RoyalTek

BT GPS mini (RBT-2100) User Manual

FCC Compliance and Advisory 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.

The equipment has been certified to comply with the limits for a Class B computing 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 or 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 switching the equipment off and on. The user can try to correct the interference by the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or and experience radio/TV technician for help.

Changes or modification not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

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1. Product Introduction

1.1. Overview

BT GPS mini (RBT-2100)-A compact combo-device with Bluetooth and GPS technology

1.1.1. Wireless GPS receiver:

BT GPS mini, a multi-wireless GPS consumer product, is the smallest and most cost-effective Bluetooth GPS receiver in the world. It has a built-in replaceable and rechargeable Lithium-ion battery just using the same battery of Nokia 6100 cell phone. With the dimension of 70(L) x 41(W) x 23(H) mm and weight only 60g, making it an ideal solution to carry everywhere.

BT GPS mini is both precise and durable. Its 12-channel receiver allows for continuous tracking of all visible satellites. By wearing this Bluetooth GPS around your neck and having your bluetooth integrated with any kind of mobile device, such as PDA or Notebook, it will provide your exact location almost anywhere.

1.2. Main Features

- Twelve parallel channels
- Support 2D / 3D information
- Hot/ Warm/ Cold start time: 8/ 38/ 45 seconds
- RF MCX connector for external GPS antenna
- Support standard NMEA-0183 at 57600 bps baud rate
- Compatible with Bluetoth devices with SPP (Serial Port Profile)
- Three LEDs showing Bluetooth, GPS and battery status
- Rechargeable and replaceable Lithium-ion battery, also compatible with Nokia 6100 cell
- Power switch

1.3. Product Notification

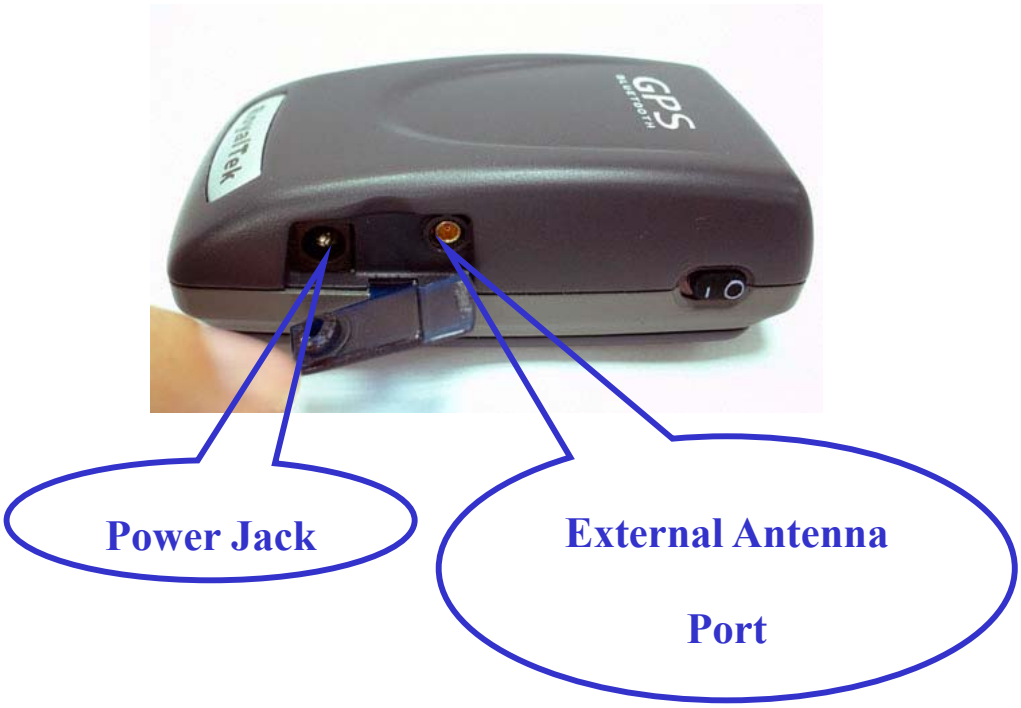
- Operating temperature range -20 ºC to +60 ºC
- Charger operating temperature range 0 ºC to +40 ºC
- Battery Storage temperature range -20 ºC to +50 ºC
- Lithium-ion battery lasts more than 8 hours in continuous operation mode.
- Humidity range up to 95% no condensing

1.4. Application

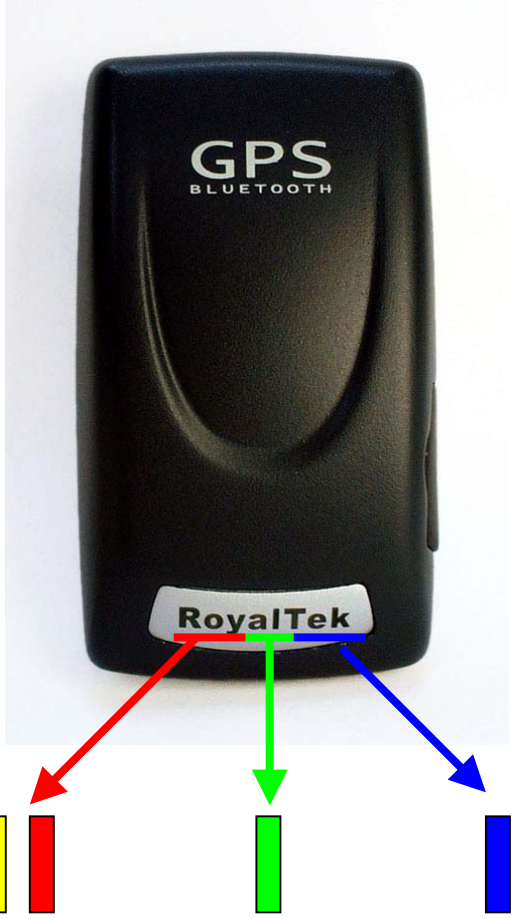
- Navigation
- Automotive Vehicle Tracking
- Personal Positioning
- Geographic Surveying
- Sporting and Recreation
- Consumer wireless GPS
- Cellular Phone

2. Quick Start

2.1. Control Switch, Power Jack & Antenna Port



2.2. LED Display



Battery Status **GPS Status** **Bluetooth Status**

- Blinking Blue light indicates Bluetooth in connection

- Green light grows indicates power on
- Blinking Green light indicates GPS position fixed

- Yellow light indicates charging

- Blinking red light indicates low power

2.3. Hardware Features

2.3.1. Power Switch

Power ON / Power OFF

2.3.2. Power Jack

The power jack allows you to connect to either a DC (included) or AC power charger to recharge the internal battery.

2.3.3. External Antenna Port

If you have an external antenna with a male MCX connector (available separately), you can use it instead of the **BT GPS mini** receiver's internal antenna. Simply plug your external antenna into the antenna port.

2.3.4. Bluetooth Status LED (Blue)

Flashing - Bluetooth is on and ready to transmit.

2.3.5. GPS Status LED (Green)

Flashing - Position is fixed.

Steady light – Device is on but position is not fixed.

2.3.6. Battery Status LED (Red/Yellow)

None - Battery has adequate power supply.

Red - Power is low. Charging immediately is required.

Yellow - Connected to power charger, charging.

LED off - Battery is fully charged.

2.4. Getting Started

2.4.1. STEP 1: Charge the Battery

1. Before you use the Bluetooth GPS Receiver, the battery must be charged. Connect the power charger to the power jack, and then plug into an electrical outlet. As the device is charging, the Battery Status LED will show a yellow light.
2. When the battery is fully charged, the Battery Status LED will turn off. Unplug the device and remove the charger.

2.4.2. STEP 2: Turn on Receiver and Wait for GPS Fix

1. The GPS Status LED will initially show a steady green light to show that the position has not been fixed yet.
2. After the position is fixed, the GPS Status LED will be showing flashing green. Now you are ready to connect to your Bluetooth-enabled mobile device and use your GPS application.

2.4.3. STEP 3: Connect to Bluetooth-Enabled Devices

1. From your Bluetooth-enabled mobile device, perform a Bluetooth device discovery. Refer to the user documentation for your Bluetooth-enabled device for instructions.
2. After connection is created between Bluetooth-enabled device and Bluetooth GPS, the LED will show flashing blue light.

Note: If it is needed to type in Pin code during configuration, please Key in " 0000".

2.4.4. STEP 4: Use GPS Application

1. Load your GPS mapping or routing software, along with the corresponding maps of the areas that you are occupying or plan to travel to.
2. Start the application. Make sure the application is set for the COM port that your Bluetooth-enabled mobile device will use for serial communication. Now you should be ready to use your GPS application as directed by the user documentation that came with the software. More configurations may be necessary.
3. Refer to the following software application user manual to set up the parameters of the device via Bluetooth radio.

