixed 115200. Click on “Connect” to build a connection. GPS status in the “SATELLITE INFORMATION” section will start to show when you click on it.
Note: Plug in the USB cable to connect your PC and iBT-GPS in advance.

3. To stop connection anytime, just click on “Disconnect”.

ii. Output Period：

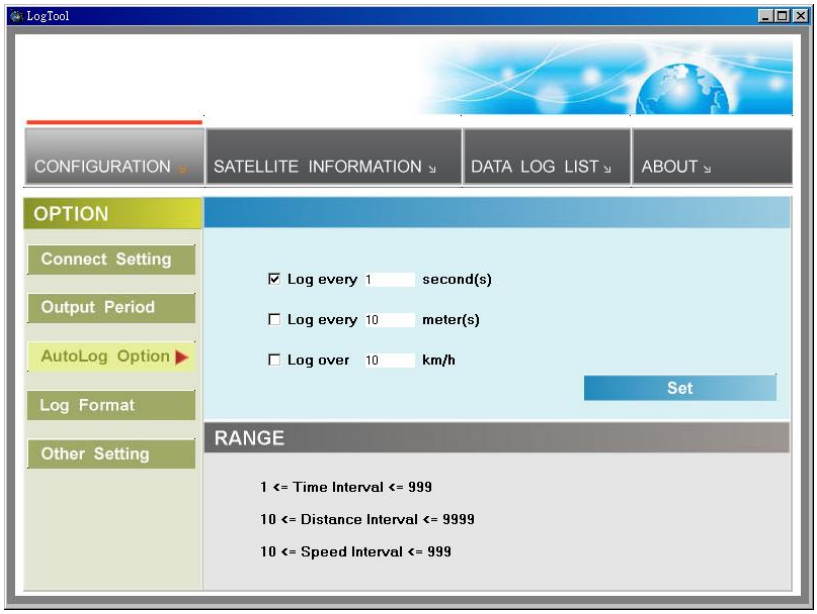
This is to set NMEA output selection for the Bluetooth interface in the NAV mode.



- Check the NMEA type -> Choose output period -> Set
- For selecting NMEA data output (RMC, GSV, GSA, GGA are compulsory data, user are not allowed to DE-SELECT)
- NMEA setting here will only affect the NMEA sentences for navigation usage. This has nothing to do with logger's data recording.
- Period (s): For example, GLL (4) stands for GLL sentence update every 4 seconds.

iii. AutoLog Option (Change Recording Interval)：

This is to set the record method.



1. Setting log time interval：Configure log interval between 1~999 sec.
   For example, “10 Seconds” stands for iBT-GPS will record one data every 10 seconds.
2. Setting log distance：Configure log interval between 10~9999 meter(s)
   For example, “1000 meters” stands for iBT-GPS will record one data every 1000 meters.
3. Setting log speed：

Configure log interval between 10~999 km/h. Set speed at the highest

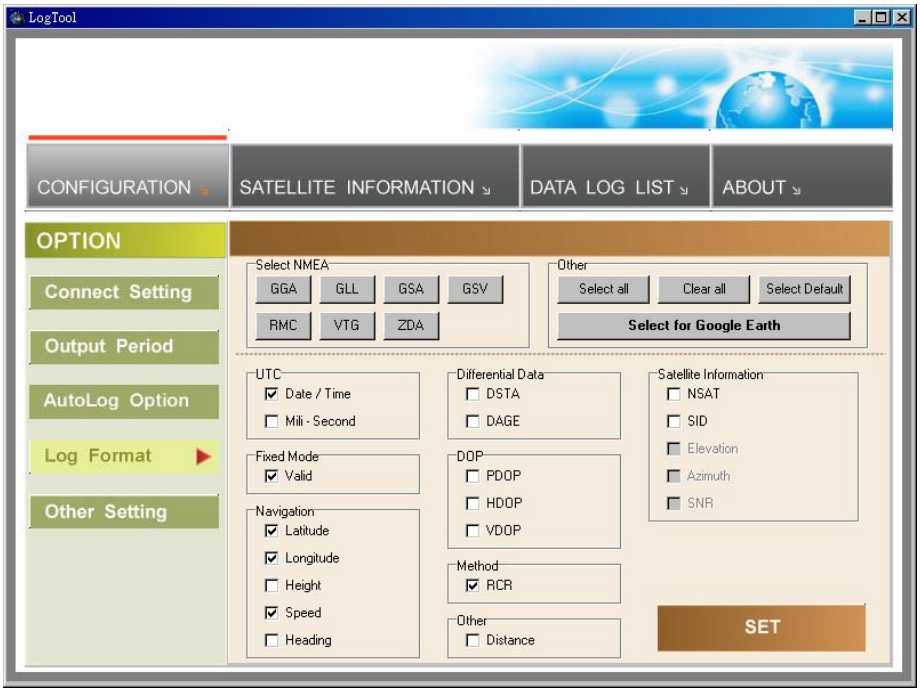
rate. If any log data exceeds this speed, it will be recorded.

