

ADXL312 Sensor Evaluation System

FEATURES

Flexible inertial sensor evaluation platform

Single main board operates with interchangeable satellite boards

Separates DUT from controller for accurate environmental testing

Interrupt driven device communication

12.5 Hz to 3200 Hz data sampling

Synchronous sampling for X, Y, and Z axes

Continuous stream to file data recording

Supports all data rates

Standard USB cable for power and communications

PC-based graphical user interface (GUI)

Fast, easy installation

INTERNAL SENSOR EVALUATION SYSTEM

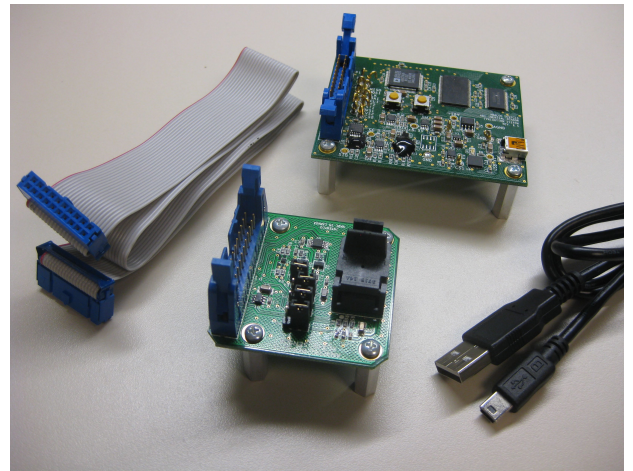


Figure 1.

GENERAL DESCRIPTION

The [ADXL312](#) inertial sensor evaluation system is an easy-to-use evaluation tool targeting bench or desktop characterization of Analog Devices, Inc., inertial sensor products. The system consists of the inertial sensor evaluation board (ISEB), or main board, and a satellite board for any Analog Devices inertial sensor product. The ISEB connects directly to a PC via a USB cable, with the USB connection providing both power and communications to the board. The ISEB is connected to the satellite board through a ribbon cable. This cable allows the satellite to be easily manipulated for testing or to separately be placed into an environmental chamber for temperature or humidity testing. Separating the board mitigates corruption of data due to the temperature and humidity effects of other components.

The ISEB is a universal main board and is intended to be used with various satellites of Analog Devices inertial sensors, including analog and digital accelerometers and gyroscopes. The different products are evaluated by means of separate GUIs that are customized for performance and characterization measurements relevant to the inertial sensor being evaluated.

The EVAL-ADXL312Z-M system contains the ISEB and the EVAL-ADXL312Z-S satellite. Also included is a USB A to Mini-B cable to connect the ISEB to a PC and an 18-inch, 20-pin ribbon cable to connect the ISEB to the satellite. A CD is included with the necessary drivers and installers to use the system and to quickly begin evaluating the ADXL312.

INSTALLATION PROCEDURE

The following steps must be completed, in the order listed, to successfully set up and run the ADXL312 evaluation system:

1. Download the **ADXL312** folder to the PC hard drive
2. Install the USB drivers for the inertial sensor evaluation system (ISEB).
3. Connect the ISEB hardware to the PC.
4. Install the latest firmware revision into the ISEB hardware (included on the CD).
5. Install the ADXL312 evaluation system GUI.
6. Configure the ISEB hardware.
7. Launch the ADXL312 evaluation system GUI and test devices.

This user guide is designed to provide all the details necessary to install and operate the ADXL312 evaluation system.

TABLE OF CONTENTS

Features	1	Inertial Sensor Evaluation System GUI.....	8
Internal Sensor Evaluation System.....	1	Getting Started.....	8
General Description	1	Configuration Panel.....	9
Installation Procedure.....	1	Real-Time Measurement Panel	10
Revision History	2	Real-Time Measurement Panel, Common Uses.....	11
Inertial Sensor Evaluation System Setup	3	Power Consumption Panel.....	12
Download Files	3	Power Consumption Panel, Common Uses	13
ISEB Hardware Setup.....	3	Temperature Panel	14
COM Port Verification	4	Troubleshooting Tips	15
Installing the Latest ISEB Firmware.....	5	Header Pinout	16
Hardware Configuration	7		

REVISION HISTORY

10/10—Revision 0: Initial Version

INERTIAL SENSOR EVALUATION SYSTEM SETUP

DOWNLOAD FILES

Before proceeding with the installation routine, download the files within the **ADXL312** folder (located on the included CD) to a local folder on the target PC. Do this by taking the following steps:

1. Browse to a destination directory on the host PC.
2. Right-click to select **New/Folder**.
3. Name this folder and copy the CD files into this new location.

ISEB HARDWARE SETUP

Before connecting the ISEB hardware to the PC, drivers must be installed so that the PC properly recognizes the ISEB main board. The USB drivers for the ISEB are available in the **/ISEB_USB Drivers/** folder.

Installing the USB Drivers for the ISEB

To install the USB drivers, take the following steps:

1. Execute the **ADI_ISEB_USB_Drivers.exe** file located in **/ISEB_USB Drivers/**.
2. Follow the on-screen instructions to install the drivers.
3. Click **Continue Anyway** when prompted that the drivers are not tested.

You can now connect the ISEB main board to the computer via the included USB cable. If the previously installed drivers are not automatically associated with the device, you may need to select the drivers manually, as follows:

1. Connect the USB A to Mini-B cable to the PC and then to the ISEB. When the ISEB board is connected, the **Found New Hardware Wizard** window will appear.
2. If prompted to install drivers, click **Install from a list or specific location (Advanced)** and click **Next>** (see Figure 2).
3. Select **Don't search. I will choose the driver to install** and click **Next>** (see Figure 3).
4. Select **ADI Inertial Sensor Evaluation System** from the model list and click **Next>** to complete the process (see Figure 4).

The ISEB should be detected automatically in the **Device Manager** as the **ADI Inertial Sensor Evaluation System** under the **Ports (COM & LPT)** selection. It is recommended to open the **Device Manager** to verify hardware detection and to record the communication port associated with the ISEB for use in the GUI.