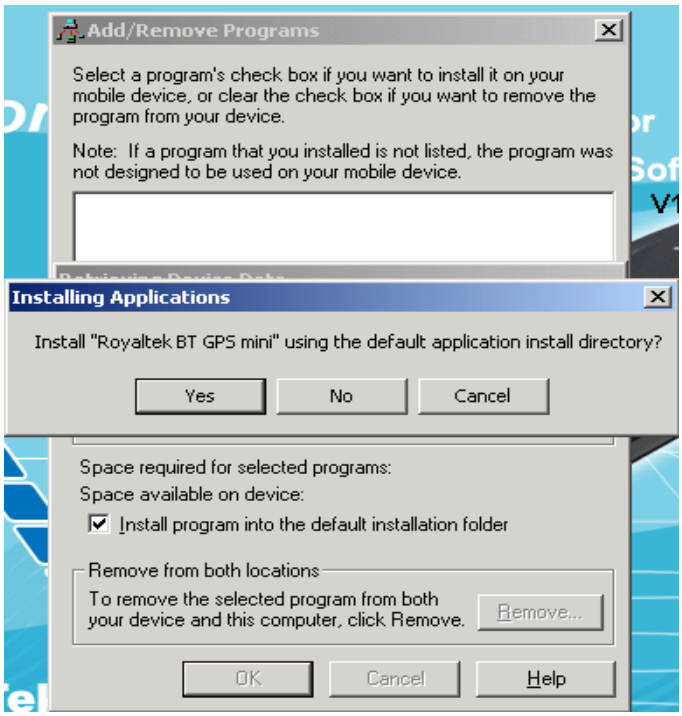
3. Installation

The Main Menu of Installation CD shows as above.

- Click the **Software for Windows 2000/XP; Software for Windows 98SE/ME** to install the PC software application.
- Click the **Software for Pocket PC 2002; Software for Pocket PC 2003** to install the PDA software application.
- Click the **Software for Palm OS** to install Palm software application.
- Click the **User Manual** to open the user manual of Bluetooth GPS.
- Click the **View Our Website** to link our http://www.RoyalTek.com, please make sure your PC connects to Internet first.
- Click the **Browse CD Contents** to open the explorer to browse the files within the CD.

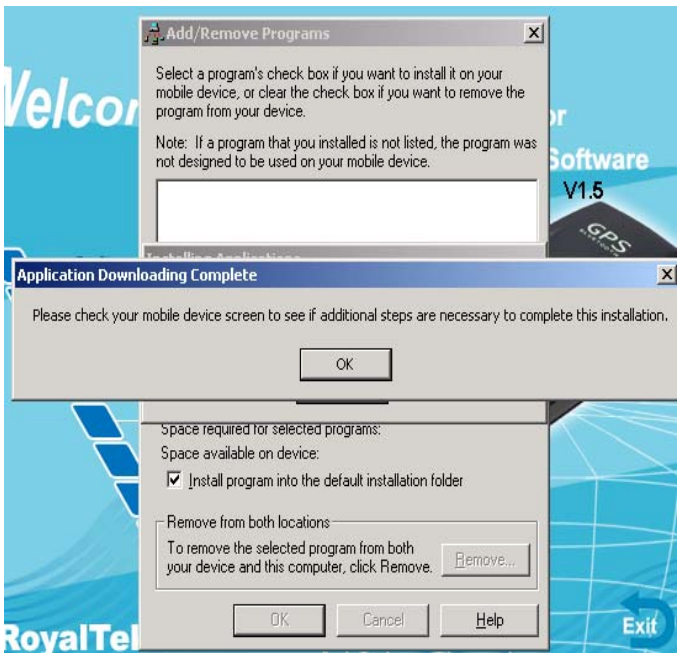
3.1. Install PDA Software Application

Before you click the **"Software for Pocket PC 2002; Software for Pocket PC 2003"** to install the PDA software application from CD, you have to synchronize the PDA and your system. Then the following window will show in your system as below:

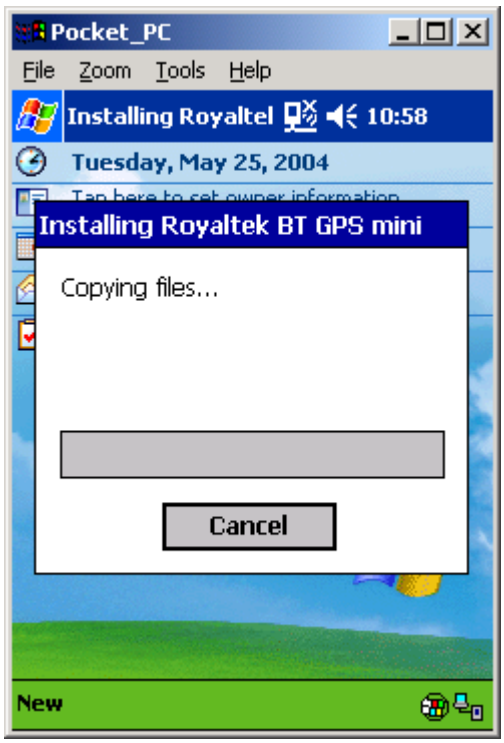


Click "Yes>" to continue. Or click "No" to select the other destination to install, or "Cancel" to give up installation.

Click " OK" to complete the installation.



You can also see the “Installing RoyakTek **BT GPS mini** ” message box.

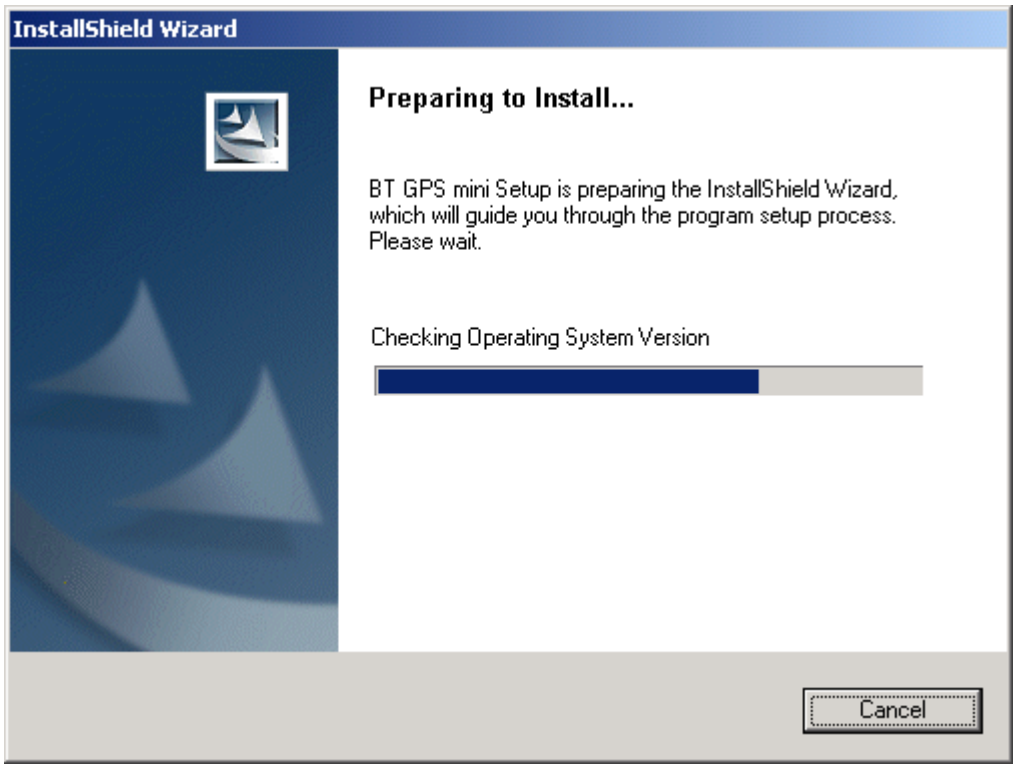


Note: About to install the software application to your PDA, please refer to your user manual of your PDA manufacture.

3.2. Install PC Software Application

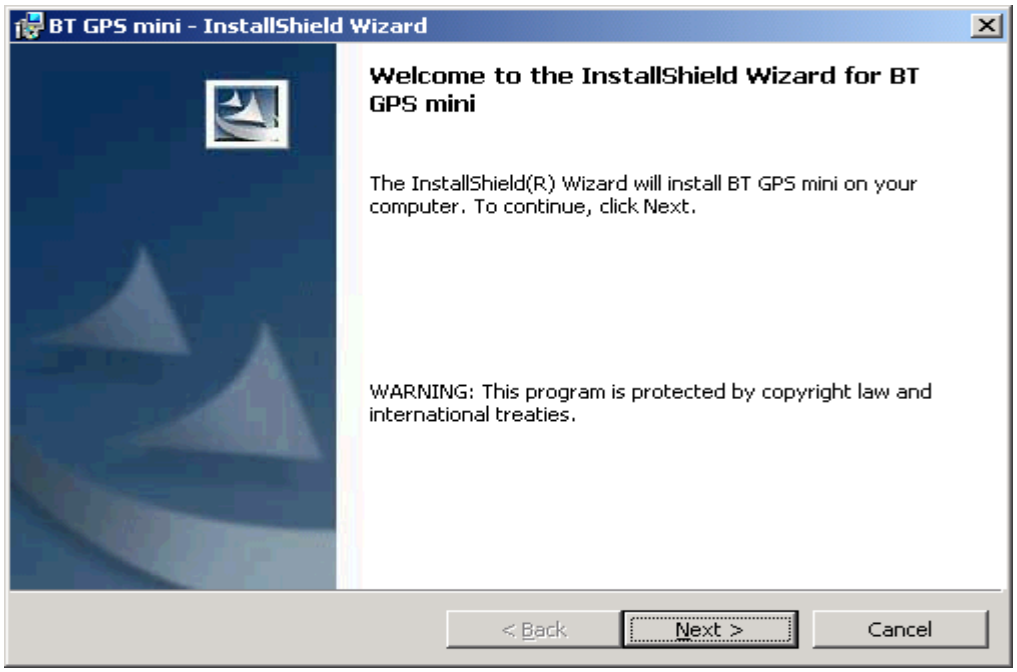
Install the pc software application from CD.

