Evaluation Board User Guide
EVAL-ADXL345Z-M

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Evaluating the ADXL345 Digital Accelerometer

FEATURES

- Flexible inertial sensor evaluation platform
  - Single main board operates with interchangeable satellite boards
- Separates DUT from controller for accurate environmental testing
- Continuous stream to file data recording
- Standard USB cable for power and communications
- PC-based graphical user interface (GUI)
- Fast, easy installation

ONLINE RESOURCES

- Evaluation Kit Contents
  - EVAL-ADXL345Z-M
  - An USB A to Mini-B cable
  - An 18-inch, 20-pin ribbon cable
- Documents Needed
  - ADXL345 datasheet
- Required Software
  - ADXL345 Evaluation GUI
- Design and Integration Files
  - Schematics, layout files, bill of materials

EQUIPMENT NEEDED

- PC running Windows
- USB 2.0 port

GENERAL DESCRIPTION

The *i*MEMS® ADXL345 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 an USB cable, with the USB connection providing both communications and power 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 separately placed into an environmental chamber for temperature or humidity testing. Separating the boards mitigates corruption of data due to the temperature and humidity effects of other components.

The ISEB is an universal main board and is intended to be used with various satellites of Analog Devices inertial sensors, including analog and digital accelerometers, as well as 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-ADXL345Z-M system contains the ISEB and the EVAL-ADXL345Z-S satellite. Also included is an 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.

TYPICAL SETUP

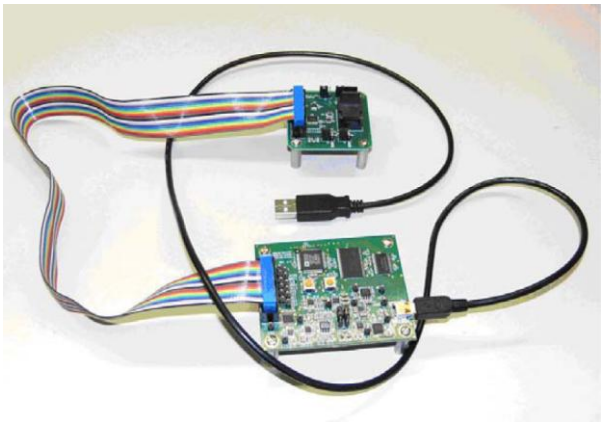

Figure 1. EVAL-ADXL345Z-M Evaluation System

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REVISION HISTORY

8/13—Revision 1 to Revision 2

Increase UART speed to support 3200Hz ODR show on GUI

9/12—Revision 0 to Revision 1

Update firmware and GUI

6/09—Revision 0: Initial Version

GETTING STARTED

This section provides quick start procedures for using EVAL-ADXL345Z-M board. Both the default and optional settings are described. The steps below should be followed to successfully set up and run the ADXL345 evaluation system:

1. Install the USB drivers for the inertial sensor evaluation system (ISEB).
2. Connect the ISEB hardware to the PC.
3. Install the latest firmware revision into the ISEB hardware (on the ftp://ftp.analog.com/pub/iMEMS_Sensor_Eval/.).
4. Install run time engine and the ADXL345 evaluation GUI.
5. Configure the ISEB hardware.
6. Launch the ADXL345 evaluation GUI and test devices.

SOFTWARE INSTALLATION PROCEDURES

Install USB Drivers

To install the USB drivers, follow these steps:

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

After the above steps are complete, you can 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. The satellite board does not need to be connected for this step. New hardware is detected upon completion of this step.
2. If prompted to install drivers again, click **Install from a list or specific location (Advanced)** (see Figure 2); then click **Next**.

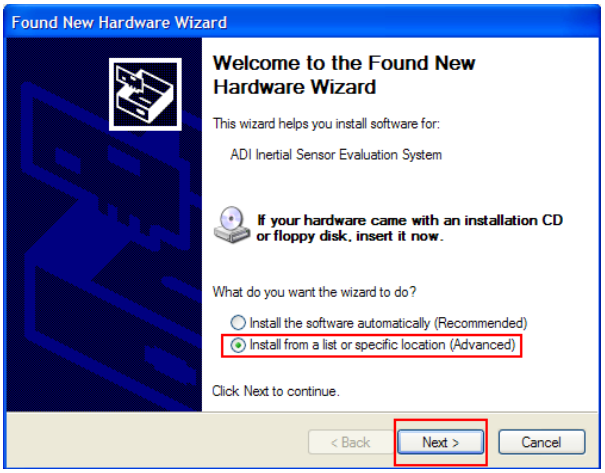


Figure 2. Found New Hardware Prompt

3. Select **Don't search. I will choose the driver to install** (see Figure 3), and click **Next**.
4. Select **ADI Inertial Sensor Evaluation System** from the model list (see Figure 4), and click **Next** to complete the process.

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.