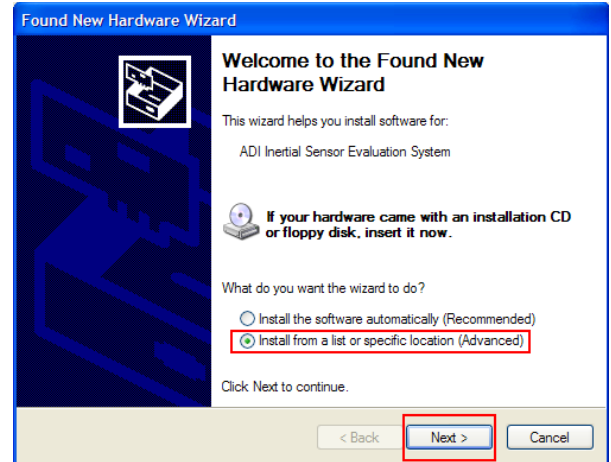


Figure 2. Found New Hardware Prompt

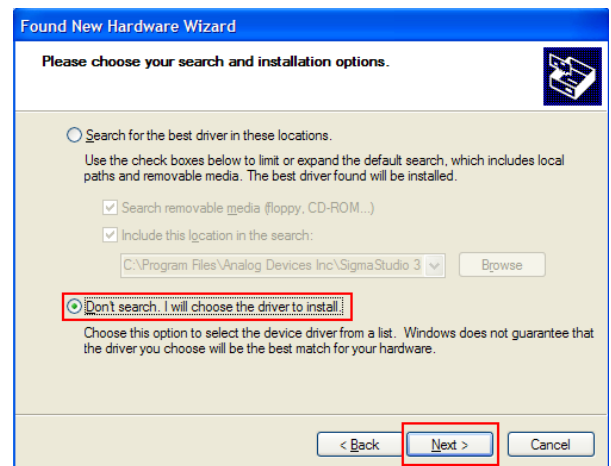


Figure 3. Selection of the Driver to Install

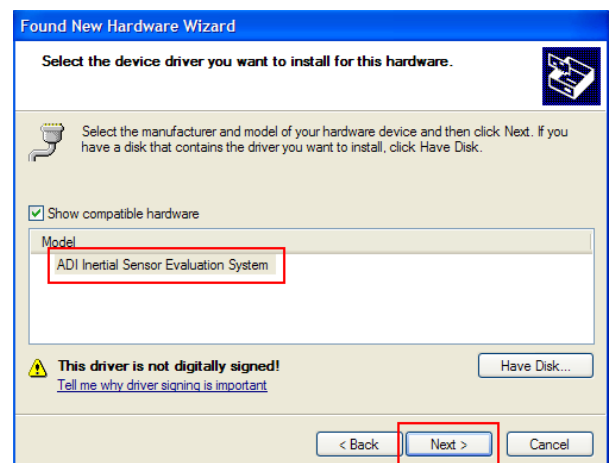


Figure 4. Selection of the ADI Inertial Sensor Evaluation System Drivers

COM PORT VERIFICATION

Installing the latest firmware revision, as well as operating the [ADXL312](#) evaluation GUI, requires that you know the COM port that is assigned to the ISEB main board. With the ISEB main board connected to the PC, perform the following steps to determine the assigned COM port number.

For Windows® Vista,

1. From the **Start** menu, right-click **Computer** and select **Properties**. The window shown in Figure 5 should open.
2. Underneath **Tasks**, select **Device Manager**. Windows Vista may request that you allow access to this panel, and administrative privileges may also be required. The window shown in Figure 6 should now open.
3. Expand the **Ports (COM & LTP)** menu item. The **ADI Inertial Sensor Evaluation System** should be listed with an assigned COM port number in parenthesis.
4. Note the COM port number for future use.

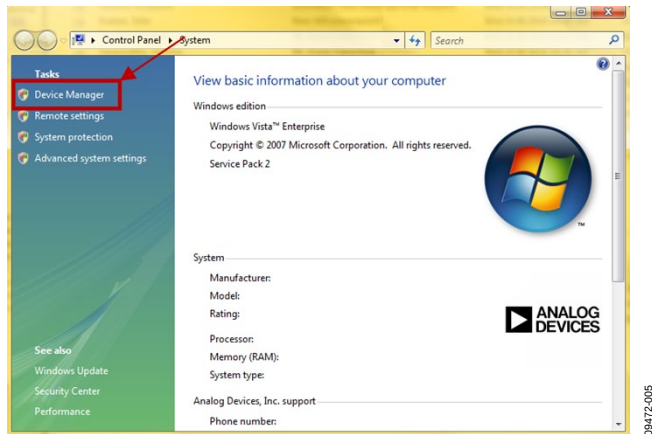


Figure 5. Computer Properties

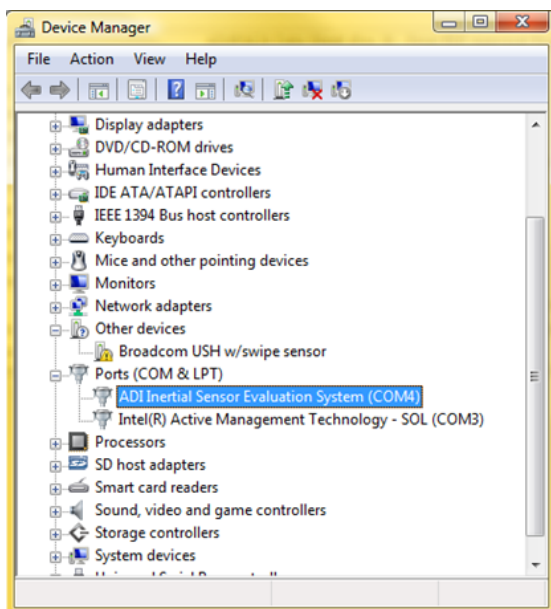


Figure 6. Device Manager Showing the COM Port Number

For Windows XP/2000,

1. From the **Start** menu, right-click **My Computer** and select **Properties**.
2. Click the **Hardware** tab of the **System Properties** window, as shown in Figure 7.
3. Select **Device Manager** to look up the assigned COM port of the ISEB hardware.

The **Device Manager** window should look like the window shown in Figure 6.

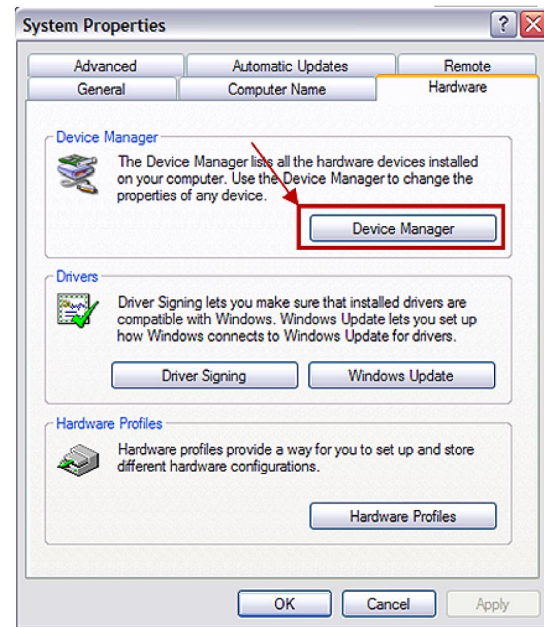


Figure 7. System Properties

INSTALLING THE LATEST ISEB FIRMWARE

The latest ISEB firmware is included on the installation CD, located in the **/Firmware Utility/** folder. To successfully use the ISEB evaluation hardware, the **ADXL312 - Firmware.hex** file must be flashed to the ISEB controller. The installation CD contains the firmware and the utility that allows you to flash a new version of the firmware onto the ISEB microcontroller. In addition, as new firmware is made available, it can be downloaded from the Analog Devices website ([ADXL312 Product Page](#)).

To flash the ISEB microcontroller with new firmware, follow these steps:

1. Ensure that the ISEB is connected to and detected by the PC. The COM port on which the device is recognized must also be known, as mentioned in the COM Port Verification section.
2. Run the **ARMWSD.exe** program located in the **/Firmware Utility/** folder; it displays information about the downloader, as shown in Figure 8.