When screen shows the installation window as follows:



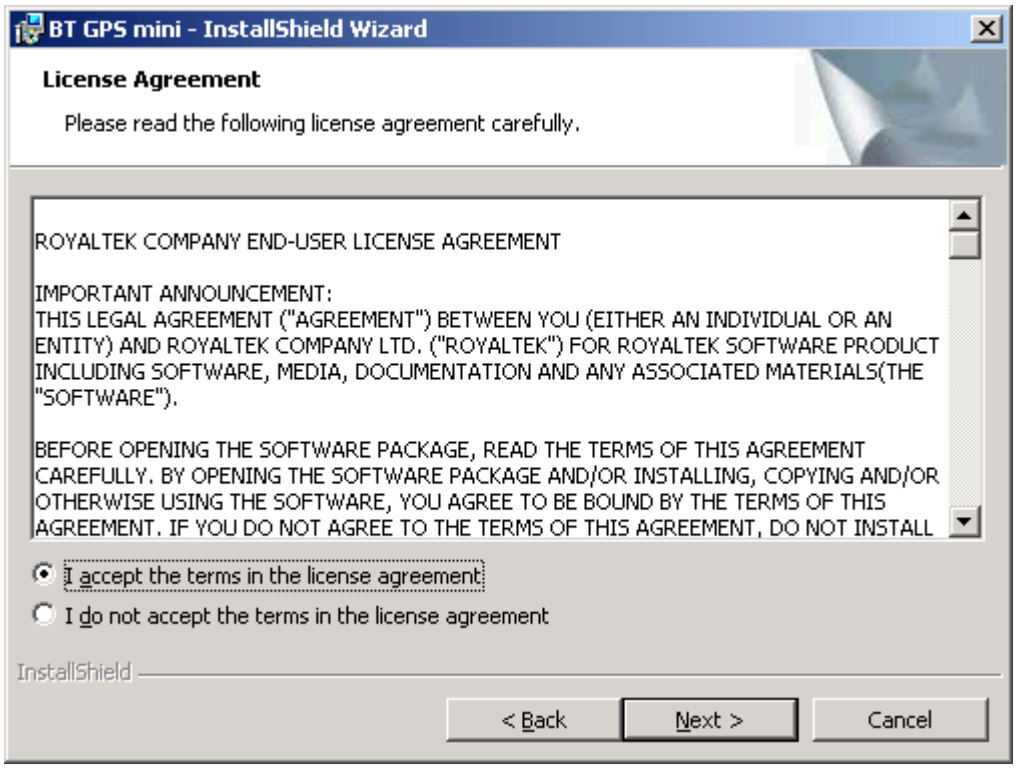
Click “Cancel” to give up installation.

Then you will get into the Bluetooth GPS welcome page

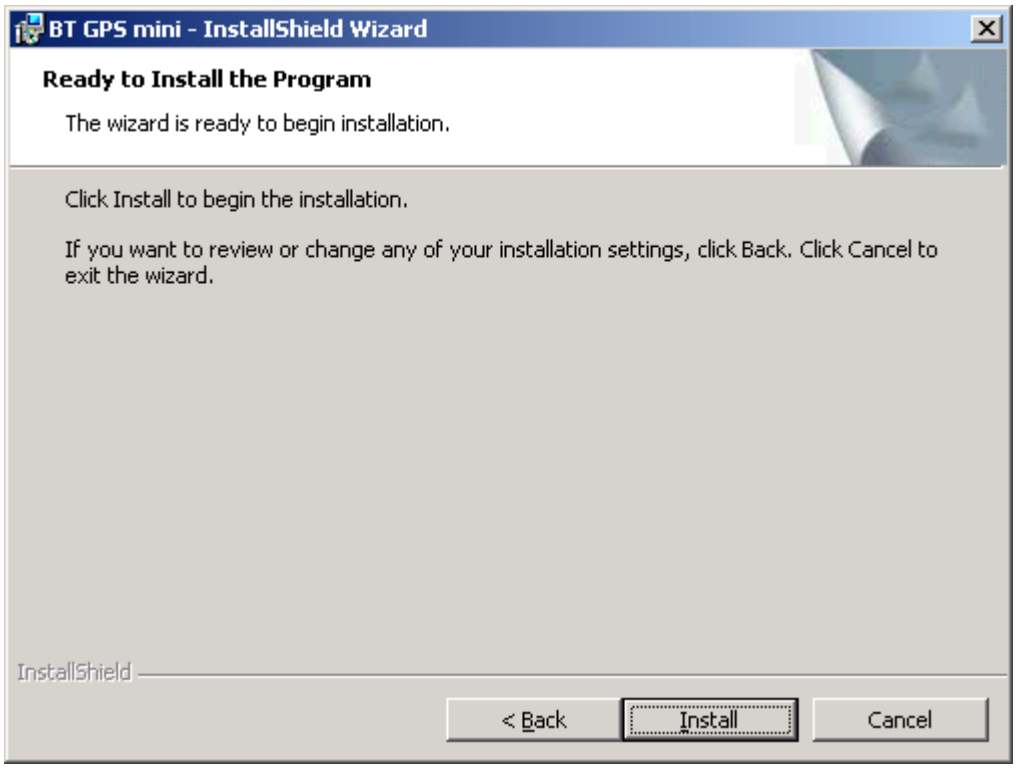


Click “Next> to next page” , or click”<Back” to back last stage or “Cancel” to give up installation.

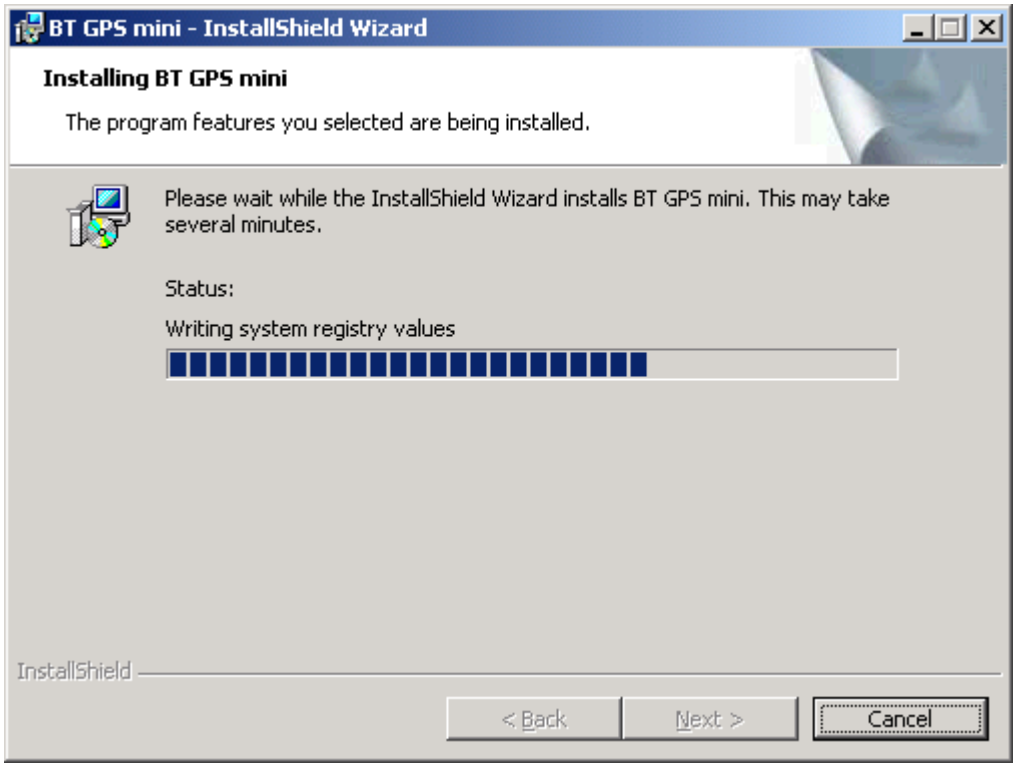
To the License Agreement page:



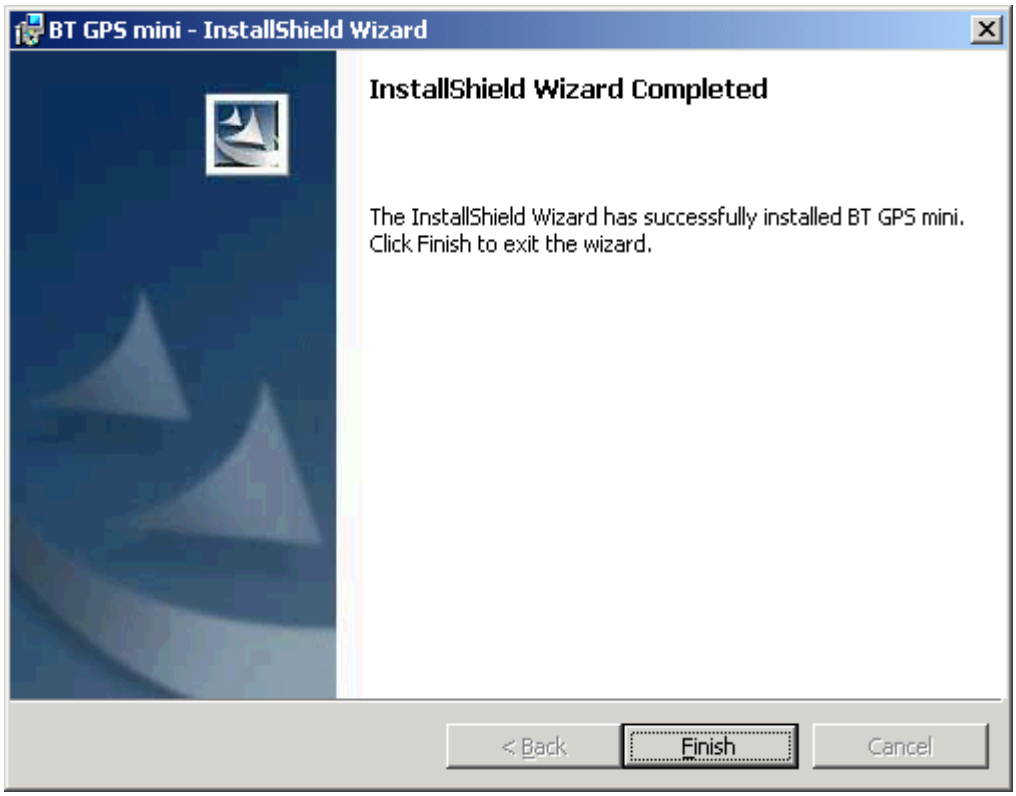
Click " I accept the terms of the license agreement" then click "Next>" to next page, or click"<Back" to back last stage or "Cancel" to give up installation.



Click "Install" to start installation. Or click"<Back" to back last stage or "Cancel" to give up installation.



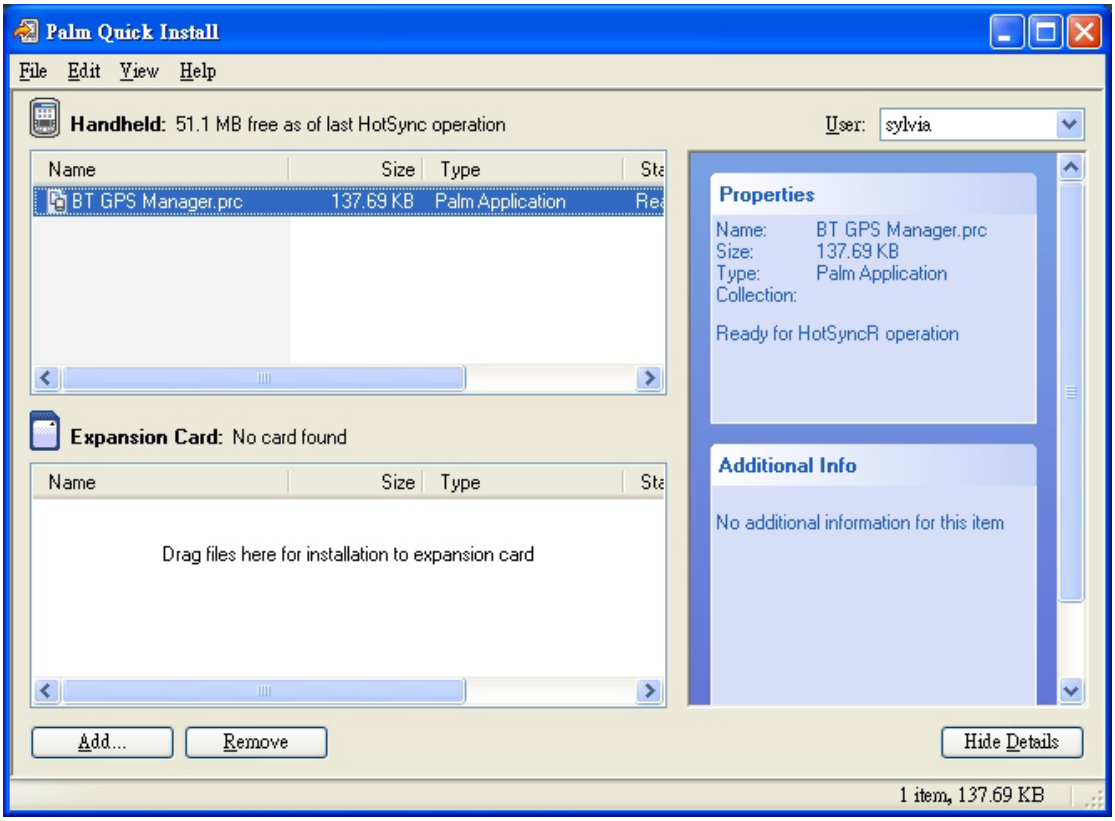
Then start installation. And finish installation will ask you to restart your computer as follow window.



Please click “Finish” to finish the Installation. And your desktop will appear the Bluetooth GPS icon. Or click”<Back” to back last stage or “Cancel” to give up installation.

You can double click the Bluetooth GPS icon to execute the Bluetooth GPS software application.

3.3 Install Palm Software Application



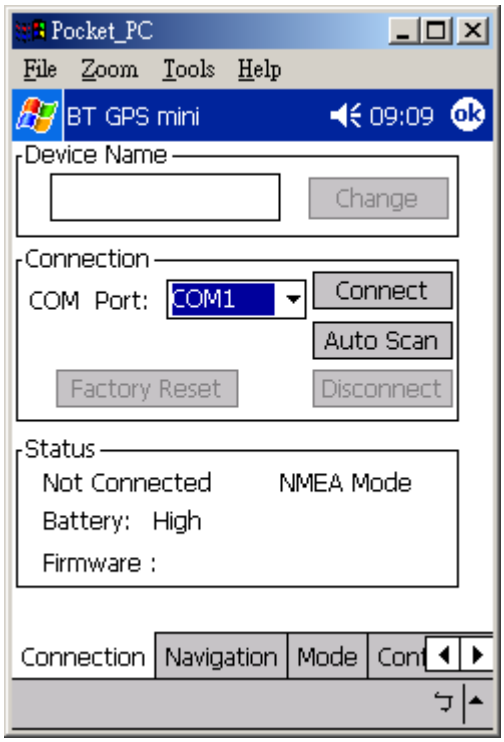
Note:

To execute this Palm Software Application, please install Palm software in advance.

4. Software Application User Manual for PDA

4.1. Connection Page

User has to set up a connection with BT GPS mini device by this dialog.



4.1.1. Device Name

When connection is successful, it will show the Device's ID Name automatically.

4.1.2. Change

When connection is successful, the "Change" Button will be workable. If you want to change the Device's Name, please enter the new Device's ID Name in the BT GPS mini ID field, then click "Change" button to upload the Device's ID Name to BT GPS mini .

4.1.3. COM Port

Indicate Bluetooth serial com port.

4.1.4. Connect

Connect to the BT GPS mini device. When you try to connect to Bluetooth enabled device, the window will pop up a "Connection" dialogue box with "Waiting" message.

And it means connecting successful when seeing a "BT GPS mini" dialogue box with "Set up connection with device" message.

If the window is shown a "BT GPS mini" dialogue box with "Failed to set up connection" message. It means the connection failed, please try it again.

4.1.5. Auto Scan

Automatically scan the **BT GPS mini** COM port in order to connect to **BT GPS mini** device.

4.1.6.Factory Reset:

Factory reset to the device. To reset all parameters, datalogs, and to disconnect Bluetooth.

