Leadtek®
We Make Dreams a Reality

LEADTEK GPS SMART ANTENNA TECHNICAL SPECIFICATION

GPS 9531

Leadtek®
We Make Dreams a Reality

Version 1.05

2 October 2002

Leadtek®
We Make Dreams a Reality

Contents

Leadtek®
We Make Dreams a Reality

1. Introduction

Leadtek GPS 9531 is a complete GPS smart antenna receiver, including an embedded antenna and GPS receiver circuits, designed for a broad spectrum of OEM system applications. The product is based on the proven technology found in other Leadtek 12 channel GPS receivers and SIRF chipset solution. The GPS smart antenna will track up to 12 satellites at a time while providing fast time-to-first-fix, one second navigation updates and low power consumption. Its far reaching capability meets the sensitivity requirements of car navigation as well as other location-based applications.

Leadtek GPS 9531 smart antenna is designed to withstand rugged operating conditions and is completely water resistant. With a clear view of the GPS satellites and a PDA or notebook PC to provide power source and digital map function, a truly portable navigation system becomes a reality using the Leadtek GPS 9531 smart antenna. The PDA or notebook PC communicates with the smart antenna via RS-232 serial communication interface. Internal memory backup allows the device to retain critical data such as satellite orbital parameters, last position, date and time. End user interfaces such as displays can be added by the application designer.

The smart antenna design utilizes the latest technology and high level circuit integration to achieve superior performance while minimizing space and power requirements. This hardware capability combined with software intelligence makes the smart antenna easy to be integrated and used in all kinds of navigation applications.

2. Technical Specifications

2.1. Electrical Characteristics

2.1.1 General

Frequency	L1, 1575.42 MHz
C/A code	1.023 MHz chip rate
Channels	12

2.1.2 Accuracy

Position	15 meters, 2D RMS
Velocity	0.1 meters/second
Time	1 microsecond synchronized to GPS time

2.1.3 Datum

WGS-84

2.1.4 Acquisition Rate

Reacquisition	0.1 sec., average
Hot start	8 sec., average
Warm start	38 sec., average
Cold start	48 sec., average

2.1.5 Dynamic Conditions

Altitude	18,000 meters (60,000 feet) max.
Velocity	515 meters/second (1000 knots) max.
Acceleration	4g, max.
Jerk	20 meters/second^3, max.

2.1.6 Power

Main power input	5.0 ± 5% VDC input
Power consumption	0.9 W at 5 VDC
Power connector	Universal connector (RJ-11)
Backup power	3 V Lithium-Ion rechargeable battery

2.1.7 Serial Port

Electrical interface	One UART for Data INPUT (RX) and OUTPUT (TX)
Protocol messages	SiRF binary and NMEA-0183, version 2.20 with a baud rate selection. SiRF binary-position, velocity, altitude, status, and control NMEA - GGA, GLL, GSA,GSV, RMC and VTG Default Message refers to ***2.4 Interfaces***

2.1.8 Cable Length

GPS9531 for RJ-11	RJ-11 type plug to Smart Antenna: 1500mm

2.1.9 Battery

Lithium Rechargeable Battery(***Note 1***)

2.2. Environmental Characteristics

Operating temperature range	-40 deg. C to +85 deg. C
Storage temperature range	-55 deg. C to +100 deg. C

2.3. Physical Characteristics

Length	78 mm (3.07 in)
Width	73.0 mm (2.67 in)
Height	26 mm (1.02 in)
Weight	380 g
Interface connector	GPS9531 for RJ-11: Standard RJ-11 type plug

2.4. Interfaces

(1) One channel for RS-232 serial interface, with user selectable baud rate (4800, 9600, 19200, 38400)

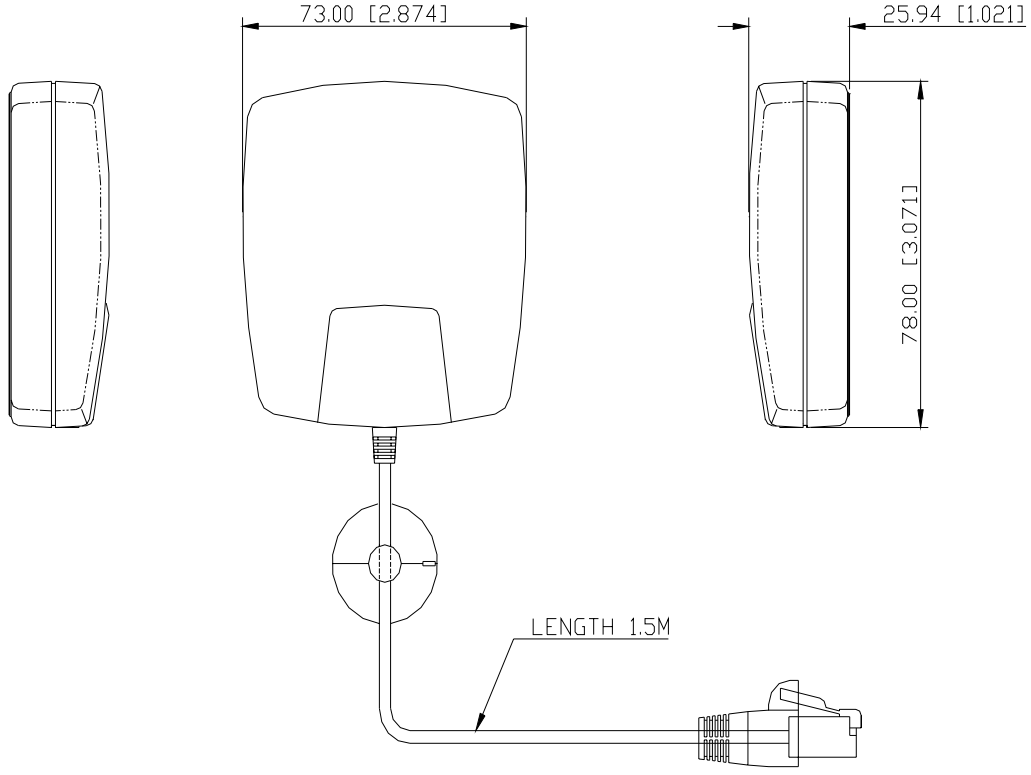
(2) NMEA 0183 standard output (Data format is GGA, GLL, GSA, GSV, RMC, VTG)

(3) Universal connector available for different PDA/Pocket PC/Smart Phone.

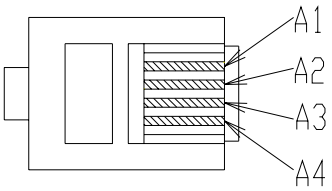
(4) We strongly suggest that you make use of Leadtek standard NMEA setting, that is, baud rate is 9600 and data output is GGA(output once per 1 sec), GSA(output once per 5 sec), GSV(output once per 5 sec), RMC(output once per 1 sec), VTG(output once per 1 sec).

(5) You can use Leadtek **GMonitor** or **Winfast Navigator** software to test the smart antenna and change communication baud rate or data protocol on your PC or notebook. And you can also use Leadtek **GPS Monitor for WinCE** to do them on your PDA.

3. Mechanical Dimensions



4. Pin Assignment of Connector



PIN	Signal Name
A1	Ground
A2	Rx (Data Input from PC/Notebook/PDA to GPS.)
A3	Tx (Data Output from GPS to PC/Notebook/PDA.)
A4	Vcc (Power)

5. Applications

The customers can use notebook PC or PDA to display their location data by Leadtek smart antenna. We supply many types of cable to connect the smart antenna to your PDA or notebook. These cables are listed as follow.

Part No	**Device**	**Description**
19000001	**PALM M500 PDA**	Including car cigar-lighter charger and for PALMM500 PDA
19000002	**IPAQ 38xx series PDA**	Including car cigar-lighter charger and for IPAQ3800 PDA
19000003	**Notebook**	Including DB9,car cigar-lighter charger and for notebook
19000004	**Notebook**	Including DB9 ,mini dim connector and for notebook
19000005	**SAGEM PDA phone WA3050**	Including car cigar-lighter charger and for SAGEM PDA
19000006	**Handspring Edge PDA**	Including car cigar-lighter charger and for EDGE PDA
19000007	**PALM V/Vx PDA**	Including car cigar-lighter charger and for PALM PDA
19000008	**CASIO PDA E125**	Including car cigar-lighter charger and for CASIO PDA
19000009	**IPAQ PDA 36/37 series**	Including car cigar-lighter charger and for IPAQ PDA
19000010	**HP Jonada 5xx Series PDA**	Including car cigar-lighter charger and for HP PDA
19000011	**Handspring Visor PDA**	Including car cigar-lighter charger and for VISOR PDA
19000012	**Notebook**	Including USB connector
19000013	**CASIO E200 PDA**	Including car cigar-lighter charger and for CASIO E200
19000016	**XDA**	Including car cigar-lighter charger and for XDA
19000018	**Pocket Loox PDA**	Including car cigar-lighter charger and for Pocket Loox PDA

6. Operation and Test

The customers can use Leadtek GMonitor.exe to test the smart antenna. You can change

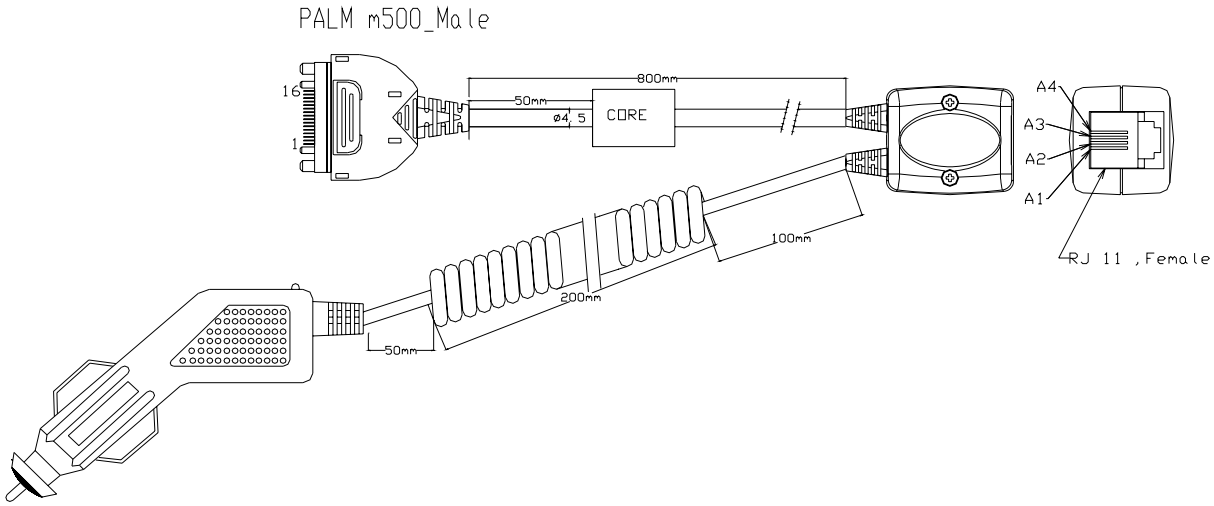
the data protocol and communication data baud rate for your application using this software. The software and manual are available for download from Leadtek website, www.leadtek.com.tw.

7. Appendix A

The following is a list of the cables for smart antenna, you can choose one which you need and apply it.

