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Analog Devices Wiki

This version (03 Aug 2016 14:27) was **approved** by NevadaMark.
 The Previously approved version (03 Aug 2016 14:25) is available.

ADIS1646X/AD24000 EVALUATION ON A PC

OVERVIEW

Evaluating the ADIS16460 [<http://www.analog.com/ADIS16460>] and the AD24000 on a PC requires the use of the ADIS16IMU4/PCBZ [<http://www.analog.com/EVAL-ADIS16IMU4>] and EVAL-ADIS [<http://www.analog.com/EVAL-ADIS>]. Aside from this section of the datasheet, the instruction text and graphics identify only the ADIS16460. However, all of these instructions apply to the AD24000 in the same manner. Mention of AD24000 is omitted only to simplify the text.

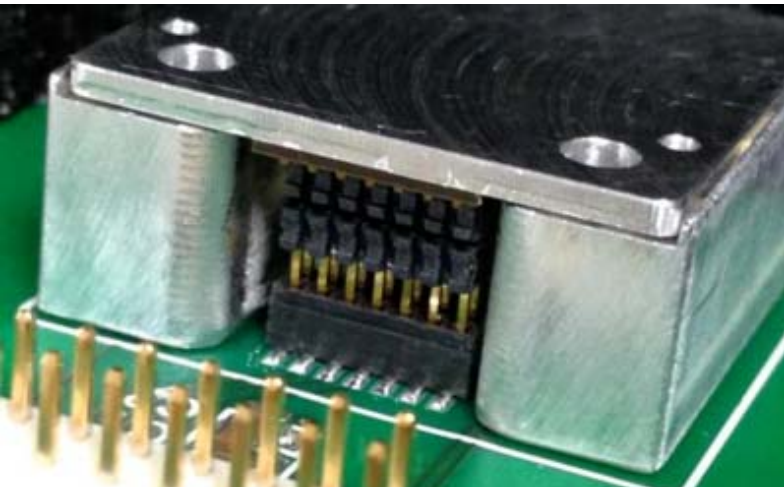
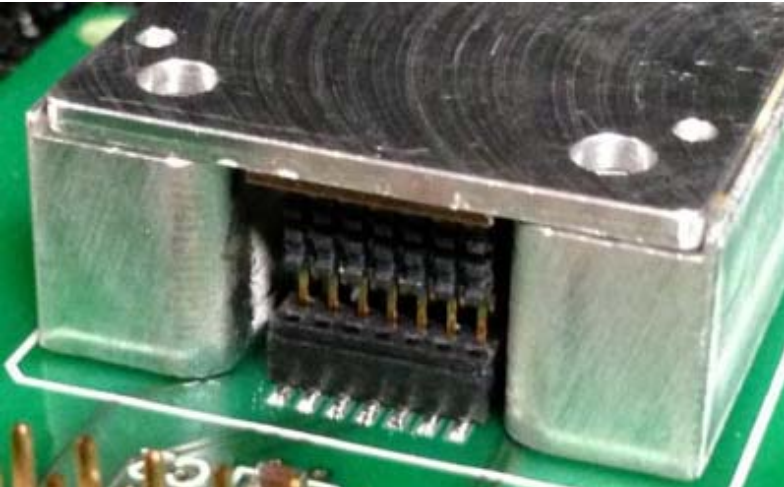
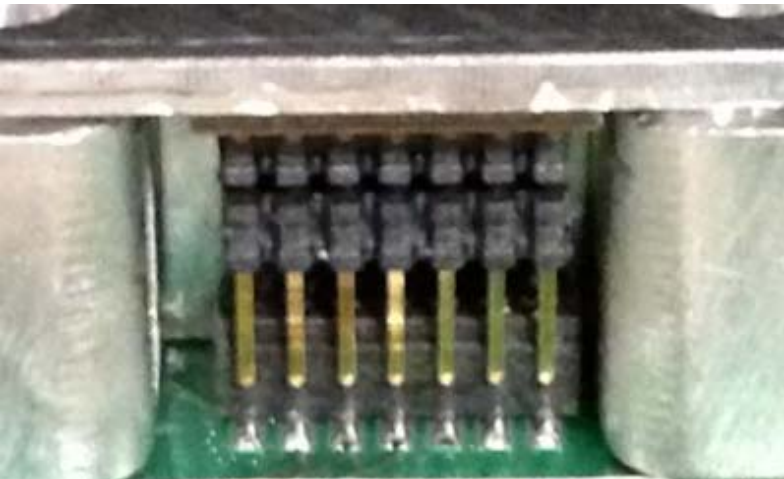
SETUP

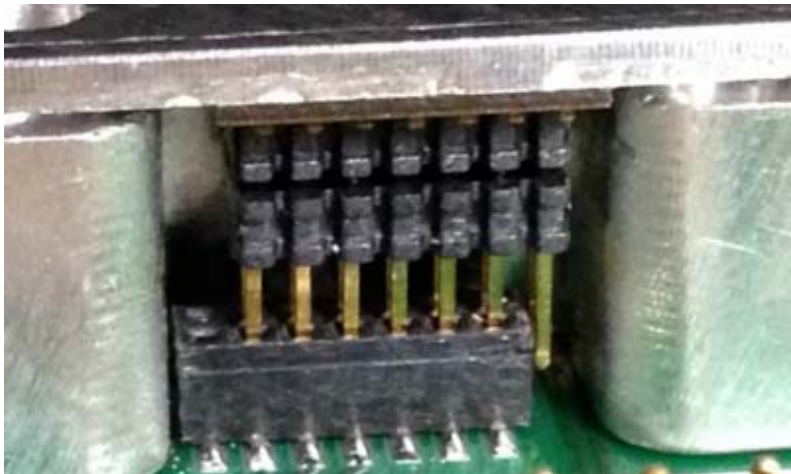
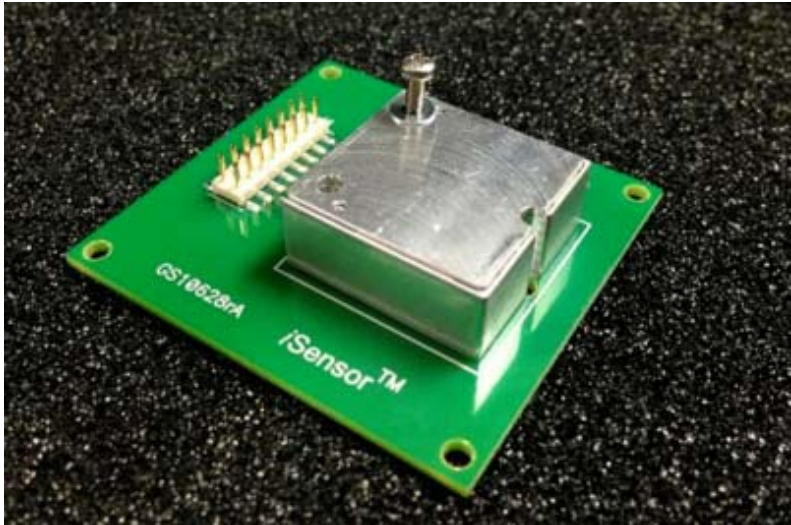
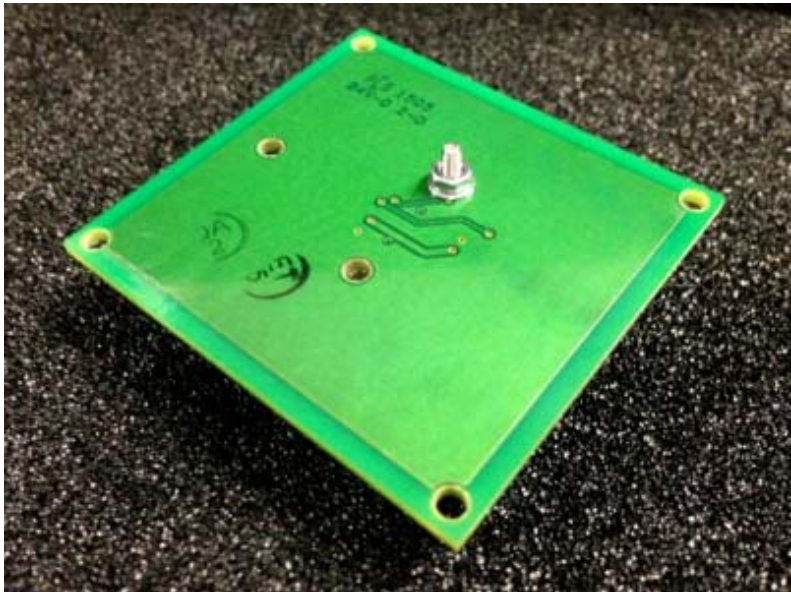
The physical setup requires only three simple steps:

