WinDriver™ USB Quick-Start Guide

A 5-Minute Introduction to Writing USB Device Drivers

Version 15.1.1

Who Should Use WinDriver?

- Hardware developers — Use DriverWizard to quickly test your new hardware.

- Software developers — Use DriverWizard to generate the device driver code to drive your hardware. Use the WinDriver tools to test and debug your driver.

Which Operating Systems Does WinDriver for USB Support?

- Windows 10/Server 2016/8.1/Server 2012 R2/8/Server 2012, Windows 10 IoT, and Linux. Check the Jungo Web site for updates on new operating systems support.

- WinDriver-based drivers are portable among all supported operating systems without any code modifications.

> OS-specific support is provided only for operating systems with official vendor support.

Where Can I Get More In-Depth Information?

- You can download a free, full-featured, 30-day evaluation of WinDriver, including documentation, from our web site: https://www.jungo.com/st/contact-form/?product=WinDriver.

- For user manuals, data sheets, FAQs, and other documentation, visit WinDriver Support page: https://www.jungo.com/st/support/windriver/.

7 Steps to Building Your Driver

1. **Set up**

   a. Connect your device to the USB bus.

   b. Install WinDriver.

2. **Select your device**

   a. Start DriverWizard — **<path to WinDriver>/wizard/wdwizard**. On Windows you can also run DriverWizard from the **Start** menu: **Start | Programs | WinDriver | DriverWizard**.

   > ℹ️ On Windows 7 and higher you must run DriverWizard as administrator.

   b. In the dialogue box that appears, choose **New host driver project**.

   DriverWizard will show all Plug-and-Play cards plugged in your machine.

c. Select your USB device from the list.
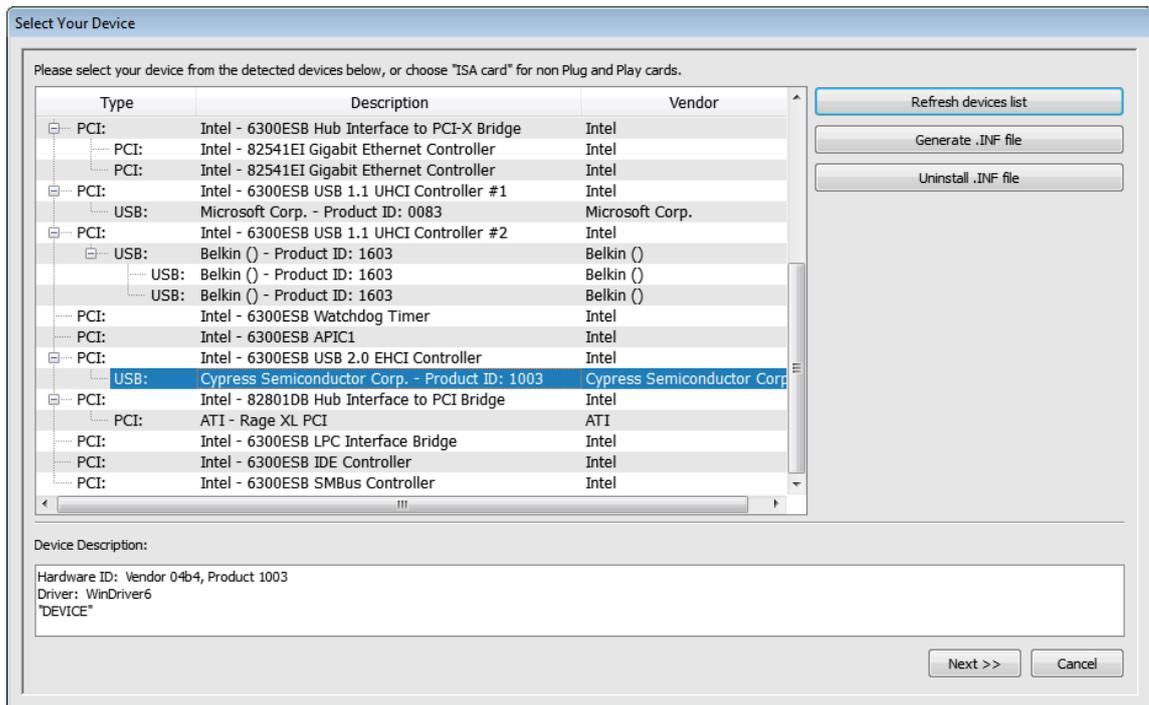
3. **Install an INF File for Your Plug-and-Play Device (Windows)**

On Windows operating systems, you must first generate and install an INF file that registers your USB device to work with WinDriver. If you attempt to view and access your device's resources without installing such a file, DriverWizard will notify you of the need to install an INF file.