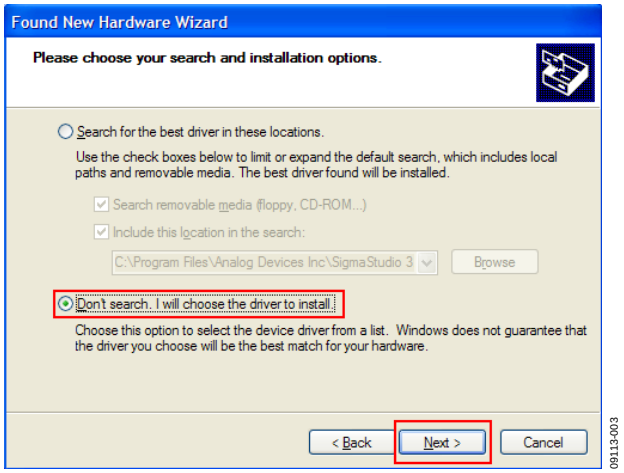


Figure 3. Selection of the Driver to Install

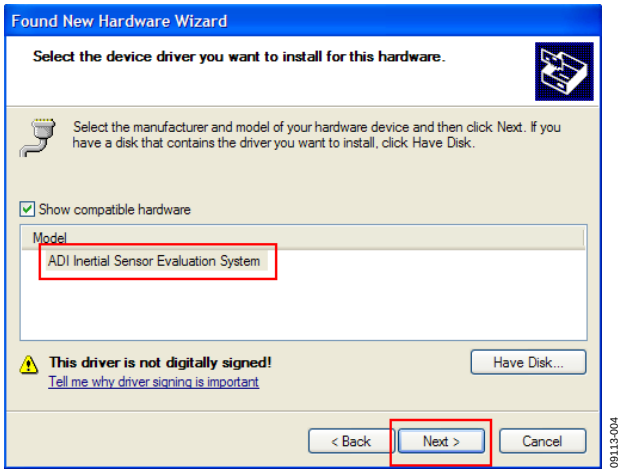


Figure 4. Selection of the ADI Inertial Sensor Evaluation System Drivers

Com Port Verification

Installing the latest firmware revision, as well as operating the ADXL345 evaluation GUI, requires that you know the communications port that is assigned to the ISEB main board. With the ISEB main board connected to the PC, you should perform the following steps to determine the assigned COM port number.

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 5.
3. Select **Device Manager** , expand the **Ports (COM & LTP)** menu item as shown in Figure 6. **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.

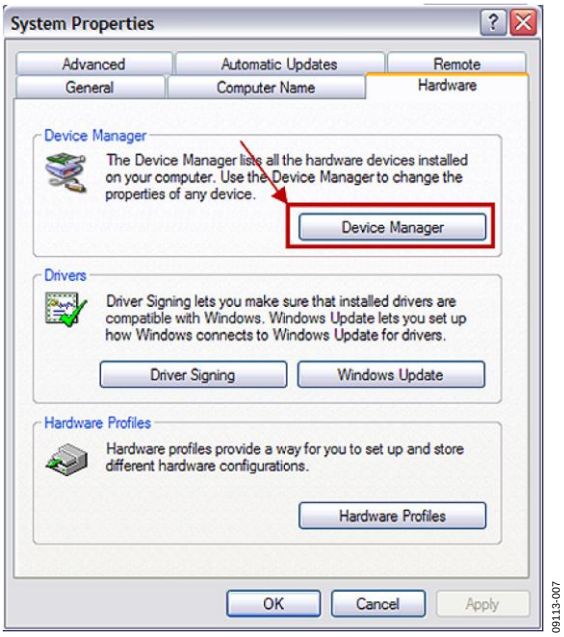


Figure 5. System Properties

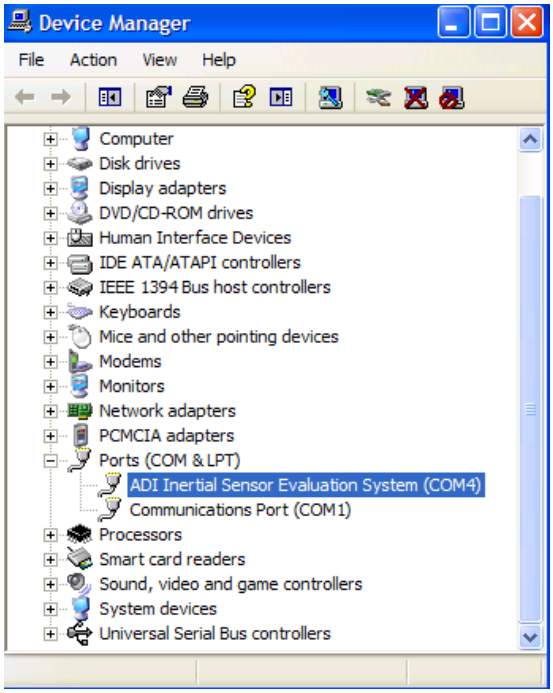


Figure 6. Device Manager Showing the COM Port Number

Installing the Latest ISEB Firmware

The latest ISEB firmware can be found from website. To successfully use the ISEB evaluation hardware, this firmware should be flashed to the ISEB controller. You can also flash a new firmware that is developed by yourself, but when you want to use EVB GUI to evaluate the part again, please flash the firmware that ADI offered on website. In addition, as new firmware is made available, it can be downloaded from the ADI FTP: ftp://ftp.analog.com/pub/iMEMS_Sensor_Eval/.

To flash the ISEB microcontroller, 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 should also be obtained, as mentioned in the Com Port Verification section.
2. Run the **ARMWSD.exe** program (it can be downloaded from the ftp://ftp.analog.com/pub/iMEMS_Sensor_Eval/ in the folder of EVAL-ADXL345-M); it displays information about the downloader, as shown in Figure 7.

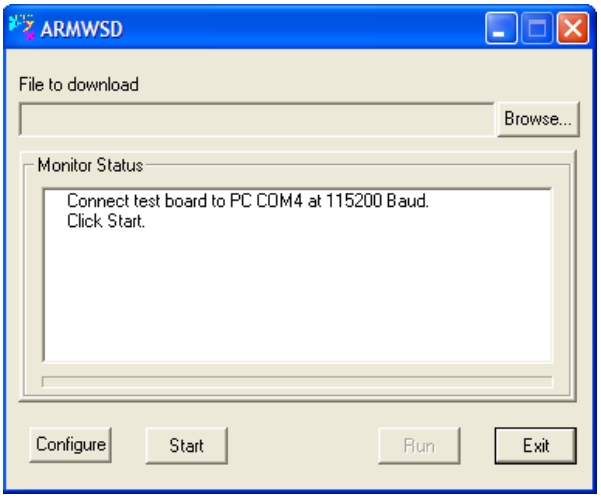


Figure 7. ISEB ARMWSD Firmware Downloader

3. Click **Browse…** and select the **ADI_ISEB_FW_XL345.hex**.
4. Click **Configure** to display the box shown in Figure 8.