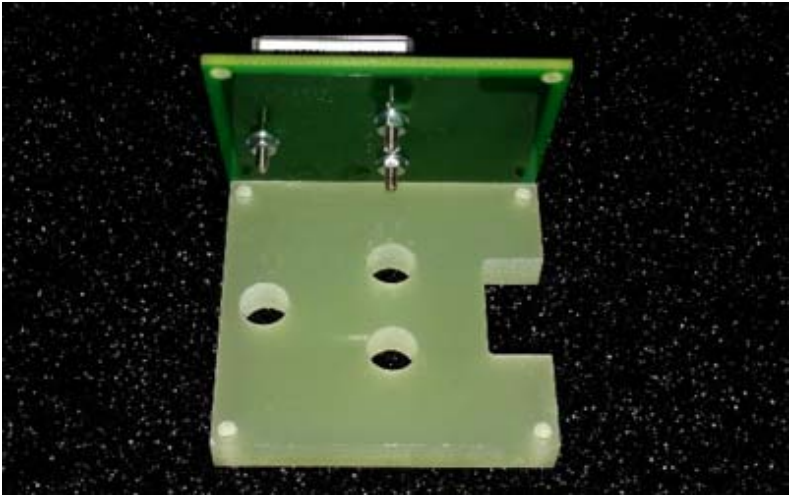
1. Install the DUT (for example, an ADIS16460AMLZ) onto the ADIS16IMU4/PCBZ
2. Connect the ADIS16IMU4/PCBZ to the EVAL-ADISZ
3. Set JP1 Jumper on EVAL-ADISZ

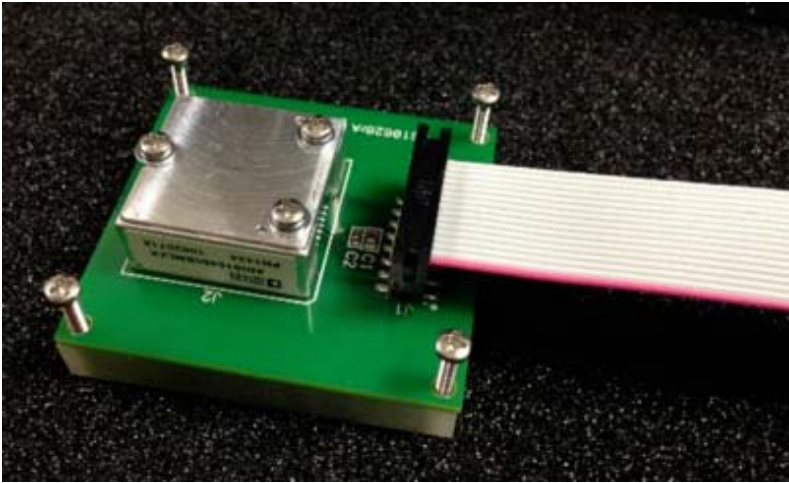
ADIS1646x Installation on the ADIS16IMU4/PCBZ

STEP	DESCRIPTION	PICTURE
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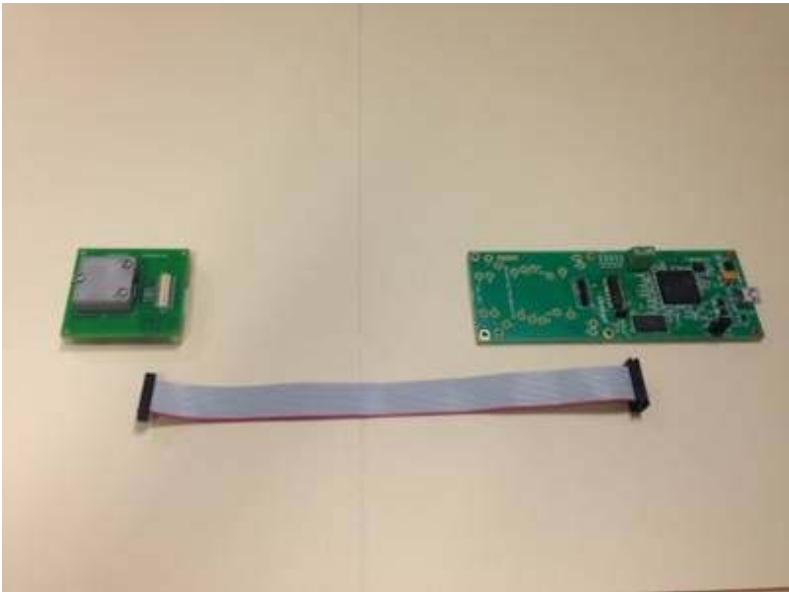
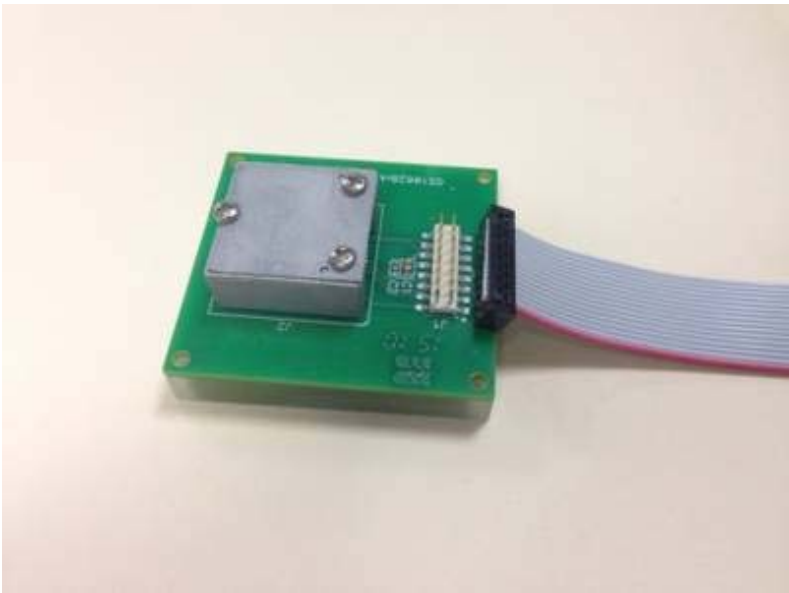
1	Using the silk screen and J2 connector interface as a guide, install the IMU onto the Interface PCB	 A close-up photograph showing the IMU module correctly installed on the Interface PCB. The IMU is a rectangular metal component with a black top surface. It is mounted on a green PCB. The J2 connector interface is visible, showing gold-plated pins that are properly aligned and inserted into the connector.
	Incorrect pin registration example #1	 A close-up photograph showing an incorrect pin registration. The IMU is mounted on the PCB, but the gold-plated pins of the J2 connector are not properly aligned with the connector's receptacles. Some pins appear to be bent or misaligned, leading to poor contact.
	Incorrect pin registration example #2	 A close-up photograph showing another incorrect pin registration. The IMU is mounted on the PCB, but the gold-plated pins of the J2 connector are not properly aligned with the connector's receptacles. The pins appear to be bent or misaligned, leading to poor contact.