DriverWizard automates the INF creation and installation process for you.

To generate and install an INF file with DriverWizard, follow these steps:

a. Click the **Generate .INF file** button or click **Next**.
DriverWizard will display information detected for your device — vendor ID, product ID, device class, manufacturer name and device name — and allow you to modify this information.

Enter Information for INF File

Please fill in the information below for your device.

This information will be incorporated into the INF file, which WinDriver will generate for your device.

The information you specify will appear in the Device Manager after the installation of the INF file.

Vendor ID: 04b4   Device ID: 1003

Manufacturer name: Cypress Semiconductor Corp.

Device name: DEVICE

Device Class: OTHER

WinDriver's unique Class.

Use this option for a non-standard type of device.
WinDriver will set a new Class type for your device.

☐ Support Message Signaled Interrupts (MSI/MSI-X)

☑ Automatically install the INF file.

   Note: This will replace any existing driver you may have for your device.

[Next]   [Cancel]

For **multiple-interface** USB devices, you can select to generate an INF file either for the composite device or for a specific interface.

• When selecting to generate an INF file for a specific interface of a multi-interface USB device, the INF information dialogue will indicate for which interface the INF file is generated.

- When selecting to generate an INF file for a composite device of a multi-interface USB device, the INF information dialogue provides you with the option to either generate an INF file for the root device itself, or generate an INF file for specific interfaces, which you can select from the dialogue.
  Selecting to generate an INF file for the root device will enable you to handle multiple active interfaces simultaneously.

- When using DriverWizard on Windows, you can choose to automatically install the INF file by checking the **Automatically Install the INF file** option in DriverWizard's INF generation dialogue.
  If the automatic INF file installation fails, DriverWizard will notify you and provide manual installation instructions.

b. Click **Next** in the INF generation dialogue in order to generate the INF file and install it (if selected).

c. When the INF file installation completes, select and open your device from the list described in Step 2.

4. **Open your hardware device**

    Choose the desired **alternate setting from the list.**
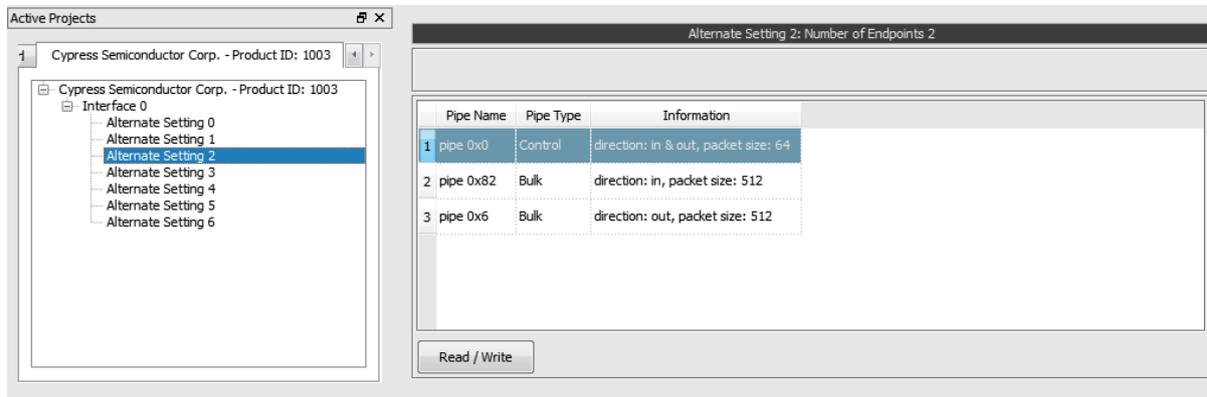
5. **Test your hardware**

    Before generating your device driver code, it is important to make sure your hardware is working as expected. Use DriverWizard to diagnose your hardware:

    • Select the desired pipe from the wizard's **Alternate Setting** window area, which displays the supported pipes for your selected alternate setting.