For example, “100km/hr” stands for iBT-GPS will record one data when exceeding 100km/hr. The number of data count shows the time user exceeds 100km/hr.

Note: Can be Mixed to log by time interval/ distance/ speed.

iv. Log Format：

The table presents which information will be recorded for each way points.



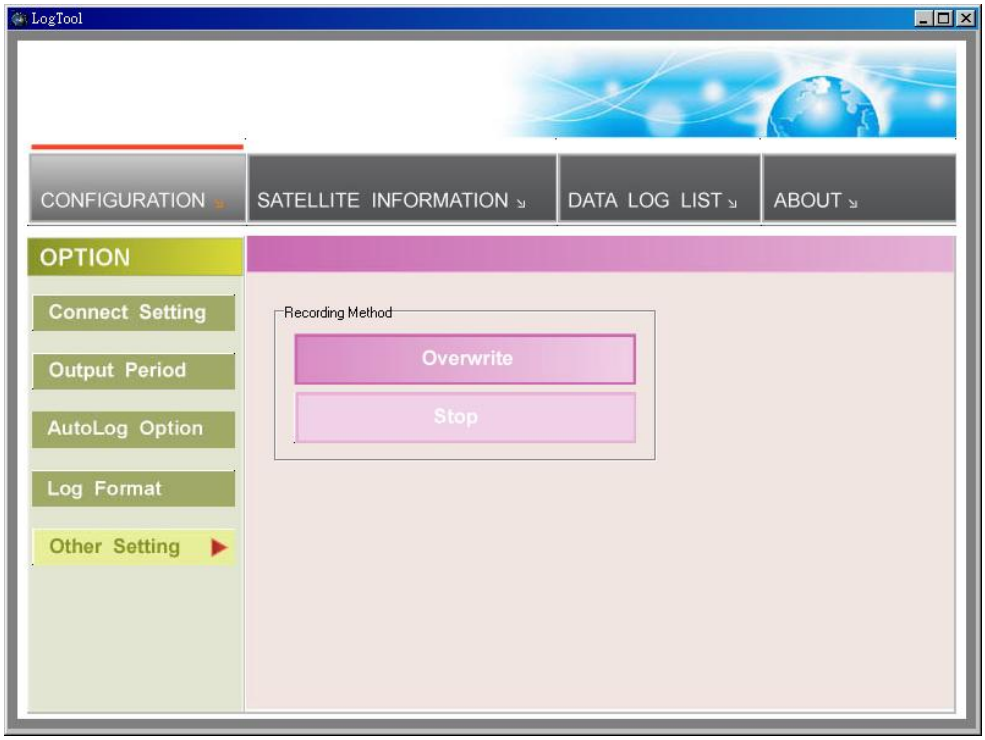
- Normally, UTC, latitude, longitude, valid, speed and RCR should be chosen. Therefore, the number of recorded data is estimated to be about 74,000 points.
- ELEVATION, AZIMUTH and SNR can only be checked when SID is checked.

UTC	Universal Coordinated Time, formerly GMT or Greenwich Mean Time.
VALID	Data fix or not
LATITUDE	A north/south measurement of position perpendicular to the earth's polar axis.
LONGITUDE	An east/west measurement of position in relation to the Prime Meridian, an imaginary circle that passes through the north and south poles.
HEIGHT	The altitude of a place above sea level or ground level.
SPEED	Rate of motion
HEADING	The compass direction in which the longitudinal axis of a ship or aircraft points
DSTA	DGPS station ID number
DAGE	Time in seconds since last DPGS update
PDOP	(Positional Dilution Of Precision) ; Position accuracy; 3D-coordinates
HDOP	(Horizontal Dilution Of Precision); horizontal accuracy; 2D-coordinates
VDOP	(Vertical Dilution Of Precision); vertical accuracy; height
NSAT	Number of Satellite (in Used, in View)
SID	Satellite ID
ELEVATION	The elevation of the satellite
AZIMUTH	Line-Of-Sight angle of the satellite