The downloader file should be configured for the ADuC7026 microcontroller on the ISEB. This can be selected in the **Parts** tab. The other 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 8). If you cannot download the .hex file correctly, please try to make the **Baudrate** lower and retry. "Program" and "Verify" and suggested to check at the same time in **Commands** tab.

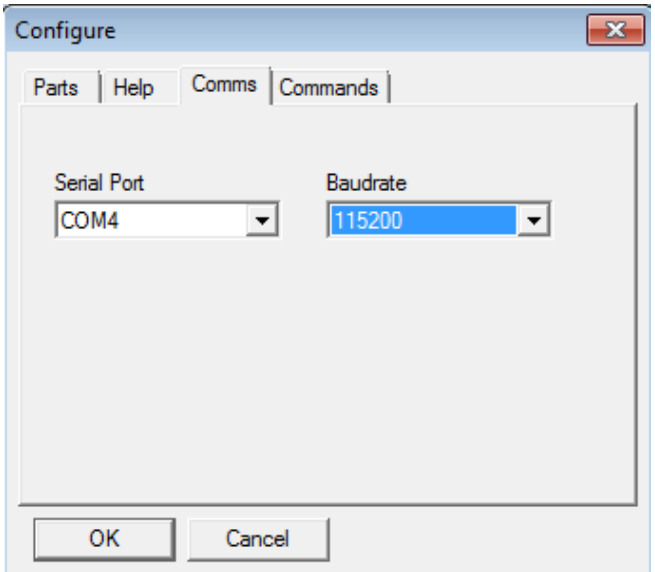


Figure 8. Selecting the Correct COM Port for the Downloader

When the COM port is selected, click **OK** to accept the changes and go back to the ARMWSD box (shown in Figure 7).

When the ISEB is connected, the correct firmware is selected, and the downloader is fully configured, follow these steps to flash the firmware:

1. Click **Start** in the ARMWSD box (see Figure 7) to initiate the flashing process. After clicking **Start**, click the two buttons (shown in Figure 9) on the ISEB in the following order to flash the firmware:

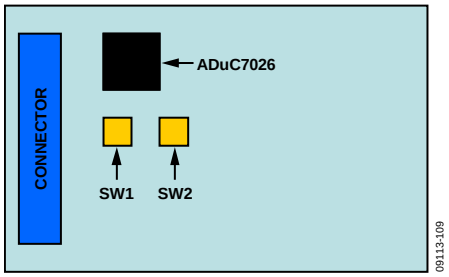
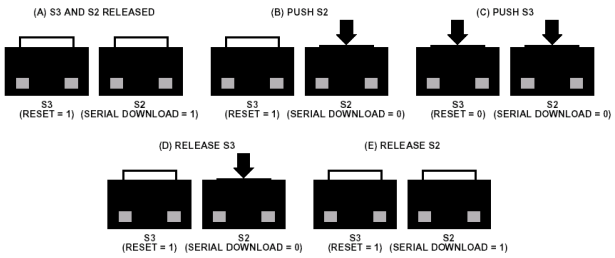


Figure 9. ISEB Switch Locations for Flashing the Microcontroller

   a. Press and hold down **SW1** (Serial Download).
   b. With **SW1** held down, press and release **SW2** (Reset).
   c. Release **SW1**.



   The download begins and is automatically verified by the downloader.

2. If the downloading process fails, which is indicated in the **Monitor Status** box (see Figure 7), attempt the download again by clicking **Start** and then pressing the appropriate switch combination. It may take a few attempts to reprogram the board successfully. You can also try to lower the download Baudrate as shown in Figure 8 to increase the success rate.
3. After the download has completed successfully, click **Run (**as shown in Figure 7) to reset the ISEB and to begin running the new firmware. When this step is complete, the board is updated correctly.

Updating the firmware may require that a new evaluation GUI be obtained. If the firmware used is obtained from the ADI FTP, the most recent version of the evaluation GUI, which is also located on the FTP, should be used.

Installing the ADXL345 Software Evaluation GUI

The software GUI installation did not include National Instruments drivers and run-time engines that are necessary for proper operation. If there is no such run-time engines in your computer, please also install it before installing the ADXL345 software evaluation GUI. The run-time engine installer also can be found on the ADI FTP. To run the software GUI installation routine, double-click the **setup.exe** file located in the /**EVAL-ADXL345Z-M GUI Installer**/ folder. The window shown in Figure 10 is displayed.

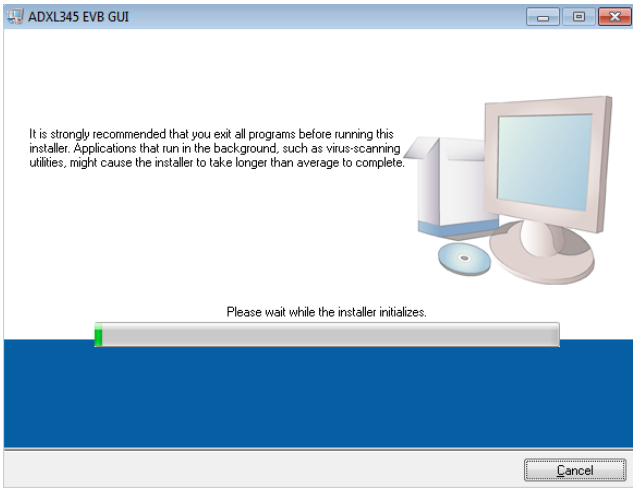


Figure 10. ADXL345 Evaluation Software Installation Welcome

From this point, complete the following steps to install the evaluation software:

1. Select the destination directory. The installer autopopulates the names of the directories in which to store the software GUI and required National Instruments products (see Figure 11). You can change these directories; however, most installations can proceed with the default values.
2. When you finish selecting a directory, click **Next**. The National Instruments Software License Agreement is displayed.
3. Read the license agreement before accepting it; then, click **Next**. The installer lists the required components to install on your PC (see Figure 12).
4. To start the installation, click **Next**. The installer completes installation of the software evaluation GUI and all required National Instruments drivers and run-time engines. After the installation is complete, the box shown in Figure 13 is displayed.
5. Click **Finish** to complete the installation.