    • For a control pipe (a bidirectional pipe), click **Read / Write**. A new dialogue box will appear, allowing you to select a standard USB request or enter a custom request. Once you select a standard USB request, the setup packet array is automatically filled, and the request description is displayed in the dialogue box. For a custom request, you are required to enter a setup packet and write operation data:
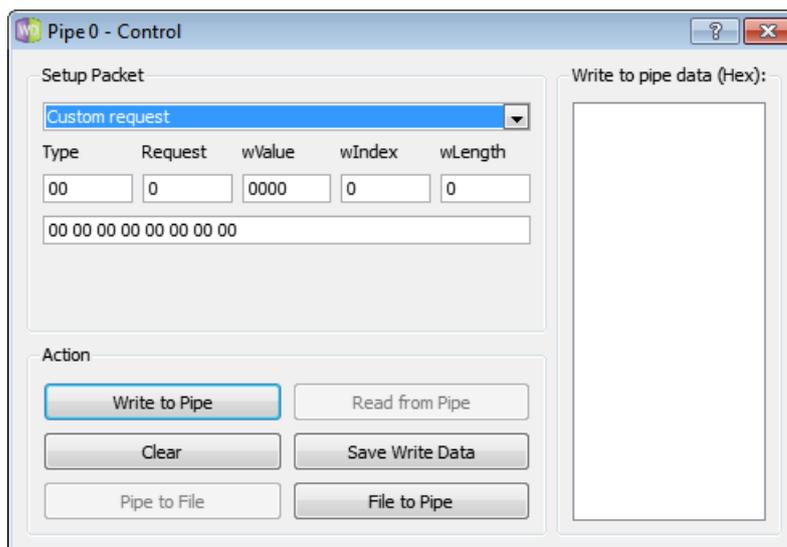
    • For an input pipe (moves data from device to host), click **Listen to Pipe**. To successfully accomplish this operation, you first need to verify that the device sends data to the host. If no data is sent after listening for a short period of time, DriverWizard will notify you that the transfer failed.

To stop reading, click **Stop Listening**.

You can also press the **Reset Pipe** button to reset the pipe.
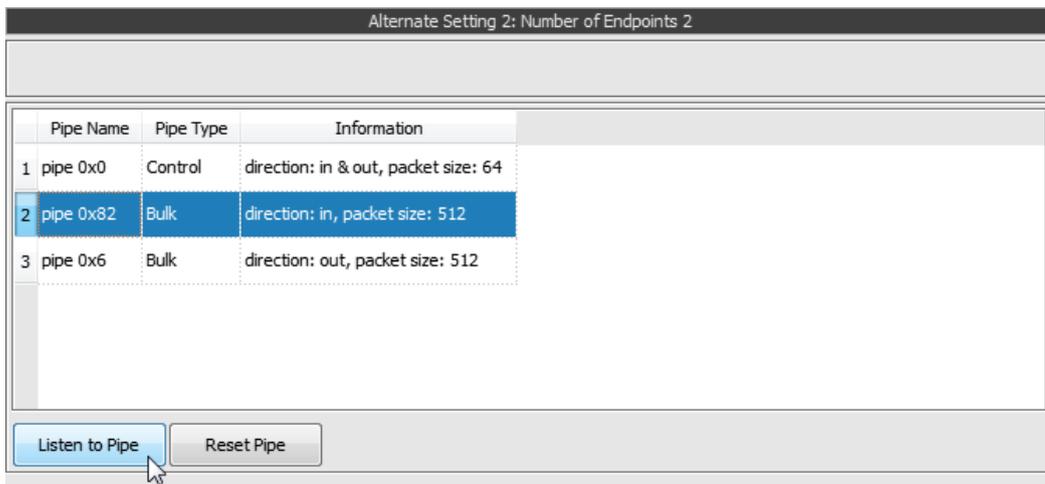
- For an output pipe (moves data from host to device), click **Write to Pipe**. A new dialogue box will appear, asking you to enter the data to write. The DriverWizard log will contain the result of the operation.

