

ADISUSBZ iSensor Evaluation System

FEATURES

PC USB evaluation system for inertial measurement units

PC evaluation software

**ADIS16003, ADIS16006, ADIS16133, ADIS16135,
ADIS16136, ADIS16201, ADIS16203, ADIS16204,
ADIS16209, ADIS16210, ADIS16220, ADIS16223,
ADIS16227, ADIS16228, ADIS16240, ADIS16260,
ADIS16265, ADIS16300, ADIS16305, ADIS16334,
ADIS16360, ADIS16362, ADIS16364, ADIS16365,
ADIS16367, ADIS16375, ADIS16385, ADIS16400,
ADIS16405, ADIS16407**

Compatible with Windows XP, Windows Vista, Windows 7

32-bit USB driver support

No external power supply required for most products

KIT CONTENTS

ADISUSBZ circuit board

12-pin ribbon connector, 2 mm

USB A-to-B cable, 6 ft

GENERAL DESCRIPTION

The iSensor® family of products provides a serial peripheral interface (SPI) for data communications. The SPI interface and a well-calibrated cluster of sensors enable quick integration into systems that use embedded processor systems. For users who are familiar with embedded processors, integrating the iSensor® device with a familiar processor system enables development with

familiar software tools, provides more flexibility, and enables more design reuse after the initial sensor evaluation is complete. For users who are not familiar with embedded processors and their development tools, the ADISUSBZ system provides a simple tool for verifying parametric performance and demonstrating most product functions.

The ADISUSBZ circuit board provides tapped holes (M2 × 0.4 mm), and the kit includes an assortment of M2 × 0.4 mm machine screws for simple IMU attachment. The location of the mounting holes facilitates easy electrical connection with either mating connector on the ADISUSBZ: J1 or J4.

The power management system provides jumper selection for three device under test (DUT) power options: 5 V (USB), 3.3 V, and an external option. The 5 V option provides access to the USB 5 V supply voltage for the DUT, and the 3.3 V option uses a linear regulator to convert the USB supply to 3.3 V.

The ADISUSBZ system supports PC evaluation software packages for most iSensor products. These software packages provide three modes of operation: demonstration (main window), register access, and data capture.

The ADISUSBZ kit includes a USB cable for quick connection to a PC and a 12-pin ribbon cable for mounting hardware. The IMU evaluation software package supports operation on Windows® XP, Windows Vista®, and Windows 7 (32-bit) PC systems.

PHOTOGRAPH OF INERTIAL SENSOR EVALUATION SYSTEM



Figure 1.

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REVISION HISTORY

3/12—Rev. 0 to Rev A	
Changes to Table 1	3
Changes to Installing Products with Breakout Boards	
Section.....	4
Added Remote Connections Section	5
1/12—Revision 0: Initial Version	

PRODUCT SELECTION AND INSTALLATION GUIDE

GETTING STARTED

Getting started with the [ADISUSBZ](#) system involves three steps: physical DUT installation, software installation, and functional verification.

EVALUATION TOOL SELECTION

Table 1 provides a list of part numbers that the [ADISUSBZ](#) is compatible with, along with the appropriate mating connector, JP1 setting, and machine screw length for physical attachment. The mounting holes on the [ADISUSBZ](#) accommodate M2 × 0.4 mm machine screws.

PHYSICAL DUT INSTALLATION

Mating Connector

The [ADISUSBZ](#) has mating holes and connectors for each part number in Table 1. Start the physical installation process by identifying the correct mating connector. For those parts that require use of J1, the installation process involves the use of the 12-pin ribbon cable provided with the [ADISUSBZ](#) kit. For those that require the use of J4, the installation process involves connecting the mating connector in the DUT to J4 ([ADISUSBZ](#)).