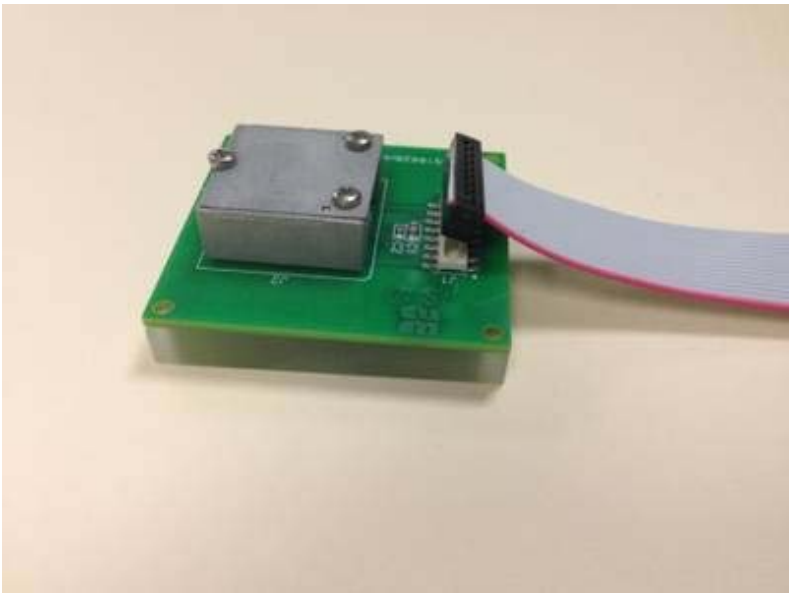
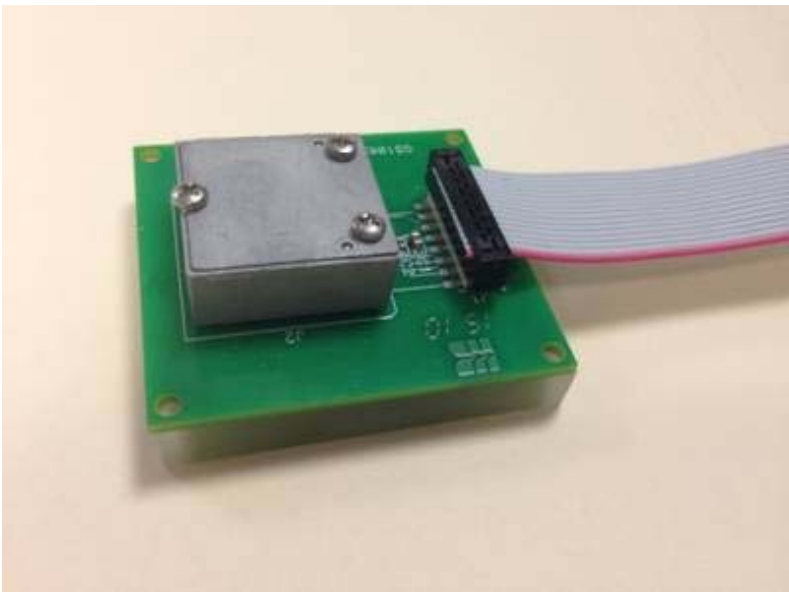
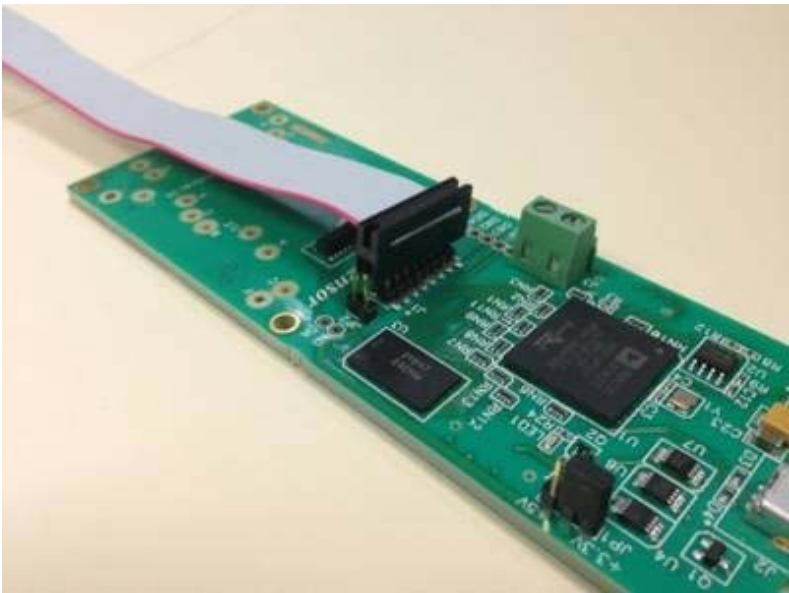
	Incorrect pin registration example #3	
2	Insert the first machine screw into the IMU body, using a washer	
3	On the back side, install the washer and nut, hand-tighten	

4	Repeat the process with the other two machine screws, then use a torque screw driver to tighten the machine screw torque to 24 inch-ounces.	
5	Set the interface board (with IMU installed) on top of the spacer	
6	Mount the interface board and spacer to the test surface using the machine screws	

7	Use the ribbon cable to connect to an embedded processor system	
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Connect the ADIS16IMU4/PCBZ to the EVAL-ADIS

STEP	DESCRIPTION	PICTURE
1	Select the ribbon cable from the ADIS16IMU4/PCBZ kit	
2	Install one side of the ribbon cable onto J1 of the ADIS16IMU/PCBZ	

STEP	DESCRIPTION	PICTURE
		
		
3	Install the other side of the ribbon cable on to J1 of the EVAL-ADISZ	

EVAL-ADIS JUMPER SETTINGS

JUMPER	SETTING
JP1	+3.3V
JP2	Not used, may want to leave it in place for safety reasons

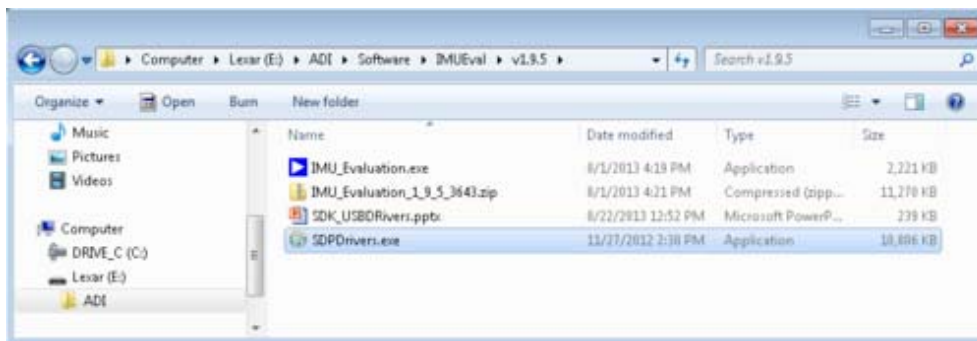
IMU EVALUATION SOFTWARE OVERVIEW

IMU Evaluation Software [http://www.analog.com/en/evaluation/EVAL-ADIS/eb.html#SOFTWARE_AND_TOOLS] installation only requires two simple steps:

1. Download, unzip and install the EVAL-ADIS USB Driver http://www.analog.com/en/evaluation/EVAL-ADIS/eb.html#SOFTWARE_AND_TOOLS (click here to see the download link) [http://www.analog.com/en/evaluation/EVAL-ADIS/eb.html#SOFTWARE_AND_TOOLS (click here to see the download link)]
2. Download, unzip and copy the IMU_Evaluation*.exe file to the desired location on the test PC (click here to see the download link) [http://www.analog.com/en/evaluation/EVAL-ADIS/eb.html#SOFTWARE_AND_TOOLS]

