Evaluating the ADIS16607 Precision, Miniature MEMS IMU Using the ADIS16607/PCBZ and EVAL-ADIS-FX3

FEATURES

- Small size: 33.25mm × 30.75mm
- Convenient connector: 16-pin (2 × 8), 2mm pitch
- Mounting holes (2.28mm diameter) in each corner (4×)
- Fully compatible with the EVAL-ADIS-FX3 evaluation board and software GUI

HARDWARE NEEDED

- ADIS16607/PCBZ
- EVAL-ADIS-FX3 (sold separately)

SOFTWARE NEEDED

- EVAL-ADIS-FX3 driver
- *i*Sensor-FX3-Eval GUI

DOCUMENTS NEEDED

- ADIS16607 data sheet
- EVAL-ADIS-FX3 user guide

EVALUATION BOARD PHOTOGRAPH

GENERAL DESCRIPTION

The ADIS16607/PCBZ is an evaluation board for the ADIS16607 precision, miniature, microelectromechanical system (MEMS) inertial measurement unit (IMU) that is designed to interface with the EVAL-ADIS-FX3 board (which is sold separately) or to provide a prototype connection to another existing embedded processor platform.

The setup detailed in this user guide allows quick evaluation of the ADIS16607 performance, such as streaming time domain accelerometer and gyroscope data at the IMU maximum throughput, while also having the flexibility to perform low level tasks, such as reading or writing to specific registers or checking GPIO status.

Consult the ADIS16607 data sheet and the EVAL-ADIS-FX3 wiki page on the Analog Devices, Inc., website in conjunction with this user guide when working with the ADIS16607/PCBZ evaluation board.

Note that the ADIS16607/PCBZ has to two options available: the ADIS16607-2/PCBZ for evaluating the ADIS16607-2 and the ADIS16607-3/PCBZ for evaluating the ADIS16607-3.

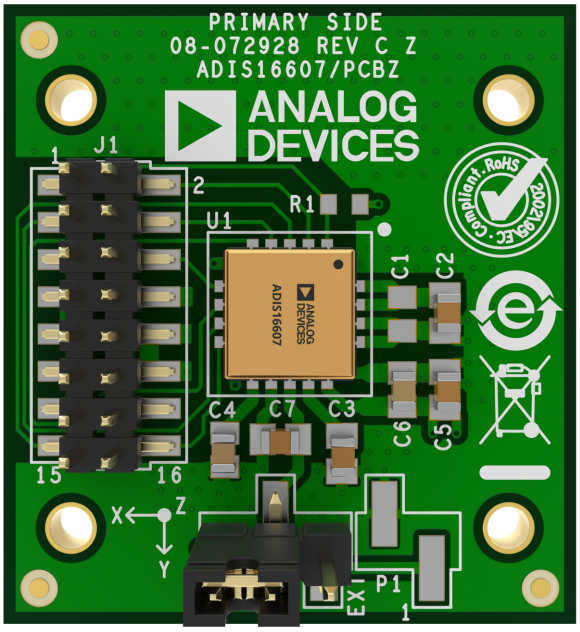


Figure 1. ADIS16607/PCBZ Evaluation Board Photograph

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REVISION HISTORY

9/2026—Revision 0: Initial Version

EVALUATION BOARD HARDWARE

The ADIS16607/PCBZ has multiple variants corresponding to the gyroscope ranges, including the models available in the latest ADIS16607 data sheet. The accelerometer full-scale range is fixed at 40g. Full specifications for the ADIS16607 IMU are available in the product data sheet.

The J1 connector of the ADIS16607/PCBZ is pin compatible with the P3 connector of the EVAL-ADIS-FX3 (see Table 1 for the pinout). It can be directly connected to the EVAL-ADIS-FX3 using the flat ribbon cable included in the EVAL-ADIS-FX3 evaluation kit (which is sold separately), as shown in Figure 2

For additional information about the EVAL-ADIS-FX3, including evaluation board schematics, see the EVAL-ADIS-FX3 webpage.

The schematic of the ADIS16607/PCBZ is shown in Figure 12.