Power Supply Setting

JP1 provides three options: 5 V, 3.3 V, and external. The 5 V option provides direct access to the PC USB supply. The 3.3 V option uses a linear regulator to convert the PC USB supply to a stable, 3.3 V output. The external supply option enables testing of the DUT over a variable supply range. When using the [ADISUSBZ](#) with the [ADIS16385](#), the 5 V option is also available because the start-up currents from the [ADIS16385](#) can cause the USB supply to reach the current limit thresholds, preventing the [ADISUSBZ](#) from starting up. Removing C14 from the bottom side of the [ADISUSBZ](#) can also help lower the transient current requirements when evaluating the [ADIS16385](#).

Table 1. Mating Connector and Mounting Hole Identifiers

Part Number	Mating Connector	JP1 Setting	Screw Length ¹
ADIS16003/PCBZ	J1	3.3 V, 5 V	4 mm
ADIS16006/PCBZ	J1	3.3 V, 5 V	4 mm
ADIS16133BMLZ	J4	5 V	16 mm
ADIS16135BMLZ	J4	5 V	16 mm
ADIS16136AMLZ	J4	5 V	16 mm
ADIS16201/PCBZ	J1	3.3 V	4 mm
ADIS16203/PCBZ	J1	3.3 V	4 mm
ADIS16204/PCBZ	J1	3.3 V	4 mm
ADIS16209/PCBZ	J1	3.3 V	4 mm
ADIS16210/PCBZ	J1	3.3 V	6 mm
ADIS16220/PCBZ	J1	3.3 V	4 mm
ADIS16223/PCBZ	J1	3.3 V	6 mm
ADIS16227/PCBZ	J1	3.3 V	6 mm
ADIS16228/PCBZ	J1	3.3 V	6 mm
ADIS16240/PCBZ	J1	3.3 V	4 mm
ADIS16260/PCBZ	J1	5 V	4 mm
ADIS16265/PCBZ	J1	5 V	4 mm
ADIS16300/PCBZ	J4	5 V	12 mm
ADIS16305/PCBZ	J4	5 V	12 mm
ADIS16334BMLZ	J4	5 V	12 mm
ADIS16360BMLZ	J4	5 V	4 mm
ADIS16362BMLZ	J4	5 V	4 mm
ADIS16364BMLZ	J4	5 V	4 mm
ADIS16365BMLZ	J4	5 V	4 mm
ADIS16367BMLZ	J4	5 V	4 mm
ADIS16375AMLZ	J4	3.3 V	16 mm
ADIS16385BMLZ	J4	External, 5 V	16 mm
ADIS16400BMLZ	J4	5 V	4 mm
ADIS16405BMLZ	J4	5 V	4 mm
ADIS16407BMLZ	J4	5 V	4 mm

¹ Machine screw lengths are not intended to imply any level of attachment assurance. The machine screw lengths provide a minimum of 2 mm of penetration into the [ADISUSBZ](#) holes for demonstration purposes only. Withstanding vibration and shock conditions, may require additional considerations.

