Solar Bluetooth GPS Receiver

HS-BS01

User's Manual

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Caution

Read before you start to use:

- Global position system (GPS) is obtained by American Ministry of National Defense, and they got the full responsibility about the preciseness and the maintenance. Any changes may cause the capacity and preciseness of GPS differed.
- If you use this device inside of buildings, tunnels, or any huge objects beside you, the GPS signals might be cut-off or disturbed. Please do not consider that the receiver is malfunction.
- The receiver operating temperature is located between -10~70.For safety and lifetime of Li-ion battery usage, do not place this device over two hours with overheated environment.

0 Quick Start

0.1 Inside the Package

Thank for your purchasing on our GPS product, and enjoy while using Please open the package, and check if parts missed.

A. Basic package

1. Solar Bluetooth GPS Receiver(HS-BS01) x 1
2. High capacity rechargeable lithium-ion battery x 1
3. Manual CD-Rom x 1

B. Optional package

In order to support various computers and handheld devices, you may need some optional accessories inside the package also:

1. Car charger x1
2. Travel charger(AC adaptor) x1

0.2 Connect to your PC/PDA

A. Push the power button for 2 seconds, power on the Bluetooth GPS receiver .

B. Put the Bluetooth GPS receiver at proper place (open sky) for good GPS signal reception.

C. Turn on the power of your navigation platform like PC/PDA/ SmartPhone etc.

D. Search for Bluetooth device by your Bluetooth manager on your Host Platform (laptop/PDA/Smartphone). Normally Pincode is not necessary. But some Bluetooth embedded system force to enter pincode(password), please fill [0000] in such case.

E. Connect Solar Bluetooth GPS Receiver and then make sure baud rate set at 9600 bps (standard) in your application program.

F. In firstly Use of this Solar Bluetooth GPS Receiver ,we strongly recommend you to bring Bluetooth GPS receiver **outdoor or open sky at least 15~20 minutes for sure 3D position fixed and constellation almanac updated.**

1. Introduction

Solar Bluetooth GPS Receiver is a total solution of GPS receiver with state-of art SiRF STAR III high sensitivity technology. High capacity rechargeable lithium-ion battery and solar charger circuit build-in, GPS antenna, Blue tooth transmit/receive system are included. It is designed on the most advantage GPS kernel(**SiRF starIII**), got the full-function, industry-level locating capacity and low prices.

You can use Solar Bluetooth GPS Receiver as vehicles navigator, security system, geographic measurement, investigations or agriculture purpose. Solar Bluetooth GPS Receiver operation requirement is a proper power supply and the open sky-view. Solar Bluetooth GPS Receiver can communicate with other electronic devices by Blue tooth interface. Built-In Flash Memory can save satellite information and do almanac refresh periodically .This will shorten Time To First Fix (TTFF) effectively.

Patent protected Solar Cell design can extend the device usage time up to 15 hrs.. Lithium-ion battery can be re-charged reasonably under nature or artificial light enviroment no matter HS-BS01 receiver is turned on or off. Most of operating usage, you are free of charger!

Solar Bluetooth GPS Receiver is designed as a high position accuracy. It will update the satellite position every second. The Solar Bluetooth GPS Receiver auto-locating feature is capable of automatically determining a navigation solution without intervention. However, acquisition performance could be interfered and do cold start if the receiver were initialized with occurrence of the following events:

1) First in use

2)The GPS receiver is not in use for more than 3 months or transportation over istances further than 500 kilometers.

3) Failure of the internal memory battery without system standby power.

2. Features and Functions

1) Superior Urban Canyon Performance with 20 channel all-in-view tracking sensitivity –159dBm
2) **Total solution in power management.**
   Unique Solar Cell re-charging design (patent protected) can extend your GPS operation up to **15** hrs .
3) **Green solution in exactly wireless GPS receiver application**
   Always charge your lithium-ion battery under nature or artificial light.
4) **Considerate LED/switch button design**
   easy look, easy touch !one-touch button design keep your hand free
5) **Act as WARM/HOT start with built-in battery**
   back-up power design will keep flash memory and RTC clocking lways. Shorten TTFF effectively

6) **Automatically almanac/ ephemeris update in flash memory**
programmable flash utility to do refresh on satellite orbit data information.
7) **Smart power management solution.**
GPS Device will automatically shutdown in case of bluetooth connecting signal failure detected and time over default setting value.
8) Compatible with Bluetooth Serial Port Profile (SPP) completely.
9) Easy to combine with vehicle, voyage navigation, vehicle management, AVL, personal navigation, tracking system and map applications.