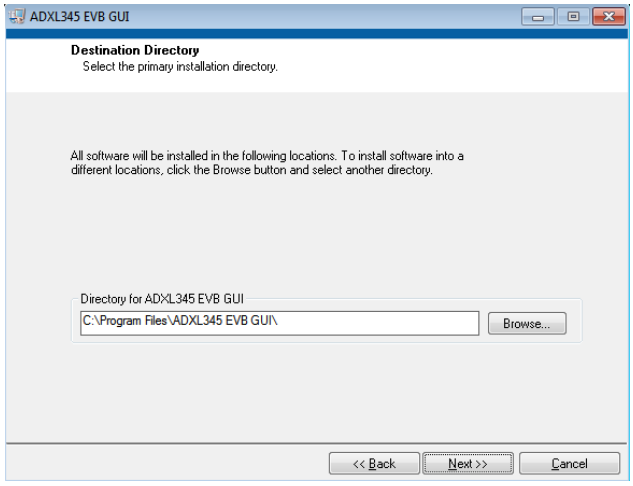


Figure 11. ADXL345 EVB GUI Destination Directory Selection

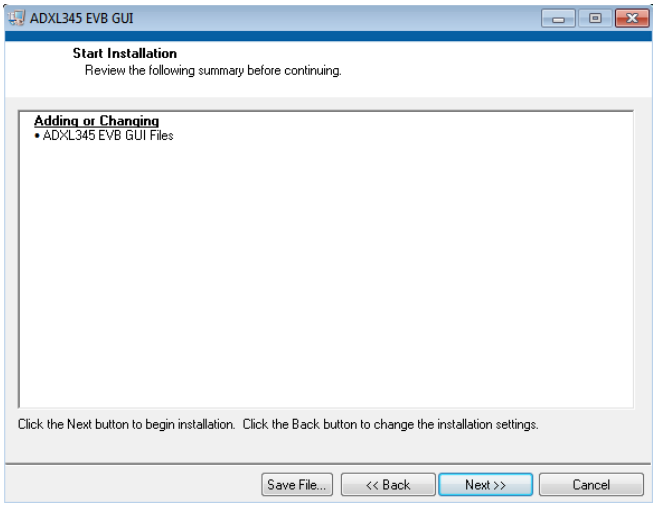


Figure 12. ADXL345 EVB GUI Start Installation (Listing Varies Based on PC Requirements)

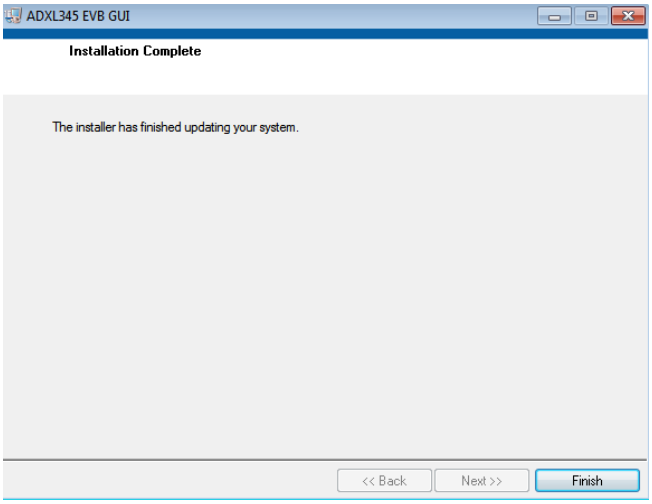


Figure 13. ADXL345 EVB GUI Installation Complete

EVALUATION BOARD SETUP PROCEDURES

Before using the software for testing, configure the evaluation board as follows:

1. Verify that the jumpers located in the center of the ADXL345 satellite are configured as shown in Figure 14.

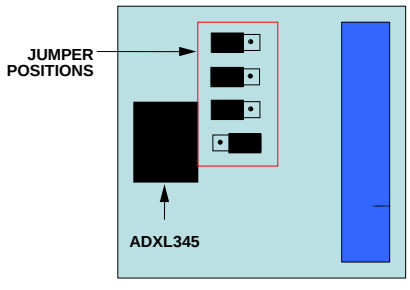


Figure 14. Correct Jumper Positions for the ADXL345 Satellite

2. Place the ADXL345 accelerometer into the socket on the satellite board. The Socket Pin 1 Indicator is located inside the socket close to the hinge, as shown in Figure 15. This pin indicator should match up with the Pin 1 Indicator on the ADXL345.

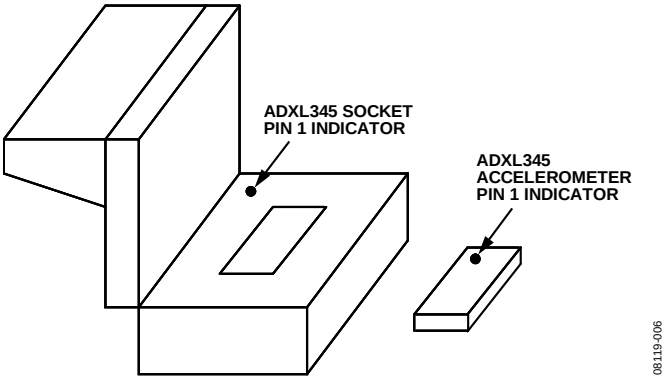


Figure 15. Location of Pin 1 Indicators for the ADXL345 Accelerometer and Socket

3. After positioning the ADXL345 in the socket, firmly close the socket until it latches.
4. Connect the ISEB to the ADXL345 satellite using the 18-inch, 20-pin ribbon cable. This cable is keyed to prevent inserting it backwards and causing damage to the system.
5. Connect the ADXL345 satellite to the opposite end of the ribbon cable.
6. Connect the ISEB to the USB cable.
7. Plug the USB A to Mini-B cable into the PC, if prompted to install the device, see the Install USB Drivers section for details on how to install and select the correct driver.