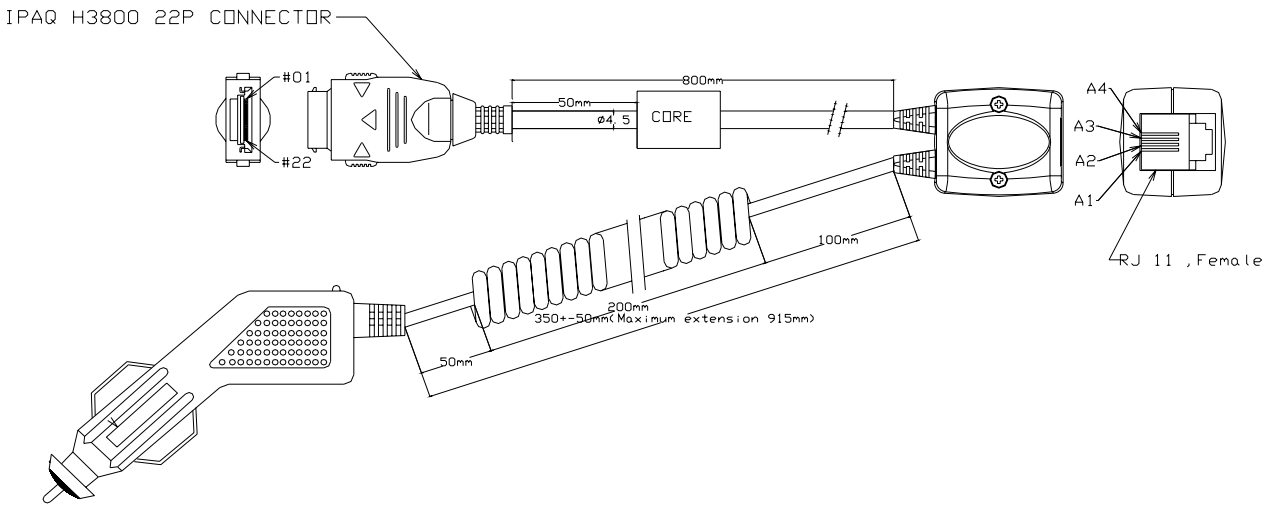
7.1 19000001

This cable is for **Palm M500 PDA.**



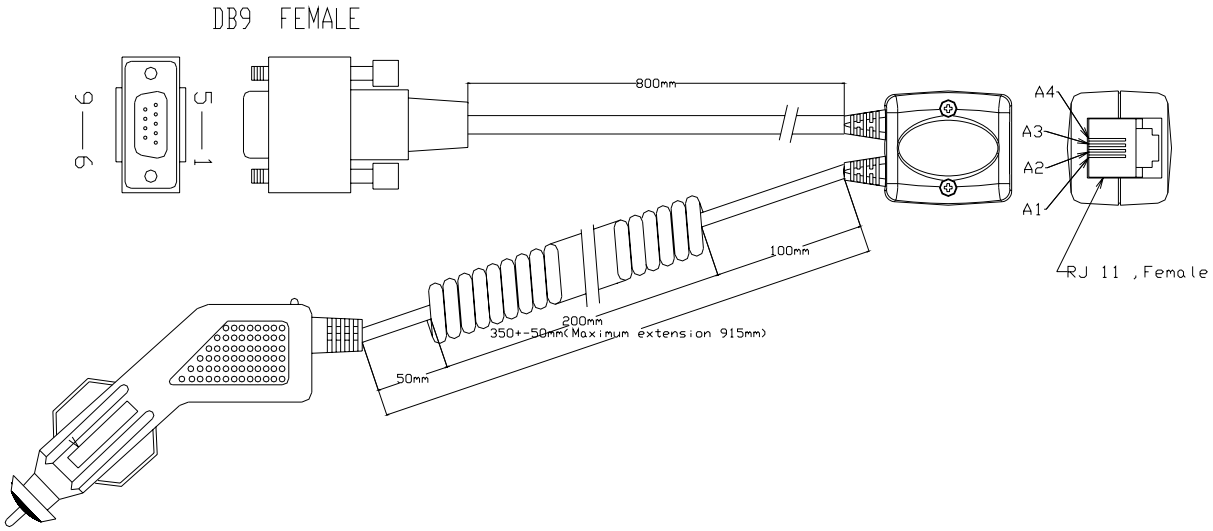
7.2 19000002

This cable is for **Compaq iPAQ 38xx series PDA.**



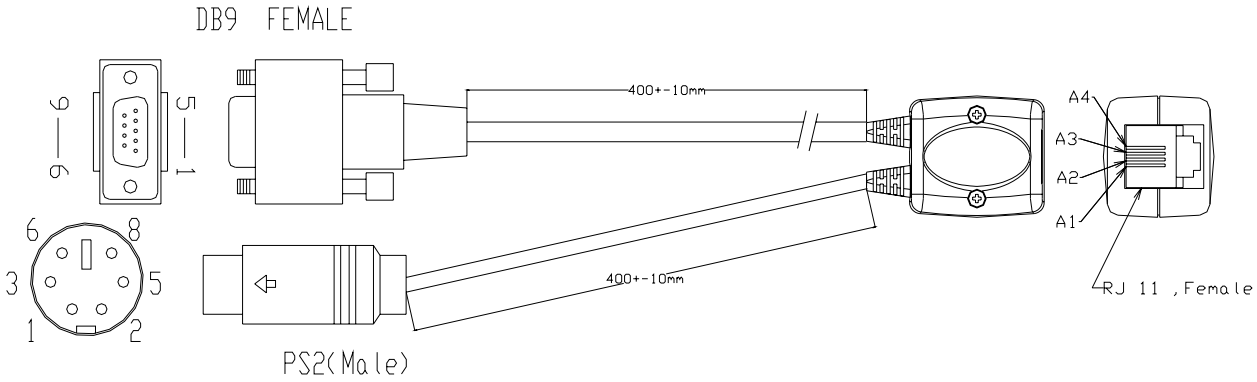
7.3 19000003

This cable is for **notebook or regular PC.**



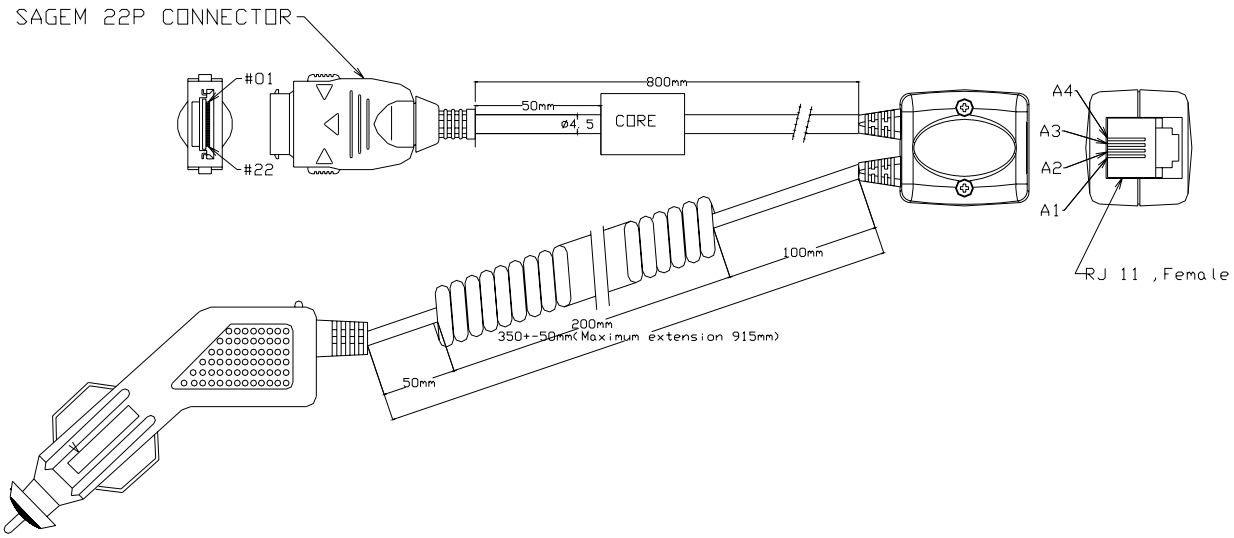
7.4 19000004

This cable is for **notebook or regular PC.**



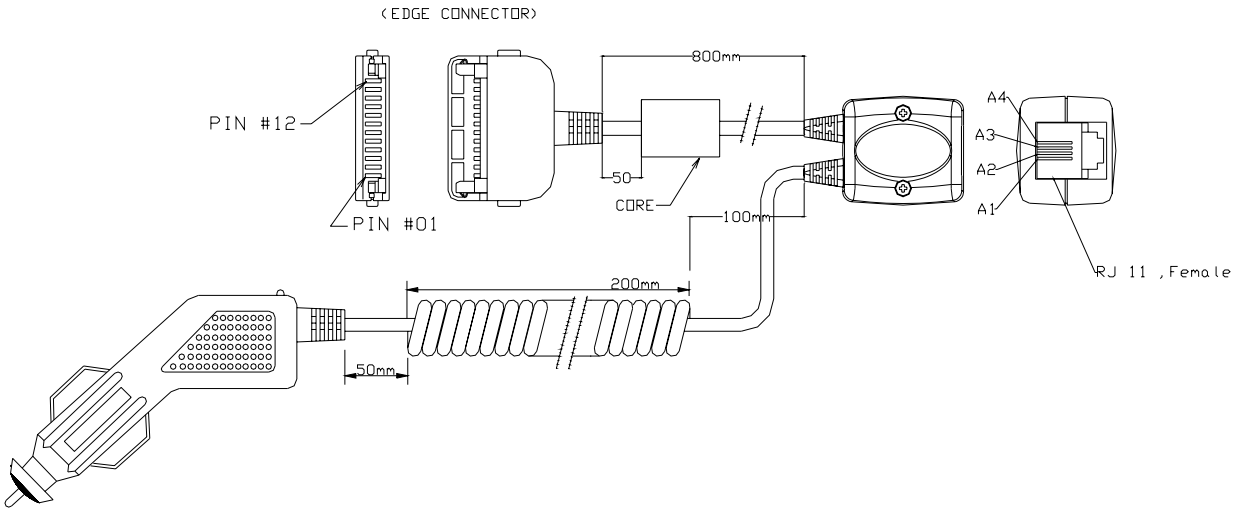
7.5 19000005

This cable is for **Sagem WA3050 PDA phone**.