3. Technical Specification

3.1. General

Core Module: firmware by SiRF starIII ,chipset by SiRF starIII Solution
Satellite channel number: all-in-view 20 parallel satellites;
GPS frequency: 1575.42 MHz
Receiver: L1, C/A code.
Antenna type : built-in ceramic patch antenna
External connector: standard MMCX

3.2. Acquisition Time

Refresh: 0.1 sec
Cold start: <42 secs(average, **normally occurred in first use of GPS receiver life**)
Warm start <38 secs(average)
Hot start: <1 secs(average)
Position information update period: 1 sec
Tracking sensitivity:-159dBm

3.3. Precision/ Accuracy

Position accuracy: <10m(2D RMS) or <5m(WAAS enable)
Speed: 0.1m/sec, typical
Time: 1 msec(satellite time)

3.4. Dynamic condition

Altitude: 18,000m(60,000 feet)
Velocity: 515m/sec(700knod)
Acceleration: 4G(G for gravity unit)
Jerk: 20m/sec

3.5. Power management

A)Applied External Voltage : 5V DC +/- 5%(via charge cable)

B)Power system:

Main battery: Rechargeable Lithium-ion 3.7V battery, as the main power.

Backup battery:on board 3V backup battery for RTC(Real Time Clock) operating in idle .

Solar Panel: auxiliary power provider

C)Power consumption: 85mA(typical)

D)Battery endurance: Charged with 4 hours(firstly in use), more than 12 hours of working time; with solar charger enabled, up to 15 hours.

3.6. Protocol &Interface

A) Output format

NMEA 0183,

Baud rate: 9600 bps(standard)

Data bit: 8

Parity: None

Stop bit: 1

B)Output terminal :Mini -USB

C)NMEA code support:

GPGGA(1 sec interval)

GPGSA(1 sec interval)

GPGSV(5 sec interval)

GPRMC(1 sec interval)

GPVTG(1 sec interval)

D) Compatible with Blue tooth devices with Serial Port Profile (SPP)

Blue tooth version 1.1 compliant

Blue tooth **Class 2** operation (up to 10 meter range)

Frequency : 2.400 to 2.480 GHz

Input Sensitivity: -83dBm

3.7. Dimension/Environment Specification:

Dimension size: 103mm× 55 mm× 22 mm

Weight: < 80g(battery excluded)

Operation temperature: -10 to + 70

Storage temperature: -40 to + 85

Operation humidity: 5%R.H. to 95%R.H. no compressed

4. Start to Use

Step 1: Charge the battery in first use

Please fully-charge the battery with at least 4 hours before you use the GPS receiver firstly.

Connect charge cable to the power plug at the bottom and start charging

Power Indicator:

(1) Power on/ Power off:

- **Green** LED blinks 3 pulses

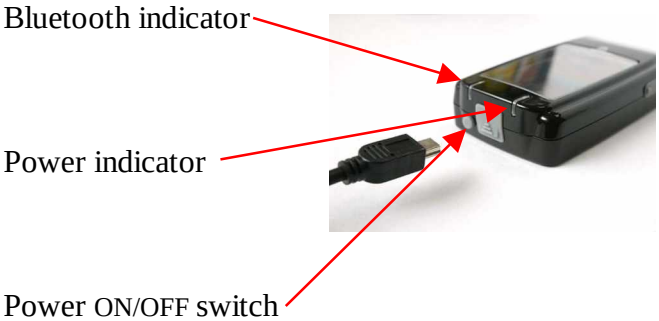
(2) Power low:

- **Green** LED blinks 3 pulses, then automatically off

(2) Charging:

- **Green** LED blinks 1 pulse/sec

Step 2: Power on, connect with Bluetooth



Push the power switch 1~2 seconds to Power on

Bluetooth indicator :

(1) Bluetooth host searching:

- **Blue LED** blinks 3 pulse/second

(2) Bluetooth host connected:

- **Blue LED** blinks 1 pulse/2 seconds

Note: Some PDA needs to restart the Bluetooth function if you need to re-connect.

Step 3: GPS function test

In firstly Use of this Receiver,we strongly recommend to bring your Solar Bluetooth GPS Receiver outdoor and open sky at least 15~20 minutes for almanac update.