SNR	Signal to Noise Ratio
RCR	Record method: Speed/ Time/ Distance/ Push Button
MS	Mili-second

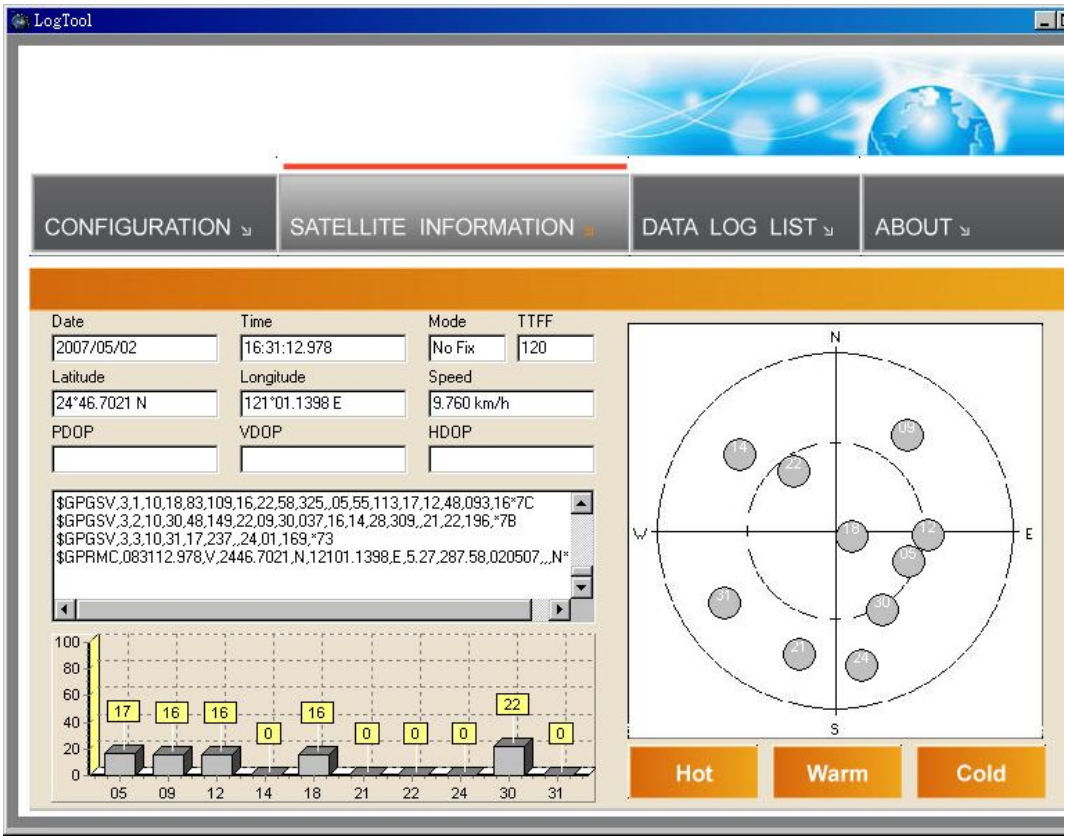
v. Other Setting：

This setting is about: when the logger’ s on-board Flash memory is full, what would you want the logger to do in terms of recording?



- The default setting is “Stop” (Full and stop)
- The other recording method is “Overwrite” (Repeat).

3.2.2 Satellite Information



i. GPS status view：

To check GPS acquisition condition (Reception)

Date	UTC date
UTC Time	Universal Coordinated Time, formerly GMT or Greenwich Mean Time.