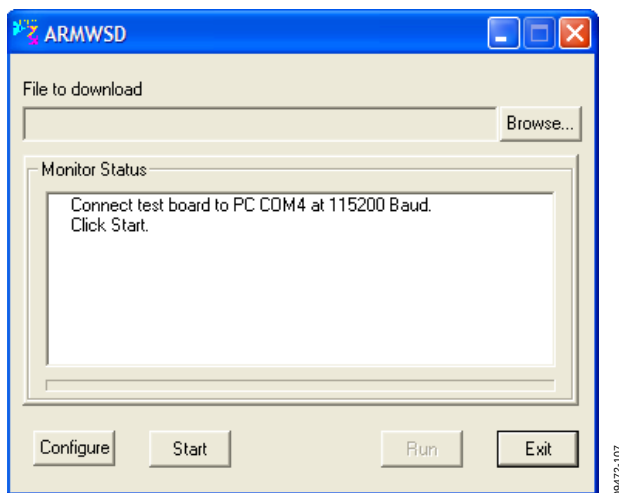


Figure 8. ISEB ARMWSD Firmware Downloader

3. Click **Browse...** and select the **ADXL312 - Firmware.hex** file located in the **/Firmware Utility/** folder.
4. Click **Configure** to display the box shown in Figure 9.

The downloader file should be configured for the **ADuC7026** microcontroller. The only option you may need to change is the COM port. You can select the correct port from the **Serial Port** menu on the **Comms** tab (see Figure 9).

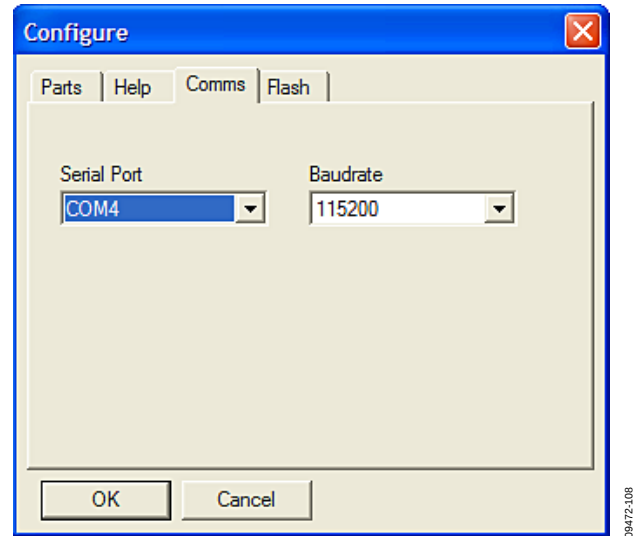


Figure 9. Selecting the Correct COM Port for the Downloader

When the COM port is selected, click **OK** to accept the changes and go back to the ARMWSD box (see Figure 8). The downloader is now fully configured. Follow these steps to flash the firmware:

1. Click **Start** in the ARMWSD box (see Figure 8) to initiate the flashing process.
2. Press the two buttons (shown in Figure 10) on the ISEB in the following order to flash the firmware:
 - a. Press and hold down **SW1**.
 - b. With **SW1** held down, press and release **SW2**.
 - c. Release **SW1**.
3. The download begins and is automatically verified by the downloader.

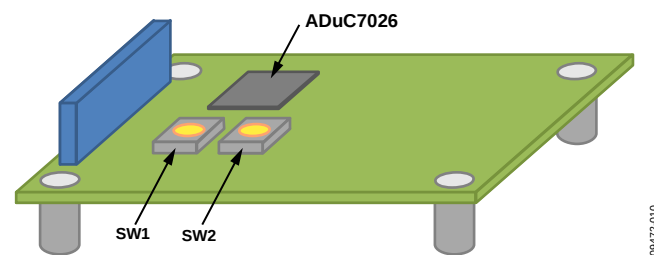


Figure 10. ISEB Switch Locations for Flashing the Microcontroller

4. If the downloading process fails, which is indicated in the **Monitor Status** box (see Figure 8), attempt the download again by repeating Step 1 through Step 3.
5. After the download has completed successfully, click **Run** (shown in Figure 8).

The **ADXL312 - Firmware.hex** firmware has been developed for specific operation with the **ADXL312** satellite board. To use the ISEB main board with any other satellite board, simply locate the other device's firmware on the included installation CD and flash it onto the ISEB main board. This will allow operation with that device's evaluation GUI.

Installing the ADXL312 Software Evaluation GUI

The software GUI installation was created to include all required National Instruments drivers and run-time engines that are necessary for proper operation. To run the software GUI installation routine, double-click the **setup.exe** file located in the **/ADXL312 Eval Software Installation/** folder on the included CD. The window shown in Figure 11 will be shown.

Complete the following steps to install the evaluation software:

1. Select the **Destination Directory** (see Figure 12). It is recommended to keep the default settings for these fields.
2. Click **Next>>**. The **License Agreement** window will then be shown.
3. Read the **National Instruments Software License Agreement**. Chose **I accept the License Agreement(s)**, and then click **Next>>**. The installer will then list the required components that will be installed on your PC (see Figure 13).
4. Click **Next>>** to start the installation. After the installation is complete, the box shown in Figure 14 will display.
5. Click **Finish** to complete the installation.