The ADXL345 evaluation system should now be set up and ready to use.

EVALUATION BOARD HARDWARE

The EVAL-ADXL345Z-M provides all of the support circuitry required to operate the ADXL345 in its various modes of configurations. Figure 1 shows typical bench characterization setup used to evaluate the EVAL-ADXL345Z-M.

Firstly, the EVAL-ADXL345Z-M could be used to study and evaluate ADXL345. User can view and save the real time output of ADXL345 on PC for algorithm developing; check the power consumption of ADXL345 under different work mode; view and save ADXL345 temperature drift data; study ADXL345 build in interrupt functions; change the power supply and check the ADXL345 performance under different power supply.

Secondly, the EVAL-ADXL345Z-M could be used to do secondary development by user. You can realize different reference design based on it, just like the inclinometer demo that we offered based on it.

POWER SUPPLIES

All kinds of EVAL-ADXL345Z-M functions can be supported by USB directly, no other power supply needed to run the board. There are on board DC-DC, LDO and Voltage References to adjust the supply for each part on the evaluation board.

JUMPER SETTINGS

Set the jumper settings/link options on the evaluation board for the required operating modes before powering on the board. The functions of the jumpers are described in Table 1.

Table 1. Jumper Settings

Jumper	Description
P1	Interface for connecting mother board and satellite board.
P2	This jumper is used to control ADXL345 chip select pin. The default connection is for SPI, jump to VDD IO (VS2) for I2C interface.
P3	This jumper is used to control ADXL345 SCL/SCLK pin. The default connection is for SPI, jump to SCL1A for I2C interface.
P4	This jumper is used to control ADXL345 SDA/SDI/SDIO pin. The default connection is for SPI, jump to SDA1A for I2C interface.
P5	This jumper is used to control ADXL345 SDO/ALT ADDRESS pin. The default connection is for SPI, jump to VDD IO (VS2) for I2C interface and the 7-bit I2C address for the device is 0x1D, followed by the R/$\overline{W}$ bit. This translates to 0x3A for a write and 0x3B for a read.

EVALUATION BOARD CIRCUITRY

This section describes the key parts on the development board.

ACCELEROMETER

The ADXL345 is a small, thin, low power, 3-axis accelerometer with high resolution (13-bit) measurement up ±16g. Digital output data is formatted as 16-bit twos complement and is accessible through either an SPI (3- or 4-wire) or I2C digital interface.

MICROCONTROLLER

The microcontroller on EVAL-ADXL345Z-M is ADUC7026. It is fully integrated, 1MSPS, 12-bit data acquisition systems incorporating high performance twelve channel ADCs, 32-bit MCU, and Flash/EE memory on a single chip. There are also four channel 12-bit voltage output DAC on ADUC7026 which are used to control the power supply of ADXL345. The development tools, like ARMWSD serial downloader, evaluation version IAR, evaluation version Keil etc., are available online and they can be found from the address: http://www.analog.com/en/processors-dsp/analog-microcontrollers/ADUC7026/products/dt-software-configurable-products/MicroConverter_Development_Tools/resources/fca.html.

HOW TO USE THE SOFTWARE FOR TESTING

GETTING STARTED

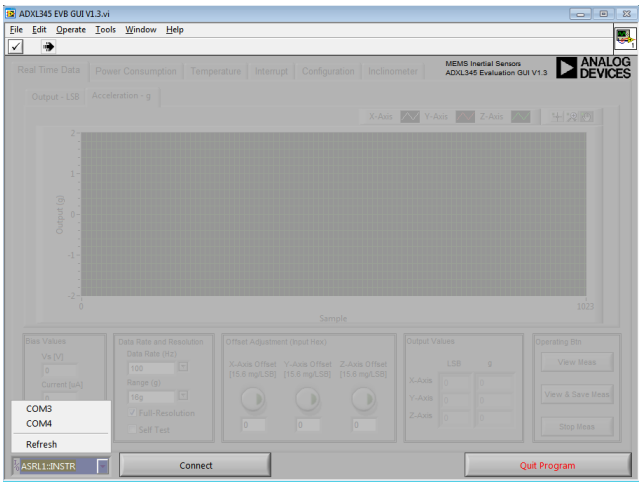


Figure 16. ADXL345 Evaluation GUI Startup

Before running the software evaluation GUI, it is a good idea to reset the ISEB by pressing the SW2 button described in the Installing the Latest ISEB Firmware section. This removes any errors that may be lingering due to an improper shutdown or disconnection from the PC.

After completion of the software GUI installation routine, a shortcut to launch the executable is added to the **Program Menu->Analog Devices – Inertial Sensor Eval**. To launch the evaluation GUI, click **ADXL345 EVB GUI**. A window similar to the one shown in Figure 16 is displayed.

At this point, the functionality of the GUI is completely deactivated. Before testing any devices, you must associate the software GUI with the previously installed hardware through the COM port. See **PC Device Manager** under the **Ports (COM & LTP)** submenu to determine which COM port is assigned to the Analog Devices inertial sensor evaluation system. Select this COM port from the drop-down menu, and click **Connect** to begin using the GUI.

After the COM port is connected, the full functionality of the software evaluation GUI is available for you to use. The following sections describe the purpose of each tab of the GUI. You can exit the GUI at any time by clicking **Quit Program** located in the lower right of the startup window.