Power on the Solar Bluetooth GPS Receiver

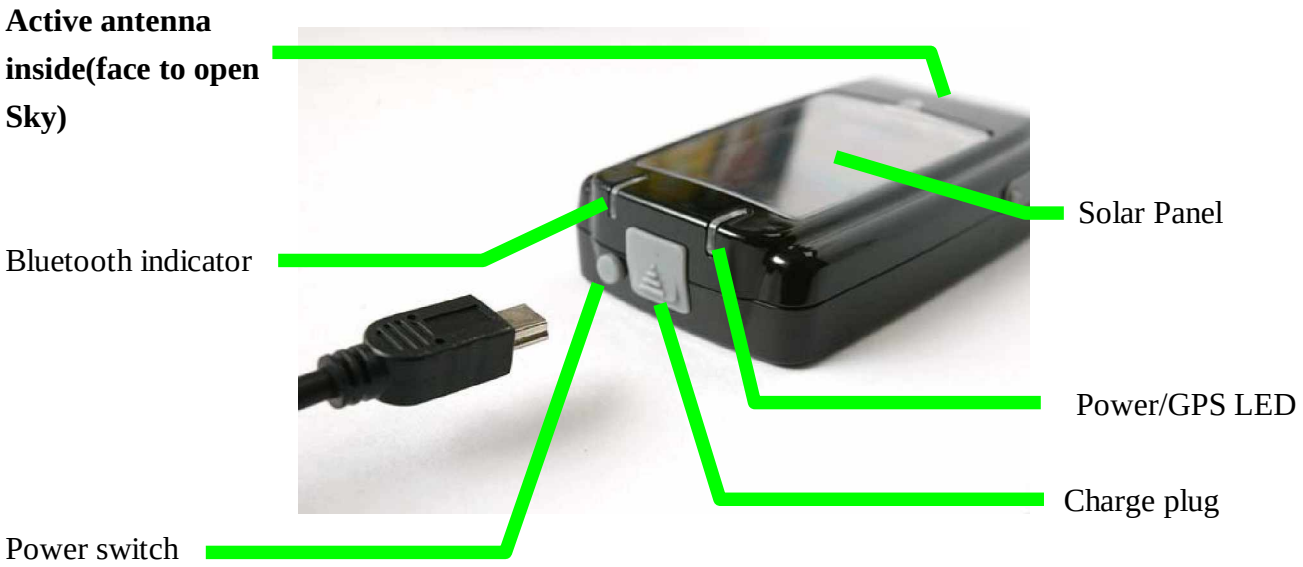
GPS Acquisition Fix Indicator

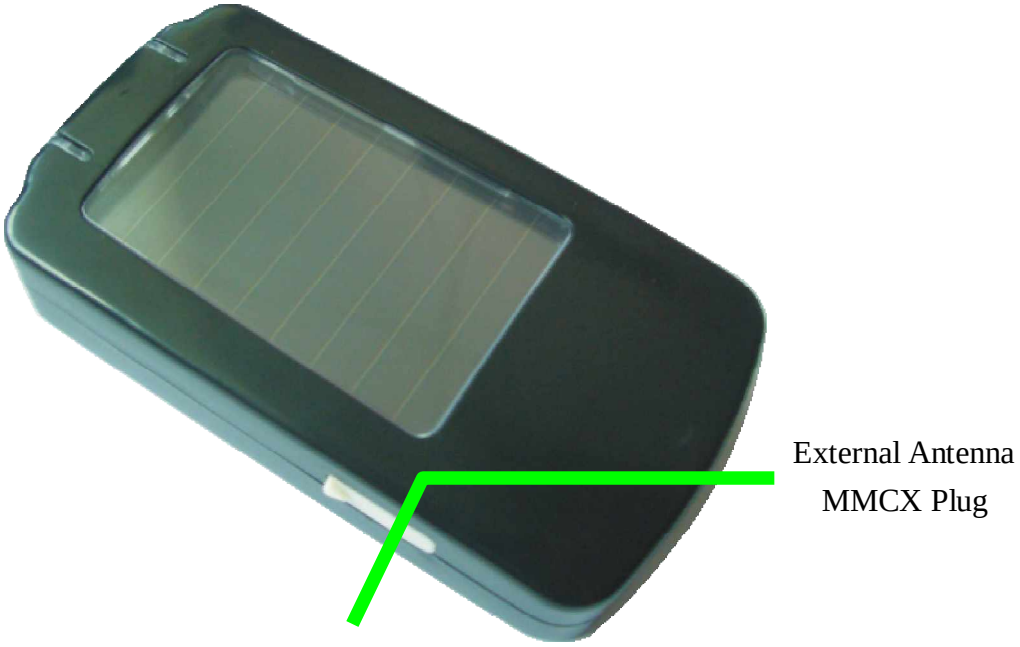
- **Red LED** blinks (1 pulse/sec): Inquiring
- **Red LED** blinks (1 pulse/2 secs): Position fixed

5. Software/Hardware Usage

5.1. Hardware description

1). Solar Bluetooth GPS Receiver device function description is shown as below:





2). LED display description

Symbol	Color	Behavior	Description
Blue tooth Indicator	Blue	Blinking in 1 pulse/sec	Searching for Bluetooth host
		Blinking in 1 pulse/2 secs	Connected with host & communicating Bluetooth Indicator
Power/GPS Acquisition LED (Red/Green combined)	Green	Blinking 3 pulses	Battery low/ Power on/ Power off
	Green	Blinking 1 pulse/sec	Charging
	Green	Light up	Charge completed(LED off when cable away)
	Red	Blinking in 1 pulse/sec	Positioning
	Red	Blinking in 1 pulse/2 secs	Position fixed

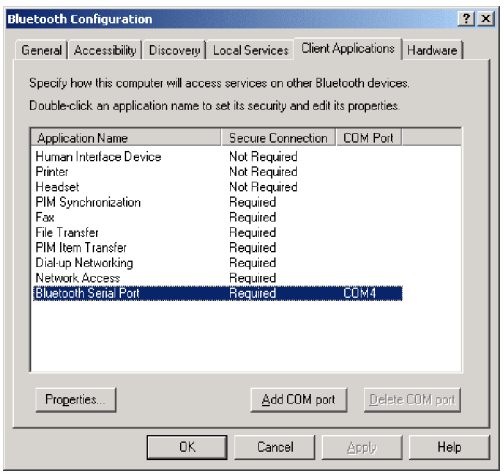
3).Power ON/OFF

Push button 1~2 seconds

5.2. Configuration setup with PC connection

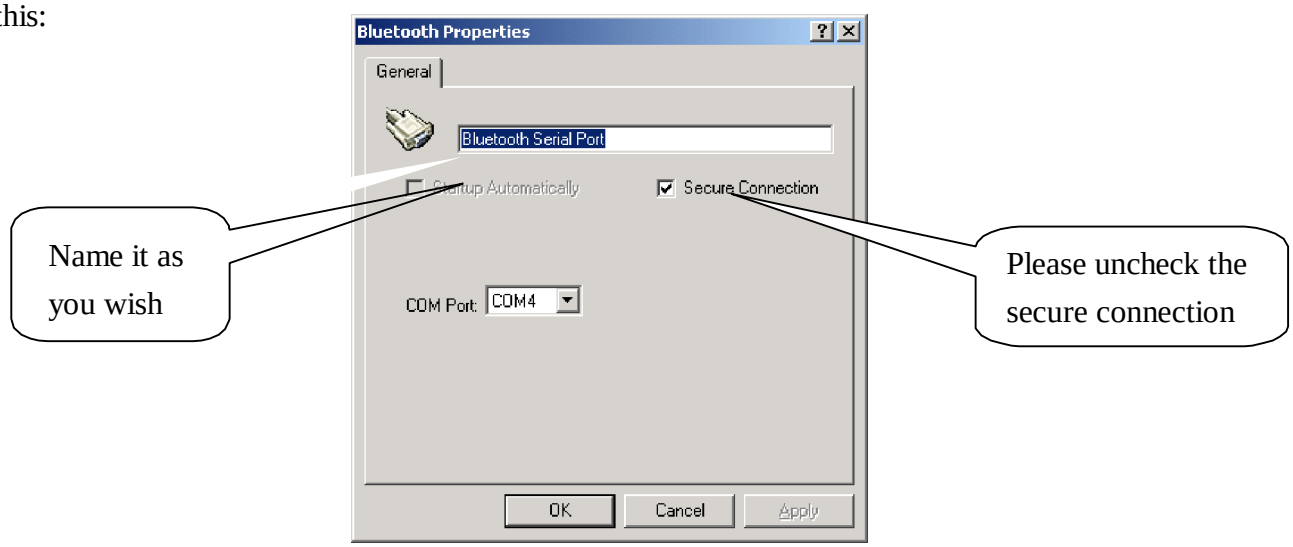
Here is a sample to show you how to connect Solar Bluetooth GPS Receiver with your PC, software install and basic function test.

1) First, select a PC with Bluetooth interface. Or you can purchase Bluetooth adapter for your PC. Please contact with your PC's sales about this.
2) Check your Bluetooth manager if there exist any configuration of Bluetooth Serial Port Profile like this:



Note: this sample is for your reference only. The screen may various between different models of Bluetooth manager software.