Table 1. ADIS16607/PCBZ J1 Ribbon Cable Connector Pinout

Pin	Signal	Function
1	NRESET	Reset
2	SCLK	Serial peripheral interface (SPI)
3	NCS	SPI
4	DOUT	SPI
5	DNC	Do not connect
6	DIN	SPI
7	AGND	Ground
8	AGND	Ground
9	AGND	Ground
10	VDD	Power
11	VDD	Power
12	VDD	Power
13	DATA_RDY	Data ready output, connected to DIO1 on the EVAL-ADIS-FX3
14	SYNC	External sync input, connected to DIO2 on the EVAL-ADIS-FX3
15	WAKE	Wake input, connected to DIO3 on the EVAL-ADIS-FX3
16	DEV_NOK	Device not OK (DEV_NOK) output, connected to DIO4 on the EVAL-ADIS-FX3



Figure 2. ADIS16607/PCBZ Connected to the EVAL-ADIS-FX3

GETTING STARTED

To get started, take the following steps:

1. Download and install the EVAL-ADIS-FX3 driver.
2. Download the iSensor-FX3-Eval graphical user interface (GUI) software (Version ≥2.9.5.11) from Github and run the installer.
3. Connect the ADIS16607/PCBZ and EVAL-ADIS-FX3 as shown in Figure 2.
4. Connect the USB cable to the EVAL-ADIS-FX3 and plug the other end of the cable to a PC.
5. Run the latest version of the **iSensor_FX3_Evaluation_Software.exe** file.
6. When the application opens, a welcome window appears, which shows detailed information about the GUI. If you are familiar with the interface, you can skip it and close it.
7. When running the application for the first time, a **Select DUT** window appears. Select the ADIS16607/PCBZ model matching your device.
8. In the **iSensor FX3 Eval** window, click **Connect to FX3**.
9. If the **DUT Type** box does not display the ADIS16607/PCBZ model matching your device, click **Select DUT Type** and choose the correct model.
10. The **iSensor FX3 Eval** window shows the **FX3 Status** and **DUT Type** boxes in green (see Figure 3).
11. To verify that the communication with the ADIS16607/PCBZ is correct, click **Read Page** to begin a multibyte read of the entire register map. The DEV_ID register will show 6000.