USB Driver Installation

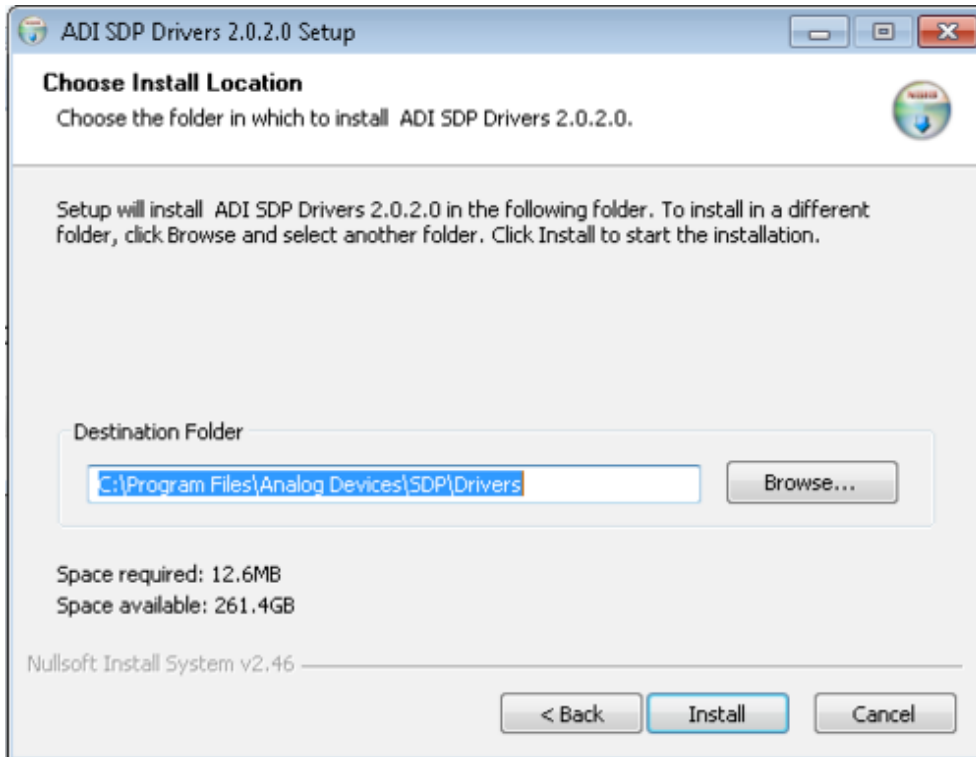
After downloading the EVAL-ADIS USB Driver file, extract the SDPDrivers.exe file from the zip file, into a convenient location and then double click on it to start the process.



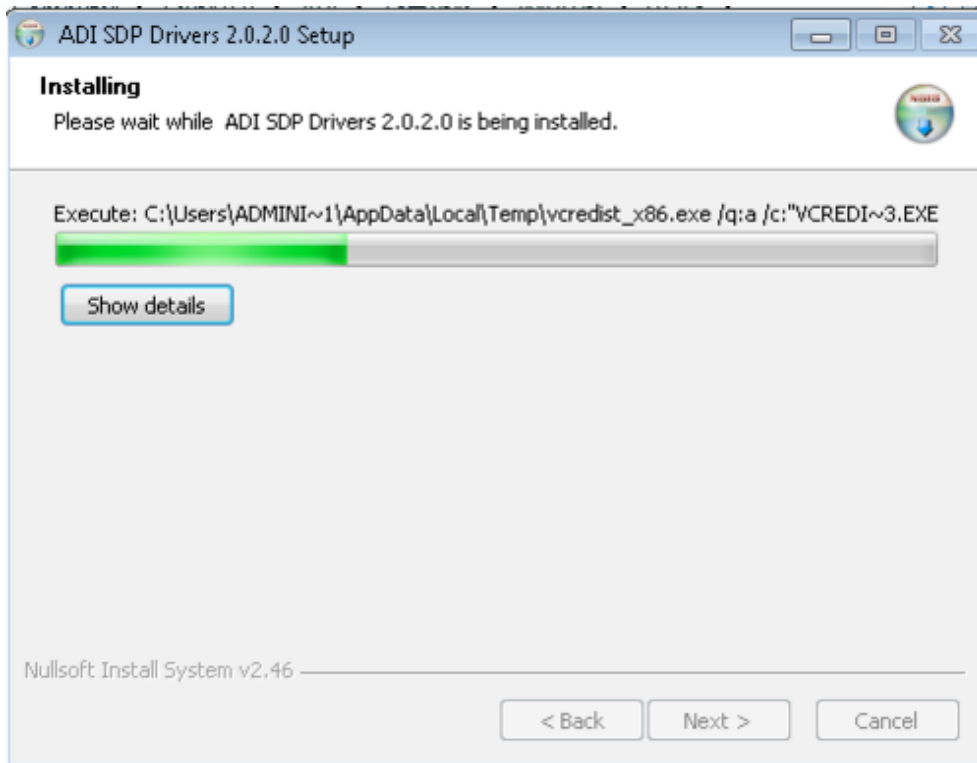
When the setup wizard opens, click on **Next** to start the installation process



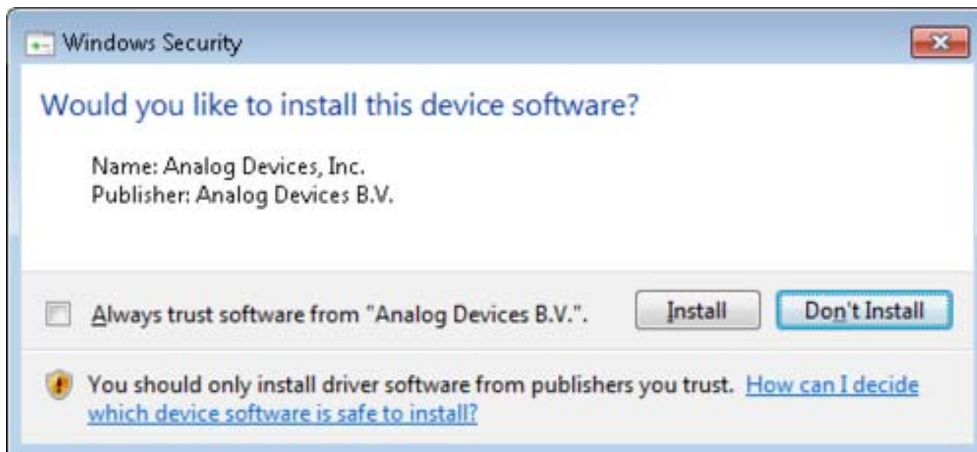
Click on **Next** to accept the default driver location.



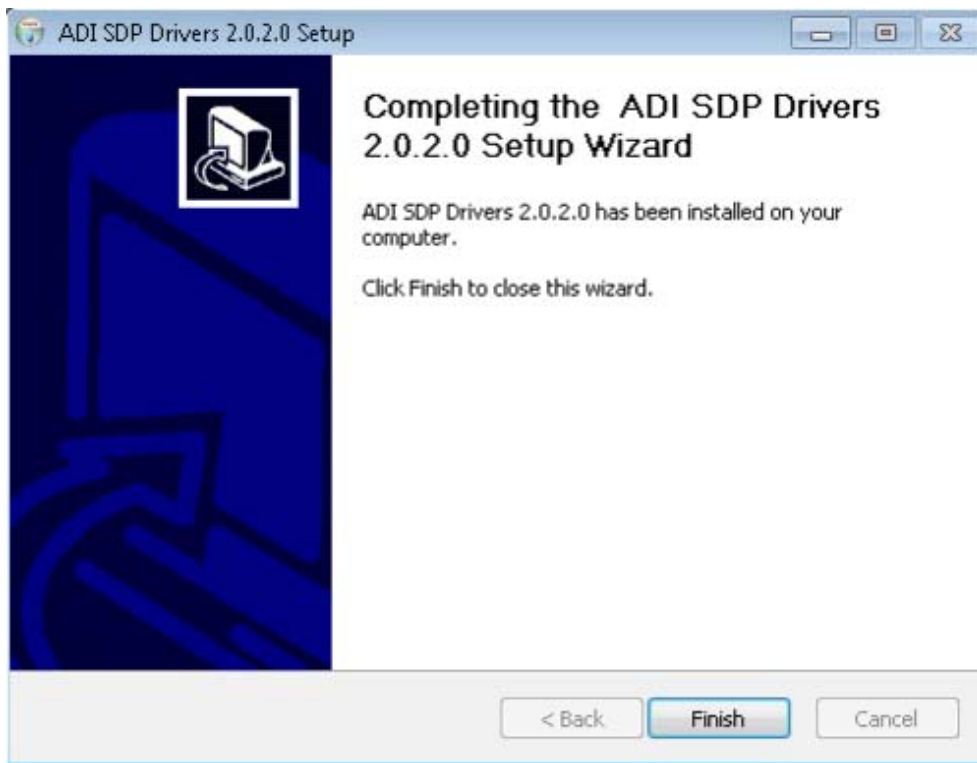
The process will involve at least two progress bars that look like the following:



If you encounter this type of message during the process, click on **Install** to continue with the installation.