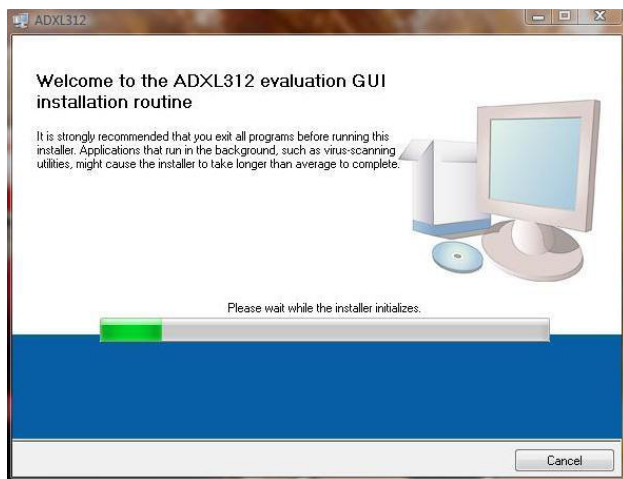


Figure 11. ADXL312 Evaluation Software Installation Welcome

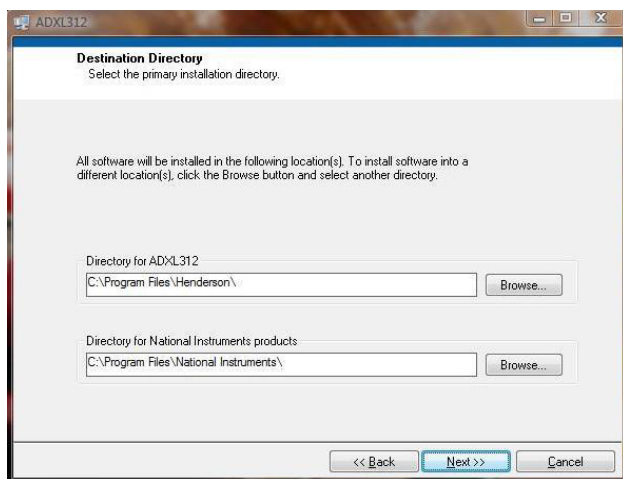


Figure 12. Destination Directory Selection

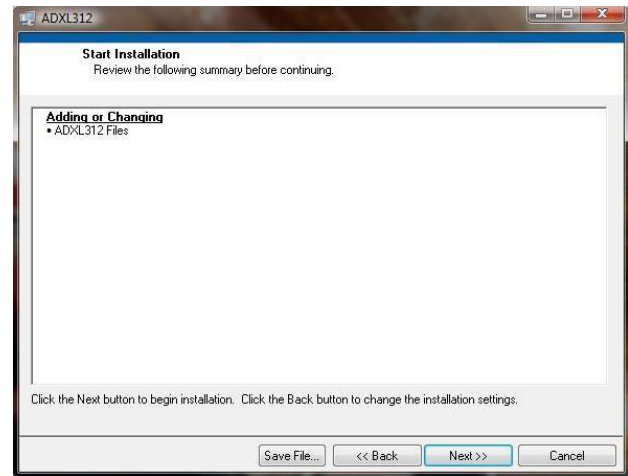


Figure 13. Start Installation (Listing Varies Based on PC Requirements)

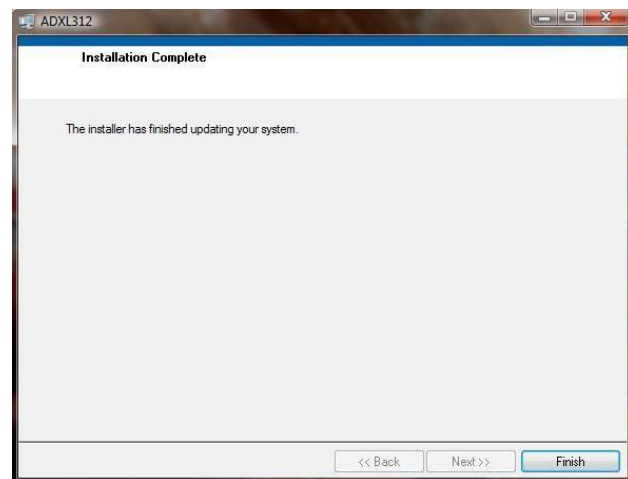


Figure 14. Installation Complete

HARDWARE CONFIGURATION

The ADXL312 satellite board should be connected to the inertial sensor evaluation board (ISEB), as shown in Figure 16. The red wire of the ribbon cable is designed to connect Pin 1 of the satellite board header to Pin 1 of the ISEB board. Refer to the Header Pinout for the complete satellite board pinout.

Additionally, several jumpers located on the satellite board can be used to switch the part between I²C and either 3-wire or 4-wire SPI communication. However, 4-wire SPI operation is required to use the [ADXL312](#) software evaluation GUI. Figure 15 shows the correct jumper settings that will configure the satellite board for 4-wire SPI.

The satellite board can be freely connected to any other evaluation system in which 3-wire SPI or I²C operation may be desired. Refer to the Header Pinout section, as well as the satellite board schematic included on the CD to determine the necessary configuration for your application.

