USB GPS sensor driver for Windows 7 location and sensor platform

User Guide



Abstract

This document describes the use and installation of u-blox USB Location Sensor driver for the Windows 7 operating system to be used with u-blox GPS receivers.

www.u-blox.com





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1 Introduction

The Windows 7 operating system provides built-in support for sensor devices including location sensors, such as GPS devices. As part of this support, the Windows Sensor and Location platform provides a standard way for u-blox to expose GPS Location sensor devices. At the same time, the platform gives developers a standardized API and device driver interface (DDI) to work with sensors and sensor data.

The u-blox USB sensor driver connects all u-blox GPS receivers to the sensor and location API structure for Windows 7. It parses and converts u-blox GPS messages into the standard sensor properties, which can be accessed by the location and sensor APIs. (see Figure 1)

1.1 About location sensor devices

The Windows Sensor and Location platform organizes sensors into *categories*, which represent broad classes of sensor devices, and *types*, which represent specific kinds of sensors. In Windows 7, a GPS sensor is part of the Location category.

1.2 u-blox sensor and location platform

The following diagram shows the relationship between user and u-blox components:



Figure 1: Overview of u-blox drivers and applications with Windows

1.3 Sensor API

The Sensor API enables C++ developers to create sensor-based programs by using a set of COM interfaces. The API defines interfaces to perform common sensor programming tasks that include managing sensors by category, type, or ID, managing sensor events, working with individual sensors and sensor collections, and working with sensor data. The Windows SDK includes header files, documentation, samples, and tools to help guide software developers on how to use sensors in Windows programs.



1.4 Location API

Built on the Sensor API, the Location API provides an easy way to retrieve data about geographic location while protecting user privacy. The Location API provides its functionality through a set of COM interfaces that represent objects. These objects can be used by programmers who understand how to use COM through the C++ programming language, or in scripting languages, such as JScript. Scripting support gives easy access to location data for projects that run in the Local Computer zone, such as gadgets. The Windows SDK includes header files, documentation (including scripting reference documentation), samples, and tools to help guide Web and software developers on how to use location information in their programs.

For more information see the Introduction to Microsoft's Sensor and Location Platform in Windows[3].

1.5 Sensors control panel

Windows 7 includes a control panel that lets computer administrators enable or disable sensors system-wide or for each user. Because some sensors can expose sensitive data, this user interface gives administrators control over whether all programs have access to each sensor for each user. Users can also view Location sensor properties and change the sensor description that is displayed in the user interface.

The Control Panel also provides a Default Location page to enable users to provide their location. When no sensor is available, the platform will use the user-provided location. Users can provide civic address fields, which include the street address, city, state or province, and country or region.

For more information see the Introduction to Microsoft's Sensor and Location Platform in Windows[3].



2 u-blox environment

2.1.1 Location sensor

In Windows 7, u-blox GPS receivers are classified within the sensor part of the Location category.

2.1.2 Sensor driver

u-blox has created a USB sensor driver connecting all u-blox GPS receivers to the Windows 7 sensor and location platform. The u-blox Location Sensor driver conforms to Microsoft's Windows Driver Model. It is based on the Windows User Mode Driver Framework (UMDF) and supports the USB suspend mode. The driver is WHQL certified.

The u-blox sensor driver parses u-blox NMEA and UBX proprietary messages [2] to convert latest location information (e.g. latitude, longitude, altitude) as sensor data to the location and sensor platform. Supported sensor data and properties are listed in Appendix A.

Beside this sensor driver u-blox provides a virtual com port driver to help customers connecting/testing u-blox GPS receivers with legacy Windows NMEA-based applications. This solution is intended to help u-blox' customers to smoothly migrate their legacy location application to the Windows 7 location and sensor platform. u-blox recommends the latter approach in accordance with Microsoft sensor and location API utilization policy.

2.1.3 u-center

The u-center GPS Evaluation Software provides a powerful platform for u-blox GPS product evaluation, configuration, testing and real-time performance visualization of u-blox GPS receiver products. It also provides AssistNow client functionality for A-GPS.