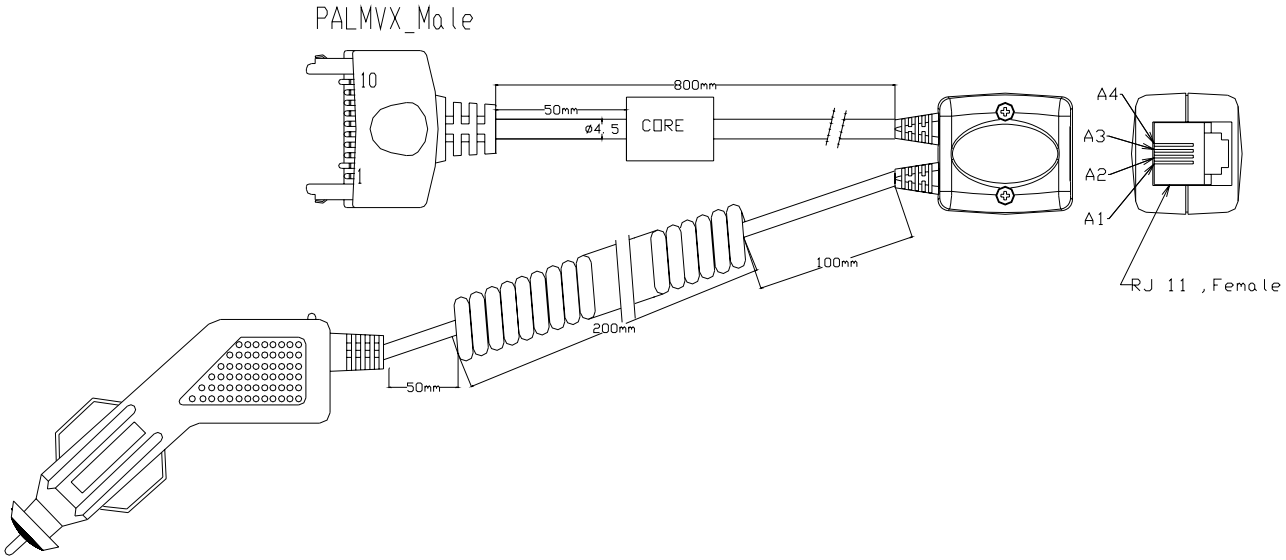
7.6 19000006

This cable is for **Handspring Edge PDA.**



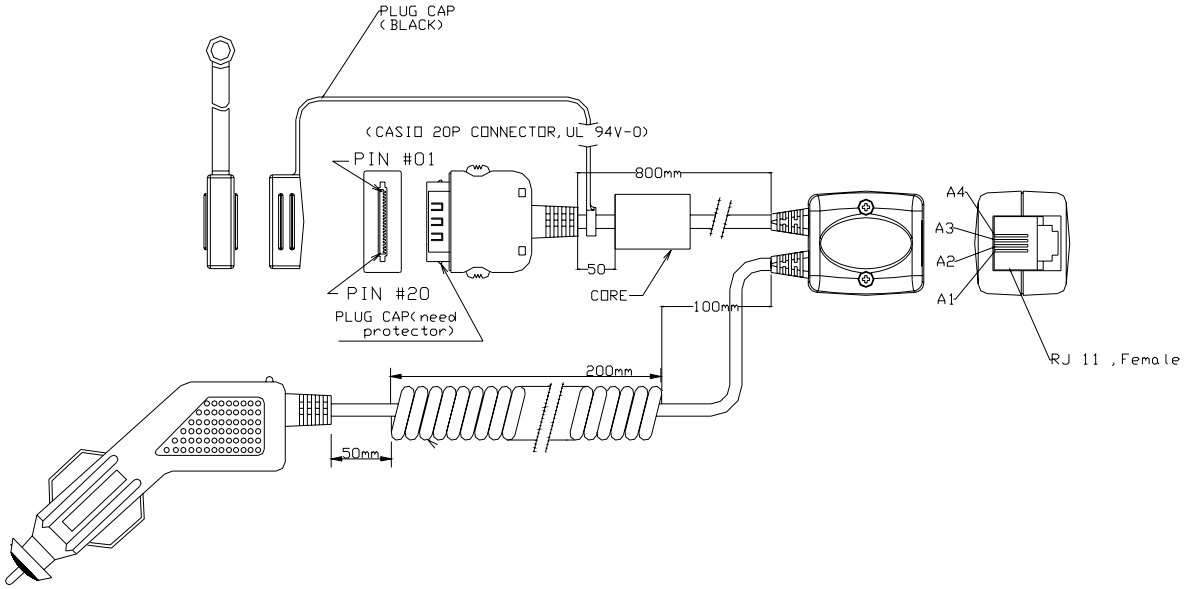
7.7 19000007

This cable is for **Palm V/Vx PDA.**



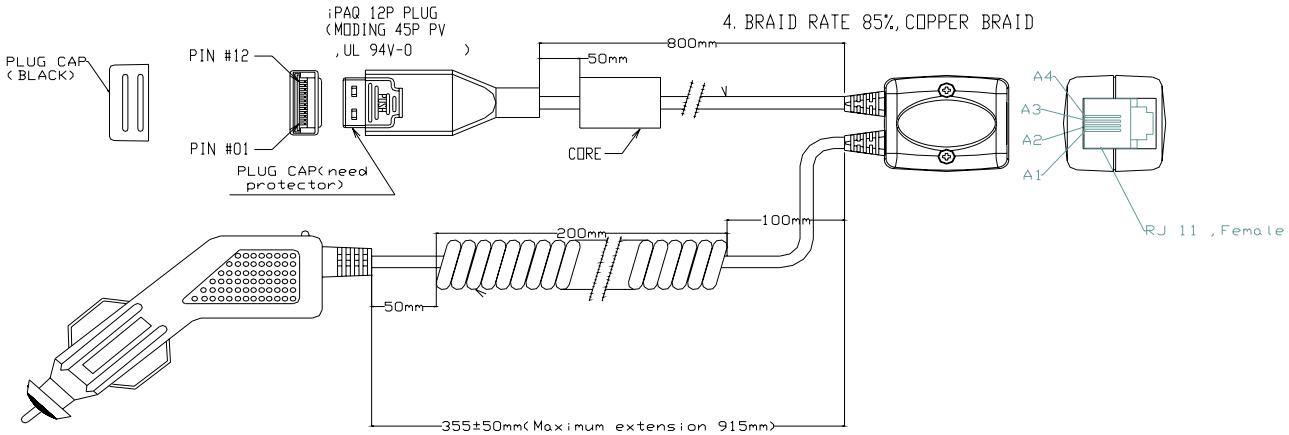
7.8 19000008

This cable is for **Casio Cassiopeia E125 PDA**.