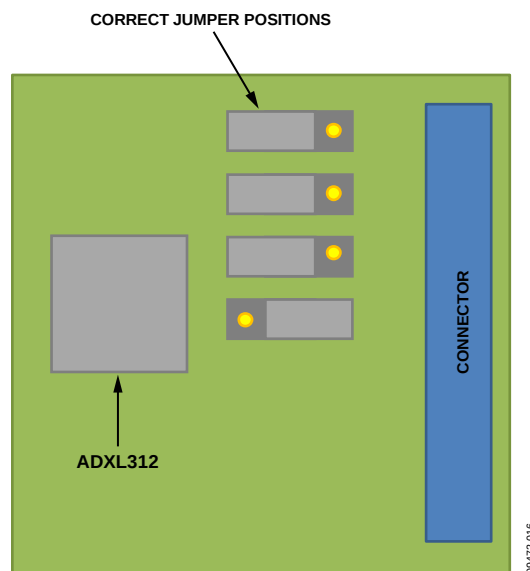


Figure 15. Correct Jumper Positions for the ADXL312 Satellite

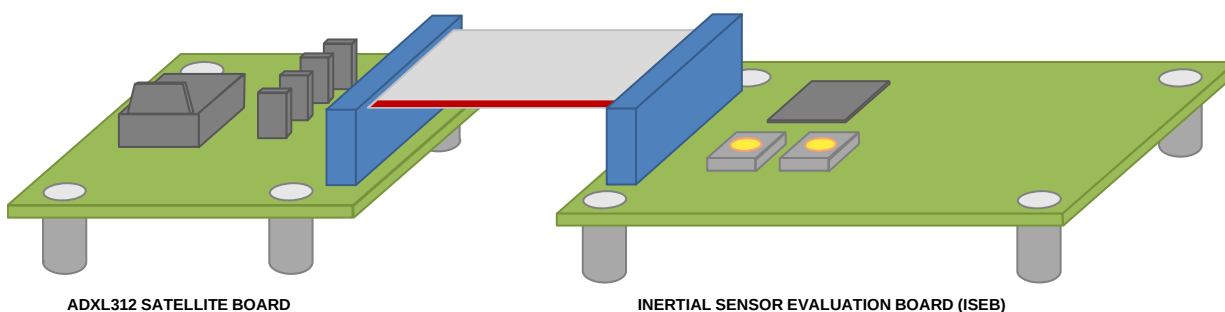


Figure 16. Satellite Board Connection to ISEB

INERTIAL SENSOR EVALUATION SYSTEM GUI

GETTING STARTED

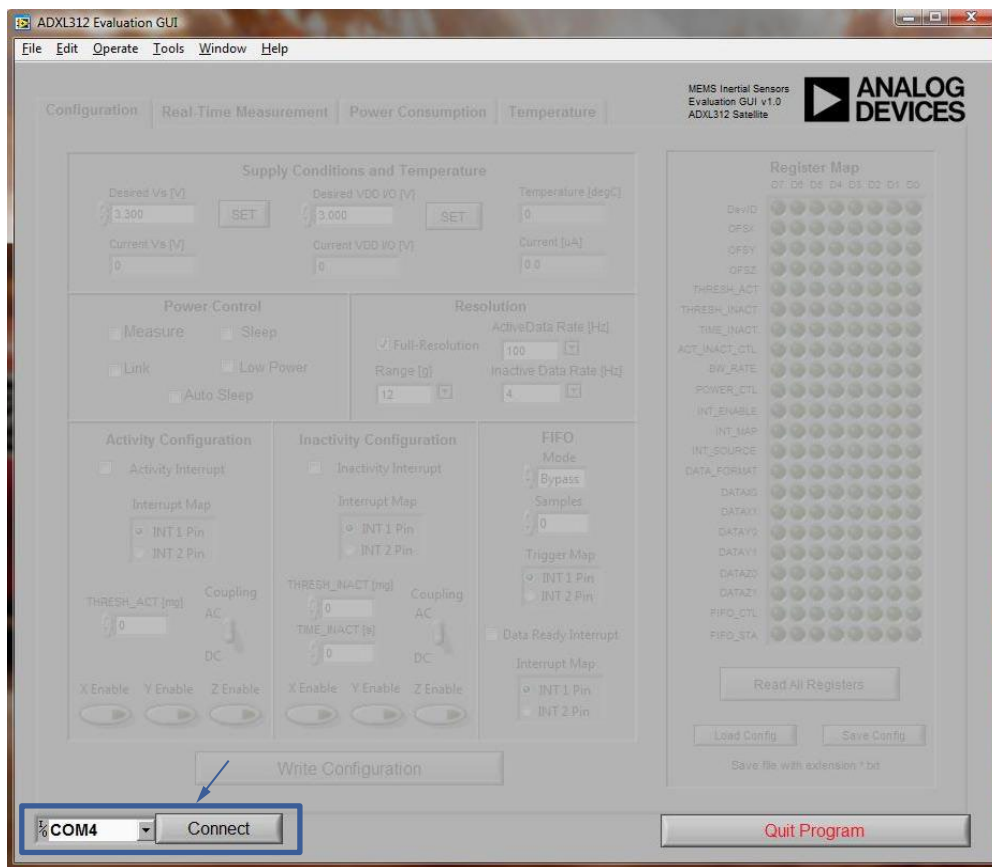


Figure 17. COM Port Selection

As part of the installation routine, a Start Menu item is created that launches the **ADXL312 Evaluation GUI**. Click the executable, located at **Start > All Programs > Analog Devices – Inertial Sensor Eval > ADXL312 Evaluation Software > ADXL312 Eval**.

When opened, you will see the screen shown in Figure 17. All functionality has been disabled until the COM port selection

is complete. From the drop-down menu, select the COM port assigned to the ISEB evaluation board. Refer to the COM Port Verification section for the procedure to follow to verify the COM port assignment. Ensure that a reasonable COM port value (<10) has been assigned to the ISEB hardware. The software will not interact properly with excessively high COM port values.

CONFIGURATION PANEL

The **Configuration** panel allows users to set the operating conditions for the ADXL312, as well as read/write the contents of the memory map. Figure 18 shows the Configuration panel once the COM port verification step has been completed. The default contents of the memory map can be seen at the right side of the screen. By default, every ADXL312 contains the memory map assignments shown in Table 1.

Table 1. Memory Map Initial Conditions

Register Name	Address	Contents
DevID	0x00	0xE5
BW_RATE	0x2C	0x0A
INT_SOURCE	0x30	0x02

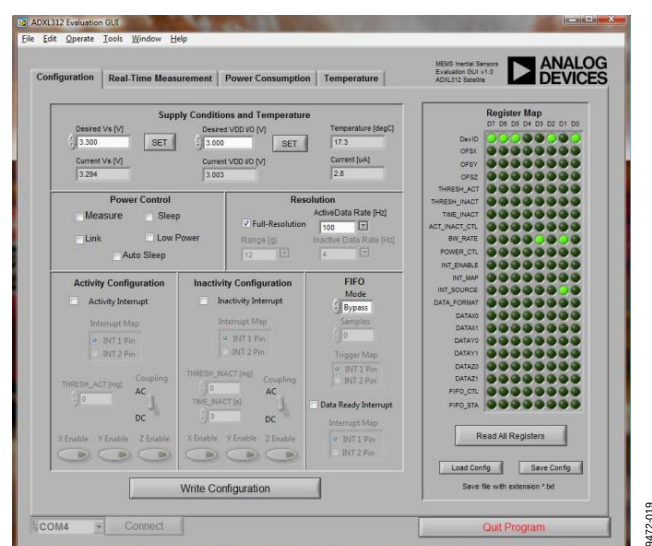


Figure 18. Configuration Panel Initial Conditions

The following actions are available in the **Configuration** panel:

- **SET (Vs)** sets the main supply voltage of the ADXL312. The default value is 3.3 V. When the **SET** button is pressed, the ISEB will apply the desired supply voltage, and then read back the voltage using an on-board voltage monitor. This value is displayed in the **Current Vs [V]** text box.
- **SET (VDD I/O)** sets the interface voltage of the ADXL312. The default value is 3.0 V. This voltage must be less than then the supply voltage **Vs**. When the **SET** button is pressed, the ISEB will apply the desired supply voltage, and then read back the voltage using an on-board voltage monitor. This value is displayed in the **Current VDD I/O [V]** text box.
- Pressing the **Read All Registers** button performs a read back of the entire ADXL312 memory map. The memory map display will be refreshed to reflect these contents.

- The memory map contents are changed by interacting with the various front panel controls on the **Configuration** panel. The **Activity Configuration**, **Inactivity Configuration**, **FIFO Mode**, **Resolution**, and more can all be adjusted with these controls. When the desired configuration is achieved, press the **Write Configuration** button to transfer these settings to the ADXL312 memory map. The memory map then refreshes to show the contents that were just written. See Figure 19 for an image of the **Configuration** panel once the **Write Configuration** button has been pressed. Note that the configuration settings from this panel are preloaded (as needed) into the rest of the GUI.

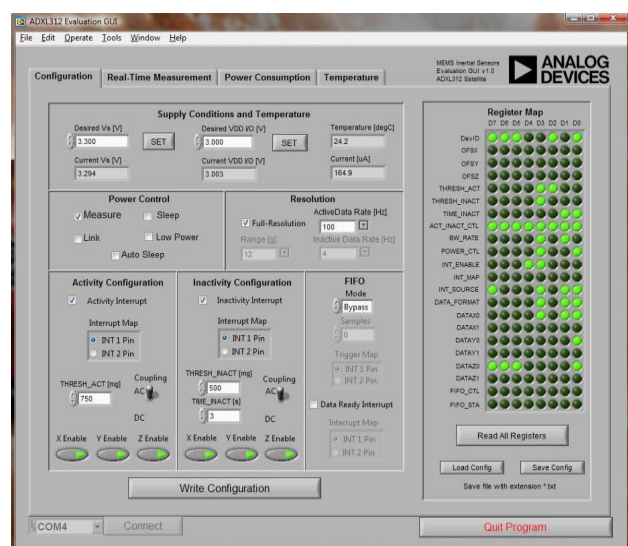


Figure 19. Configuration Panel with Sample Configuration

- Memory map settings can be saved to file for future use. Press **Save Config** to transfer the contents of the **Register Map** (the LED array at the right side of the **Configuration** panel) to file.
- By pressing **Load Config**, any previously saved **Register Map** can be recalled and loaded onto an ADXL312. Performing this routine will both refresh the **Register Map** LED array, as well as affect the value of the front panel controls.

REAL-TIME MEASUREMENT PANEL

The **Real-Time Measurement** panel is the primary panel for reading/recording data from the [ADXL312](#). The necessary settings that were applied on the **Configuration** panel will be carried over to this panel. This includes:

- **Data Rate [Hz]**
- **Range [g]**
- **Full-Resolution [Y/N]**
- **FIFO Mode**
 - Samples
 - Activity threshold

These parameters can also be adjusted as needed, without having to revert to the **Configuration** panel.