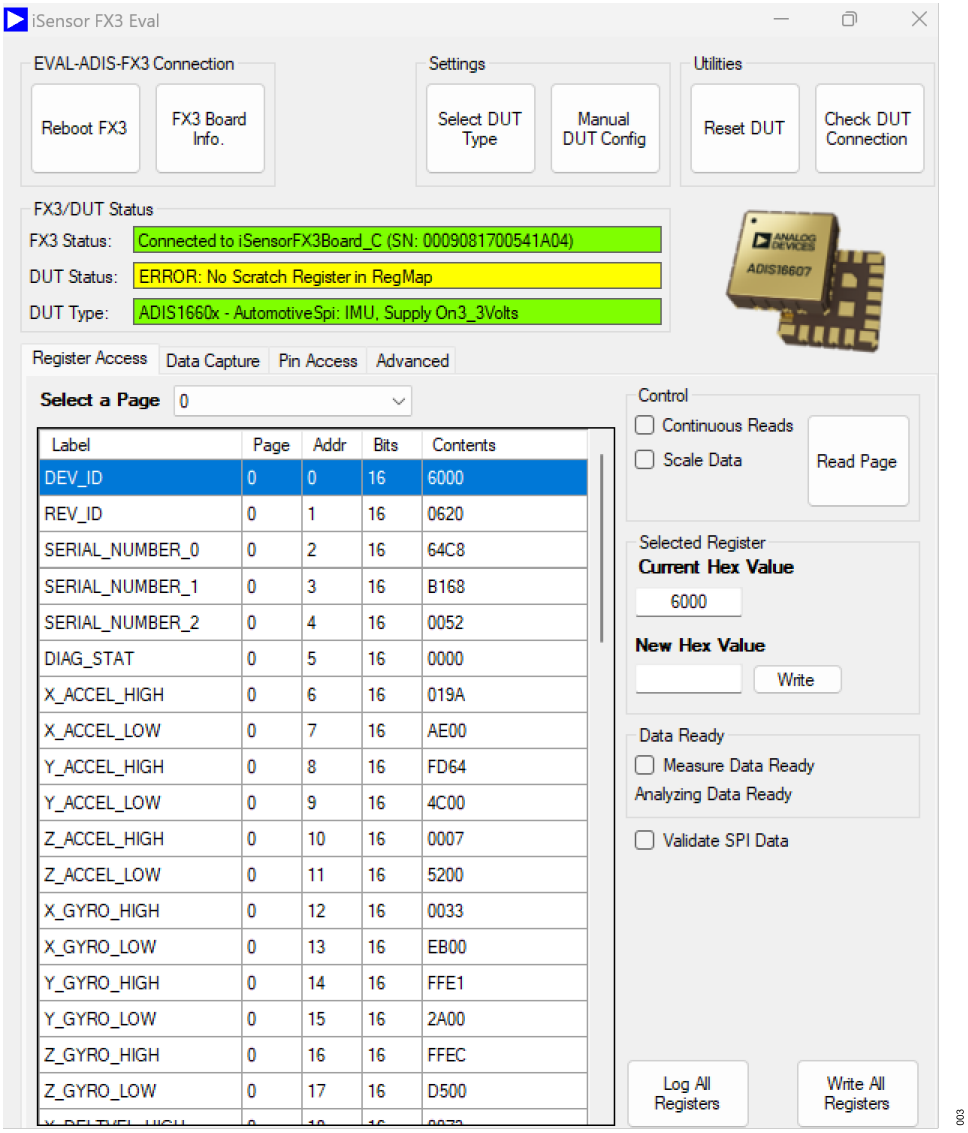


Figure 3. iSensor FX3 Eval Window

GETTING STARTED

REGISTERS READ AND WRITE EXAMPLE

Register Reads

As previously mentioned, when **Read Page** is clicked in the **iSensor FX3 Eval** software, the entire register map is read. Alternatively, the user can select the register of interest, which automatically performs a single register read of that specific register. For example, if DEV_ID is selected, the current value is displayed in the **Contents** column of the **Register Map** table, and it can also be found under the **Selected Register** section of the screen (see Figure 4).

By default, raw register values are displayed in hex format. Check off the **Scale Data** box for registers to display in decimal format. Note that the x_ACCEL_HIGH and x_GYRO_HIGH outputs are scaled in gravity (*g*) and degrees per second (dps), respectively, and all other registers are raw values.

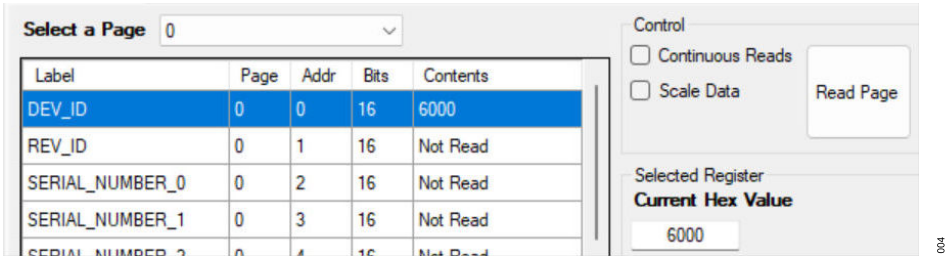


Figure 4. DEV_ID Read Example

GETTING STARTED

Register Writes

The **iSensor FX3 Eval** software allows users to run single register writes by selecting the desired register, typing in the desired value into the **New Hex Value** box, and then by clicking **Write**, as shown in Figure 5. Note that, depending on whether the **Scale Data** box is checked off or not depends on whether the value written will be interpreted as hex or decimal.