4.1.7. Disconnect

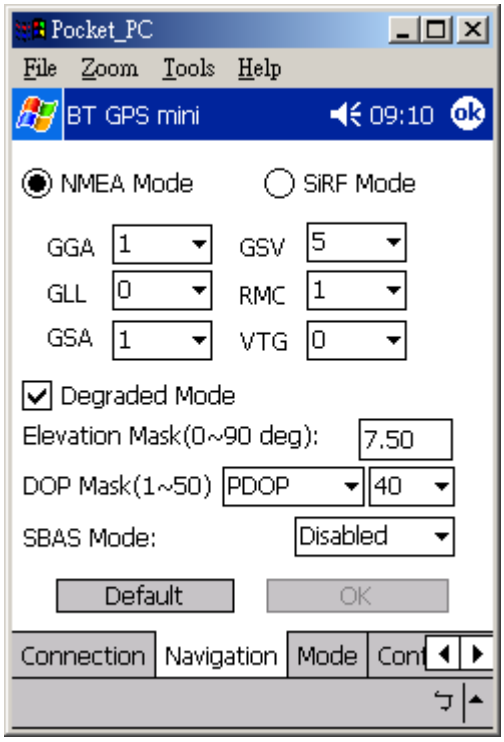
Disconnect to the BT GPS mini device.

Note:

When performing the Auto Scan, the user has to wait for a while because it will need time to get necessary system information from **BT GPS mini**.

4.2. Navigation Page

You can set GPS-relative parameters by this dialog.



4.2.1. NMEA Mode / SiRF Mode

Display (or change) the mode of device.

Setup the parameters of in NMEA Mode or SiRF Mode.

4.2.2. Degraded Mode

Enable or disable degraded mode.

4.2.3. Elevation mask

Elevation mask setting.

4.2.4. DOP Mask

DOP mask type and DOP mask value setting.

4.2.5. SBAS Mode

Enable or disable SBAS function.

4.2.6. Default

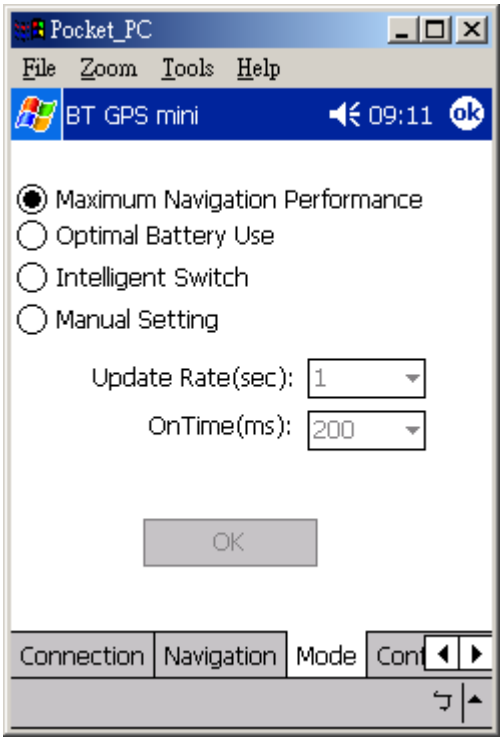
Reset values of this dialog into default value. It has not changed the setting of device yet. You still need to push OK button if you want to change the setting of device.

4.2.7. OK

Upload the parameters to the **BT GPS mini**.

4.3. Mode:

Use this page for power mode setting.



4.3.1. Maximum Navigation Performance:

Select for best system performance.

4.3.2. Optimal Battery Use:

Select to optimize the battery usage.

4.3.3. Intelligent Switch:

Select for switching power mode automatically.

When position keeps still, it enters power save mode. When position is in high speed updating, it enters max performance mode.

4.3.4. Manual Setting:

Select for adjusting the Update Rate and On Time value.

(Suggestion: Optimized for the device by selecting Maximum Navigation Performance or Optimal Battery Use for default value setting.)

4.4. Configuration

Use this page to set the system configuration values.

4.4.1. Change Password

Display the “ Change Password” dialog screen.

4.5. About

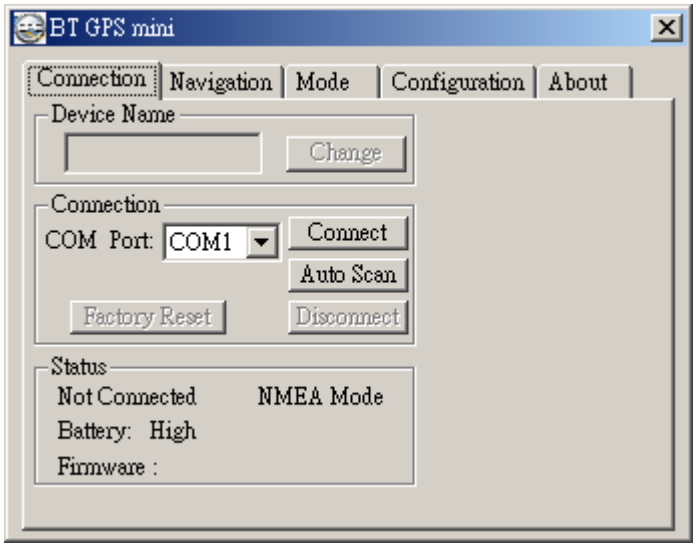
This page shows the software version and the copyright claim.

Pocket_PC
File Zoom Tools Help
BT GPS mini
09:42
ok
BT GPS mini : 1.5.5.115
Build Date: May 25 2004
Copyright RoyalTek Company.
Mode
Configuration
About

5. Software Application User Manual for PC

5.1. Application User Interface

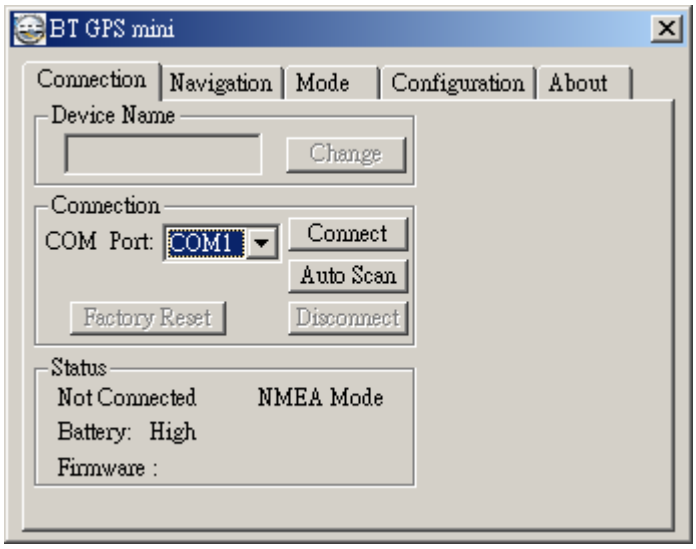
Click the icon as right in your desktop to run the software after install the **BT GPS mini** software. Then you can see the **BT GPS mini** window as Figure 1.



You can choose the button in the left side to open the dialogs for each function setting such as Connection, Navigation, Mode, Configuration, About. And use the left up buttons to minimize or close the window.

5.2. Connection Page

User has to set up a connection with **BT GPS mini** device by this dialog.



5.2.1. Device Name

When connection is successful, it will show the Device's ID Name automatically.

5.2.2. Change

When connection is successful, the "Change" Button will be workable. If you want to change the Device's Name, please enter the new Device's ID Name in the **BT GPS mini** ID field, then click "Change" button to upload the Device's ID Name to **BT GPS mini**.

5.2.3. COM Port

Set up the **BT GPS mini** COM Port.

5.2.4. Connect

Connect to the **BT GPS mini** device. When you try to connect to Bluetooth enabled device, the window will pop up a "Connection" dialogue box with "Waiting" message.

And it means connecting successful when seeing a "**BT GPS mini**" dialogue box with "Set up connection with device" message.

If the window is shown a "**BT GPS mini**" dialogue box with "Failed to set up connection" message, it means the connection failed, please try again.

5.2.5. Auto Scan

Automatically scans the **BT GPS mini** COM Port and baud rate in order to connect **BT GPS mini** device.

5.2.6. Factory Reset:

Factory reset to the device. To reset all parameters and to disconnect Bluetooth.

5.2.7. Disconnect

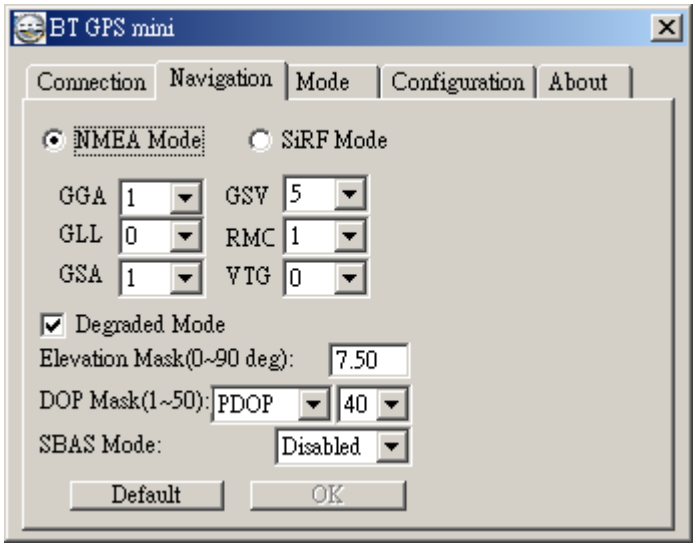
Disconnect to the **BT GPS mini** device.