Figure 20. **Real-Time Measurement** Panel

The following functionality is available to the user within the **Real-Time Measurement** panel:

- When entering the **Real-Time Measurement** panel, the supply voltage settings are maintained from the **Configuration** panel. If these settings are adequate, then there is no need to adjust the supply voltage any further. The **Update Supply Voltages** functionality allows you to set the supply voltage in between measurements to understand how the device reacts to changes in supply.
- Data capture on the **Real-Time Measurement** panel is entirely interrupt driven, such that the evaluation GUI only obtains new acceleration data samples when the DATA_RDY interrupt is asserted. The data acquisition rate is therefore directly controlled by the ADXL312 clock. Adjusting the **Data Rate [Hz]** value will dynamically adjust the data rate and bandwidth of the ADXL312.
- The device can be configured for either 1.5 g, 3 g, 6 g, or 12 g operation by choosing a value in the **Range [g]** pull-down menu. If the **Full-Resolution** option is selected, the g-range defaults to 12 g (13 bit). This offers equivalent resolution as 1.5 g (10 bit) but offers an extended range of operation.

- The **Full-Resolution [Y/N]** adjusts whether or not the **Full-Resolution** mode is enabled. It is recommended to enable this option as it provides the highest possible resolution, while also providing the widest dynamic range.
- **FIFO Mode** select allows selection of either Bypass, FIFO, Stream, or Trigger FIFO modes. Refer to the ADXL312 data sheet for a complete description of each mode.
- **FIFO Samples** select allows selection of the total number of FIFO samples that should be obtained. The behavior is slightly different depending upon the FIFO mode selected. Refer to the ADXL312 data sheet for a complete description of the FIFO samples functionality.
- The activity threshold (trigger mode only) sets the threshold for activity detection when in trigger mode (**THRESH_ACT**). Activity detection is configured for the X and Y axes only, and is set to dc threshold detection. Refer to the ADXL312 data sheet for a complete description of ac vs. dc activity detection.
- Selecting **Save Data** streams the X-, Y-, and Z-axis acceleration data to file. When **Start Measurement** is pressed, data streams to the specified file indefinitely, regardless of the selected data rate. Data recording only stops when **Stop Measurement** is pressed.
- Click **Start Measurement** to begin streaming data from the ADXL312. The device will be configured as is shown in the Configuration box at the left side of the screen. X-, Y-, and Z-axis acceleration data will be retrieved from the device until **Stop Measurement** is pushed.
- The offset of each axis can be individually adjusted to remove, for example, the effects of the gravity vector from the X-, Y-, and/or Z-axis. These values can be adjusted between measurements. Press **Set Offset** to apply these settings.
- When **Start Measurement** is pressed, **Self Test** can be pressed in order to apply a self test force to the ADXL312 beam structure. This functionality is only compatible with data rates between 6.25 Hz and 200 Hz inclusive. The ADXL312 self test routine results in a dc shift to the output of the device, as the beam is physically displaced in a manner equivalent to externally applied acceleration.

REAL-TIME MEASUREMENT PANEL, COMMON USES

Here are some common use conditions that can be applied with the **Real-Time Measurement** panel of the **ADXL312** evaluation system.

Apply Self Test

When **Start Measurement** is pressed, the self test functionality can be tested by clicking **Self Test**, which is located directly underneath the acceleration data graph (see Figure 21). Click **Self Test** once to activate the self test force, and click it a second time to deactivate the self test force. The settings in Table 2 are recommended when using the self test functionality.

Table 2. Recommended Settings for Self Test

Parameter	Setting
Data Rate [Hz]	6.25 ~ 200
Range [g]	12
Full-Resolution	On
FIFO Mode	Bypass
Set Offset	[0, 0, 0] -> [X, Y, Z]

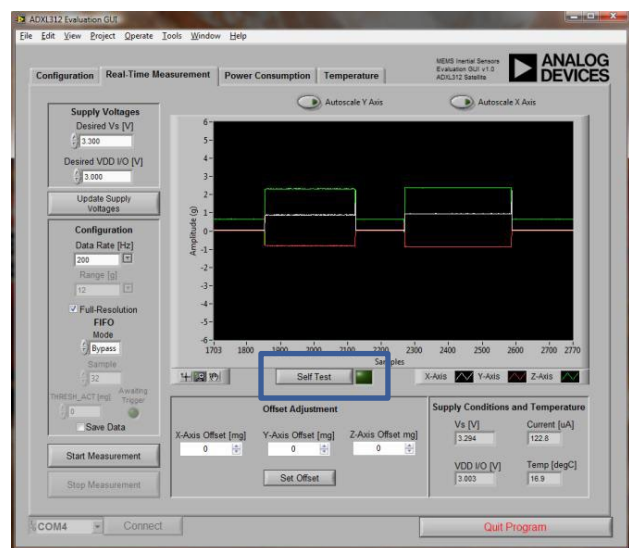


Figure 21. Self Test Toggle

Using Trigger Mode

Trigger mode is designed as follows. The FIFO is continuously filled with acceleration data. As new samples are populated into the FIFO, older samples are pushed out. This is similar to the stream mode of operation. However, when the activity interrupt is asserted, the behavior of the FIFO changes. The FIFO retains the “n” most recent FIFO samples leading up to the trigger event. Then, the device acquires “32 – n” additional samples after the trigger event occurs. The FIFO will then stop acquiring new data. The value of “n” can be adjusted by selecting a value from the **Sample** pull down menu. In this way, a moment of impact can be captured in the data FIFO for retrieval later.

To properly use the trigger **FIFO** mode, the configuration in Table 3 is recommended.

Table 3. Recommended Settings for FIFO Trigger Mode

Parameter	Settings
Data Rate [Hz]	50 ~ 3200
Range [g]	12
Full-Resolution	On
FIFO Mode	Trigger
Samples	8
THRESH_ACT [mg]	5000
Set Offset	[0, 0, 0] -> [X, Y, Z]

Once these settings are established, press **Start Measurement**. The GUI then waits for the trigger event to occur. If the trigger event does not occur within ~10 seconds, the operation times out, and the process must be repeated. Once the trigger event occurs, the 32 FIFO samples are plotted, and the measurement stops.

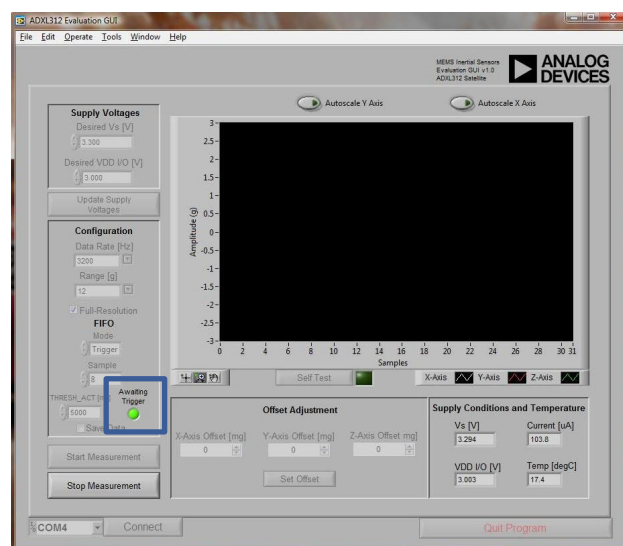


Figure 22. Awaiting Trigger Event



Figure 23. Trigger Data

Observing FIFO Operation

The ADXL312 has an innovative 32-level FIFO that can be used to temporarily store data. Once the FIFO has filled, the microcontroller can then perform a burst read of the FIFO data. This style implementation can result in large system power savings, because the microcontroller can be deactivated until it receives an interrupt command from the ADXL312 device. To witness the FIFO operation, the settings in Table 4 are recommended.