Note that you should not press the reset button (SW2) while the GUI is running. This causes the ISEB and the software GUI to lose sync and also causes the evaluation system to no longer function properly. Additionally, if for any reason the ISEB board and the software evaluation GUI do not appear to be properly communicating, you should perform the following reset routine:

1. Close the software GUI by clicking the **Quit Program** or by selecting **File/Exit**.
2. When the software GUI is closed, reset the ISEB evaluation board by pressing the reset button (SW2).
3. Restart the software GUI.

REAL TIME DATA TAB

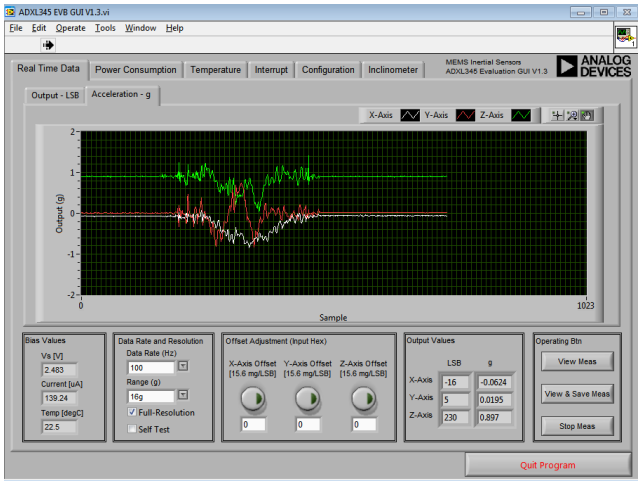


Figure 17. Real Time Data Tab

The **Real Time Data** tab configures the inertial sensor evaluation system and the ADXL345 for real-time acceleration monitoring. The tab contains an oscilloscope-like interface that you can use to view the output of the accelerometer and adjust the relevant parameters, such as data rate (bandwidth), range, and offset (see Figure 17).

The **Self Test** checkbox toggles the self-test bit of the ADXL345. When self-test is activated, the sensor beam is deflected. The electronics detect this by means of a shift in all three axes.

The ADXL345 provides three offset registers that are used for calibration and offset adjustment. On the **Real Time Data** tab, these registers are easily accessible for programming offset values. This can be done in the **Offset Adjustment** box by typing a value into the text box below the corresponding axis knob. The value should be hexadecimal from 0x00 to 0xff since the offset registers are each eight bits in twos complement format with a scale factor of 15.6mg/LSB. The value entered is written into the offset registers by clicking the corresponding axis knob.

After configuration, you can begin real-time measurement by clicking the **View Meas**. This causes many of the options and tabs to be grayed out or to disappear, to prevent software conflicts, until the **Stop Meas** button is clicked. The accelerometer output data then begins to flow across the screen at the selected output data rate.

Clicking **View & Save Meas** performs the same basic function as **View Meas**; however, it allows you to continuously stream the data to eleven .txt file. This is useful for recording the response of the part even during long term events. The first .txt file is named and located by user, the other ten .txt files are named based on the first .txt file and located in the same folder.

Eg: If user named XL345Test.txt in pop-up dialog box and saved it on desktop, then other ten .txt files which named XL345Test_1.txt, XL345Test_2.txt, … XL345Test_10.txt will be built automatically on desktop. Once XL345Test.txt saved 64K samples, the following data will be saved in XL345Test_1.txt, the rest can be deduced by analogy. When go to the last file XL345Test_10.txt, the data will be saved

continuously even its size is bigger than 64K samples. If user just test the sensor in short time and the samples smaller than 64K, then the files without any data saved will be deleted automatically when **Stop Meas** button is clicked.

Each .txt file created contains a header with the date, time, DATA_FORMAT and BW_RATE register values. X, Y, Z axes acceleration data, in gravity, are aligned in tab-delimited columns.

POWER CONSUMPTION TAB

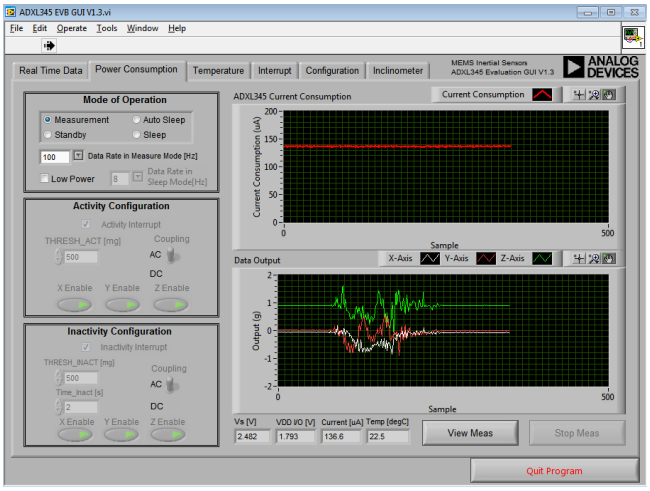


Figure 18. Power Consumption Tab

When used properly, the ADXL345 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.

The following functionality is available to you within the Power Consumption tab:

The **Mode of Operation** allows you to configure the device for Measurement, Auto Sleep, Standby, or Sleep mode. Each of these options corresponds to different device behaviors and different power consumption levels.

The **Data Rate in Measurement Mode [Hz]** drop-down menu controls the data rate that is used when the device is in measurement mode. This selection is compatible with Measurement mode of operation.

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 **Data Rate in Sleep Mode [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 Configuration** options are enabled when Auto Sleep mode is selected. The Activity Interrupt Configuration options adjust 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 Configuration** options are enabled when Auto Sleep mode is selected. The Inactivity Interrupt Configuration options adjust 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 TAB, COMMON USES

Here are some Power Consumption common use conditions that can be applied with the ADXL345 evaluation system.

Auto Sleep Behavior

To observe the behavior of the device when in Auto Sleep mode, the setting in Table 2 can be applied (see Figure 19).