Note:

When perform Auto Scan, user has to wait for a while because it will take time to get necessary system information from **BT GPS mini**.

5.3. Navigation Page

You can set GPS-relative parameters by this dialog.



5.3.1. NMEA Mode / SiRF Mode

Display (or change) the mode of device.

Setup the parameters of NMEA Mode or SiRF Mode.

5.3.2. Degraded Mode

Enable or disable degraded mode.

5.3.3. Elevation mask

To set the parameter of the Elevation mask.

5.3.4. DOP Mask

DOP mask type and DOP mask value setting.

5.3.5. SBAS Mode

Enable or disable SBAS function.

5.3.6. Default

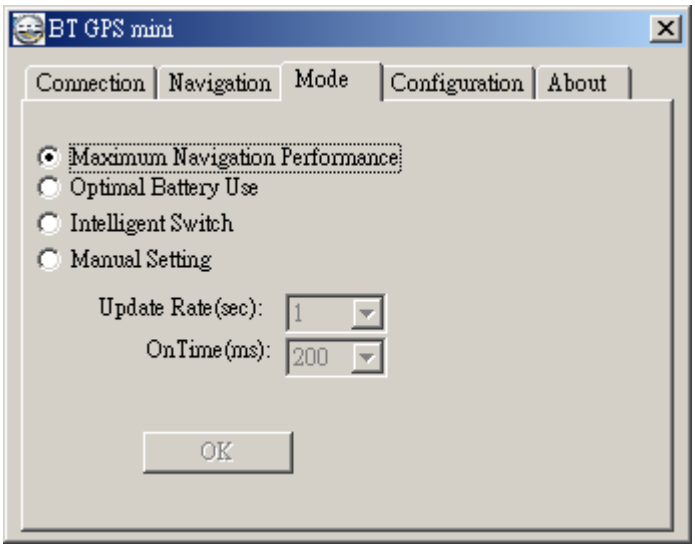
Reset values of this dialog into default value. It has not changed the setting of device yet. You still need to push OK button if you want to change the setting of device.

5.3.7. OK

Upload the parameters to the **BT GPS mini**.

5.4. Mode

Use this page for power mode setting.



5.4.1. Maximum Navigation Performance:

Select for best system performance.

5.4.2. Optimal Battery Use:

Select to optimize the battery usage.

5.4.3. Intelligent Switch

Select to switch power mode automatically.

When position keeps still, it enters power save mode. When position is in high speed updating, it enters max performance mode.

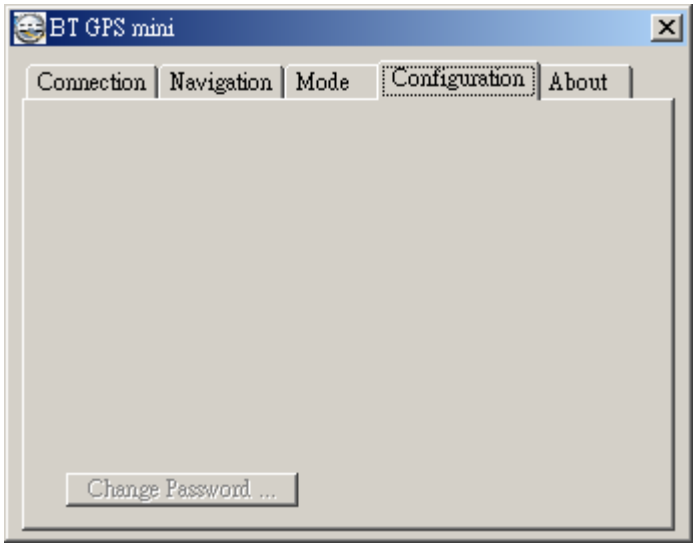
5.4.4. Manual Setting:

Select for adjusting the Update Rate and On Time value.

(Suggestion: Optimized for the device by selecting Maximum navigation Performance or Optimal Battery Use for default value setting.)

5.5. Configuration:

Use this page to set the system configuration values.

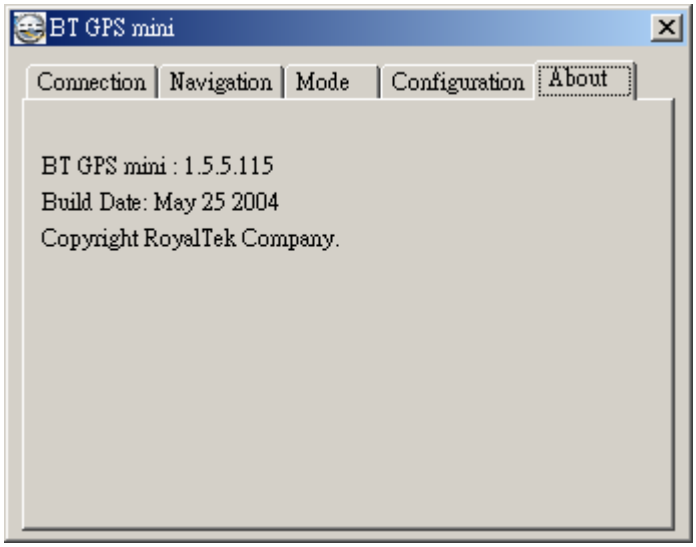


5.5.1. Change Password

Display the “ Change Password” dialog screen.

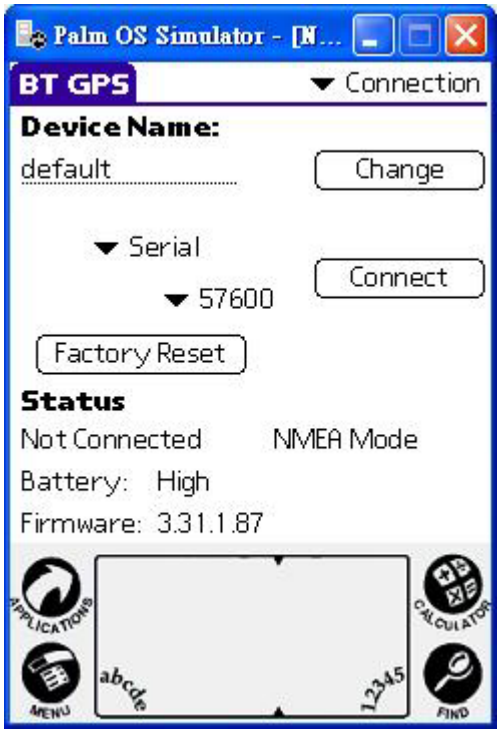
5.6. About

This page shows the software version and the copyright claim.



6. Palm Software Application User Manual

6.1. Connection Page



User has to set up a connection with **BT GPS mini** device by this dialog.

6.1.1. Device Name:

When connection is successful, it will show the Device's ID Name automatically.

6.1.2. Change:

When connection is successful, the "Change" Button will be workable. If you want to change the Device's Name, please enter the new Device's ID Name in the **BT GPS mini** ID field, then click "Change" button to upload the Device's ID Name to **BT GPS mini**.

6.1.3. COM Port:

Indicate Bluetooth serial com port.

6.1.4. Connect:

Set up the connection with **BT GPS mini** device. it again.

6.1.5. Factory Reset:

Factory reset to the device. To reset all parameters, datalogs, and to disconnect Bluetooth.

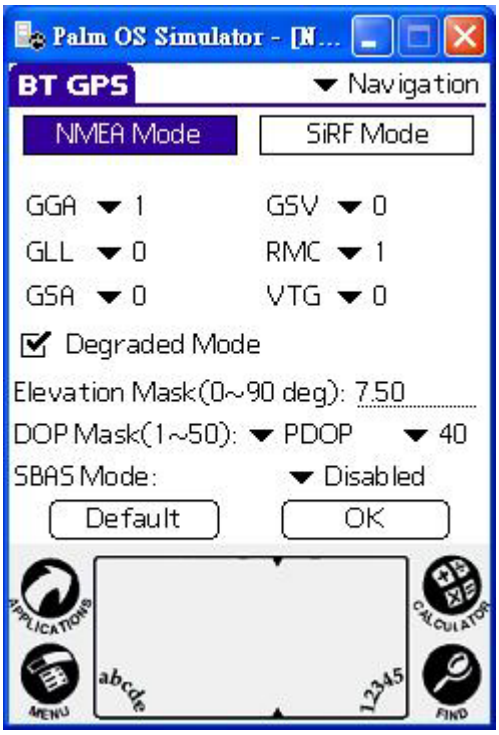
6.1.6. Disconnect:

Disconnect to the **BT GPS mini** device.

Note:

When performing the Auto Scan, the user has to wait for a while because it will get necessary system information from **BT GPS mini**.

6.2. Navigation Page



You can set GPS-relative parameters by this dialog.

6.2.1. NMEA Mode / SiRF Mode:

Display (or change) the mode of device.

Setup the parameters of in NMEA Mode or SiRF Mode.

6.2.2. Degraded Mode:

Enable or disable degraded mode.

6.2.3. Elevation mask:

Elevation mask setting.

6.2.4. DOP Mask:

DOP mask type and DOP mask value setting.