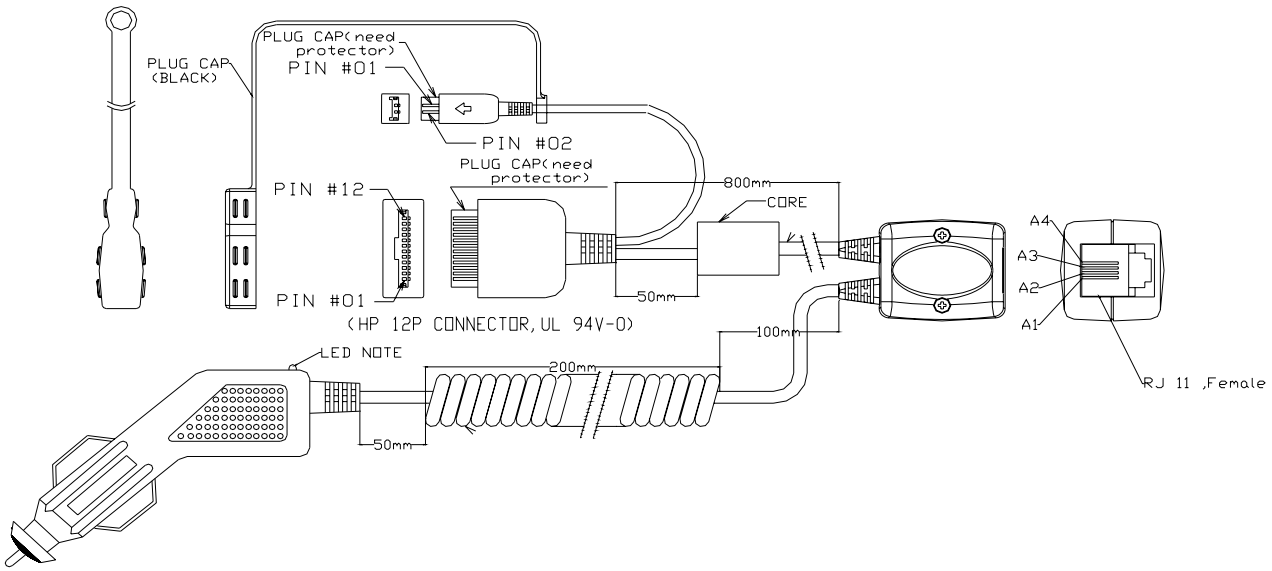
7.9 19000009

This cable is for **Compaq iPAQ 36/37 series PDA.**



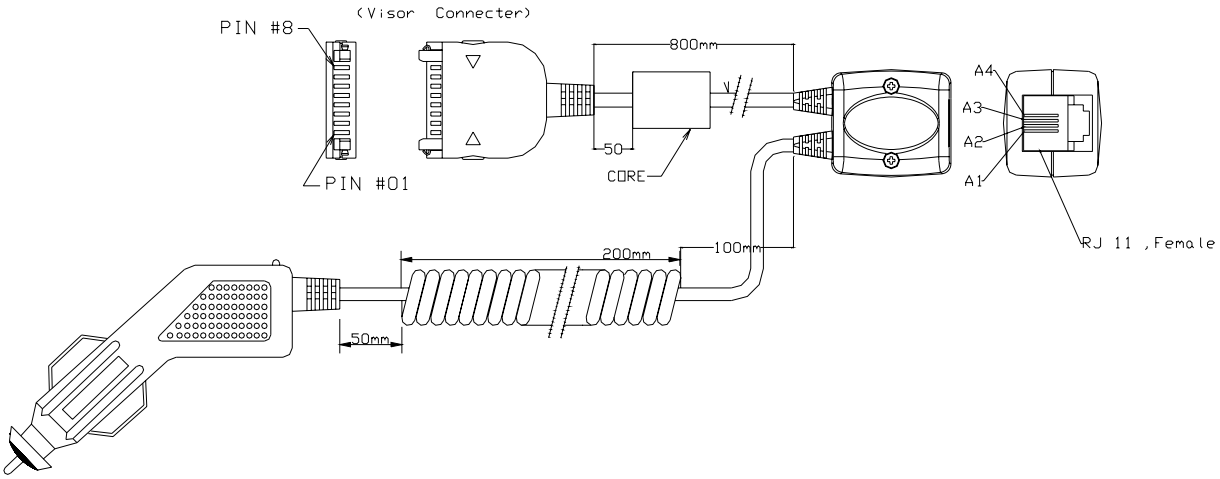
7.10 19000010

This cable is for **HP Jonada 5xx series PDA.**



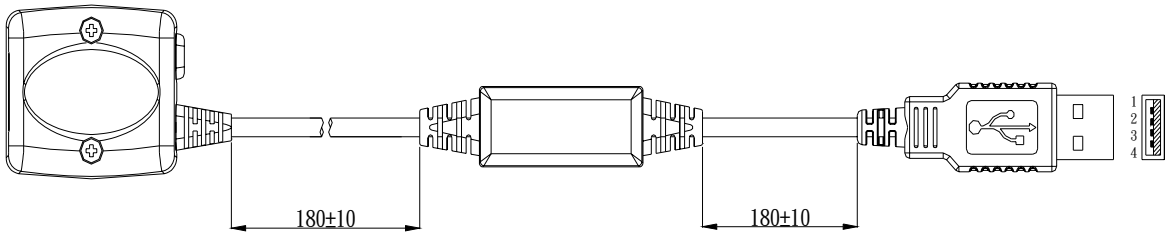
7.11 19000011

This cable is for **Handspring Visor PDA.**



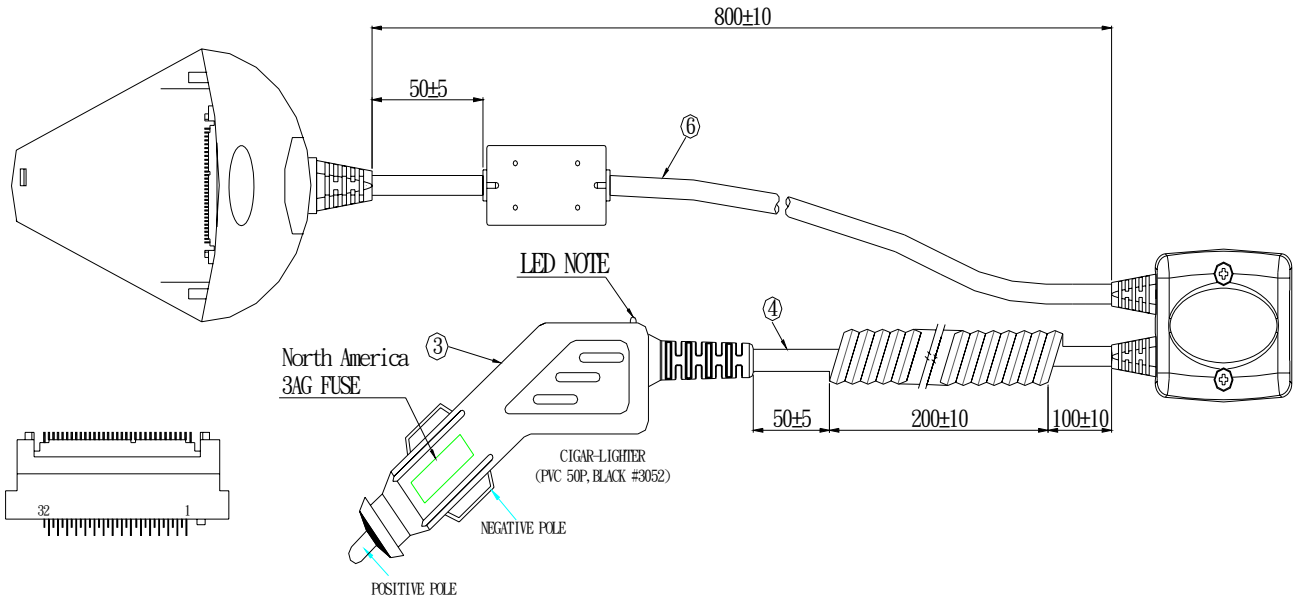
7.12 19000012

This cable is for **USB Connector**



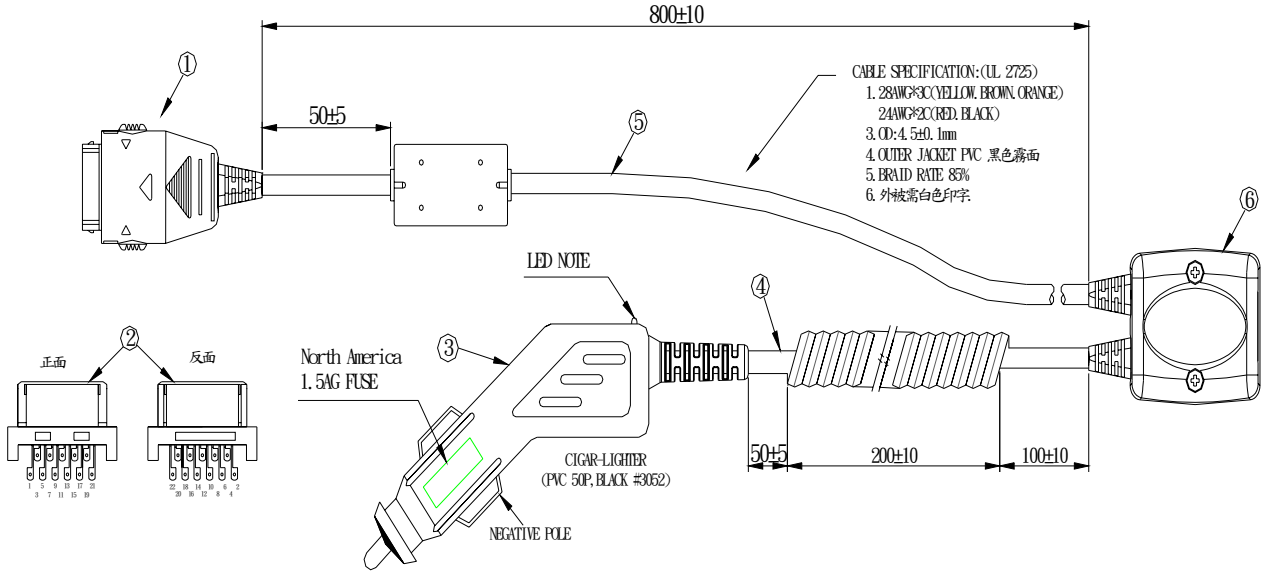
7.13 19000013

This cable is for **CASIO E200 PDA.**



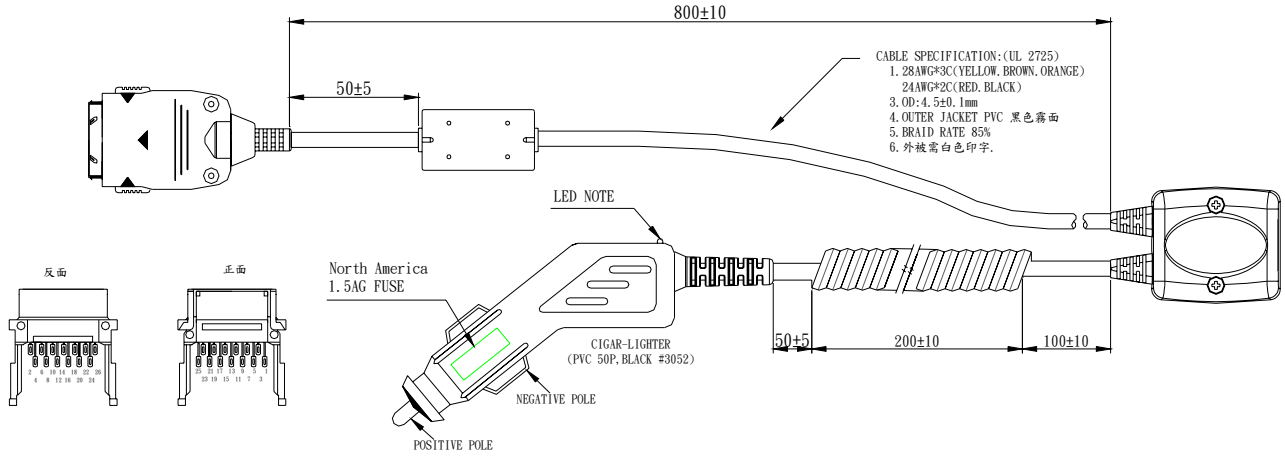
7.14 19000016

This cable is for **XDA PDA.**



7.15 19000018

This cable is for **Pocket Loox PDA.**

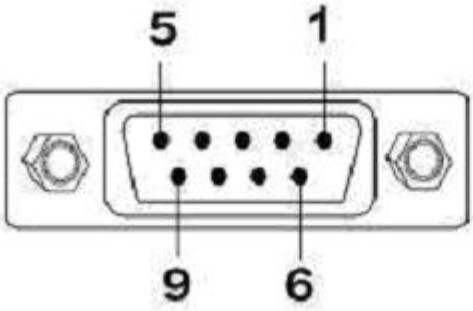


8. Appendix B

Leadtek can also provide the smart antenna using a cable with USB and RS232 DB9 connectors for customers. It can be used in notebook PC with USB or RS232 interface. The standard length of cable is 2 m.

8.1 Pin Assignment of DB9 Connector

DB9 Female Connector



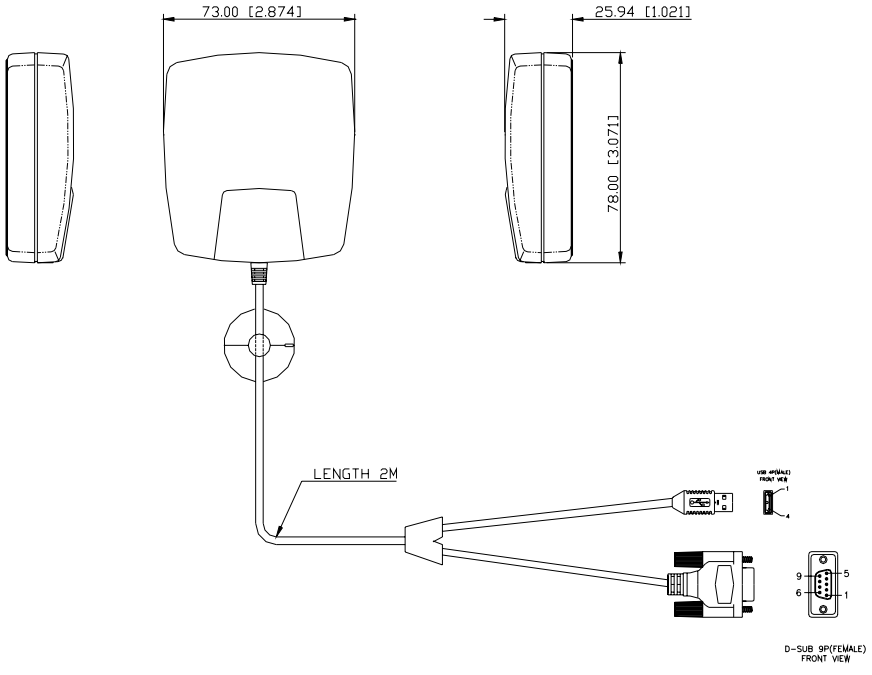
Pin	Signal Name
1	N/A
2	TD
3	**RD**
4	N/A
5	Ground
6	N/A
7	N/A
8	N/A
9	N/A

8.2 Pin Assignment of USB Connector

USB Connector

USB	PCB CONNECTOR FNALE (SJ031450)
1. VCC	1
2. D-	2
3. D+	3
4. GND	4

8.3 Mechanical Dimensions



9. Appendix C

Please refer to another operational manual, software installing Manual. The content is as follows. You can find that this manual will tell you how to install the program, driver and device. Of course, we suggest you can use GMonitor program to test your device and it is downloaded by leadtek's homepage.

Leadtek®
We Make Dreams a Reality

Note 1 : The life of lithium rechargeable battery is dependent on customer how to use it. According to the data sheet, the important specification is as follow.

Characteristics Item		Performance	Test condition
Charge/Discharge cycle characteristics	20% D.O.D. (0.3mAh)Depth of discharge	Over 1000 cycle life	Until the discharge capacity reaches under 0.15mAh
	100% D.O.D. (1.5mAh)Depth of discharge	Over 200 cycle life	Until the discharge capacity reaches under 0.75mAh

Leadtek®
We Make Dreams a Reality

Leadtek Research Inc.: 18F, 166, Chien-Yi Rd., Chung Ho, Taipei Hsien, Taiwan (235)
Phone: +886-(0)2 8226 5800 Fax: +886-(0)2 8226 5801
Leadtek U.S.A.: 46721 Fremont Blvd., Fremont, CA94538, U.S.A.
Phone: +510 490 8076 Fax: +510 490 7759
Leadtek Research Europe B.V. : Antennestraat 16 1322 AB, Almere – The Netherlands
Tel:+31(0)36 536 55 78 Fax:+31(0)36 536 22 15
E-mail: gpssales@leadtek.com.tw Home Page: www.leadtek.com.tw

Leadtek®
We Make Dreams a Reality

WinFast® 9531
PORTANAV

M A N U A L

Leadtek®
We Make Dreams a Reality
Leadtek Research Inc.

Leadtek®
We Make Dreams a Reality

Table of Contents

OVERVIEW

Overview

Leadtek GPS 9531 is a complete GPS smart antenna receiver including an embedded antenna and GPS receiver circuits, designed for a broad spectrum of OEM system applications. The product is based on the proven technology also used in other Leadtek 12 channel GPS receivers, and SIRF chipset solution. The GPS smart antenna tracks up to 12 satellites at a time while providing fast time-to-first-fix, one second navigation updates and low power consumption. Its far reaching capability meets the sensitivity requirements of car navigation as well as other location-based applications.

Leadtek GPS 9531 smart antenna is designed to withstand rugged operating conditions and is completely water resistant. With a clear view of the GPS satellites and a PDA or notebook PC to provide power source and digital map function, a truly portable navigation system becomes a reality using the Leadtek GPS 9531 smart antenna. The PDA or notebook PC communicates with the smart antenna via RS-232 serial communication interface. Internal memory backup allows the device to retain critical data such as satellite orbital parameters, last position, date and time. End user interfaces can be added by application designers.

The smart antenna design utilizes the latest technology and advanced circuit integration to achieve superior performance while minimizing space and power requirements. Such hardware capability combined with the ingenuity of the software makes the smart antenna easy for integration and use with all kinds of navigation applications.

Package Contents

PC Version

GPS 9531 unit x 1
RS232-PS2 cable or USB cable x 1
User's Manual x 1
WinFast Navigator CD x 1
Bundled CD x 1

Pocket PC Version

GPS 9531 Unit x 1
Cable for PDA x 1
User's Manual x 1
WinFast Navigator CD x 1
Bundled CD x 1

System Requirements

PC Version

1. Processor: Pentium 200 or above
2. Memory: 64MB
3. O/S: Windows 95/98/NT4/ME/2000/XP
4. Free HD space：785MB
5. 8x CD-ROM drive
6. Display: Hi-Color (16bits/pixel) with 800x600 minimum of resolution

Pocket PC Version

1. O/S: Windows CE 3.0 or above
2. Free memory: 1 MB

Leadtek®
We Make Dreams a Reality

FOR PC

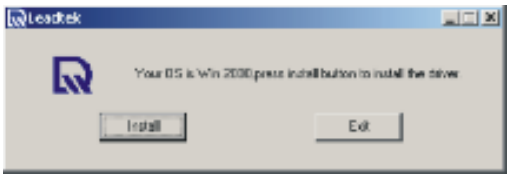
Installing 9531 USB Driver (for USB version only)

If the model of your purchase applies USB connection, you will need to install the USB driver. Skip this section and go directly to **Installing WinFast Navigator** on the next page if the USB driver has already been installed on your computer.

Step 1.
Insert the software CD in your CD-ROM drive. The Autorun program will display a setup screen as the figure to the right.

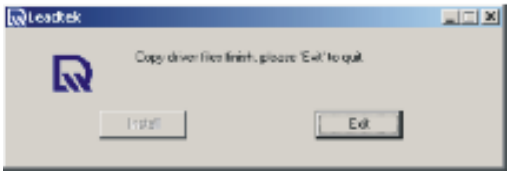
Note: You can also start the setup program by running **install.exe** in the main directory of the CD.