Once the installation has completed, click on **Finish** to complete the process.



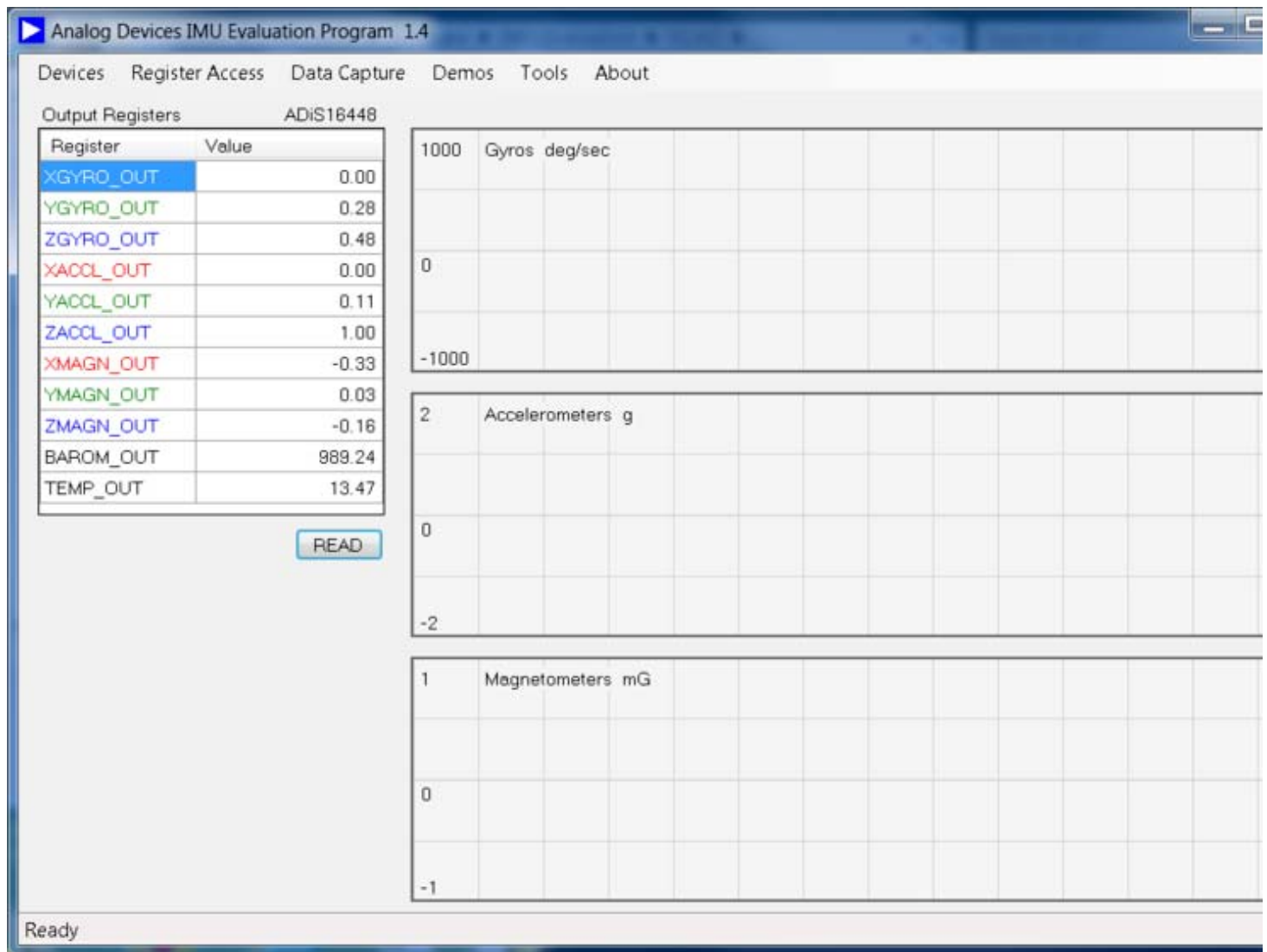
IMU EVALUATION SOFTWARE GETTING STARTED

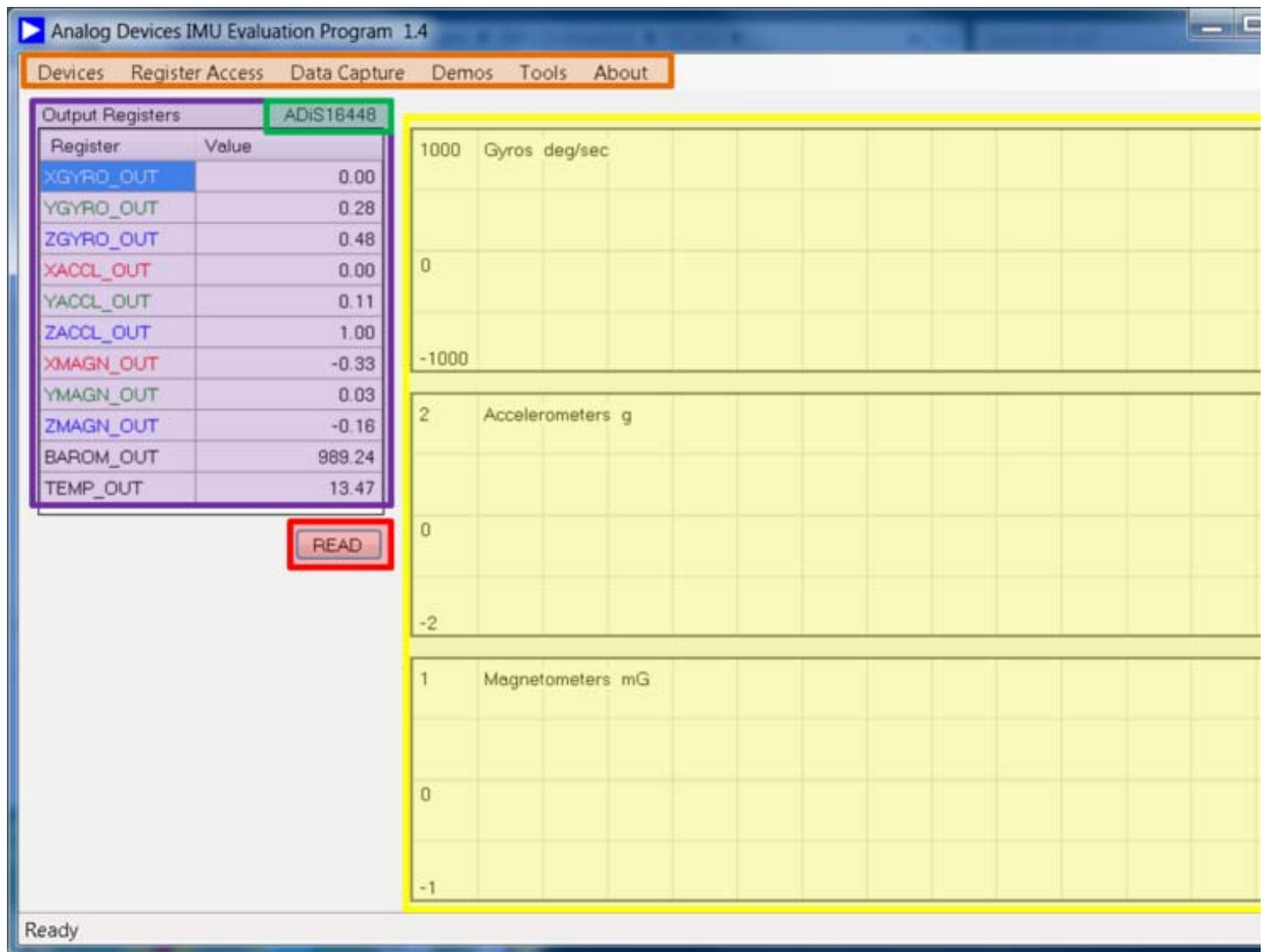
After the USB driver installation is complete, connect the EVAL-ADIS [http://www.analog.com/EVAL-ADIS] USB connector to the PC, using the USB Mini cable, from the EVAL-ADIS [http://www.analog.com/EVAL-ADIS] kit. LED2 (below left) will illuminate as soon as this connection is made. This indicates that the EVAL-ADIS [http://www.analog.com/EVAL-ADIS] has power and is going through its start-up/initialization process. After the EVAL-ADIS [http://www.analog.com/EVAL-ADIS] completes this process, LED1 (below right) will illuminate, indicating that it is time to launch the IMU Evaluation application. During the initialization process, several messages may appear on the screen. They are related to updating the EVAL-ADIS firmware and establishing communication between the PC and the EVAL-ADIS [http://www.analog.com/EVAL-ADIS]. Once LED1 lights up, double click on the IMU_Evaluation.exe file to launch the application.