From version 5.08, u-center allows collection and monitoring of location and u-blox sensors properties and data (see Appendix A). Users can access this functionality by activating either the Location API or the bidirectional Sensor API functions (see Appendix B). u-center converts sensor data and property into NMEA and UBX-similar messages to benefit from all u-center evaluation features and therefore all u-blox aiding, reset (e.g. warm start) and other u-blox proprietary functionalities.

The Sensor API initiates events whenever sensor data and property events are generated (like Location API functions). The bidirectional sensor API also features access to u-blox proprietary messages through the Sensor API proprietary property fields (see section "Basic functionality" in Appendix B).

u-center software with location API capabilities is available free of charge. Please download this version from the u-blox website.



3 u-blox driver installation

To be able to use the Sensor, you have to

- i. Install the Sensor driver (See 3.1)
- ii. Connect the device (See 3.3)
- iii. Enable the sensor (See 3.3)

To use the Virtual Com Port (VCP), you have to

- i. Install the VCP driver (See 3.1)
- ii. Add the VCP on Device Manager (See 3.2)

The following sections explain the installation procedure.

3.1 Driver installation with the installer

This section explains the installation of both Sensor driver and Virtual COM Port (VCP) driver with the installer.

- Download the installer though the following link : http://www.u-blox.com/en/usb-drivers/windows-7-driver.html
- 2) Double-click on the downloaded file ublox_A4_U5_USB_drv3264win7_install_UI.exe
- 3) On the pop-up window, select the language and then accept the License Agreement.

ſ	😧 u-blox Windows 7 USB driver Setup
	License Agreement Please review the license terms before installing u-blox Windows 7 USB driver.
	Press Page Down to see the rest of the agreement.
	J-BLOX USB DRIVERS SOFTWARE LICENSE AGREEMENT
staller Language	This Software License Agreement ("SLA") is a legal agreement between you (either an individual or a single entity) and u-blox for the u-blox software that accompanies this SLA, which includes computer software and may include associated media, printed materials, "online" or electronic documentation, and Internet-based services ("Software"). An amendment or addendum to this SLA may accompany the Software. YOU AGREE TO BE BOUND BY THE TERMS OF THIS SLA BY INSTALLING, COPYING, OR OTHERWISE USING THE SOFTWARE. IF YOU DO NOT AGREE, DO NOT INSTALL, COPY, OR USE THE SOFTWARE, YOU MAY CONTINUE TO USE U-BLOX PRODUCTS WITH THE "SOFTWARE", F.G. BY COMMUNICATING VIA UART, DDC OR SPI INTERFACES.
Please select a language.	, If you accept the terms of the agreement, dick I Agree to continue. You must accept the agreement to install u-blox Windows 7 USB driver.
English	
OK Cancel	< Back I Agree Cancel

4) On the installer window as shown below, select the driver (USB Sensor driver, Virtual Com Port driver, or both like shown on this picture) to be installed.



iccate, communicate, accelerate	Choose Components Choose which features of u-blox Windows 7 USB driver you want to install.	
Check the components yo install. Click Install to star	ou want to install and uncheck the components you don't want to t the installation.	
Select components to inst	tall: USB Sensor driver files Virtual Com Port driver file see its description.	
		Both drivers selected. Click on th
Space required: 21.1MB	< >	box to remove the check.
	< Back Instal Cancel	

When USB Sensor driver is selected, Device Driver Installation Wizard will start installation of the USB Sensor driver first. Click on 'Next'. When only Virtual Com Port driver is selected, go to 7).

5) The window should appear as shown in the following picture. Click on 'Finish' to complete USB Sensor driver installation. When only the USB Sensor driver has been selected at step 4), installation is almost finished. Go to 8).

Device Driver Installation Wiza	rd		
	Completing the Device Driver Installation Wizard		
	The drivers were successfully in	stalled on this computer.	
	You can now connect your dev came with instructions, please re	ice to this computer. If your device ad them first.	
	Driver Name	Status	
	✓ u-blox AG (WUDFRd) S	Ready to use	
	< Back	Finish Cancel	

- 6) The Device Driver Installation Wizard starts for Virtual Com Port driver installation. Click on 'Next'. The Wizard starts the installation.
- 7) The window should appear as shown. Click on 'Finish' to complete the driver installation. At this stage, only the driver is installed but the port itself still needs to be added. To add it, go to section 3.2.