Mode	(3D Fix/ 2D Fix/ No Fix)
TTFF	Time to first fix
LATITUDE	A north/south measurement of position perpendicular to the earth's polar axis.
LONGITUDE	An east/west measurement of position in relation to the Prime Meridian, an imaginary circle that passes through the north and south poles.
SPEED	Rate of motion
PDOP	(Positional Dilution Of Precision) ; Position accuracy; 3D-coordinates
HDOP	(Horizontal Dilution Of Precision); horizontal accuracy; 2D-coordinates
VDOP	(Vertical Dilution Of Precision); vertical accuracy; height

ii. Hot：

Perform hot start

iii. Warm：

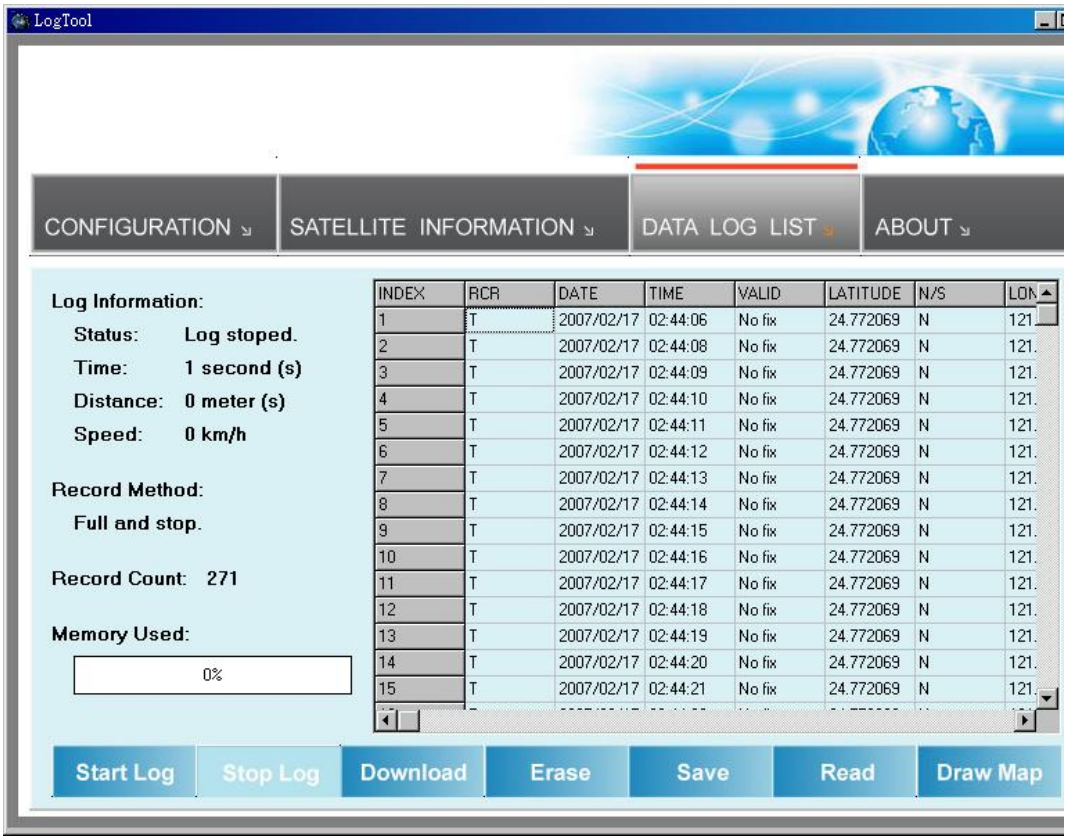
Perform warm start

iv. Cold Start：

Perform cold start

3.2.3 Data Log List --- way to download the data from logger!

Below steps is to show the way to download the data from logger.
Step 1. Click “Download” to download log data to computer.
Step 2. Click “Draw Map” to map your recorded data on Google Maps



i. Grid Array：

Show the detail recorded data list

ii. Memory Used：

To know how much space there are remaining in the memory

iii. Record Count：

Data record count

iv. Start Log：

Enable Log feature

v. Stop Log：

Disable Log feature

vi. Download：

(Note: iBT-GPS supports download via both USB and Bluetooth)

To download log data to computer file (While downloading, “cancel” manu bar will appear on middle of the screen. To cease downloading, click on Cancel.

vii. Erase：

To clear all log data from GPS receiver’s memory

(Note: To perform erase, we suggest to do “Stop Log” first)

viii. Read：

To open previous travel file from user's PC (CSV File)

ix. Save：

To save the logged data in iBT-GPS's memory to user's PC (Save as CSV File/ NMEA File/ KML File). Afterward, you can open the *.csv file by clicking "Read"

x. Draw Map (Map your recorded data on Google Maps)：

Download, then just click "Draw Map"!