Main Window

Once the IMU Evaluation software starts-up, the Main Window will appear and look like the following picture. The second picture provides color-coded boxes to support further discussion of each function in this screen.





The orange box identifies the drop-down menus, which provide a number of useful features. The **Devices** option provides a list of products. For evaluation of any ADIS1648x product, click on **Devices** and then select the part number (**ADIS16488**, for example). The green box shows the current device selection, which in this case, identifies the ADIS16448 [<http://www.analog.com/ADIS16448>] as the current selection.

The **Register Access** option provides a listing of user-configurable registers available from the part number selected in the “Devices” drop down menu. It also provides read/write access to each one of these registers.

The **Data Capture** option provides the core data collection function.

The **Demos** option only supports a 3-D rendering tool on the ADIS16480 [<http://www.analog.com/ADIS16480>].

The **Tools** option provides some diagnostic tools for the USB interface.

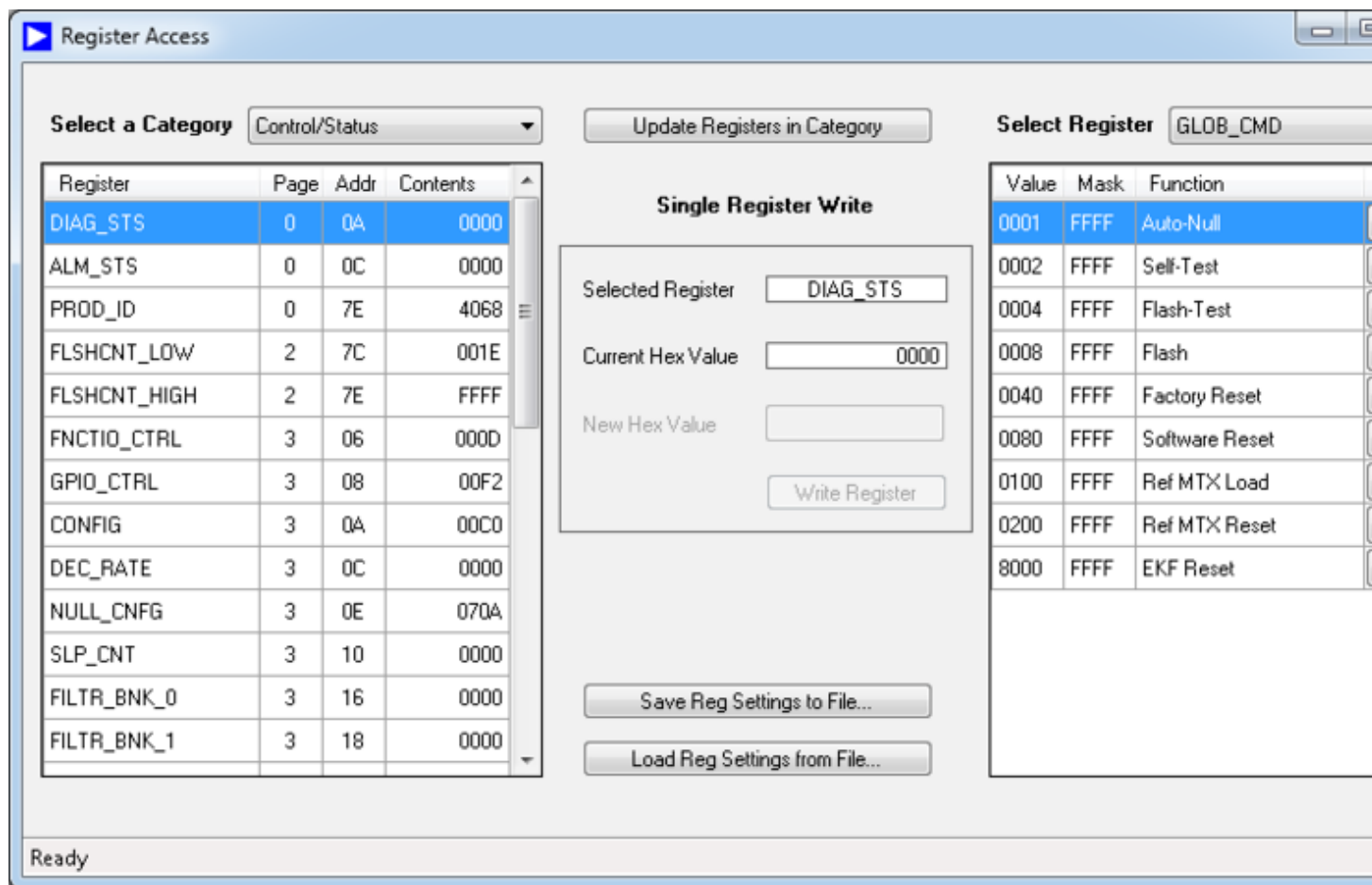
The **About** option provides more detail software revision information.

The purple box identifies the output registers, which update, real-time, after pressing the **Read** button (see the red box for the location of the **Read** button).