Step 2.
Before the system initiates the installation, it will check your OS version and display a dialog box as the figure to the right. Press **Install** to start the installation.



Step 3.
Upon completion of the installation, the system displays a dialog box. Click **OK**.

Step 4.
Now click **Exit** on the dialog box as the figure to the right to return to the Autorun setup screen.



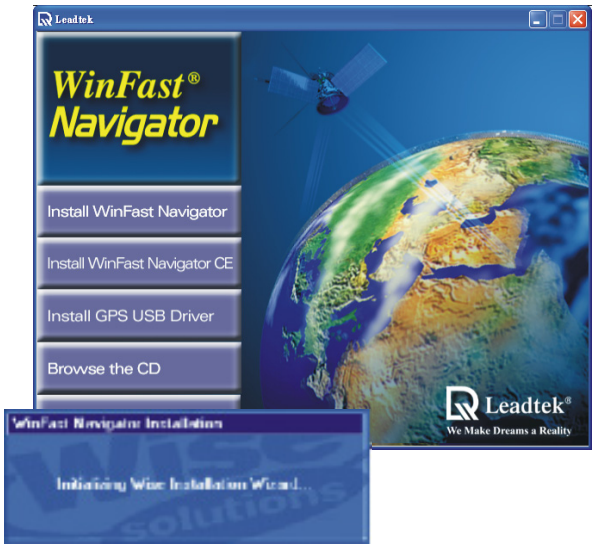
Leadtek®
We Make Dreams a Reality

FOR PC

Installing WinFast Navigator

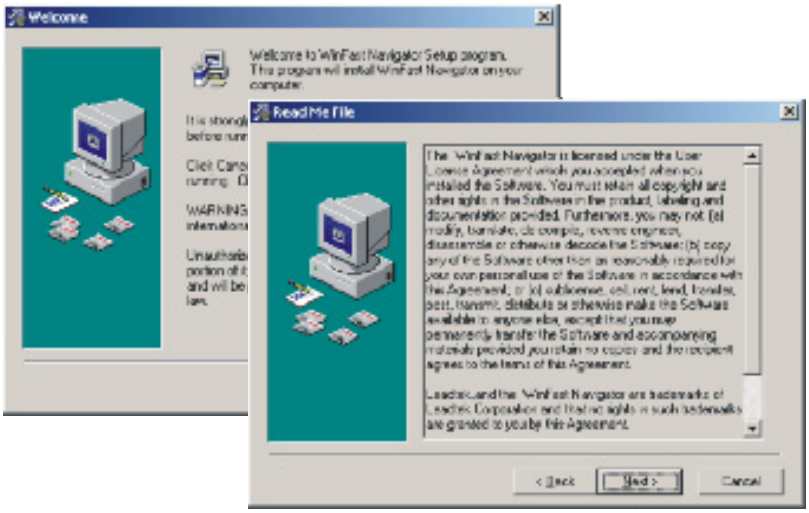
Note: The system may not function properly if you connect the GPS 9531 to your computer before the driver is installed.

Step 1.
Insert the WinFast Navigator software CD in your CD-ROM drive. The Autorun program will display a setup screen as the figure to the right.



Note: You can also start the setup program by running **install.exe** in the main directory of the CD.

Step 2.
click **Install WinFast Navigator**. A message box as the figure to the right appears and stays on the screen until the installation is initialized.

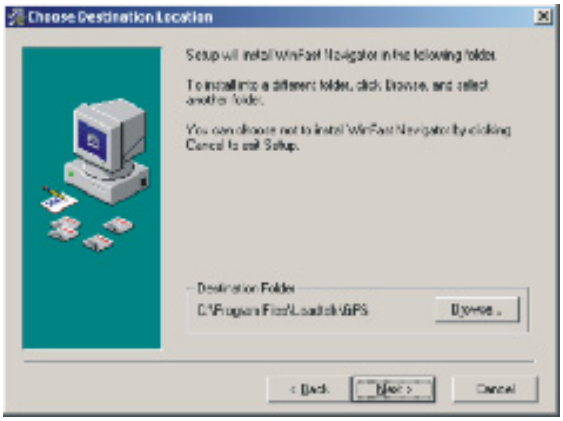


Step 3.
The setup program dialog box appears. Click **Next**. The license agreement dialog box follows. Click **Next** again.

(See the two figures to the right.)

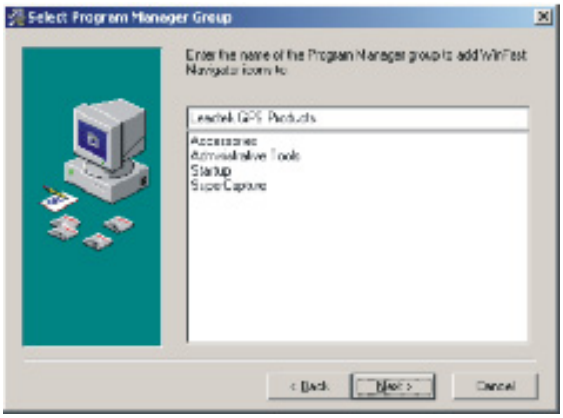
Step 4.

The **Choose Destination Location** dialog box appears. It gives the default destination folder location. If you wish to change the driver folder location, browse for a different location. If not, click **Next**.



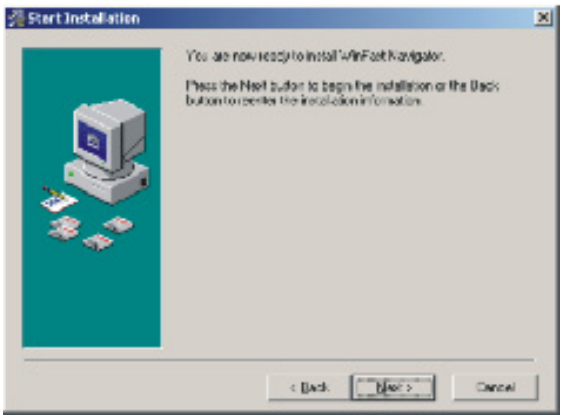
Step 5.

The **Select Program Manager Group** dialog box appears. Enter in the field the name of the program manager group where you wish to add the WinFast Navigator icons to. And then click **Next**.

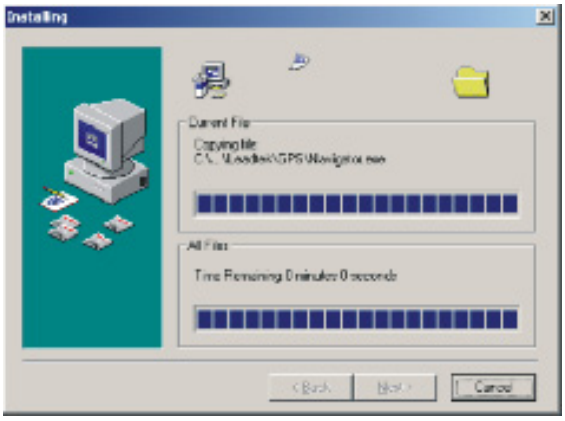


Step 6.

Now you have completed the setup for the installation. Click **Next** to start installing the WinFast Navigator

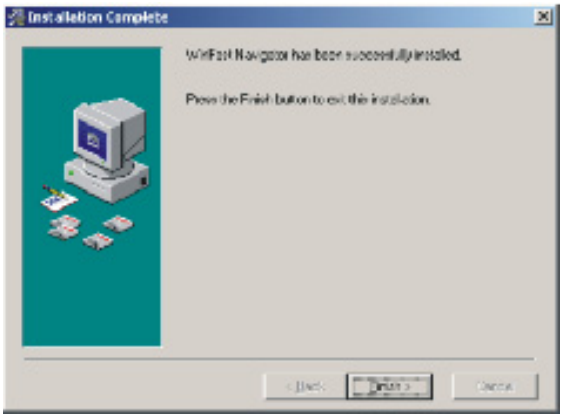


software.



Installation in progress.....

Step 7.
When your system finish the installation, the dialog box as the screen shot to the right appears. Click **Finish** to return to the setup main screen.



Step 8.
You can now exit the setup program by

Leadtek®
We Make Dreams a Reality

FOR PC

Hardware Installation

Note: The system may not function properly if you connect the GPS 9531 to your computer before the driver is installed.

Step 1.

USB Version

Connect the RJ11 connector of the GPS 9531 to the USB cable as shown in the figure to the right.

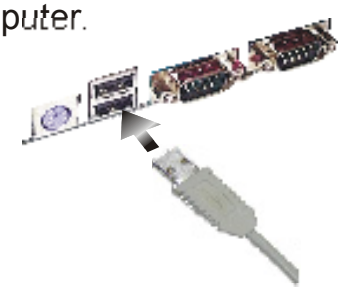
RS232 Version

Connect the RJ11 connector of the GPS 9531 to the Y-shaped cable (RS232-PS2) as shown in the figure to the right.

Step 2.

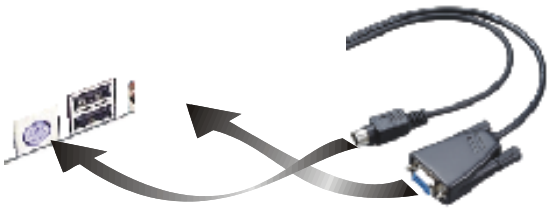
USB Version

As in the figure below, connect the USB connector to a USB port on your computer.



RS232 Version

Connect the RS232 connector to a COM port on your computer, and PS2 connector, a PS2 port.



Step 3.

Computers with USB connectors all have the USB driver built-in on the system. The system will automatically search for the driver and install it when you power on your computer.

Step 4.

The installation is completed.

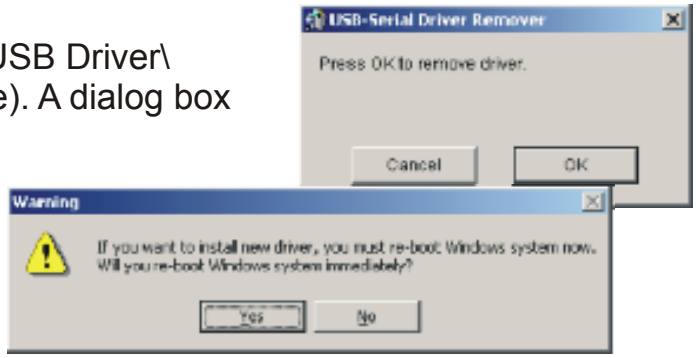
Leadtek®
We Make Dreams a Reality

FOR PC

Uninstalling 9531 USB Driver

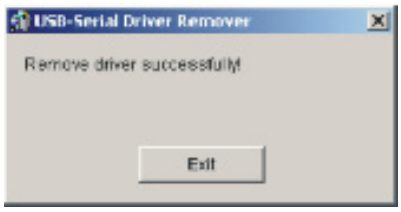
Step 1.
Detach the cables connecting your PC and the GPS 9531. **Note:** This step is vital to the successful uninstallation of the 9531 USB driver.

Step 2.
Run **DRemover98_2K.exe** at E:\USB Driver\ (assuming E: is the CD-ROM drive). A dialog box as the figure to the right appears.



Step 3.
A message telling you the driver has been removed appears. Close the message box.

Step 4.
A dialog box appears prompting you to restart your computer. Click Yes to finish removing the driver and reboot.



Uninstalling WinFast Navigator

Step 1.
Open the **Control Panel** window by clicking on **Control Panel** on the **Settings** submenu of the **Start** menu.

Step 2.
Double click on the **Add/Remove Programs** icon. Select **WinFast Navigator** from the program list. And then click the **Remove** button.