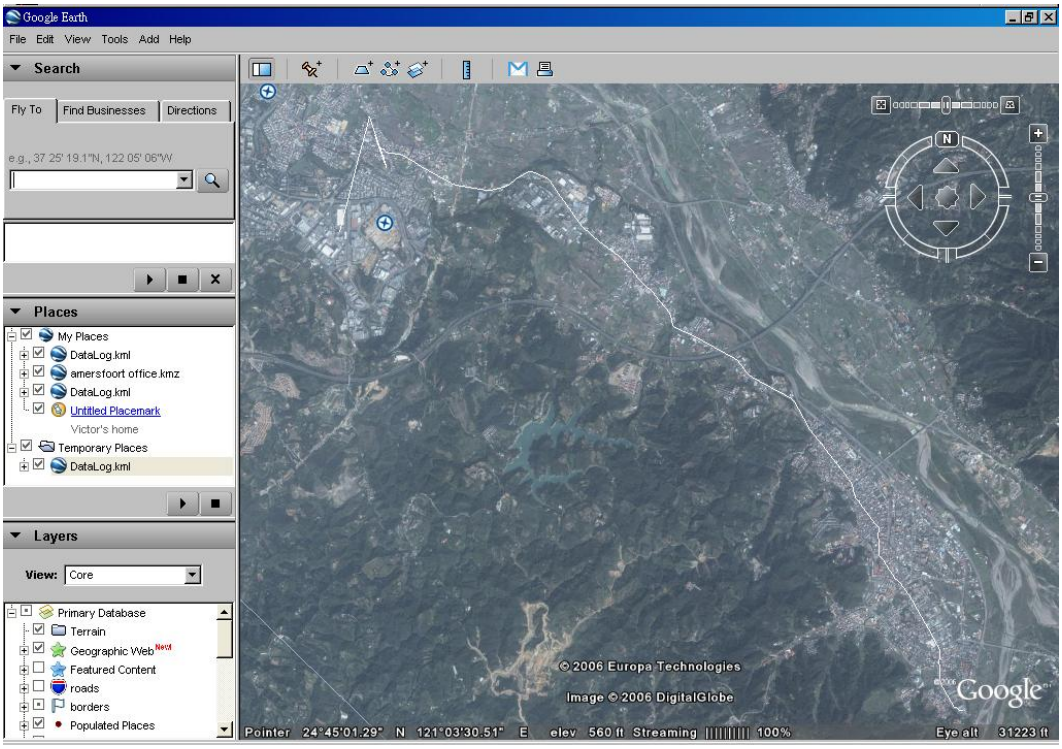
Note:

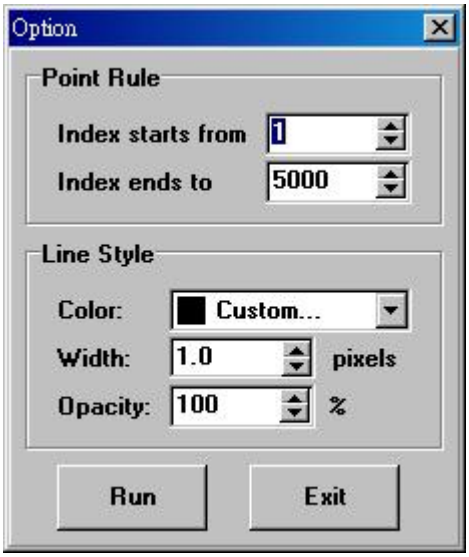
1. Google Earth is needed:

If you computer is not yet installed with Google Earth. Google Earth has free download version, go download it in the internet first. For more information, please visit http://earth .google.com/.

2. Enable Internet connecton:

To display the track points on Google Maps, your PC must have the Internet connection enabled.


Google Earth
File Edit View Tools Add Help
Search
Fly To
Find Businesses
Directions
e.g., 37 25' 19.1"N, 122 05' 06"W
Places
My Places
DataLog.kml
amersfoort office.kmz
DataLog.kml
Untitled Placemark
Victor's home
Temporary Places
DataLog.kml
Layers
View:
Core
Primary Database
Terrain
Geographic Web
Featured Content
roads
borders
Populated Places
© 2006 Europa Technologies
Image © 2006 DigitalGlobe
Google
Pointer 24°45'01.29" N 121°03'30.51" E elev 560 ft Streaming 100%
Eye alt 31223 ft



To show route in Google Earth, there are 2 options for you to choose from:

- Point Rule
- Line Style

Some icons:

	Push to log, show your favorite Points of Interest
	Logged by time interval
	Logged by distance
	Logged by speed
	Mixed logged points

3.2.4 About

Software version and company information...etc.