  You can also press the **Reset Pipe** button to reset the pipe.
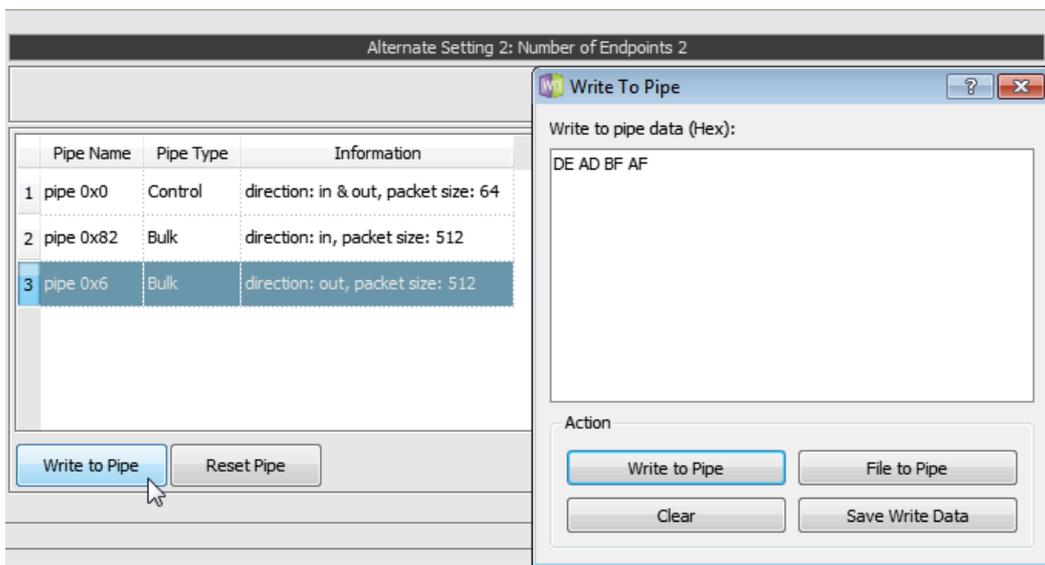
6. **Generate the driver code**

   a. Select to generate code either via the **Generate Code** toolbar icon or from the **Project | Generate Code** menu option.