6.2.5. SBAS Mode:

Enable or disable SBAS function.

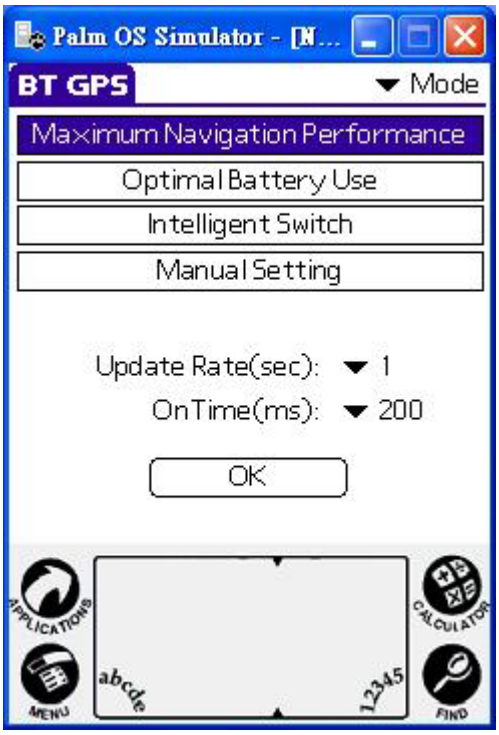
6.2.6. Default:

Reset values of this dialog into default value. It has not changed the setting of device yet. You still need to push OK button if you want to change the setting of device.

6.2.7. OK:

Upload the parameters to the **BT GPS mini**.

6.3. Mode:



Use this page for power mode setting.

6.3.1. Maximum Navigation Performance:

Select for best system performance.

6.3.2. Optimal Battery Use:

Select to optimize the battery usage.

6.3.3. Intelligent Switch:

Select for power mode automatically switch.

When position keeps still, it enters power save mode. When position is in high speed updating, it enters max performance mode.

6.3.4. Manual Setting:

Select for adjusting the Update Rate and On Time value.

(Suggestion: Optimized for the device by selecting Maximum Navigation Performance or Optimal Battery Use for default value setting.)

6.4. Configuration:

Use this page to set the system configuration values.

6.4.1. Change Password:

Display the “Change Password” dialog.

6.5. About:

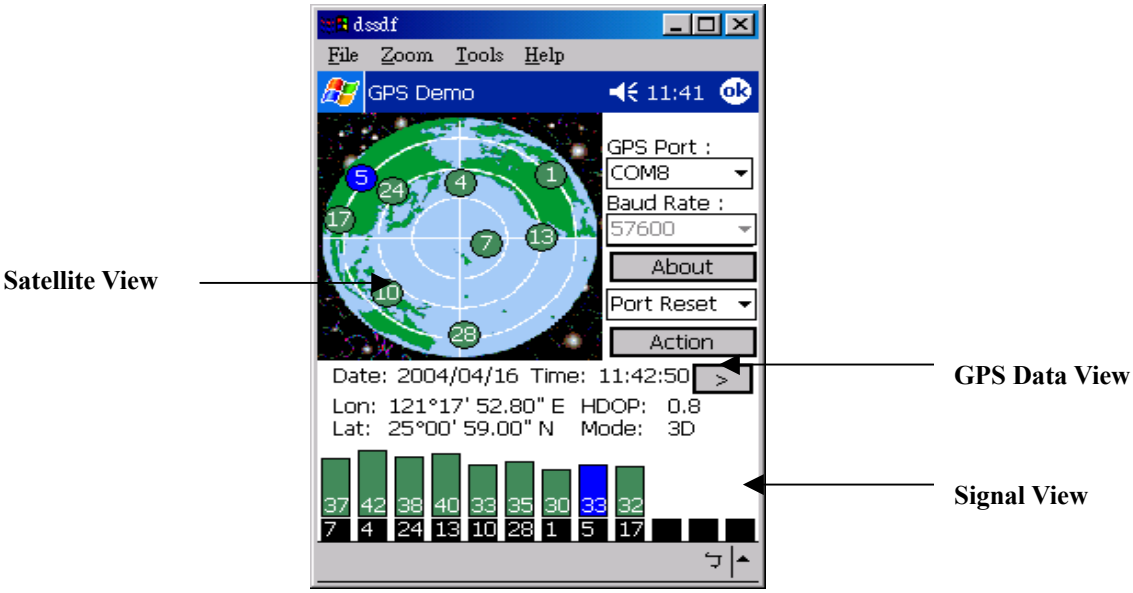
This page shows the software version and the copyright claim.

7. GPS Test on PDA

7.1. Execute GPS Demo Program

Execute RoyalTek GPS Demo program by double clicking **RoyalTek GPS Demo** icon on **Programs** menu.

7.2. GPS Demo Screen



7.2.1. GPS Port:

GPS port searching automatically by GPS port first or using COM1 as the default com port.

7.2.2. Baud Rate:

Sole baud rate : 57600.

7.2.3. About:

Version displays..

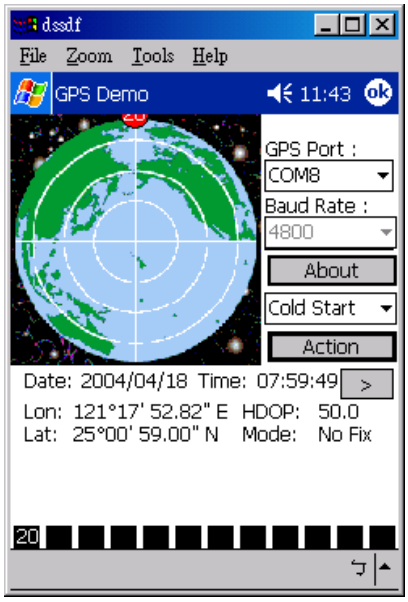
7.2.4. Action:

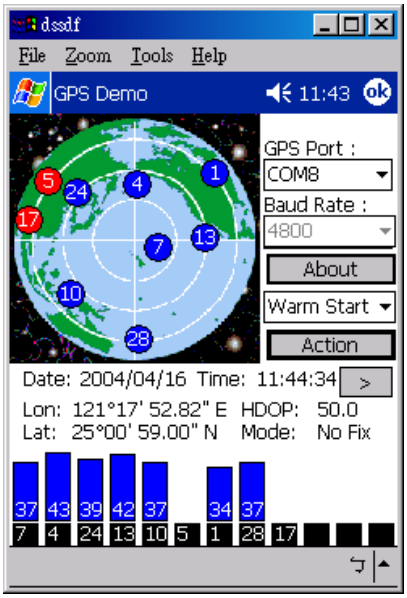
GPS action selection.

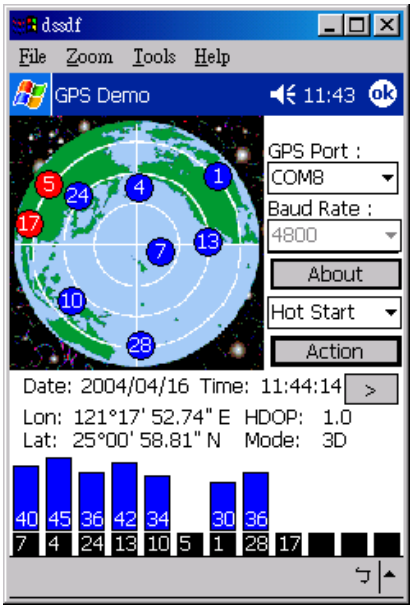
7.2.5. [>]

Switch to next screen shot.

7.3. Cold/Warm/Hot Start







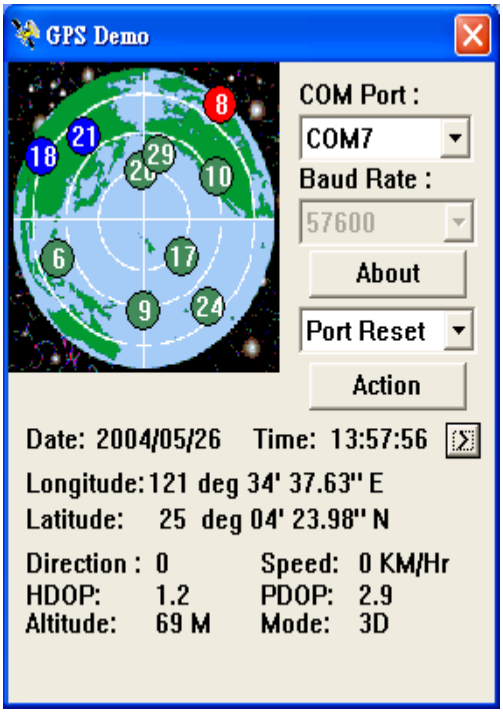
Selecting Cold/Warm/Hot Start in function scroll bar, then click **Action** to initialize Cold/Warm/Hot Start function.

7.4. About

This page shows the software version and the copyright claim.