The example shown in Figure 5 writes 0x0209 to the USER_GPIO_CFG1 register, which configures the GPIOx pins of the ADIS16607 as follows:

- GPIO0 = NRESET
- GPIO1 = WAKE
- GPIO3 = DATA_RDY

Note that the DATA_RDY signal will appear on DIO1 on the EVAL-ADIS-FX3 because GPIO3 is routed to DIO1 through the ribbon cable connector. See Table 1 and Figure 12 for more information.

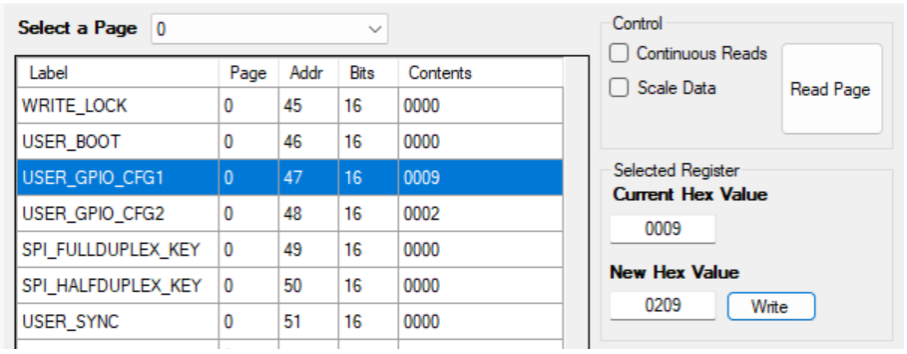


Figure 5. Single Register Writes Example

GETTING STARTED

DATA LOGGING

While the **Register Access** tab provides a convenient way to configure register settings and manually trigger register reads, the **Data Capture** tab is useful for continuous, high-speed streaming of sensor data.

Take the following steps to stream samples from the ADIS16607 to a .csv file at the full output data rate:

1. Go to the **Data Capture** tab, then click **Register Logging** to open a new window.
2. Use the **Registers** dropdown menu and the **Add Register** or **Remove Register** buttons to select which registers to stream. The settings shown in Figure 6 log 16-bit inertial outputs as well as the data counter (**DATA_CNTR**).
3. Check off the **DR Active** box to synchronize SPI reads with the data ready signal of the ADIS16607, which ensures that only fresh samples are read and redundant or skipped samples are avoided. Note that, to use this feature, the USER_GPIO_CFG1 register must be configured to enable the data ready output signal (see the Register Writes section for an example of how to do this).
4. Click **Measure Data Ready** to verify that the data ready signal is toggling at the expected rate.
5. Check off the **Validate DR Period** box to notify the GUI to measure the sensor output data rate and to verify that the time required to read the requested register list over the SPI does not exceed the data valid period.
6. Enter the desired number of samples in the **# Samples To Capture:** box. The estimated collection time is updated in the **# Record Time (est):** box, and it is equal to the number of samples divided by the data ready signal rate.
7. Edit the **Base File Name:** box for the .csv log, if desired, then click **Start Capture**. Note that, after selecting the location of the file, the data capture begins. When the data capture is complete, the **Status:** displays **Done**.
8. The recorded data is written to a .csv file in the selected location. Figure 7 shows an example of data captured using the settings shown in Figure 6. Note that the data counter (**DATA_CNTR** register) increments by exactly 1 for every sample when the **DR Active** box is checked off. If the **DR Active** box is not checked off, the **DATA_CNTR** entry may have repeated or skipped values.