Device Driver Installation Wizard				
	Completing the Device Driver Installation Wizard			
	The drivers were successfully installed on this computer.			
	You can now connect your device to this computer. If your device came with instructions, please read them first.			
	Driver Name	Status		
	✓u-blox AG (ubloxVcp) Po	Ready to use		
< Back Finish Cancel				

8) On the installer window as shown below click on 'Finish' to complete the driver installation.

😲 u-blox Windows 7 USB drive	er Setup
	Completing the u-blox Windows 7 USB driver Setup Wizard u-blox Windows 7 USB driver has been installed on your computer.
	Click Finish to close this wizard.
	u-blox Website



3.2 Virtual COM Port installation

Once the Virtual COM Port (VCP) driver has been installed, it needs to be added to the Device Manager through the following procedure:

1) From the Start menu, right click on the 'Computer' icon and then select 'Manage' from the pop-up menu.

u-Center - Shortcut		
Desktop Gadget Gallery	admin	
🧭 Paint 🔸	Documents	
Getting Started	Pictures	
Windows Media Center	Music	
Calculator	Games	
Sticky Notes	Computer	Open
Spinning Tool	Control Panel 😽	Manage
Notenad	Devices and Prir	Map network drive Disconnect network drive
	Default Program	Show on Desktop
Remote Desktop Connection	Help and Suppo	Rename
All Programs		Properties
Search programs and files	Shut down 🕨	
😰 🤌 📳 🛛		

- 2) In the Computer Management window, select 'Device Manager' from the list of icons on the left.
- 3) In the main part of the window, right click on the top (root) device and then select 'Add legacy hardware'.



4) The device install wizard (Welcome to the Add Hardware Wizard) should start. Select 'Next'.



- 5) On the following page (The wizard can help install other hardware), choose "Install the hardware that I manually select from a list (Advanced)" then click on 'Next'.
- 6) On the following page (From the list below, select the type of hardware you are installing), choose (COM & LPT) and click on 'Next'.
- 7) On the following page (Select the device driver you want to install for this hardware.), first select u-blox AG under Manufacturer. u-blox Virtual COM Port then appears under Model; select u-blox Virtual COM Port and click on Next.

Select the manufacturer an disk that contains the drive	d model of your hardware device and then click Next. If you have a r you want to install, click Have Disk.
Manufacturer	Model
(Standard port types) Microsoft u-blox AG	🔄 u-blox Virtual COM Port
This driver is digitally signed.	Have Disk

8) Now the wizard is ready to install the VCP. Click on 'Finish' on the following window.

Add Hardware	
The wizard is ready to install your hardware	
Hardware to install:	
u-blox Virtual COM Port	
To start installing your new hardware, click Next.	
< Back Next >	Cancel

9) The window should appear as follows. Click on 'Finish'.



Completing the Add Hardware Wizard
The following hardware was installed: u-blox Virtual COM Port
windows has infished installing the software for this device.



3.3 Connecting the GPS sensor

Once the Sensor driver has been installed (see 3.1), the device can be connected to any USB port.

1) When the device is connected for the first time to any port, the driver is installed for the USB port, to which the device is connected, and the following message will be shown after the installation.



2) The installed drivers appear on the Device Manager as in the figure below.



3) The sensor needs to be enabled on Location and Other Sensors under Control Panel as shown below.



4) In order to see if the device works through the installed sensor, Weather Gadget can be used.





3.4 Uninstalling the drivers

1) On Program and Features, double-click on the driver package to uninstall as shown below.