7.5. Next Screen

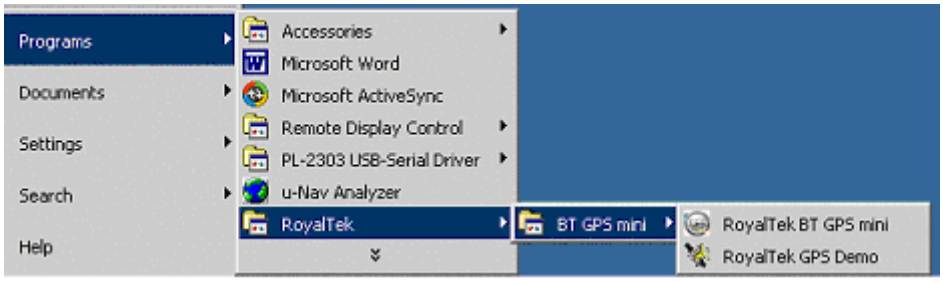
Clicking > to switch GPS bar chart image to have more GPS data.



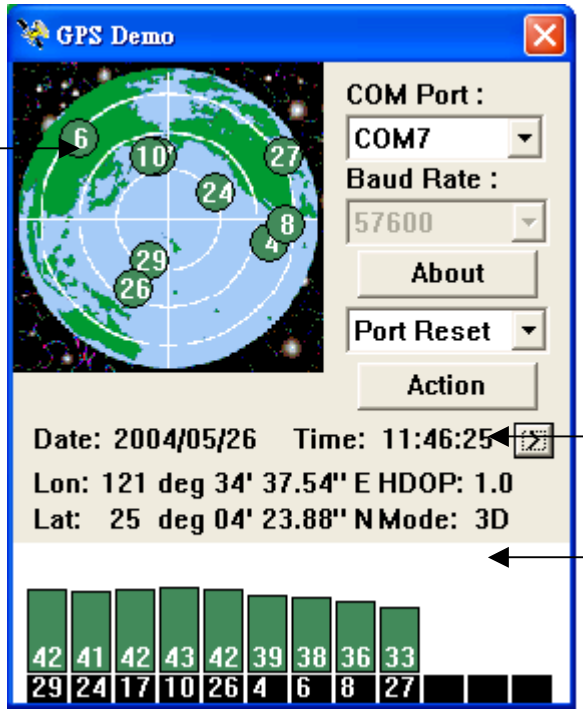
8. GPS Test on PC

8.1. Execute GPS Demo Program

ExecuteGPS Demo program by double clicking **GPS Demo** icon on **Programs** menu.



8.2. GPS Demo Screen



8.2.1. GPS Port:

GPS port searching automatically by GPS port first or using COM1 as the default com port.

8.2.2. Baud Rate:

Sole baud rate : 57600.

8.2.3. About:

Version displays..

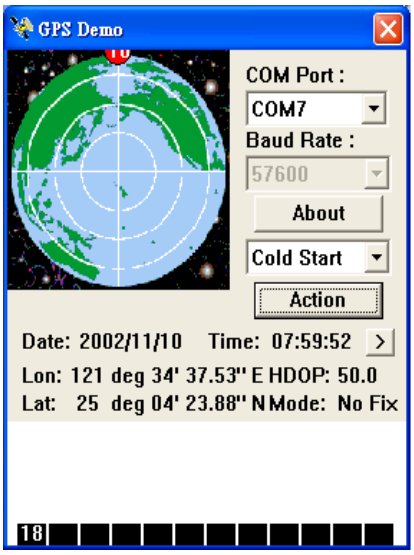
8.2.4. Action:

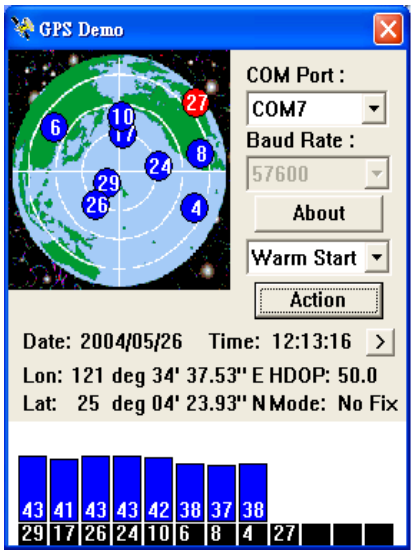
GPS action selection.

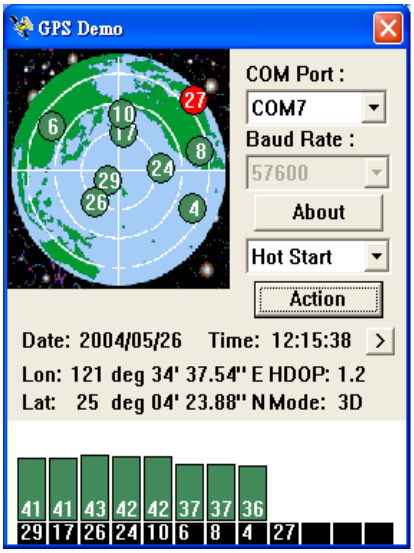
8.2.5. [>]

Switch to next screen shot.

8.3. Cold/Warm/Hot Start



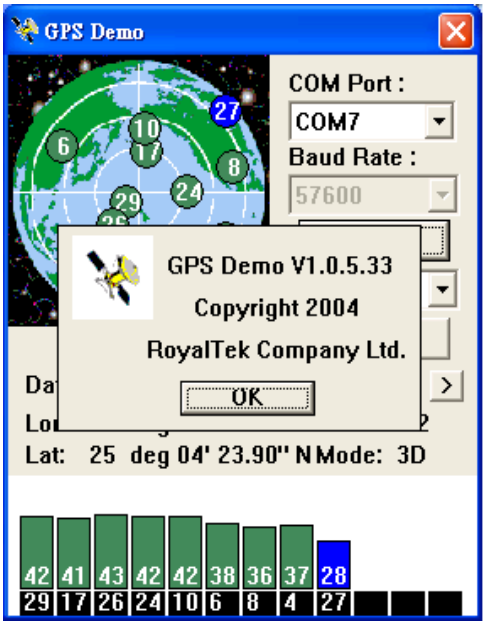




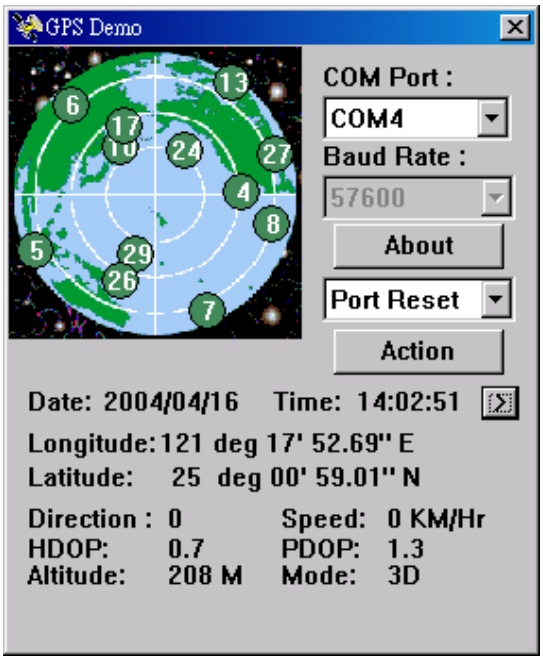
Selecting Cold/Warm/Hot Start in function scroll bar, then click **Action** to initialize Cold/Warm/Hot Start function.

8.3. About

This page shows the software version and the copyright claim.



8.4. Next Screen



Clicking > to switch GPS bar chart image to have more GPS Data.

9. Explanation of GPS Terminology

Degraded Mode:

It is the operation mode that uses 2 SVs or 1 SV for positioning output. The effect of degraded mode in GPS receiver is to have more position fix than none of it. It would sometimes have the situation of position drifting when this mode is enabled.

Elevation Mask:

GPS satellites that are low on the horizon are subject to noise due to the amount of atmosphere that the signal must travel through. Better position accuracy is often achieved if lower elevation satellites are not used in the position solution. The elevation mask is used to exclude the use of satellites in the position solution that are below a defined elevation mask.

DOP Mask:

DOP is the abbreviation of "dilution of precision". To achieve a positioning accuracy of 10m, it must combine the ranging accuracy and geometry to be acceptable values. GDOP is geometric dilution of precision which contains the effect of position (x, y, z) and time. PDOP is the position dilution of precision which contains the effect of position (x, y, z). HDOP is the horizontal dilution of precision which contains the effect of horizontal plane (x, y). Better position accuracy is often achieved with smaller DOP value. The DOP Mask is used to exclude the output of position that DOP value is higher than the DOP Mask.

SBAS Mode:

SBAS is abbreviation of Satellite-Based Augmentation Systems. It is WAAS in US, European Geostationary Navigation Overlay Service (EGNOS) in Europe and Multi-functional Transport Satellite (MTSAT) Satellite -based Augmentation System (MSAS) in Japan. It provides additional ranging capability, integrity information, and differential corrections at L1 frequency, which is broadcast from geostationary satellites.

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Revision History

Data	Revision	Note
4/7/2004	V.1.0	
5/26/2004	V.1.5	