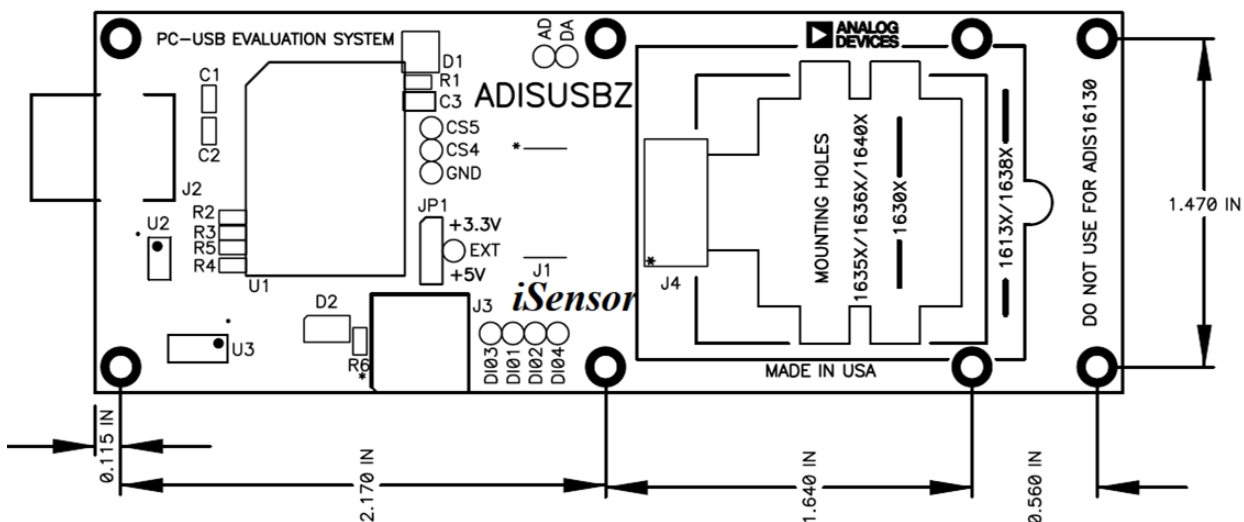


Figure 2. [ADISUSBZ](#) Top View, Dimensions and Mounting Hole Locations

Installing Products with Breakout Boards

The ADIS16003, ADIS16006, ADIS16201, ADIS16203, ADIS16204, ADIS16209, ADIS16210, ADIS16220, ADIS16223, ADIS16227, ADIS16228, ADIS16240, ADIS16260, and ADIS16265 products interface to the ADISUSBZ using breakout boards. These breakout boards provide a connector that is pin compatible with J1 on the ADISUSBZ board and have mounting holes, which line up with the $M2 \times 0.4$ mm holes on the ADISUSBZ.

Install these devices as follows:

1. Line up the mounting holes with the matching set on the ADISUSBZ.
2. Secure the breakout board using the $M2 \times 0.4$ mm screw length listed in Table 1.
3. Connect J1 on the breakout board to J1 on the ADISUSBZ using the 12-pin ribbon cable provided with the ADISUSBZ kit.

The ADIS16210, ADIS16223, ADIS16227, and ADIS16228 breakout boards provide interface connectors that have 14 or 16 pins. In these cases, Pin 1 to Pin 12 match Pin 1 to Pin 12 on J1 of the ADISUSBZ board. There are two options for making this connection:

1. Use a 16-pin ribbon cable connector (not included) to connect J1, Pin 1 to Pin 12, on both ADISUSBZ and ADIS162xx/PCBZ. For example, a 16-pin ribbon cable connector could use Molex P/N 87568-1663 for the connectors and 3M P/N 3625/16 for the ribbon cable.
2. Cut Pin 13, Pin 14, Pin 15 and Pin 16 off J1, on the ADIS162xx/PCBZ, then use the 12-pin ribbon cable to connect J1, Pin 1 to Pin 12, on both ADISUSBZ and ADIS162xx/PCBZ.

The ADIS16223/PCBZ and ADIS16227/PCBZ include the device (ADIS16223CMLZ, for example), a machine screw (Size 10-32), and a breakout board. Install the DUT onto the breakout board, using the machine screw and the DUT mating connector prior to installing it onto the ADISUSBZ.



Figure 3. ADIS16265/PCBZ and ADISUSBZ



Figure 4. ADIS16210/PCBZ and ADISUSBZ

Installing Products with Embedded Connectors

The ADIS16133, ADIS16135, ADIS16136, ADIS16375, and ADIS16385 products connect directly to J4 using their own embedded connectors. Use J4 (ADISUSBZ) as the guide for installing these products in the correct location, and then secure these devices using $M2 \times 0.4$ mm machine screws (see Table 1).