Table 2. Recommended Settings for Auto Sleep Operation

Parameter	Setting
Mode of Operation	Auto Sleep
Low power	Off
Inactivite Data Rate [Hz]	8
Activity Configuration	
Activity Interrupt	On
THRESH_ACT [mg]	500
Coupling	AC
X Enable	On
Y Enable	On
Z Enable	On
Inactivity Configuration	
Inactivity Interrupt	On
THRESH_INACT [mg]	500
Time_Inact [s]	2
Coupling	AC
X Enable	On
Y Enable	On
Z Enable	On

After the settings are applied, click **View Meas**.

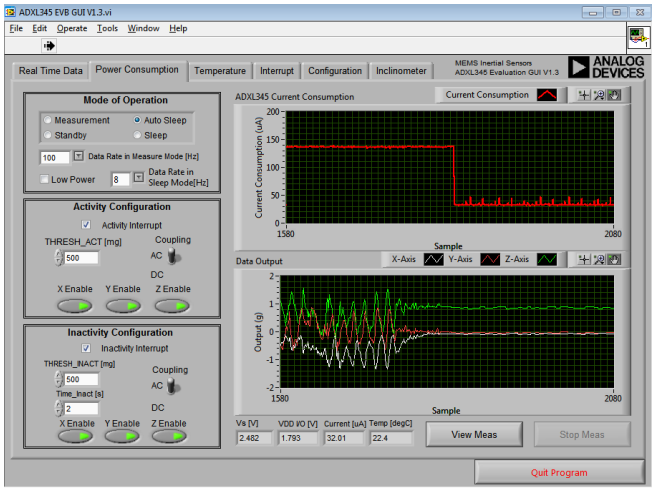


Figure 19. Auto Sleep Operation

You can find that if you shake or turn the satellite board, to make the acceleration variation on any axis > 500mg, that will

trigger the activity interrupt, and make the device to measurement mode.

If you do nothing with the satellite board for >2 seconds, that 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 appears different from when the part is awake.

Observing Low Power Behavior

To observe the behavior of the device in low power mode, the following procedure can be performed:

1. Select **Measurement** and **Data Rate in Measurement Mode** in the **Mode of Operation** section.
2. Click **View Meas**.
3. Allow the acceleration/current consumption graphs to fill with information.
4. Click **Stop Meas**.
5. Select **Low Power** in the **Mode of Operation** section.
6. Click **View Meas**.

This process results in a step change to the current consumption of the ADXL345 and is reflected in the waveform graphs. Additionally, the acceleration/current 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 20 illustrates both the decrease in current consumption and the slight increase to the rms noise of the acceleration data.

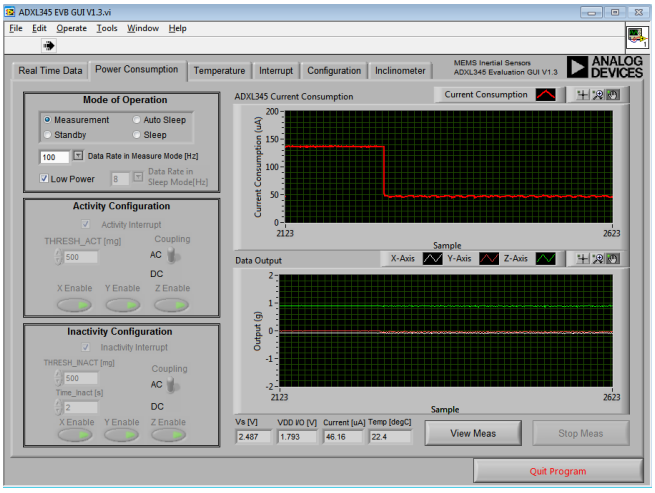


Figure 20. Low Power Operation

TEMPERATURE TAB

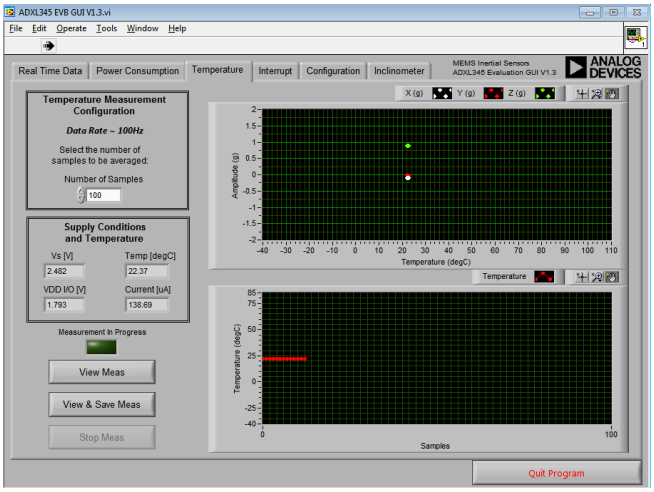


Figure 21. Temperature Tab

The **Temperature** tab as shown in Figure 21 is designed to facilitate temperature testing of the ADXL345. 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 ADXL345 device.

For this tab, the ADXL345 data rate is fixed to 100 Hz, with the effective data rate observed by the user determined by the **Number of Samples** box. 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. The operation about **View Meas, View & Save Meas, Stop Measurement** is the same as described in **Real Time Data** tab.

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

1. The temperature sweep ramp rate should be kept low (<2° C/minute) to avoid false temperature hysteresis. The physical separation of the ADT7301 and the ADXL345 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.
2. Ensure that the device remains stable during the temperature sweep. Any motion induced during the temperature sweep results in erroneous data samples.