Table 4. Recommended Settings for FIFO Operation

Parameter	Settings
Data Rate [Hz]	50 ~ 100
Range [g]	12
Full-Resolution	On
FIFO Mode	FIFO
Samples	32
Set Offset	[0, 0, 0] -> [X, Y, Z]

The FIFO can be used at any data rate; however, 50 Hz ~ 100 Hz is recommended because its operation can be visually observed.

Once **Start Measurement** is pressed, the evaluation GUI begins retrieving acceleration data from the device. However, data is only retrieved when the FIFO has filled to contain 32 samples. At this point, all 32 levels of the FIFO is read, and the entirety of its contents is updated on the acceleration data graph.

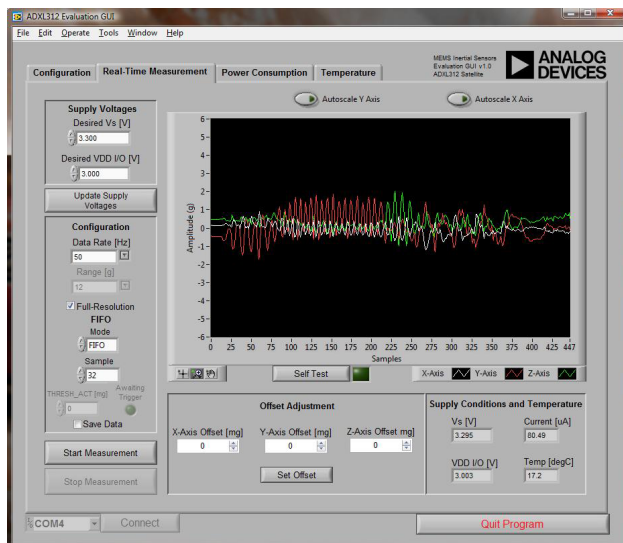


Figure 24. FIFO Operation

POWER CONSUMPTION PANEL

When used properly, the ADXL312 offers extremely low system level power consumption. The innovative **Auto Sleep** functionality allows the device to sleep and wake-up based on externally applied acceleration. Additionally, a low power mode provides normal operation at a reduced level of current consumption, with only a slight increase to the rms noise. As with the **Real-Time Measurement** panel, the necessary configuration settings are imported from the **Configuration** panel.

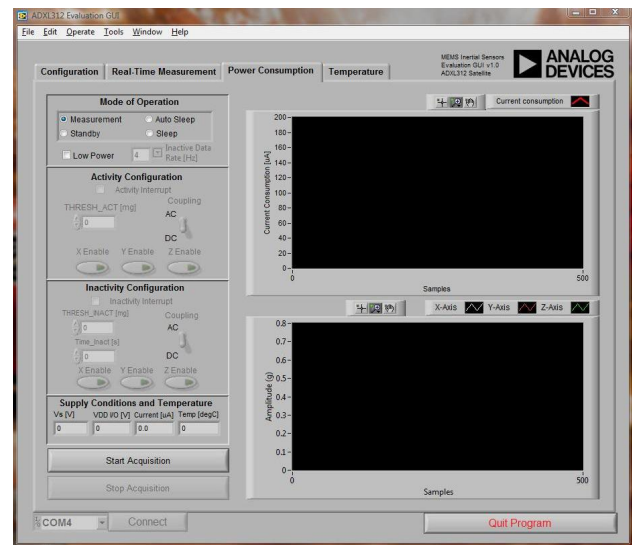


Figure 25. Power Consumption Panel

The following functionality is available to the user within the **Power Consumption** panel:

- The **Mode of Operation** options allow you to configure the device for **Measurement**, **Auto Sleep**, **Standby**, or **Sleep**. Each of these options corresponds to different device behaviors, and different power consumption levels.
- **Low Power** allows you to toggle **Low Power** mode. **Low Power** mode can be applied in addition to any of the **Modes of Operation** previously described.
- The **Inactive Data Rate [Hz]** drop-down menu controls the data rate that is used when the device is in sleep mode. This selection is compatible with both **Sleep** and **Auto Sleep** modes of operation.
- The **Activity Interrupt Configuration** must be used with **Auto Sleep** mode. The **Activity Interrupt Configuration** adjusts the settings that determine what level of activity is required to wake the device from **Sleep** mode. When in **Auto Sleep** mode, activity can only be detected after inactivity.
- The **Inactivity Interrupt Configuration** must be used with **Auto Sleep** mode. The **Inactivity Interrupt Configuration** adjusts the settings that control what level of inactivity is required to put the device into **Sleep** mode. When in **Auto Sleep** mode, inactivity can only be detected after activity.

POWER CONSUMPTION PANEL, COMMON USES

Here are some **Power Consumption** common use conditions that can be applied with the [ADXL312](#) evaluation system.

Auto Sleep Behavior

To observe the behavior of the device when in **Auto Sleep** mode, the settings in Table 5 can be applied (see Figure 26).

Table 5. Recommended Settings for Auto Sleep Operation

Parameter	Settings
Mode of Operation	Auto Sleep
Low Power	Off
Inactive Data Rate [Hz]	4
Activity Configuration	
Activity Interrupt	On
THRESH_ACT [mg]	750
Coupling	AC
X Enable	On
Y Enable	On
Z Enable	On
Inactivity Configuration	
Inactivity Interrupt	On
THRESH_INACT [mg]	750
Time_Inact [s]	3
Coupling	AC
X Enable	On
Y Enable	On
Z Enable	On

When the settings are applied, press **Start Acquisition**.

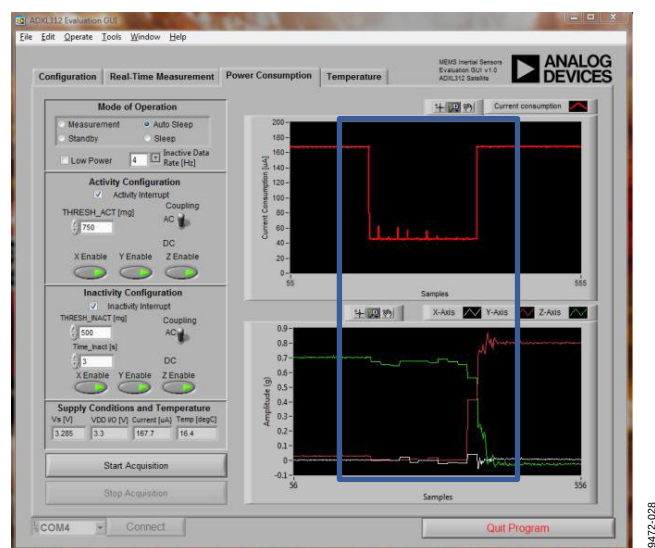


Figure 26. **Auto Sleep** Operation

The following process can then be followed to observe the auto sleep behavior:

- Do nothing for >3 seconds which will cause the inactivity interrupt to assert, sending the device into sleep mode.
 - During sleep mode, the device data rate is reduced. The acceleration data will appear different then when the part is awake.