   b. Choose the code language and target development environment(s) for the generated code:
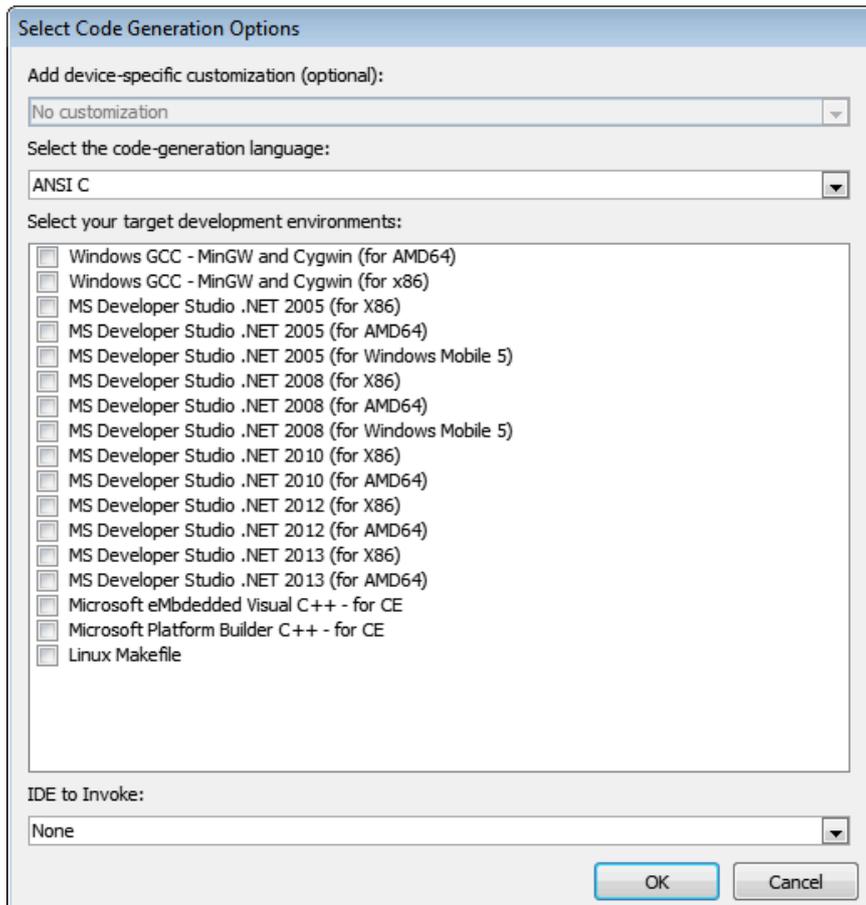
c. Click **OK**. DriverWizard will display a list of the generated files, and launch the development environment you selected to invoke in Step b above (if any).
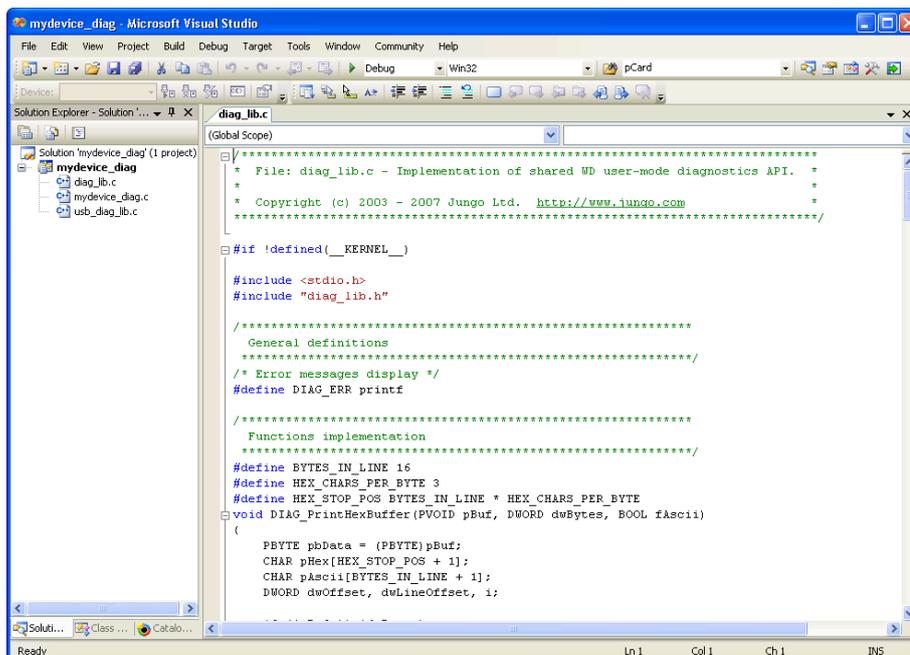
DriverWizard generates the following:

- API for accessing your hardware from the application level (and from the kernel).

- A sample application that uses the above API to access your hardware.

- Project make files for all of the supported operating systems and environments.

- An INF file for your device (on Windows).

7. **Compile and run**

- Use the make file that DriverWizard generated with your favorite compiler.

- Compile the sample diagnostics application, and run it! This sample is a robust skeletal code for your final driver.

- Modify the sample application to suit your application needs, or start from one of the many samples provided with WinDriver.

Frequently Asked Questions

Q: How does WinDriver work?