INTERRUPT TAB

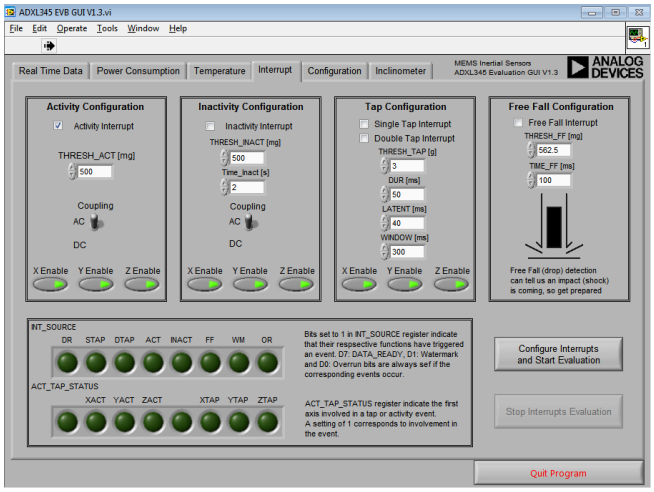


Figure 22. Interrupt Tab

The **Interrupt** tab as shown in Figure 22 is used to demonstrate the built-in functions of the ADXL345. By selecting the functions to enable and configuring the appropriate parameters, the benefits and uses of the interrupt can be examined. This tab is updated whenever a selected interrupt occurs or every 0.5 second. This means once an interrupt occurred, the corresponding LED in INT_SOURCE will light up, but after at most 0.5 second, if the interrupt disappeared, the corresponding LED in INT_SOURCE would dim again.

Each interrupt can be enabled by selecting the corresponding checkbox. After the settings are applied, click **Configure Interrupts and Start Evaluation** button. This causes many of the options and tabs to be grayed out or to disappear, to prevent software conflicts, until the **Stop Interrupts Evaluation** button is clicked.

The corresponding bit will be set to 1 in INT_SOURSE register if the respective interrupt (activity, inactivity, single tap, double tap, free fall) have been enabled and triggered. Since the D7: DATA_READY, D1: Watermark and D0: Overrun bits of INT_SOURCE are always set if the corresponding events occur, the GUI shield these three bits, they always dim to make sure there is only one LED in INT_SOURCE light on when only one selected interrupt triggered.

CONFIGURATION TAB

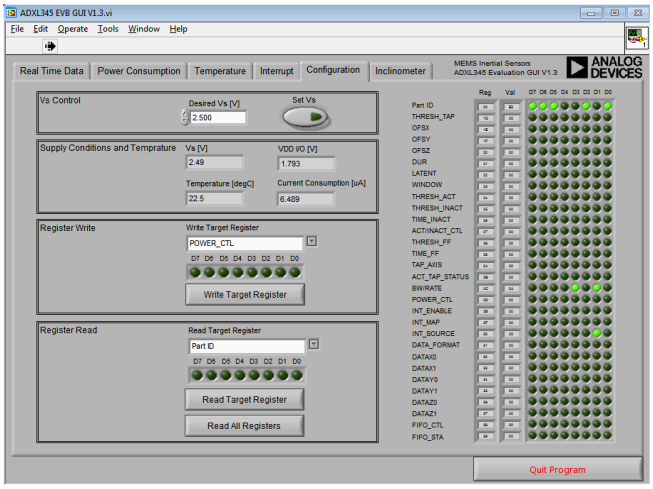


Figure 23. Configuration Tab

The **Configuration** tab allows you to set the operating conditions for the ADXL345, as well as read/write the contents of the memory map. Figure 23 shows the **Configuration** tab after 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 ADXL345 contains the memory map assignments shown in Table 3.

Table 3. Memory Map Initial Conditions

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

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

Set Vs sets the main voltage of the ADXL345. The default value is 2.5V. When the **Set Vs** knob is clicked, the ISEB applies the desired supply voltage, and then reads back the ADXL345 operating voltage, interface voltage, operating temperature and current consumption. These values are displayed in the **Supply Conditions and Temperature** box.

To write a value to a register, select the register from the **Write Target Register** menu and click the D7 through D0 indicators to set the value. If an indicator is lit, the value written to that bit is a Logic 1, whereas an unlit indicator indicates a Logic 0. When the register is configured correctly, click the **Write Target Register** button to send the value to the ADXL345. Note that the D7 through D0 indicators under **Write Target Register** are not updated based on the value stored in that register.

To read a value from a register, select the register from the **Read Target Register** menu and click the **Read Target Register** button, the indicators in **Register Read** box will be refreshed to reflect the target register content.

Clicking the **Read All Registers** button performs a read back of the entire ADXL345 memory map. This action updates all register values and indicators on the right side of the screen.

INCLINOMETER TAB

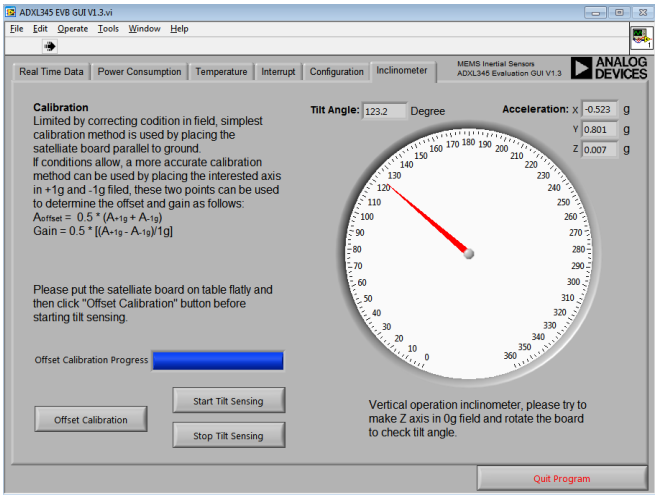


Figure 24. Inclinometer Demo

ADXL345 evaluation GUI also support inclinometer demo. Go to **Inclinometer** tab, read the notes firstly. Then, put the ADXL345 satellite board on table flatly to make it parallel with the ground (z axis in 1g field), click **Offset Calibration** button, wait around six seconds to finish offset calibration. After that, click **Start Tilt Sensing** button to test the evaluation board tilt angle (please try to make z axis in 0g filed when playing tilt sensing). You can click **Stop Tilt Sensing** button to stop tilt sensing function at any time (See Figure 24).

NOTES

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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