Figure 5. ADIS16136AMLZ and ADISUSBZ



Figure 6. ADIS16385BMLZ and ADISUSBZ

The ADISUSBZ does not currently have mounting holes for the ADIS16375. When evaluating the ADIS16375, start by pressing it onto J4, and then use a nail to slide it into the mounting holes and press it down into the PCB material. This provides a mark for drilling and tapping holes for the ADIS16375. Use an M1.6 drill bit and either of the following tap sizes: $M2 \times 0.4$ mm or 2-56. Future ADIS16375 evaluation options will be available on the EVAL-ADIS system.

Installing IMU Products with Flexible Connectors

The ADIS16360, ADIS16362, ADIS16364, ADIS16365, ADIS16367, ADIS16400, ADIS16405, and ADIS16407 IMU products interface to the ADISUSBZ using the flexible interface connector and the mounting tabs, which are located on the package sides adjacent to the flexible connector. Protect the flexible connector from stress when installing the devices and extracting them from the ADISUSBZ. Start the installation process by pressing the connector onto J4 on the ADISUSBZ. Then, install the two $M2 \times 0.4$ mm machine screws. See Figure 7 for the machine screw locations and refer to AN-1041 and AN-1045 for handling requirements on these devices.



Figure 7. ADIS16407BMLZ and ADISUSBZ

Installing the ADIS16300, ADIS16305, and ADIS16334

The ADIS16300/PCBZ, ADIS16305/PCBZ, and ADIS16334/PCBZ include a flexible connector. Use this flexible connector to connect the device to J4 on the ADISUSBZ (see Figure 8).



Figure 8. ADIS16334BMLZ and ADISUSBZ

REMOTE CONNECTIONS

In cases that require up to 12 inches of separation between the DUT (ADIS16xxx) and ADISUSBZ, use a longer ribbon cable to connect J1 on the breakout board (ADIS16xxx/PCBZ) and J1 on the ADISUSBZ. When the distance must be greater than 12 inches, reliable communication on the SPI may require active drivers. Note that Table 1 lists many part numbers that end in “BMLZ.” When using the ADISUSB for a remote connection to these devices, switch to using the /PCBZ version of the part number. For example, use ADIS16362/PCBZ to use this approach to create a remote connection to the ADISUSBZ.

SOFTWARE INSTALLATION

SYSTEM REQUIREMENTS

The [ADISUSBZ](#)-compatible software works on 32-bit PC machines that use Windows XP, Windows Vista, or Windows 7. There are no 64-bit driver files available. See the [EVAL-ADIS](#) for an evaluation system that supports 64-bit drivers.

APPLICATION DOWNLOAD AND INSTALLATION

The [ADISUSBZ](#) enables PC-based evaluation of many *iSensor* products by using dedicated software packages. These software packages are available for download at the following site: www.analog.com/ADISUSB, under the Software and Tools tab.

1. Click on the appropriate software package, using the DUT part number, and download the archive file to a temporary directory.
2. Extract the contents of the archive file into a temporary directory.
3. Click **setup.exe** to start the installation process.
4. When the welcome screen appears, click **OK** to continue the installation and then follow the prompts.

See Figure 9, Figure 10, Figure 11, and Figure 12 for the typical prompts and options in each software installation process. Figure 13 shows the prompt that appears when the installation wizard requests permission to copy over a file. Click **Yes** to keep the files currently installed on the PC and deny the request to copy over them.