FOR PC

WinFast Navigator for PC

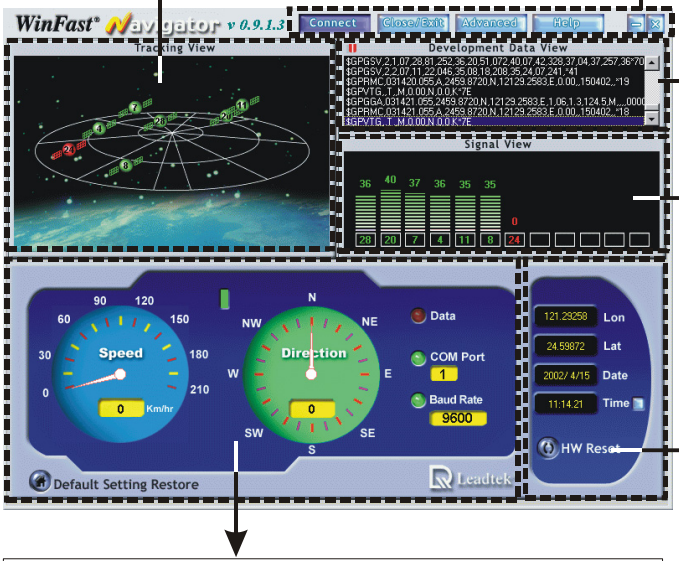
The WinFast Navigator allows you to control the function of the module using an easy-to-use application.

Application Main Screen

When you run the application, the main screen appears as the figure below.

Tracking View Window shows the positions of satellites of the tracking view in a dynamic 3-dimentional picture. See page 10 for detail.

Tool Bar includes buttons that control the connection and settings of the receiver. See page 10 for detail.



Development Data View Window shows the data received by the PC through the connection with the GPS 9531. See page 11 for detail.

Signal View Window displays a dinamic graph that shows The signal strength of satellites used to navigate. See page 11 for detail.

Connection Information shows the speed and direction of the subject, and the connection status between the PC and GPS 9531. See page 12 for detail.

Position Window shows the position data. See page 13 for detail.

Tool Bar

Connect
Press to initiate the connection with the GPS 9531 and start receiving data. Connection properties can be configured using the **Advanced** settings dialog box.

Close/Exit
Close and exit the application.

Advanced
Press to open the Advanced settings dialog box, which allows you to configure for the GPS 9531.

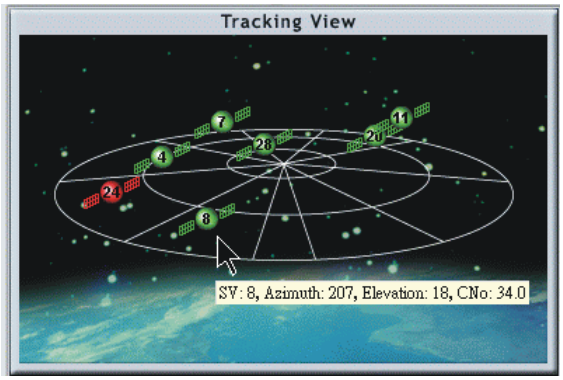
Help
Press to view the WinFast Navigator online help.

Minimize
Minimize the WinFast Navigator application window.

Close/Exit
Close the WinFast Navigator application.

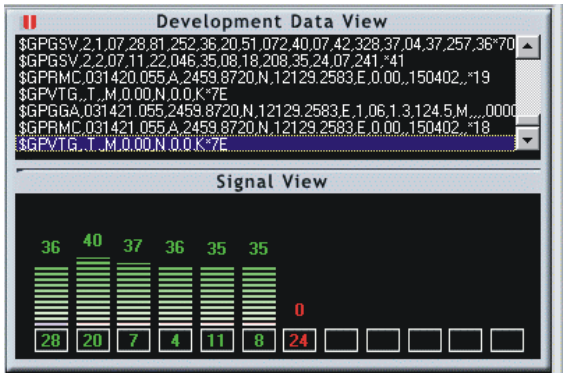
Satellite Tracking View Window

This window shows the relative positions and numbers of satellites on the tracking view in a dynamic 3-dimentional picture. Move the mouse cursor to a satellite to view the detailed information, including SV (satellite number), azimuth*, elevation and CNo (satellite signal strength), in a message box as shown in the figure.



***Azimuth:** The horizontal angular distance from a reference direction, usually the northern point of the horizon, to the point where a vertical circle through a celestial body intersects the horizon, usually measured clockwise. Sometimes the southern point is used as the reference direction, and the measurement is made clockwise through 360.*

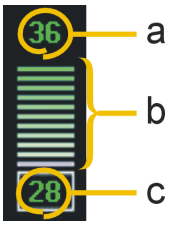
Satellite Data and Signals



This part of the main screen shows the data received by the PC through the connection with the GPS 9531 in the **Development Data View** window. The signal strength of satellites that are used for navigattion are shown on the graph in the **Signal View** window.

Development Data View Window

This window outputs the NMEA messages from the GPS 9531 through an RS232 connection. (See **Advanced Settings** on page 14 for how to configure the output messages).



Signal View Window

a. The number on top of the bar is the C/N reading of the satellite, which indicates the strength of the satellite signal. A satellite that is used for navigation should have a minimal C/N reading of 38.

b. The bars on the graph indicates the signal strength the GPS received. The color of the bars indicates the validity of the received data; green indicates that received data is valid for navigation, purple indicates received data is uncertain, and red indicates the GPS 9531 is unable to obtain data of the satellite.

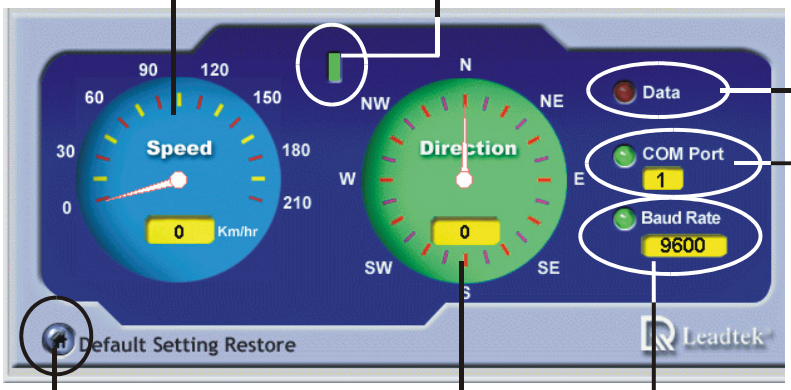
c. The number in the block on the bottom of each bar is the number of a satellite in the tracking view. The color of the number indicates the validity of the satellite for navigation; green indicates that the satellite is good for navigation, purple indicates received data of the satellite is uncertain, and red indicates the GPS 9531 is unable to obtain data of the satellite.

Connection Information

This part of the main screen shows the speed and direction of the subject, and the connection status between the PC and GPS 9531.

Speed
Shows the speed of the moving subject in kilometers per hour.

Fix Indicator
Red light indicates the GPS 9531 does not have a fix, and the output data displayed on the main screen is not valid. Green light indicates the GPS has a fix, and the navigation has started.



Data Transmission Indicator
When data is being transmitted through a COM port, this indicator blinks red light.

Direction
Shows the moving direction of the navigating subject.

COM Port Used
The COM port the GPS is using for transmitting data. Normally it is either (COM) 1 or (COM) 2.

Restore Default Button
Press this button to reset all settings as default. Settings made using the Advanced dialog box will not be valid.

Baud Rate
The Baud Rate of the current data transmission.

Position Data

Lon
The longitude of the current position the GPS 9531 outputs.

Lat
The latitude of the current position the GPS 9531 outputs.

Date & Time
The date and time shown here are in GMT (Greenwich Mean Time) as the result of GPS's calculation. To change them to your local time, click the square button to the right of **Time.**

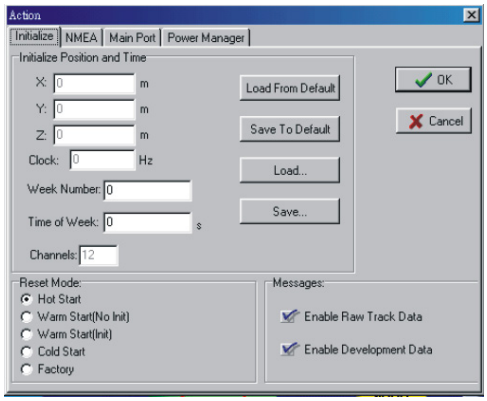
HW Reset
Press this button to reset the GPS 9531.

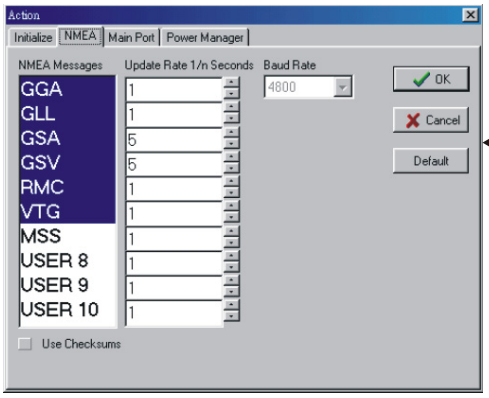
Advanced Settings

Press **Advanced** on the tool bar; a 4-tabbed dialog box appears, which includes four setting groups described as follows:

Initialize Settings

Click the Initialize tab to open the dialog box for setting the initialize position and time, and reset mode.



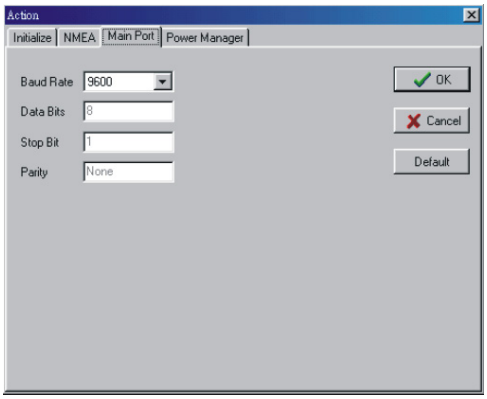


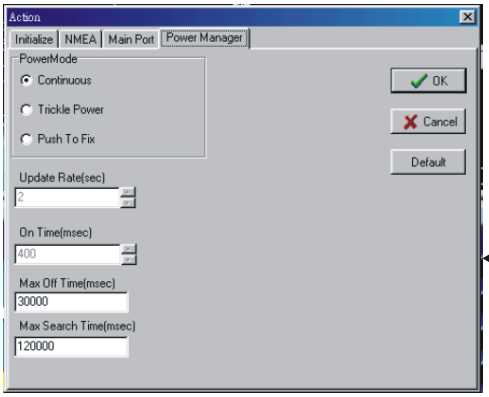
NMEA Messages Settings

Click the NMEA tab to open the dialog box that allows you to control how the NMEA messages are being output.

Main Port Settings

Click the Main Port tab to open the dialog box and setup for COM port.





Power Manager Settings

Click the Power Manager tab to open the dialog box for setting the power mode and its behavior.

Start Navigating

Before you start navigating, make sure the GPS 9531 has been connected to your computer and the driver and software have been installed.

Step 1.

Open the WinFast Navigator application. Click the **Connec**t button on the tool bar of the main screen (see page 10). The WinFast Navigator will start detecting for protocol and receiving data.

Note: After clicking the **Connect** button, check the **Data Transmission Indicator** (see page 12) for data transmission. The indicator blinks red light to indicate data is being transmitted. If the indicator does not respond for a period of time, the **Advanced Settings** dialog box appears automatically. Now make sure the GPS and driver are installed properly, and change the settings and receive data manually.

Step 2.

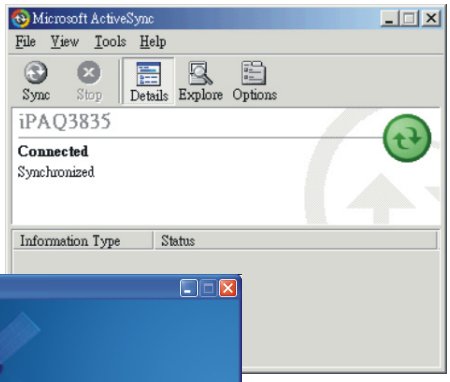
When the connection is established, the **Development Data View** window will start outputting NMEA messages, which tells you the GPS is working properly. Now look at the **Fix Indicator** between the **Speed** and **Direction** meters (see page 12) and wait for a fix (green light). When the green light is on, the received data becomes valid.

Step 3.

Use the **Advanced Settings** dialog box to change the settings of the GPS 9531 when such a change is required.