A: With WinDriver, your device driver is developed in the user mode (as part of your application or as a separate DLL). This dramatically shortens development time by enabling you to use your standard development tools (MS Visual Studio, C++, GCC, Windows GCC, etc.) to develop and debug your driver.
The user-mode device-driver application/DLL that you develop with WinDriver accesses your hardware through the WinDriver kernel module (**windrvr1511.sys/.dll/.o/.ko** — depending on the OS) using the standard WinDriver functions.
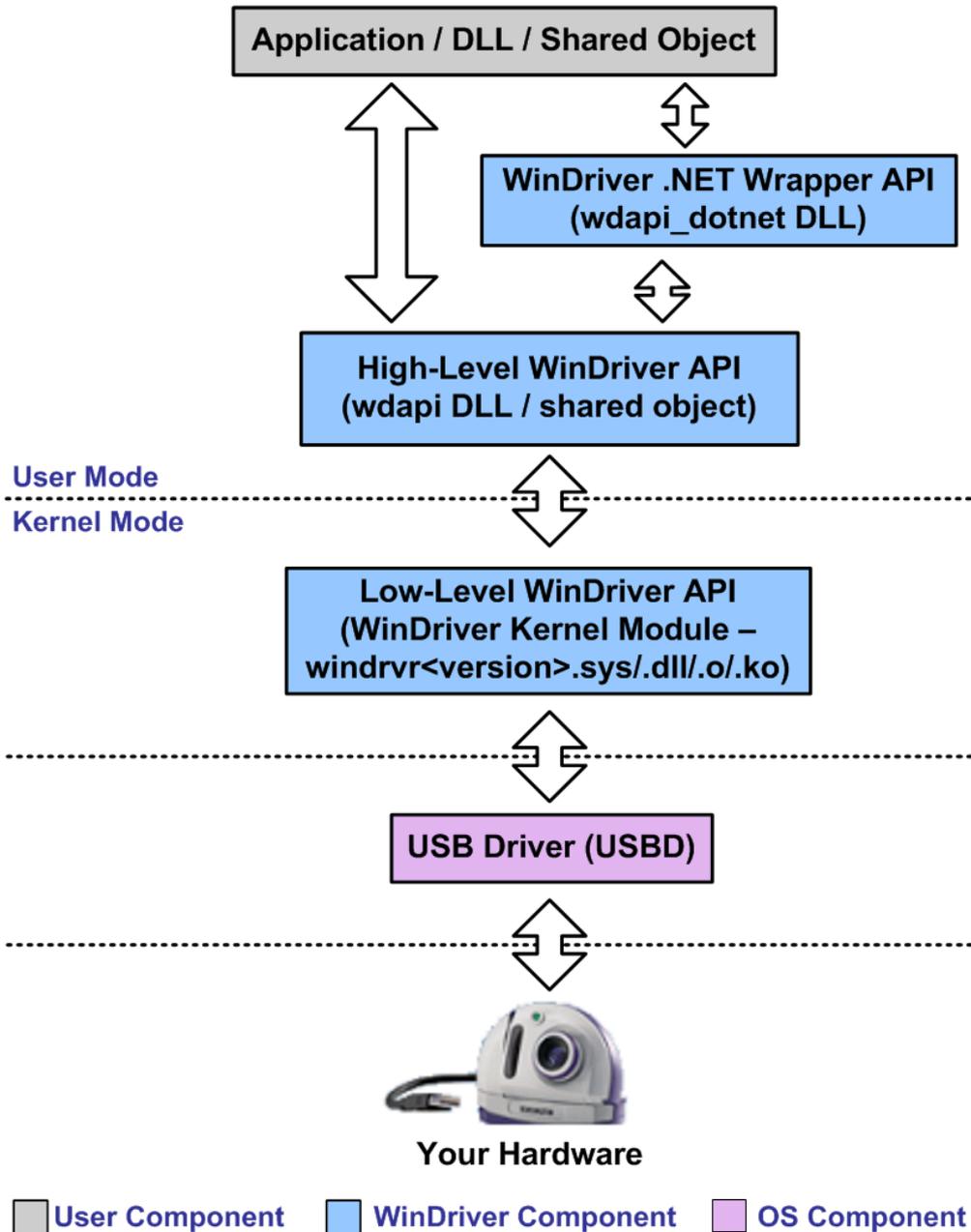
Q: What is an INF file?

A: Device information (.INF) files are text files, that provide information used by the Plug-and-Play mechanism on Windows to install software that supports a given hardware device. INF files are required for Plug-and-Play hardware, such as USB devices. The INF file includes all necessary information about the device(s) and the files to be installed. When hardware manufactures introduce new products for these Windows platforms, they must create INF files to explicitly define the resources and files required for each class of device. In order to access your device with WinDriver you need to create and install an INF file that registers your device with WinDriver's kernel driver. DriverWizard simplifies this procedure for you, as explained in the present guide.

Q: Why should I create an .INF file?

A: Create an .INF file for the following reasons:

- To bind the WinDriver kernel module to a specific USB device.

- To override the existing driver (if any).

- To enable WinDriver applications and DriverWizard to access a USB device.