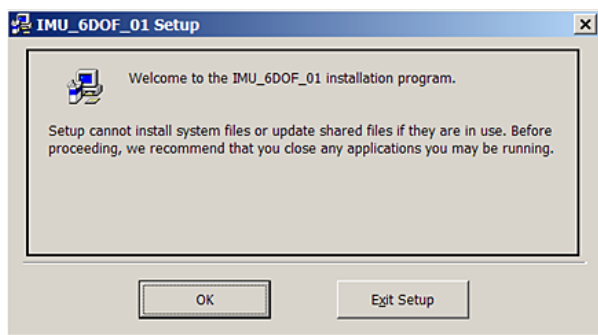


Figure 9. Example Setup Screen

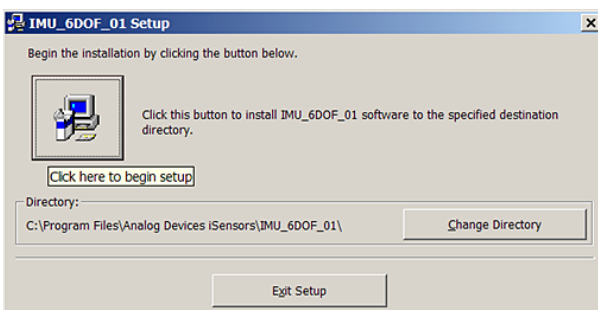


Figure 10. Prompt for Assigning the Program Folder

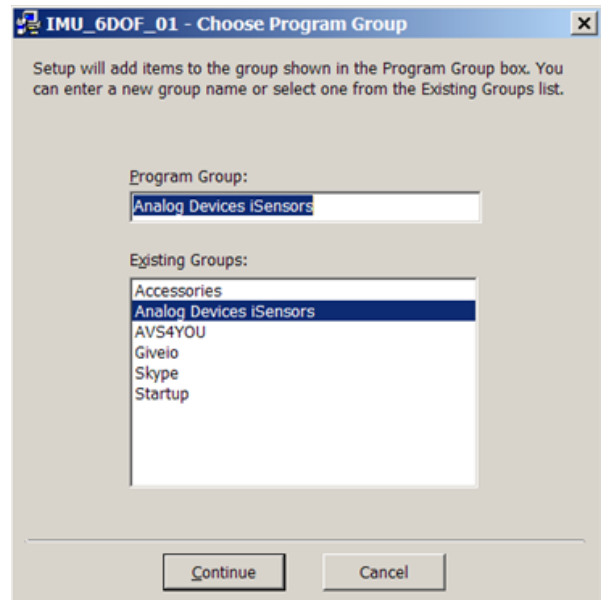


Figure 11. Prompt for Assigning the Program Group



Figure 12. Installation Success Message

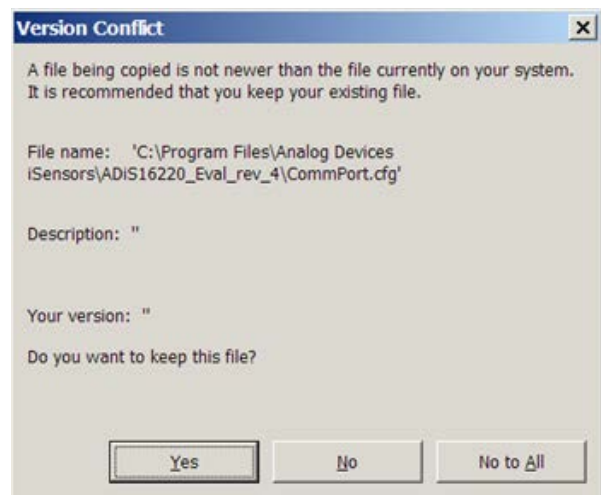


Figure 13. Version Conflict Message

giveio.exe INSTALLATION

Early iSensor software packages require the use of the giveio.exe driver. In these cases, the **giveio.exe** file is bundled with the application files. Double-click **giveio.exe** and follow the prompts in Figure 14 and Figure 15 to install this driver. For Windows XP, Windows Vista, and Windows 7, click **No** when prompted to install this driver for Windows NT or Windows 2000 (see Figure 16).