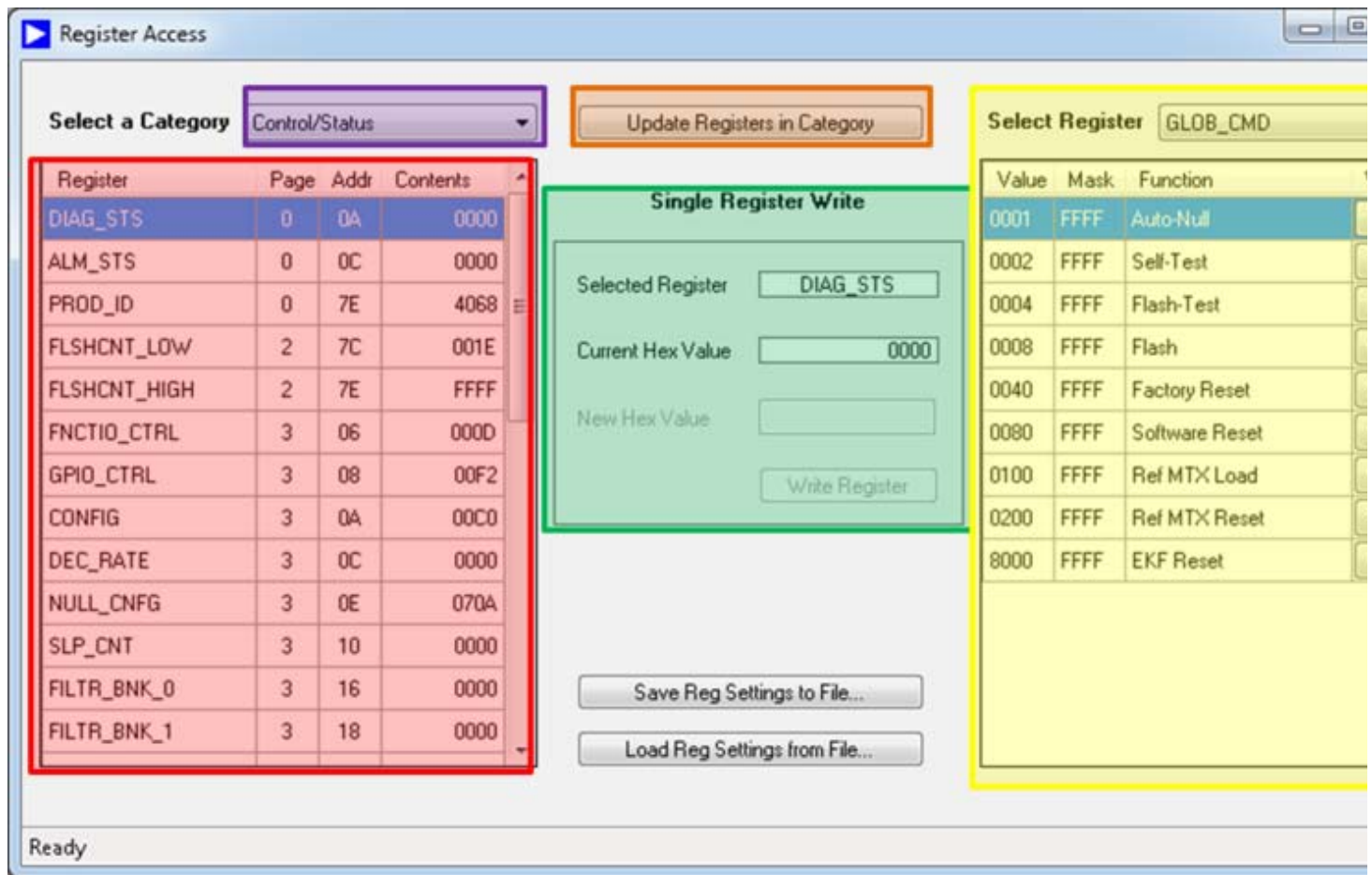
The yellow box identifies the three waveform recorder windows. The top window contains the three gyroscope outputs. The middle window contains the three accelerometer responses. The bottom window contains the three magnetometer responses. Also, each waveform matches the color of its register (see register titles in the purple box).

Register Access

The purpose of the **Register Access** window is to provide both read and write access to the user registers in the ADIS1648x products. The following picture shows the appearance of this window.



The color coded boxes illustrate the different functions that this window provides.



The purple box identifies the register category. In addition to the Control/Status, this drop-down control offers access to **Output** and **Calibration** registers.

The red box identifies all of the registers that are in the current category. Click on the register name to select a register for individual read/write access.

The green box identifies the read/write control options for the current register selection. Use the hexadecimal format when writing commands to a particular register.

The **Update Registers in Category** button (orange box) triggers a read and display update of all registers in the current category (red box).

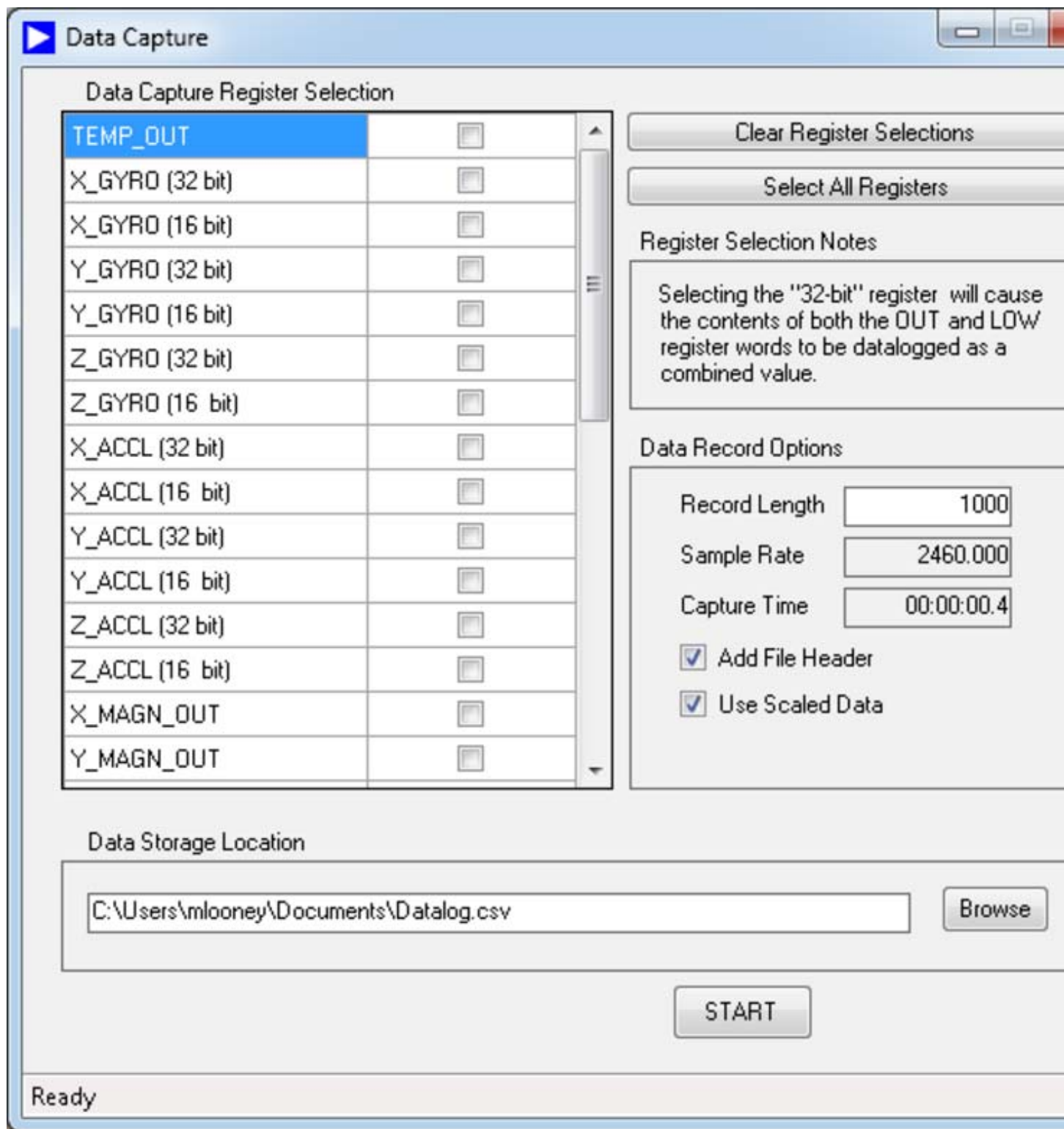
The yellow box identifies the area that provides single-bit command buttons, such as the ones provided by the GLOB_CMD register.

The **Save Reg Settings to File** command saves all of the registers in the current category into a *.csv (common-delimited) file. The **Load Reg Settings from File** button reads those settings back into the software package and triggers a routine that updates all registers with the values from this file.

APPLICATION TIP: The **Register Access** screen writes to user control registers, inside of the ADIS1648x devices, two bytes at a time. So, when configuring a register, make sure to include the hexadecimal number for all 16-bits, before pressing the **Write Register** button. When using an embedded processor to write to user control registers, inside of the ADIS1648x devices, each command (16-bits) writes to one byte at a time.