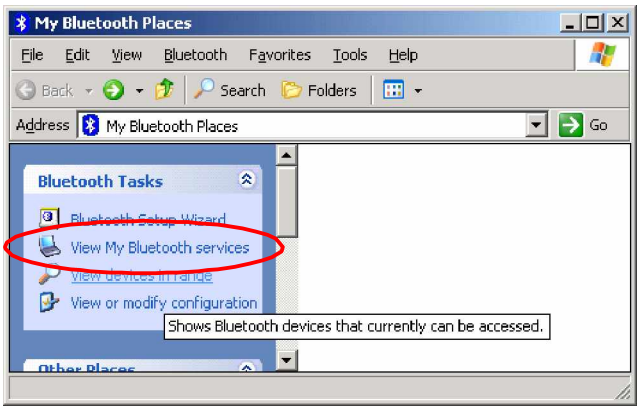
3) If not found, please create a Bluetooth serial port by yourself. The configuration should be like this:



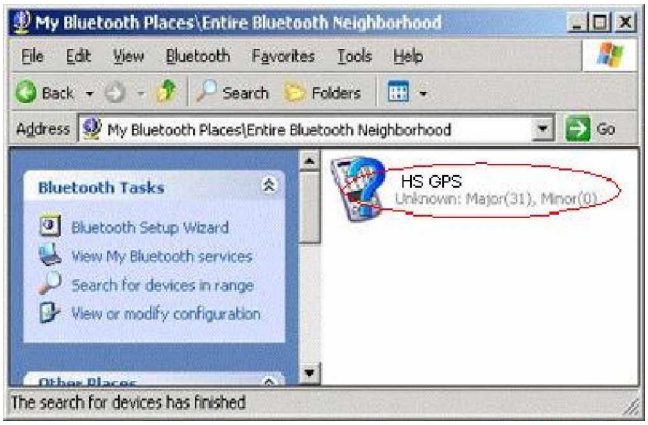
4) If there is already one, please check the content. Some Bluetooth device will enable the secure connection. Please refer to the configuration as above to uncheck it.

5) Power on your Solar Bluetooth GPS Receiver . If the battery is ready, you should see 2 LED light up: the blue LED blink 1 time/sec means Bluetooth is activated and waiting for connection. Another static red LED shows the GPS module is started and is inquiring position information.

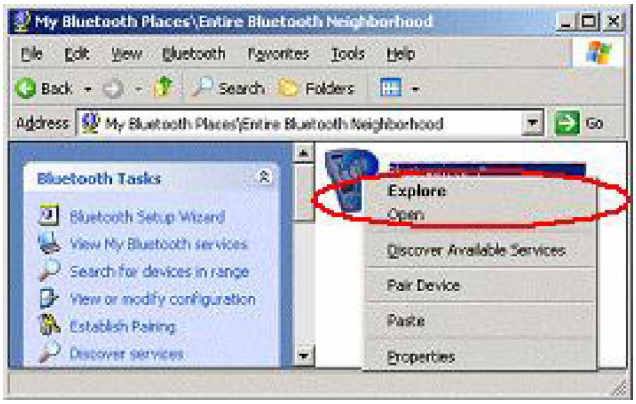
6) Open your Bluetooth places; you should see nothing while using firstly.



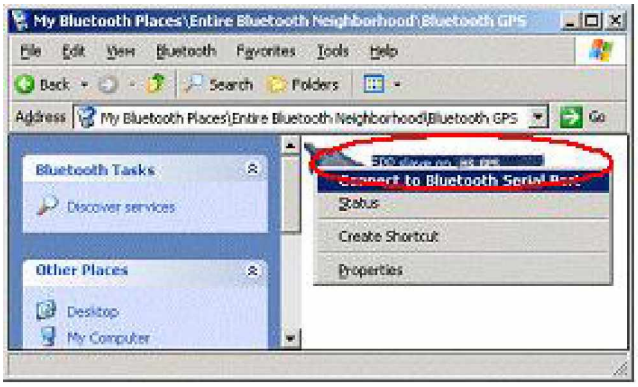
7) Click the [View devices in range] and you should find a [HS GPS] show as below:



8) Right click on the icon, select the [Discover Available Services]:



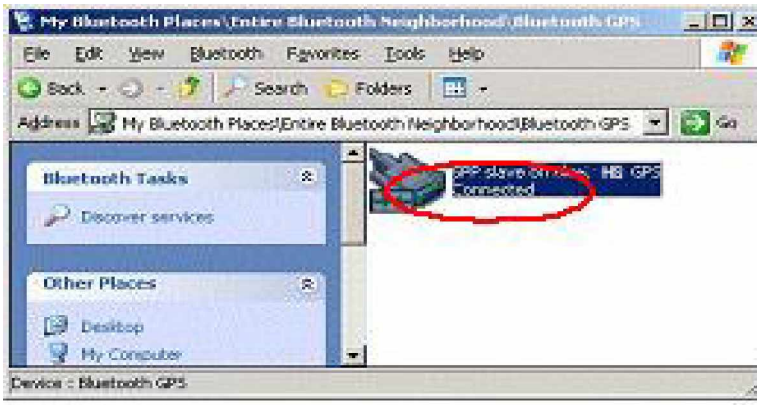
9) You should find the service SPP slave, right click and select [Connect to Bluetooth Serial Port]:



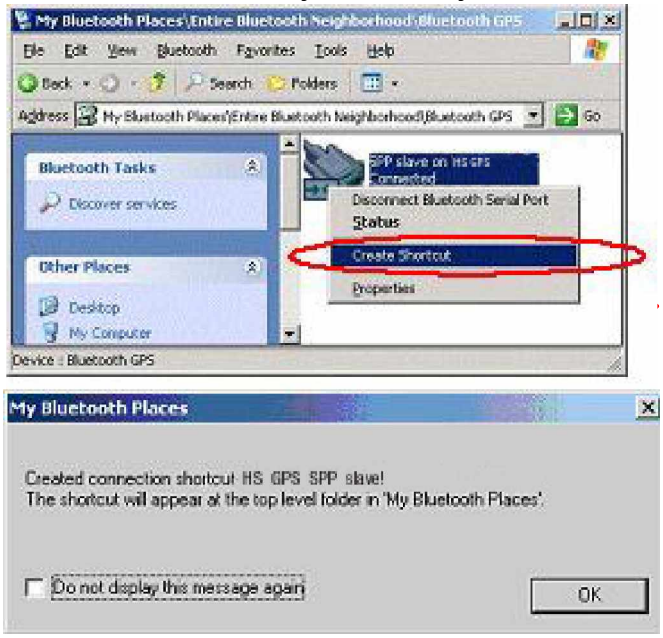
10) The follow message will show:

11) And the connection successful message:

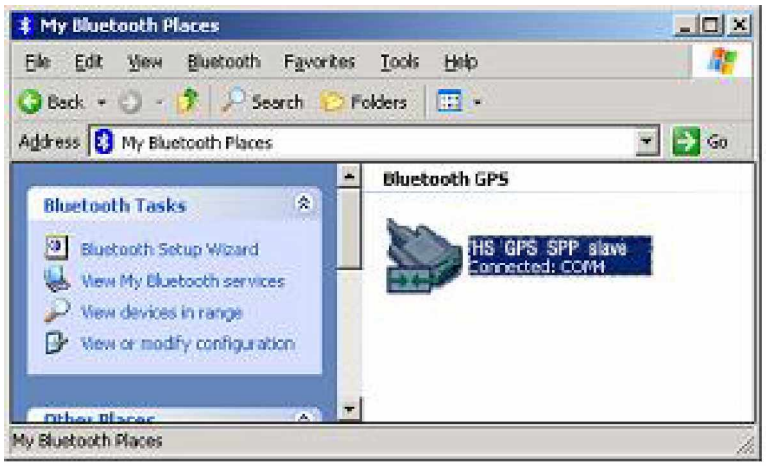
12) Back to the Bluetooth service view, you should see the icon changed to [Connected]:



13) If you wish to use the connection more easily next time, you can create a shortcut for this:



14) You will see the shortcut you just created:

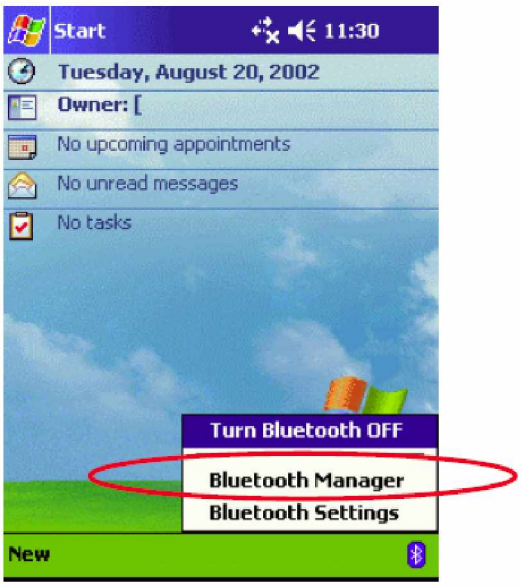


5.3. Configuration setup with PDA connection

Following will show how to configure the Bluetooth connection on PDA. It may be different from other PDA models.