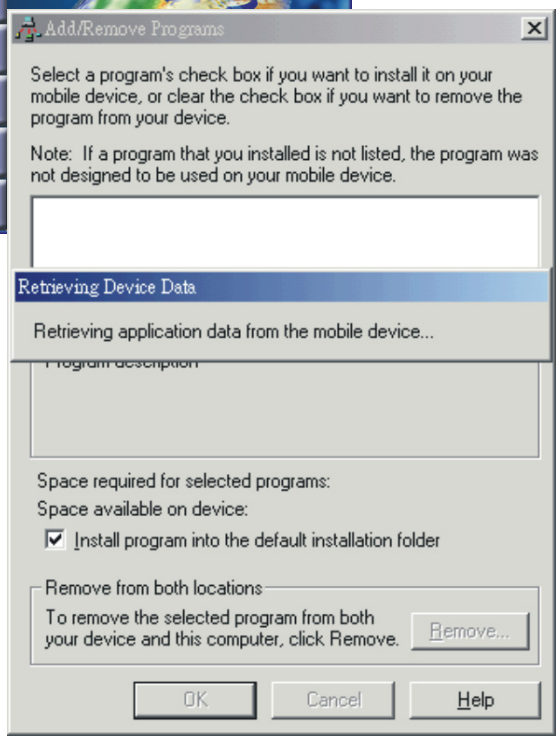
Installing WinFast Navigator for Pocket PC

Note :
Microsoft ActiveSync has to be installed on your computer when you install WinFast Navigator. The application interface is shown in the figure to the right.



Step 1.
Insert the software CD in your CD-ROM drive. The setup screen appears as shown in the figure to the right. If the setup screen does not appear automatically, run install.exe on the CD. Click **WinFast Navigator CE** to initialize the installation.

Step 2.
The **Add/Remove Programs** dialog box appears. An information box on top of it tells you the application is **Retrieving application data from the mobile device**. (See the figure to the right)



Step 3.
The application will next determine the destination location. A dialog box appears asking if you want to install the application at the default location, which is **Main Memory** on your PDA/pocket PC. Click **Yes** to install WinFast Navigator at that location. Click **No** to change the location using the next dialog box (see the second figure) which contains a selection box with 2 destination options: **Main Memory** and **iPAQ File Store**. Select one as desired and then click **OK**.

Step 4.
A dialog box appears showing the progress of installation. (See the figure to the right.)

Step 5.
When the installation is completed, a dialog box tells you to check your mobile device screen to see if additional steps are necessary to complete this installation. Click **OK**.

Leadtek®
We Make Dreams a Reality

FOR PDA

Hardware Installation

Step 1.
Make sure you have purchased the model with a suitable cable for your PDA/pocket PC. The cable comes in different specifications to suit several types of devices.

Step 2:
Connect the GPS-9531 and the cable.

Step 3:
Connect the cable to the PDA/Pocket PC.

Step 4:
Plug the cigarette lighter adapter into the cigarette lighter socket of your vehicle or a 12V power supply.

Step 4:
Turn on your PDA and adjust your PDA settings.

WinFast Navigator for PDA with WInCE

The WinCE WinFast Navigator allows you to control the function of the module using an easy-to-use application.

Application Main Screen

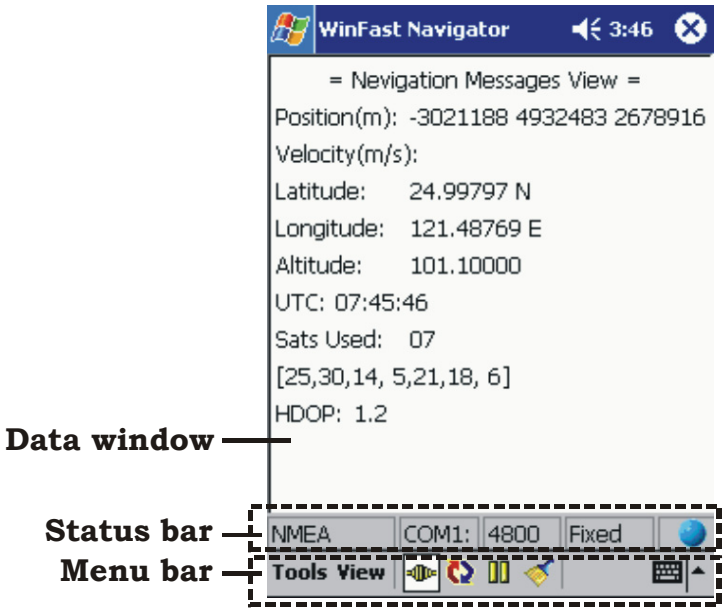
When you run the application, the main screen appears as shown in the figure below:

The main screen include three major parts:

1. **Menu bar**
   Provides accesses to all information and setting options.

2. **Status bar**
   Shows the current status, including the connection with the GPS, and the satellite data being received.

3. **Data window**
   Shows the contents of each screen.



Reading Status Bar

1. 2. 3. 4. 5.

Box 1

Shows the current status of connection with the GPS in one of four possible messages:

- **Disconnect**:
  The GPS is not connected.
- **Connect...**:
  Displayed when Protocol Parser fails. The reason may be that the COM port has not been correctly set up.
- **NMEA**:
  The data being received is in NMEA protocol.
- **SiRF**:
  The data being received is in SiRF Protocol.

Box 2

Indicates the COM port currently used.

Box 3

Shows the Baud Rate of the current COM port.

Box 4

Indicates whether the satellites are in their positions by showing **Fixed** or **Unfixed**.

Box 5

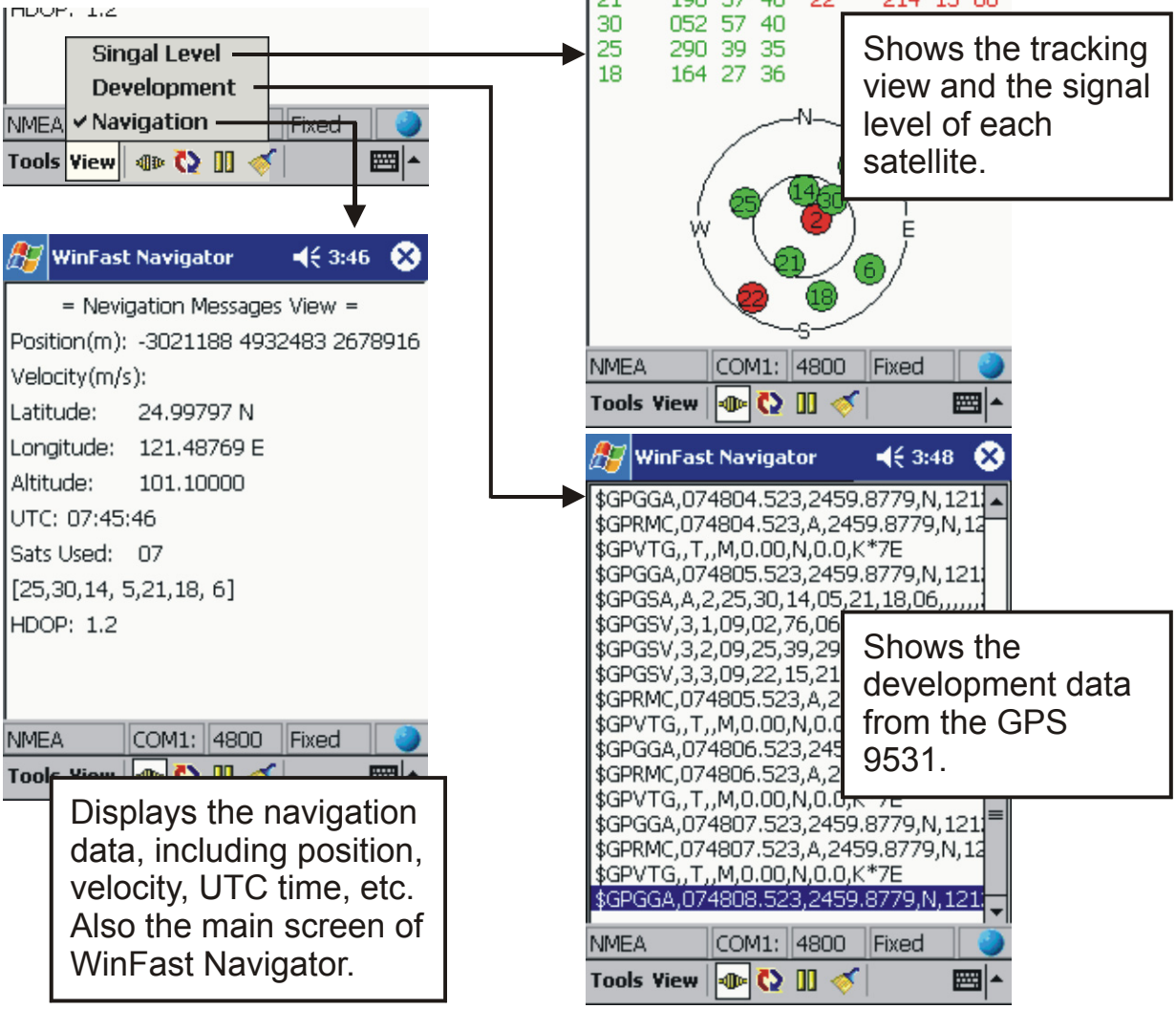
The ball-shaped icon is the data receiving indicator.

: The COM port is currently not receiving data.

: The COM port is receiving data.

Navigation Messages

On the menu bar click **View**. A menu with 3 options appears as shown in the figure below.



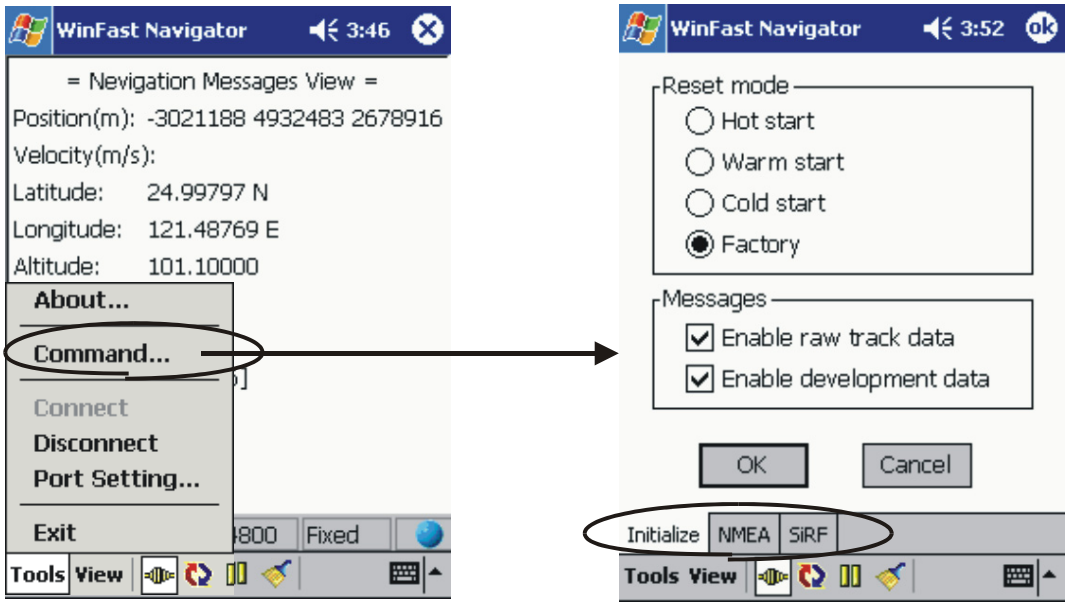
Configuration Tools

On the menu bar click **Tools**. A menu with the following options appears (see the figure on the left below):

About
Command
Connect
Disconnect
Port Setting
Exit

Command

Select **Command** and an additional menu bar appears on the bottom of the data window that includes 3 tabs: **Initialize**, **NMEA**, and **SiRF** (see next page)..