- Turn the satellite board onto its side.
 - This redirects the gravity vector to another axis, trips the activity interrupt, and returns the device to measurement mode.

Observing Low Power Behavior

To observe the behavior of the device in low power mode, as opposed to measurement mode, the following procedure can be performed.

- Select **Measurement** in the **Mode of Operation** section.
- Press **Start Acquisition**.
- Allow the acceleration/current consumption graphs to fill with information.
- Press **Stop Acquisition**.
- Select **Low Power**.
- Press **Start Acquisition**.

This process results in a step change to the current consumption of the ADXL312 and is reflected in the waveform graphs. Additionally, the current/acceleration graphs are designed to update synchronously, allowing you to observe any changes to the acceleration data behavior as a result of enabling low power mode. Figure 27 illustrates both the decrease in current consumption, as well as the slight increase to the rms noise of the acceleration data.

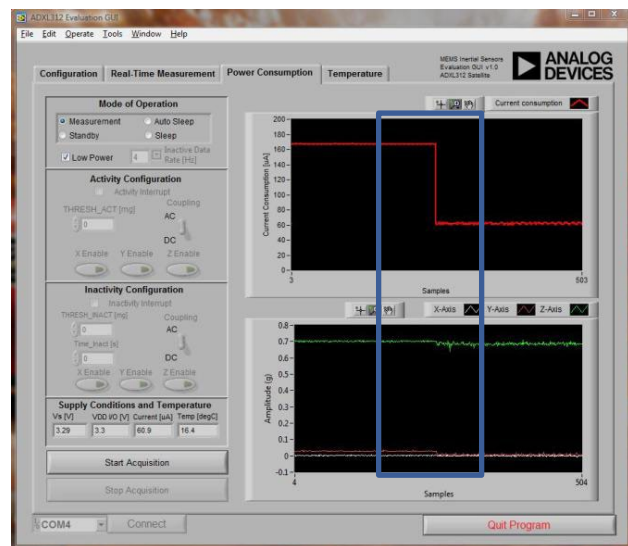


Figure 27. **Low Power** Operation

TEMPERATURE PANEL

The **Temperature** panel is designed to facilitate temperature testing of the [ADXL312](#). This panel can be used to easily determine the device offset stability with respect to temperature. An [ADT7301](#) temperature sensor is included on the satellite board for accurate temperature measurement of the environment near the ADXL312 device.

For this panel, the ADXL312 data rate is fixed to 100 Hz, with the effective data rate observed by the user determined by the **Number of Samples** field. The default number of samples is set to 100, resulting in an effective data rate of 1 Hz, and an effective bandwidth of 0.5 Hz. Low data rates are desirable for temperature testing because offset stability vs. temperature is a predominantly dc behavior.

To avoid measurement error, the following precautions should be used:

- The temperature sweep ramp rate should be kept low ($<2.5^{\circ}\text{C}/\text{minimum}$) to avoid false temperature hysteresis.
 - The physical separation of the ADT7301 and the ADXL312 results in a temperature differential, because each device takes longer to reach equilibrium with the temperature of the environmental chamber. Reducing the temperature ramp rate helps to minimize this effect.
- Ensure that the device remains stable during the temperature sweep.
 - Any motion induced during the temperature sweep results in confusing data.



Figure 28. **Temperature Test Panel**

TROUBLESHOOTING TIPS

The following tips are helpful for ensuring proper operation of the ISEB evaluation system, as well as recovery from any potential software/hardware errors.

- Connect the ISEB to the PC in this order:
 - Connect the satellite board to the main board (ribbon cable)
 - Connect the main board to the PC (USB cable)
 - Start the evaluation GUI on the PC by clicking: **Start > All Programs > Analog Devices – Inertial Sensor Eval > ADXL312 Evaluation Software > ADXL312 Eval.**
- Make sure that the proper firmware is loaded onto the microcontroller (the software may appear to hang if this step has not been completed).
 - **ADXL312 - Firmware.hex** is required for proper operation of this evaluation system.
- Only press the reset button SW2 when new firmware is being flashed onto the microcontroller. There is no other intended use for this button.
- Ensure that a low COM port number (<10) has been assigned to the ISEB. The software does not properly recognize excessively high COM port values.
- To properly reset the evaluation system, take the following steps:
 - Exit the ADXL312 evaluation software.
 - Disconnect the ISEB (unplug the USB cable from the PC).
 - Reconnect the ISEB.
 - Restart the ADXL312 evaluation software.
- Ensure that the satellite board jumpers are in their proper configuration. Refer to the Hardware Configuration section for instructions.

HEADER PINOUT

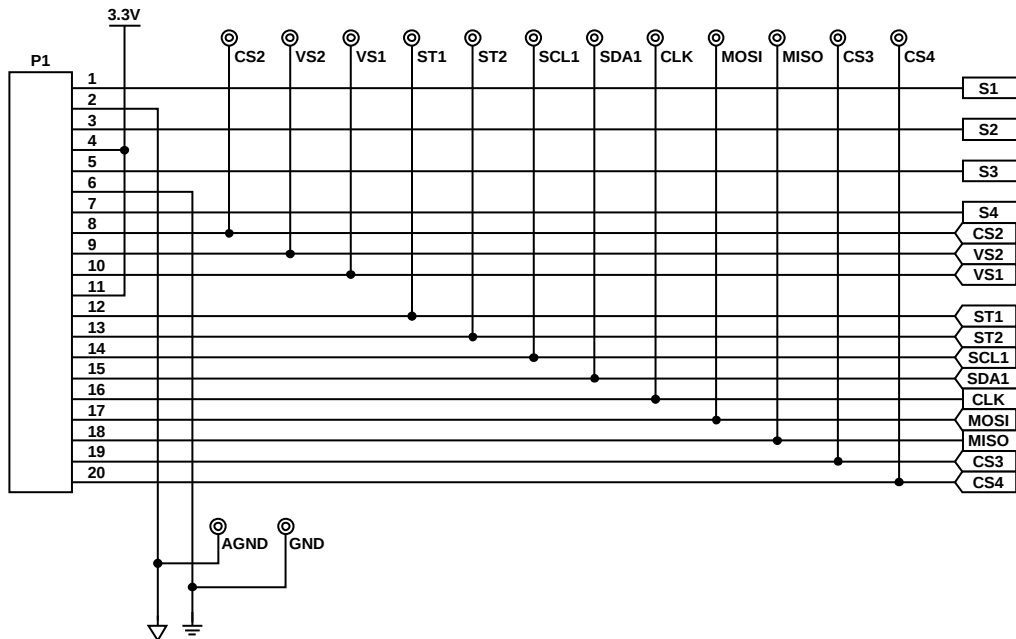


Figure 29. ISEB 20-Pin Header Pinout

09472-013

**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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