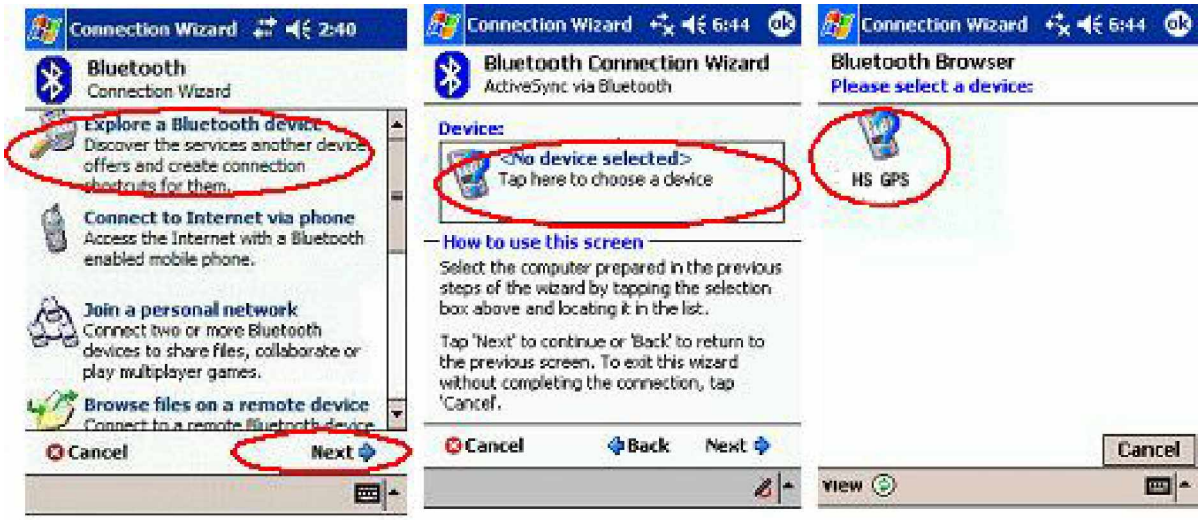
1) Power on your PDA and the Bluetooth host.
2) Power on the Solar Bluetooth GPS Receiver. If the battery is ready, you should see 2 LEDs indication: the blue for Bluetooth blinks 1 time/sec. It means the Solar Bluetooth GPS Receiver Bluetooth module is activated and waiting for connection. The red LED for GPS, means the GPS module is activated and is inquiring GPS signal.

3) See the screen, click Bluetooth mark at bottom, and [Bluetooth Manager] as below:

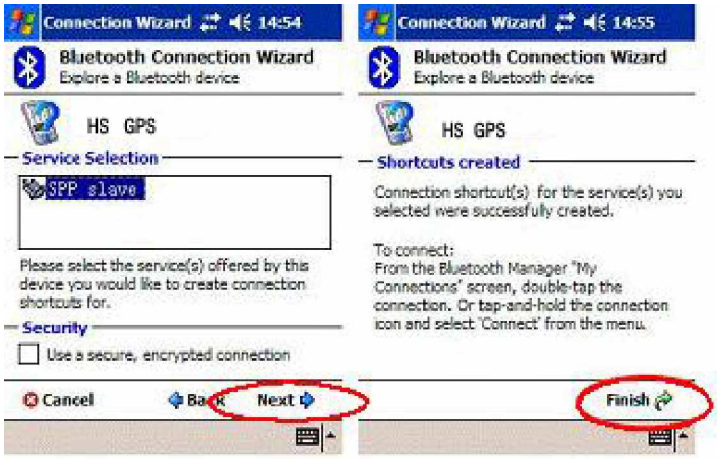


4) If this is your first time to use Bluetooth GPS, click the Bluetooth mark at the bottom as below:

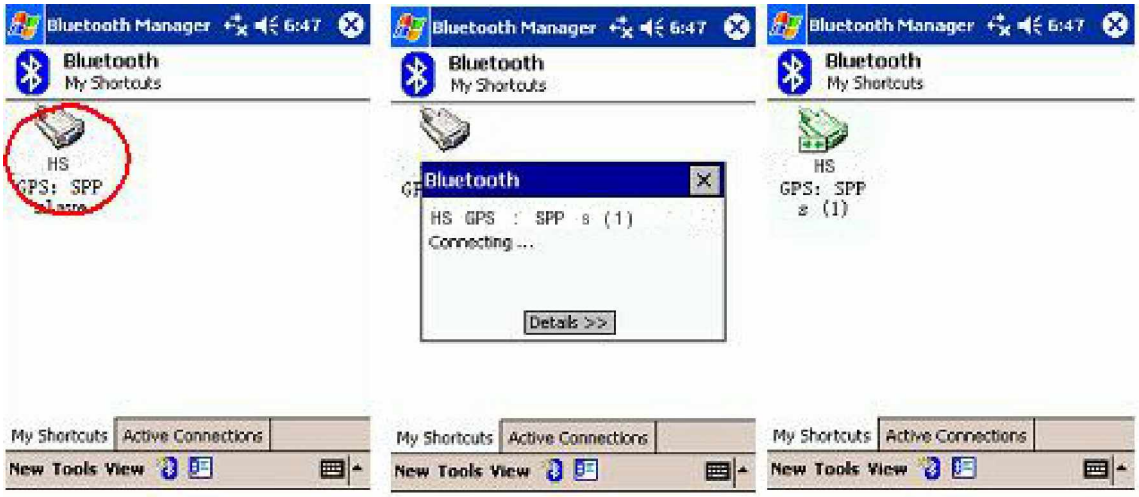
5)Then the Bluetooth connection wizard show up, select [Explore a Bluetooth device] and click [Next]. In the next page, click the box to search Bluetooth devices. Your PDA will find the Bluetooth GPS and show it in the window. Click the icon to search for service.