😋 🔵 🗢 🧱 « All Control Pane	I Items 🕨 Programs and Features	🔻 🍫 Search Progr	rams and Feature	25 P
Control Panel Home View installed updates Turn Windows features on or off	Uninstall or change a program To uninstall a program, select it from the li Organize 🔻	ist and then click Uninstall, Chang	ge, or Repair.	≣ - ⊚
	Name		Publisher	Installed On
	Soogle Earth Windows Driver Package - u-blox AG (ublox Windows Driver Package - u-blox AG (WUDA	Vcp) Ports (08/18/2009 2.0.0.0) FRd) Sensor (08/26/2009 2.0.0.1)	Google u-blox AG u-blox AG	25.08.2009 03.09.2009 03.09.2009
	·			۲.
	Currently installed programs T 3 programs installed	fotal size: 32.2 MB		

2) The driver is now removed.



Appendix A: Supported sensor data & properties

For driver revision 2.0.0.1.

Read only properties

SENSOR PROPERTY CONNECTION TYPE SENSOR_PROPERTY_CURRENT_REPORT_INTERVAL SENSOR_PROPERTY_DESCRIPTION SENSOR_PROPERTY_FRIENDLY_NAME SENSOR_PROPERTY_MANUFACTURER SENSOR_PROPERTY_MIN_REPORT_INTERVAL SENSOR PROPERTY MODEL SENSOR PROPERTY PERSISTENT UNIQUE ID SENSOR PROPERTY SERIAL NUMBER SENSOR PROPERTY STATE SENSOR PROPERTY TYPE SENSOR_DATA_TYPE_TIMESTAMP SENSOR_DATA_TYPE_ALTITUDE_ELLIPSOID_METERS SENSOR_DATA_TYPE_ALTITUDE_SEALEVEL_METERS SENSOR_DATA_TYPE_ERROR_RADIUS_METERS SENSOR_DATA_TYPE_FIX_QUALITY SENSOR_DATA_TYPE_FIX_TYPE SENSOR_DATA_TYPE_HORIZONAL_DILUTION_OF_PRECISION SENSOR_DATA_TYPE_LATITUDE_DEGREES SENSOR_DATA_TYPE_LONGITUDE_DEGREES SENSOR_DATA_TYPE_POSITION_DILUTION_OF_PRECISION SENSOR_DATA_TYPE_SATELLITES_IN_VIEW SENSOR_DATA_TYPE_SATELLITES_IN_VIEW_AZIMUTH SENSOR_DATA_TYPE_SATELLITES_IN_VIEW_ELEVATION SENSOR_DATA_TYPE_SATELLITES_IN_VIEW_PRNS SENSOR_DATA_TYPE_SATELLITES_IN_VIEW_STN_RATIO SENSOR DATA TYPE SATELLITES USED COUNT SENSOR DATA TYPE SATELLITES USED PRNS SENSOR DATA TYPE SPEED KNOTS SENSOR_DATA_TYPE_TRUE_HEADING_DEGREES SENSOR_DATA_TYPE_VERTICAL_DILUTION_OF_PRECISION SENSOR_DATA_TYPE_ALTITUDE_ELLIPSOID_ERROR_METERS SENSOR_DATA_TYPE_ALTITUDE_SEALEVEL_ERROR_METERS SENSOR DATA TYPE GEOIDAL SEPARATION SENSOR_DATA_TYPE_GPS_OPERATION_MODE SENSOR DATA TYPE GPS SELECTION MODE SENSOR DATA TYPE GPS STATUS

Read/Write properties

SENSOR_PROPERTY_CURRENT_REPORT_INTERVAL SENSOR_PROPERTY_LOCATION_DESIRED_ACCURACY



Appendix B: u-center for Windows 7

Selection of the Sensor API functionality is shown in the figure below. When u-blox sensor is enabled, the Sensor API should blink green every time sensor location data events are generated.





Related Documents

- [1] u-blox GPS location sensor driver Release note, Doc No GPS- SW-09011
- [2] u-blox 5 Protocol Specification, Doc No GPS.G5-X-07003
- [3] Introduction to Microsoft's Sensor and Location Platform in Windows : http://www.microsoft.com/whdc/sensors_
- For regular updates to u-blox documentation and to receive product change notifications please register on our homepage.

Revision history

Revision	Date	Name	Status / Comments
-	03/09/2009	svin	Initial release



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