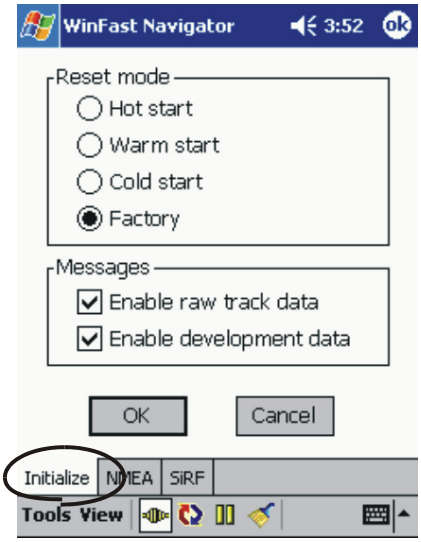


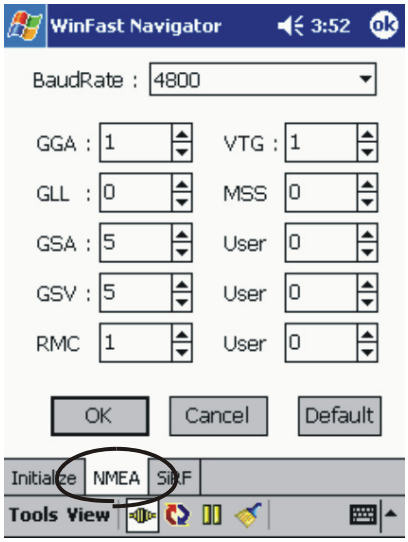
(Continued at next page)

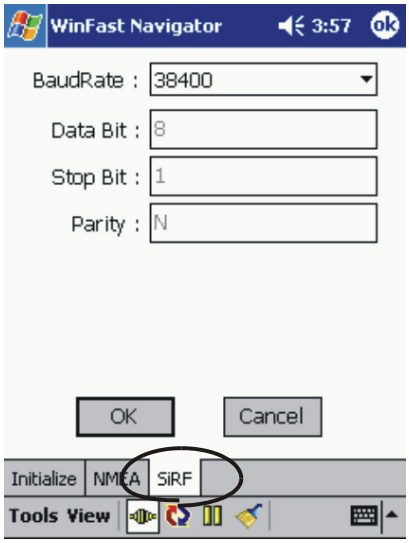
Configuration Tools (Cont'd)

(Continued from last page)

The **Initialize**, **NMEA**, and **SiRF** configuration screens under **Command** are as shown in the figures below:







Initialize screen provides options for the reset mode and protocol data transmission.

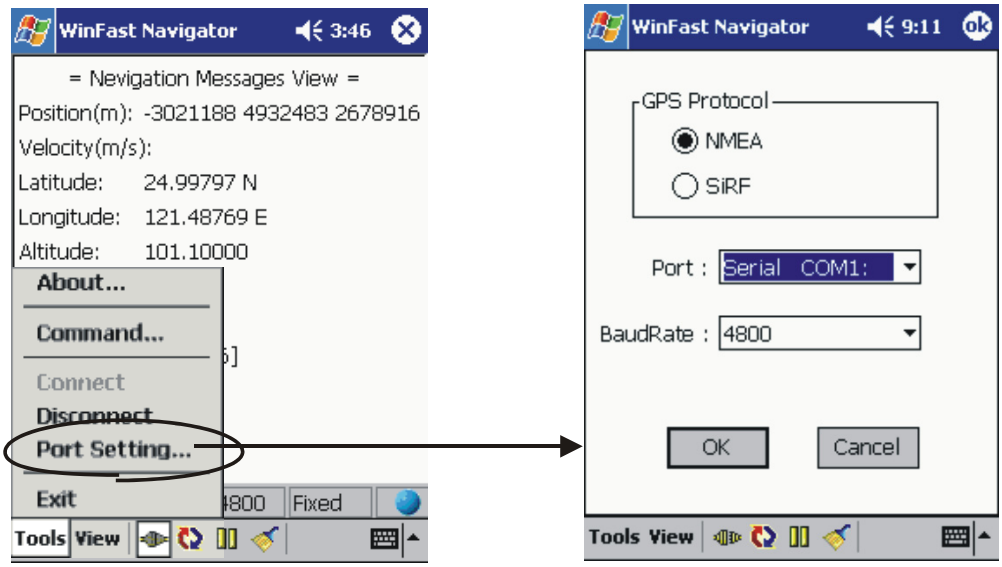
The SiRF screen allows you to set the data transmission format and default

The NMEA screen allows you to control how the NMEA messages Are being out put.

Configuration Tools (Cont'd)

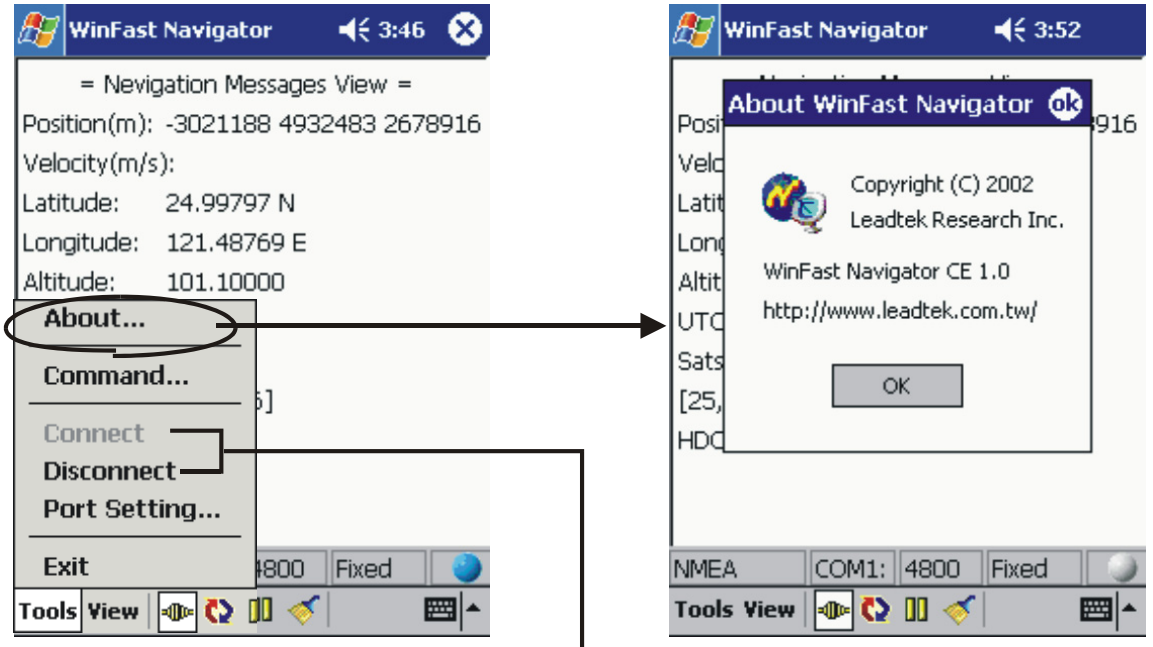
Port Setting

Select **Port Setting** from the **Tools** menu and the Port Setting screen appears. It allows you to set the GPS protocol and the connecting port.



Configuration Tools (Cont'd)

Connect, Disconnect & About



Select **About** on the Tools menu to view the copyright and version information.

Select **Connect** to start the connection, and **Disconnect** to terminate it.

Quick Buttons on Menu Bar

Connect

Press to build connection with the GPS module.

: The GPS is not connected.

: The GPS is connected.

Automatically detect communication protocol

When this button is pressed, the system will automatically detect the GPS Protocol and Baud Rate of the port currently enabled.

Pause

Press to pause the data displayed in Development View.

Clear

Press to clear the data in Development View.

APPENDIX

Appendix A Technical Specifications

Electrical Characteristics

General

Frequency	L1, 1575.42 MHz
C/A code	1.023 MHz chip rate
Channels	12

Accuracy

Position	15 meters
Velocity	0.1 meters/second.
Time	1 microsecond synchronized to GPS time

Minimum signal strength

Strength	-140dbm

Datum

WGS-84

Acquisition Rate

Reacquisition	0.1 sec., average
Hot start	8 sec., average
Warm start	38 sec., average
Cold start	48 sec., average

Dynamic Conditions

Altitude	18,000 meters (60,000 feet) max.
Velocity	515 meters/second (1000 knots) max.
Acceleration	4g, max.
Jerk	20 meters/second3, max.

APPENDIX

Electrical Characteristics (Cont'd)

Power

Main power input	5.0 ± 5% VDC input
Power consumption	0.9 W at 5 VDC
Power connector	Universal connector (RJ-11)
Backup power	3 V Lithium-Ion rechargeable battery

Serial Port

Electrical interface	One UART for Data INPUT (RX) and OUTPUT (TX)
Protocol messages	SiRF binary and NMEA-0183, version 2.20 with a baud rate selection. SiRF binary- position, velocity, altitude, status, and control NMEA - GGA, GLL, GSA,GSV, RMC and VTG

Cable Length

GPS9531 for RJ-11	RJ-11 type plug to Smart Antenna: 1500mm

Environmental Characteristics

Operating temperature range	-40 deg. C to +85 deg. C
Storage temperature range	-55 deg. C to +100 deg. C

Physical Characteristics

Length	78 mm (3.07 in)
Width	73.0 mm (2.67 in)
Height	26 mm (1.02 in)
Weight	380 g
Interface connector	GPS9531 for RJ-11: Standard RJ-11 type plug

APPENDIX

Interfaces

1. One channel RS-232 serial interface with user selectable baud rate (4800, 9600, 19200, 38400)
2. NMEA 0183 Version 2.0 ASCII output (Data format is GGA, GLL, GSA, GSV, RMC, VTG)
3. You can use Leadtek GMonitor or Winfast Navigator software to test the smart antenna and change communication baud rate or data protocol.
4. Universal connector available for different PDA/Pocket PC/Smart Phone.
5. We strongly suggest that you make use of Leadtek standard NMEA setting, that is, baud rate is 9600 and data output is GGA(output once per 1 sec), GSA(output once per 5 sec), GSV(output once per 5 sec), RMC(output once per 1 sec), VTG(output once per 1 sec).

Appendix B Warranty

Leadtek warrants to the original purchaser of this product that it shall be free of defects resulting from workmanship or components for a period of one (1) year from the date of sale. Defects covered by this Warranty shall be corrected either by repair or, at Leadtek's discretion by replacement. In the event of replacement, the replacement unit will be warranted for the remainder of the original one (1) year period or thirty (30) days, whichever is longer. THERE ARE NO OTHER ORAL OR WRITTEN WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THOSE OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

This Limited Warranty is nontransferable and does not apply if the product has been damaged by negligence, accident, abuse, misuse, modification, misapplication, shipment to the Manufacturer or service by someone other than the Leadtek Transportation charges to Leadtek are not covered by this Limited Warranty. To be eligible for warranty service, a defective product must be sent to and received by Leadtek within fifteen (15) months of the date of sale and be accompanied with proof of purchase. Leadtek does not warrant that this product will meet your requirements; it is your sole responsibility to determine the suitability of this product for your purposes. Leadtek does not warrant the compatibility of this product with your computer or related peripherals, software.

LEADTEK'S SOLE OBLIGATION AND LIABILITY UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT OF A DEFECTIVE PRODUCT. THE MANUFACTURER SHALL NOT, IN ANY EVENT, BE LIABLE TO THE PURCHASER OR ANY THIRD PARTY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LIABILITY IN TORT RELATING TO THIS PRODUCT OR RESULTING FROM ITS USE OR POSSESSION.

This limited warranty is governed by the laws of Taiwan.

Leadtek®
We Make Dreams a Reality

Leadtek Research Inc.

International Headquarters
18th Fl., 166, Chien-Yi Rd.
Chung Ho, Taipei Hsien
Taiwan (235)
Phone: +886 (0)2 8226 5800
Fax: +886 (0)2 8226 5801
http://www.leadtek.com.tw
E-Mail: gpssales@leadtek.com.tw

United States Headquarters
46732 Lakeview Blvd.
Fremont, CA 94538
U.S.A.
Phone: +1 510 490 8076
Fax: +1 510 490 7759
http://www.leadtek.com

Europe Headquarters
Antennestraat 16 1322 AB
Almere
The Netherlands
Phone: +31 (0)36 536 5578
Fax: +31 (0)36 536 2215
http://www.leadtek.nl

***WinFast*® PortaNav Manual**
Version C
August 2002

CODE: LR9531
P/N: W0500656