6) Back to the [Explore a Bluetooth device] as below. Click [Next] to list service on Bluetooth GPS. [SPP slave] should appear in the service list box, click it and click [Next] to finish shortcut creation. Don't forget to uncheck the secure connection box.



7) Back to the main screen of [Bluetooth manager] as below. Please double-click the icon to connect Solar Bluetooth GPS Receiver . If connection successful, a green arrow will show as below at right.



8) You may start to use any map/navigation software and use the GPS function now.

6. Warranty

The Bluetooth GPS receiver is warranty for free from defect in material and function for 1 year from the date of purchase. Any failure of this product within the period under normal conditions will be replaced at no charge to the customers.

This warranty does not cover failures due to abuse, misuse, accident, or unauthorized alteration or repairs, inappropriate disassemble.

- Since the Solar Bluetooth GPS Receiver got high performance rechargeable lithium-ion battery, we are strongly recommend you not to place it under the sunshine for a long time.
- The warranty will become invalid if any mis-operation found.

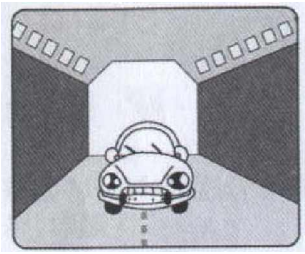
7. Trouble Shooting

7.1 Problem of Setup

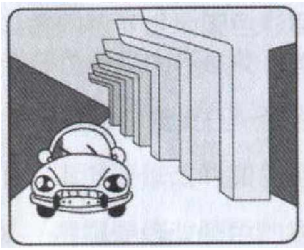
Error/Problem	Cause	Trouble shooting
Can not find the GPS device through bluetooth interface	Install not correct or battery low	Check if Solar Bluetooth GPS Receiver is installed properly, and confirm the battery level is suitable(green LED blinks or none LED)
Unable the connect through Bluetooth	Configuration incorrect	Please refer section 5.2 to re-install. Or refer to your PDA's user manual for configuration.
Fail to open COM Port	Bluetooth manager is not configured properly, or the COM port is adopted by another software	Please check your Bluetooth manager settings, close the software may use COM ports and try again. Or check if there is any password protection.
No NMEA code	(1) Some PC/PDA will enter the	(1) Disable the power saving mode
Error/Problem	Cause	Trouble shooting
(GPS data flow)	power saving mode if you stop input for a few minutes. Bluetooth interface will be reset in such case. **(2) Wrong baud rate/com port setting** **(3) Bluetooth interrupted**	try to connect GPS receiver again. **(2) Correct with right baud rate &com port** **(3) Re-connect bluetooth device**
Unstable GPS signal	**degraded by anti-sunlight film with receiver placed inside car some cases described in sec7.2**	**Plug External antenna and place on car roof**
Poor GPS signal	**Solar Storm effect** **(2) Atmosphere turbulences** **(3) SA ON by USA military**	**NA**

7.2 Concerning of Poor GPS Signal

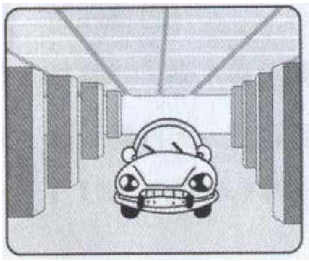
It is possible unable to receive GPS signal or signal low in these places:



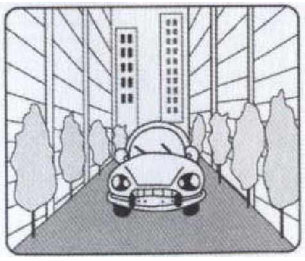
Inside the tunnel, GPS signal is blocked.



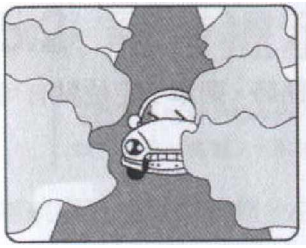
Covers above, GPS signal is blocked.



Inside buildings, GPS signal is blocked.



Beside some buildings, GPS signal is disturbed.



Inside forests, or too many covers, GPS signal is disturbed.

- If you use Solar Bluetooth GPS Receiver inside the car, some anti-sunlight windscreen film will makes the GPS signal degrade or signal lost .
- GPS satellite is owned by America military, sometimes they will tune-down the accuracy by some reason. In such cases, the GPS position may not fixed exactly.

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