Appendix

Appendix A. Specifications

General	
Frequency	L1,1575.42MHZ
C/A Code	1.023MHZ
Datum	WGS84
Performance Characteristics	
Position Accuracy	Without aid: 3.0m 2D-RMS
	<3m CEP(50%) without SA(horizontal)
	DGPS (WAAS,EGNOS,MSAS,RTCM):2.5m
Velocity Accuracy	Without aid: 0.1m/s
	DGPS (WAAS,EGNOS,MSAS,RTCM):0.05m/s
Acceleration	Without aid:<4g
	DGPS (WAAS,EGNOS,MSAS,RTCM):<4g
Timing Accuracy	50 ns RMS
Reacquisition Time	<1s
Hot start	1s
Warm start	33s
Cold start	36s
Sensitivity	Acquisition:-144dBm
	Tracking:-158dBm
Update	1Hz

Dynamic	
Altitude	Maximum 18,000m
Velocity	Maximum 515m/s
Acceleration	Maximum 4g
Power	
Input Voltage	Vin : 5.0V±10%
Work Hours	18hrs without Solar panel; **35+hrs** with Solar panel in direct sun
Battery	Built-in rechargeable 750mAH Lithium battery
I/O	
Available Baud Rates	115200 bps
Protocols	NMEA 0183 v3.01
Environment	
Operating Temperature	-10 ~ 60C
Storage Temperature	-20 ~ 70C
Charging	0 ~ 45C
Bluetooth	
Standard	Fully compliant with Bluetooth V1.2
Output Power	0dBm (Typical),ClassII
Range	Up to 15 meters
Bluetooth Profile	Serial Port Profile(SPP)
Frequency	2.4G ~ 2.4835GHz ISM Band

Security	Yes
USB Bridge	
Standard	Fully compliant with USB2.0
Full - speed	12Mbps
Dimension	88.5 x56 x13.5 mm

Data Log
8Mb serial Flash ROM
Up to 50,000 way points.
Log GPS data by time interval/ distance/ speed limit.
User can configure settings by using utility.

Solar Cell Specifications	
Minimum operating voltage, Vop (with 150Ω load)	4.5V
Minimum operating current, Iop (with 150Ω load)	30.0mA
*Open-circuit voltage, Voc	5.3V
*Short-circuit current, Isc	40.0mA

Appendix B. Anti Slip Pad

1) The anti slip pad is made by PU GEL.
2) Without glue or any prior preparation, when you need to move just peel it off and without any track.
3) It is ideal for place on dashboard of car, truck, yacht... To keep all your goods not moving (such as: Cellular phone, glasses, radar sensor, coin, key and valuable goods... Etc.) When driving around curves, over speed bumps and sudden stop. Also suitable for office, home...
4) Avoids use on paper and wet object.
5) Multi-function, non-slipping, non-toxic and reusable. Please use clean water wash up and dry off it.

Appendix G. Certification

FCC Notices

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 interface, and
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC RF Exposure requirements:
This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.
NOTE: THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHOURIZED MODIFICATION TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

NOTE: 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 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.

obtainable from Health Canada's website.

"www.hc-sc.gc.ca/rab"

CE Notices

Is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility (89/336/EEC), Low-voltage Directive (73/23/EEC) and the Amendment Directive (93/68/EEC), the procedures given in European Council Directive 99/5/EC and 89/3360EEC.

The equipment was passed. The test was performed according to the following European standards:

- EN 300 328-2 V.1.2.1 (2001-08)
- EN 301 489-1 V.1.4.1 (2002-04) / EN 301 489-17 V.1.2.1 (2002-04)
- EN 50371: 2002
- EN 60950: 2000

Appendix D. Warranty Information

Thank you for your purchase of GPS product from the company.

The company warrants this product to be free from defects in materials and workmanship for one year from the date of purchase. The warranty for accessories is six months. The stamp of distributor or a copy of the original sales receipt is required as the proof of purchase for warranty repairs. The company will, as its sole option, repair or replace any components, which fail in normal use. Such repair or replacement will be made at no charge to the customer for parts or labor. The customer is, however, responsible for any transportation costs.

This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration of repairs. The company assumes no responsibility for special, incidental punitive or consequential damages, or loss of use.