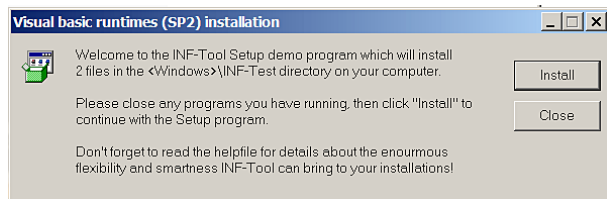


Figure 14. Installation Start Screen for giveio.exe

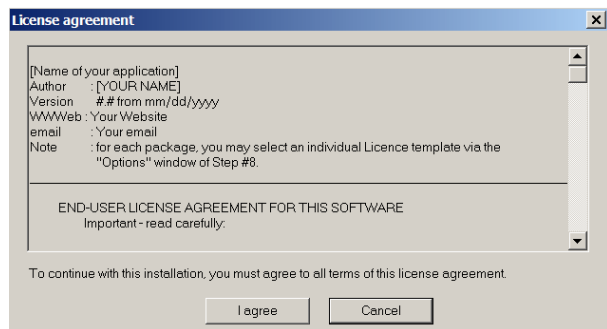


Figure 15. License Agreement for giveio.exe

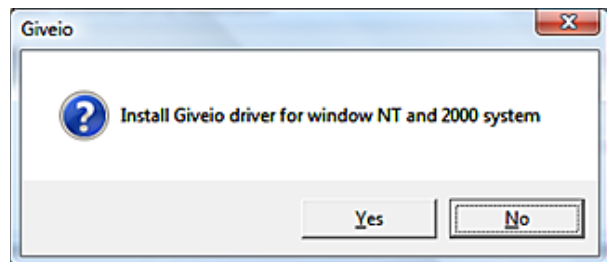


Figure 16. Click **No** for Windows Vista and Windows 7

USB DRIVER INSTALLATION

After the software installation is complete, install the USB driver as follows:

1. Plug the **ADISUSBZ** into the PC USB port using the A-to-B cable provided with the evaluation kit.
2. Wait for the PC to recognize the **ADISUSBZ** and display the prompt shown in Figure 17.
3. Select **Install the hardware automatically**, and then click **Next** to start the installation.
4. When the prompt in Figure 18 appears, select **Continue Anyway** to complete the MCP USB EVAL driver installation and setup.
5. After the MCP USB EVAL installation is completed, another window, similar to the one in Figure 17, starts a second process.
6. Click **Next** and **Continue Anyway** to complete this process.



Figure 17. Found New Hardware Wizard Prompt



Figure 18. Hardware Installation Message

Manual USB Driver Installation

If the USB driver installation does not work properly, verify that the driver files are in the correct location, as follows:

- C:\WINDOWS\system32\drivers\ezusb.sys
- C:\WINDOWS\system32\drivers\MCP_SPI.sys
- C:\WINDOWS\inf\mcpusb.inf

If the files are not in the correct locations, download the ADISUSB_Drivers.zip file from www.analog.com/ADISUSB (Software and Tools tab), extract the files to a temporary location, and then copy the files to the correct locations. After the files are in the correct location, plug the **ADISUSBZ** back into the PC to start the automatic driver installation process. Figure 17 shows the expected response. If this window does not appear, check the status of the driver in the Windows Device Manager: click **Start**, **Control Panel**, **System**, **Hardware**, **Device Manager**, **Universal Serial Bus Controllers**. MCP USB EVAL will be visible only after connecting the **ADISUSBZ** to a USB port.

When the driver installation is complete, the associated driver listing should not have the yellow exclamation warning. Right-click the listing and select properties to show additional information and options. Verify that the driver has a message saying that the driver is working properly. Use this same menu to uninstall this driver, if necessary.

Windows XP Service Pack 3

Windows XP Service Pack 3 does not allow the [ADISUSBZ](#) to initiate the second driver installation. Reinstalling the USB drivers twice helps to overcome this challenge.

Use the following steps to do this:

1. Connect the evaluation board. The result is unknown device.
2. Use the **Device Manager** to select the unknown USB driver and reinstall it. Make sure that you do not delete any files in this process. When the installation wizard asks to search the Microsoft website for the appropriate driver, click **No**. Choose the option to install automatically.
3. Use the **Device Manager** a second time to reinstall the same driver, making the same choices in the installation wizard.



ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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