Data Capture

The Data Capture function supports synchronous data acquisition, based on the data-ready signal from the ADIS1648x. The following picture represents the Data Capture window, right after opening it from the **Main Window** and the second picture provides color-coded boxes, in order to support further discussion of each function that is associated with this screen.



Data Capture

Data Capture Register Selection

TEMP_OUT	☐
X_GYRO (32 bit)	☐
X_GYRO (16 bit)	☐
Y_GYRO (32 bit)	☐
Y_GYRO (16 bit)	☐
Z_GYRO (32 bit)	☐
Z_GYRO (16 bit)	☐
X_ACCL (32 bit)	☐
X_ACCL (16 bit)	☐
Y_ACCL (32 bit)	☐
Y_ACCL (16 bit)	☐
Z_ACCL (32 bit)	☐
Z_ACCL (16 bit)	☐
X_MAGN_OUT	☐
Y_MAGN_OUT	☐

Clear Register Selections

Select All Registers

Register Selection Notes

Selecting the "32-bit" register will cause the contents of both the OUT and LOW register words to be datalogged as a combined value.

Data Record Options

Record Length

Sample Rate

Capture Time

☒ Add File Header

☒ Use Scaled Data

Data Storage Location

Ready

The red box identifies all of the registers that are eligible for inclusion in the next acquisition process. Click on each box to include a register in the next data acquisition sequence. The box will have a check mark when it has been selected.

The green box identifies the configuration box for the name and location of the data storage file.

The yellow box identifies a number of configuration options for the data acquisition process. The **Record Length** is a user input for the total number of samples in a data record. Note that all selected registers will have this number of samples in the data record file, after the acquisition process completes. The **Sample Rate** represents the rate that the ADIS1648x updates its output register. This depends on the configuration in the DEC_RATE register. For example, if DEC_RATE = 0x0009, the decimation setting is 10, which would result in an update rate of 246 SPS. After each update to the **Record Length** box, the software calculates the displays the total **Capture Time**. The **Add**

Header option allows the user to add or remove the header in the data storage file. The **Use Scaled Data** causes the software to convert the decimal, two's complement number into its representative value. For example, when enabling **Use Scaled Data**, the gyroscope outputs will be in units of degrees/second.

IMU EVALUATION SOFTWARE REVISION HISTORY

REVISION	RELEASE DATE	SUMMARY OF UPDATES
v1.14.3	8/5/15	Adjust ADIS16210 registers to match recent datasheet updates
v1.14.2	TBD	Internal update
v1.14.1	TBD	Internal update
v1.14.0	3/2/15	Internal update
v1.13.0		Internal update
v1.12.0		Internal update
v1.11.1	4/9/14	Updated Magnetometer recorder in the Main Menu for consistency across the ADIS16405, ADIS16407, ADIS16448 and ADIS16488
v1.10.1	12/9/13	Address reported issue with SYS_E_FLAG register missing from ADIS16485 and ADIS16488 Register Access Menu
v1.10.0	11/1/13	Add support for the ADIS16137
		Fix register access (<u>GPIO_CTRL</u>) in ADIS16209
v1.9.8	8/27/2013	Corrected a number of register definition issues on the ADIS16480
v1.9.7	8/21/2013	Corrected scale factors associated with GYRO_OUT/GYRO_OUT2 registers in the ADIS16133/5
v1.9.6	N/A	Extended Precision Auto Null Wait time to 30 seconds on ADIS1636x/40x
		NOTE: This version was not posted online but these updates are in current versions
v1.9.5	N/A	Corrected scale factors and offset factors associated with xTEMP_OUT on the ADIS16445
		Corrected scale factors and offset factors associated with xTEMP_OUT and xMAGN_OUT registers in the ADIS16448
		NOTE: This version was not posted online but these updates are in current versions
v1.9.4	N/A	Enabled support for using an external clock on the ADIS16405
		NOTE: This version was not posted online but these updates are in current versions
v1.9.3	3/18/2013	Added support for the ADIS16400 and ADIS16405
v1.9.2	2/18/2013	Changed the separation "de-limit" in the data captures file from a comma to a semicolon
v1.9.0	1/16/2013	Added support for the ADIS16209 and ADIS16210
		Corrected scale factors associated with the xDELTVEL_xxx registers in the ADIS16480/5
v1.8.1	12/18/2013	Corrected a data capture error, which was observed in the ADIS16448, but could have impacted other products
v1.8.0	11/8/2013	Added support for external clock use
		Added support for the ADIS16266
v1.7.0	10/1/12	Added support for the ADIS16360, ADIS16362, ADIS16364, ADIS16365, and ADIS16367
		Corrected a scaling issue for those who use "Turkey" as their regional setting.
		NOTE: Some sensitivity was still observed; some users in Turkey may need to change regional setting to fully address.
v1.6.0	9/3/12	Added support for the ADIS16300 and ADIS16305

REVISION	RELEASE DATE	SUMMARY OF UPDATES
v1.5.0	8/22/12	Added support for the ADIS16445
v1.4.0	7/18/12	Added support for the ADIS1613, ADIS16135, ADIS16136 and ADIS16334
v1.3.0	N/A	Internal updates
		NOTE: This version was not posted online but these updates are in current versions
v1.2.0	5/28/2012	Added support for the ADIS16480
		Added 3-D viewer for ADIS16480 demonstration
v1.1.1	5/4/2012	Updated register names for ADIS16448/ADIS16485 to match datasheet names
		Data Capture: changed "Cancel" button to "Stop"
v1.1.0	4/6/2012	Added support for the ADIS16485
		Improvements to Waveform Recorder appearance
v1.0.1	3/27/2012	Addressed issue to enable correct register values in the Register Access menu
v1.0.0	3/24/2012	Initial Release

TEMP

imu_evaluation_v1_17_9.zip

EXAMPLE EXERCISES

Edit the page and hit Save. See syntax for Wiki syntax. Please edit the page only if you can improve it. If you want to test some things, learn to make your first steps on the playground.

Gyroscope Demonstration

[Click here to see a gyroscope demonstration, from the ADIS16448 Wiki Site \[http://wiki.analog.com/resources/eval/user-guides/inertial-mems/imu/adis16448?&#gyroscope_demonstration\].](http://wiki.analog.com/resources/eval/user-guides/inertial-mems/imu/adis16448?&#gyroscope_demonstration)

Accelerometer Demonstration, Static

[Click here to see the static \(gravity\) accelerometer demonstration, from the ADIS16448 Wiki Site \[http://wiki.analog.com/resources/eval/user-guides/inertial-mems/imu/adis16448?&#accelerometer_demonstration_gravity\].](http://wiki.analog.com/resources/eval/user-guides/inertial-mems/imu/adis16448?&#accelerometer_demonstration_gravity)

Accelerometer Demonstration, Dynamic

[Click here to see the dynamic accelerometer demonstration, from the ADIS16448 Wiki Site \[http://wiki.analog.com/resources/eval/user-guides/inertial-mems/imu/adis16448?&#accelerometer_demonstration_dynamic\].](http://wiki.analog.com/resources/eval/user-guides/inertial-mems/imu/adis16448?&#accelerometer_demonstration_dynamic)

Useful Experiments

Click on the following links to access several useful experiments in [ADI's](#) Engineer Zone/MEMS Community.

[Gyroscope Sensitivity Measurement \[http://ez.analog.com/docs/DOC-2181\]](http://ez.analog.com/docs/DOC-2181)

[Gyroscope Noise Density \[http://ez.analog.com/docs/DOC-2212\]](http://ez.analog.com/docs/DOC-2212)

[Gyroscope In-Run Bias Stability \[http://ez.analog.com/docs/DOC-2162\]](http://ez.analog.com/docs/DOC-2162)

[Gyroscope Angle Random Walk \[http://ez.analog.com/docs/DOC-2163\]](http://ez.analog.com/docs/DOC-2163)

[ADIS16480 3-D Demonstration \[http://ez.analog.com/docs/DOC-2223\]](http://ez.analog.com/docs/DOC-2223)

15,000

Problem Solvers

4,700+

Patents

125,000

Customers

50+

Years

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