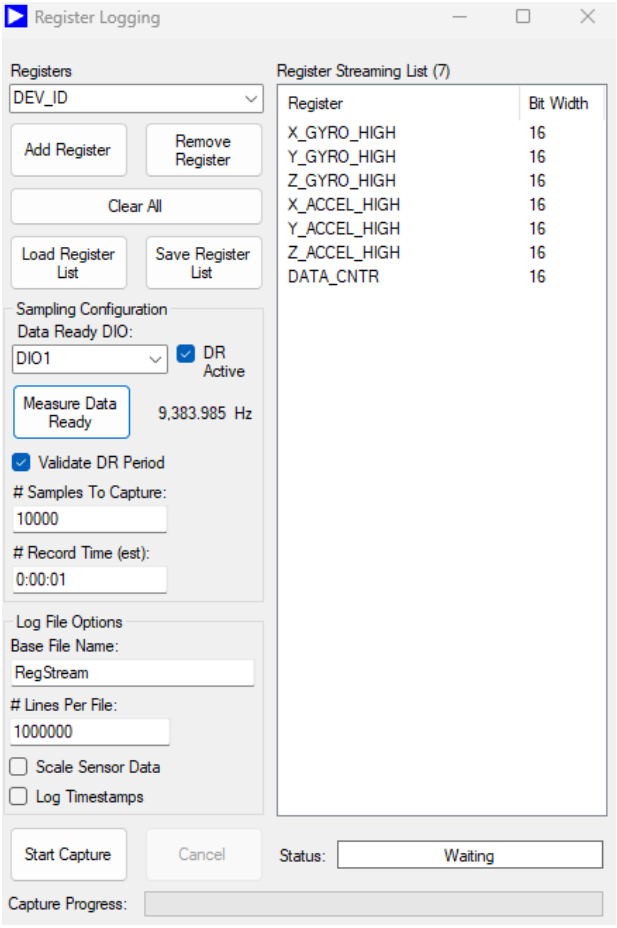


Figure 6. Register Logging Window

	A	B	C	D	E	F	G	H
1	X_GYRO_HIGH	Y_GYRO_HIGH	Z_GYRO_HIGH	X_ACCEL_HIGH	Y_ACCEL_HIGH	Z_ACCEL_HIGH	DATA_CNTR	
2	-1	-2	1	-15	-1	786	8147	
3	-2	-2	1	-15	-2	786	8148	
4	-2	-3	1	-15	0	785	8149	
5	-3	-4	1	-15	1	784	8150	
6	-3	-4	0	-14	0	784	8151	
7	-2	-2	0	-13	1	783	8152	
8	-2	-1	1	-14	1	781	8153	
9	-1	-1	2	-15	1	780	8154	
10	-1	0	1	-17	0	780	8155	
11	-1	1	1	-18	0	780	8156	
12	1	-1	2	-19	0	778	8157	
13	0	-1	2	-19	1	780	8158	

012

Figure 7. Example Log File

GETTING STARTED

GPIO PIN ACCESS

The Register Writes section showed an example of how the ADIS16607/PCBZ GPIOx pins were configured by writing to the USER_GPIO_CFG1 register within the **iSensor FX3 Eval** software. This evaluation tool also allows user interaction with the GPIO pins of the EVAL-ADIS-FX3 . In particular, it is useful to interact with the DIOx pins that connect between the EVAL-ADIS-FX3 and the ADIS16607/PCBZ GPIOx pins via the ribbon cable connector.

The user can access the GPIO status by going to the **Pin Access** tab and selecting a GPIO pin from the table shown (see Figure 8). Click **Read All** to update the current value of all GPIOs.

Press **Measure Freq** to display the frequency of the signal present on the selected GPIO pin, which can be used for measuring the data ready output of the IMU.

The EVAL-ADIS-FX3 is also capable of driving the GPIO pins by either setting them to high or low values or by outputting a PWM signal. Note that users must ensure that they do not configure the EVAL-ADIS-FX3 to drive a DIO line that is configured as an IMU output because this configuration can cause permanent damage.

To drive a GPIO pin, select the GPIO pin from the table shown in Figure 8 and then click **Set High**, **Set Low**, or **Start Pin PWM**. For example, users can configure the ADIS16607 to operate in external sync mode by setting Bits[8:6] (CFG_GPIO_2) of the USER_GPIO_CFG1 register to 001 in the **Register Access** tab. In addition, the users must provide a clock signal to the sync input pin (GPIO2) of the ADIS16607. Because GPIO2 is routed to DIO2 through the ribbon cable connecter, the user can provide a clock signal by selecting **DIO2** in the **Pin Access** tab, entering the desired clock frequency in the **PWM Setup** section of that tab, and then clicking **Start Pin PWM**.

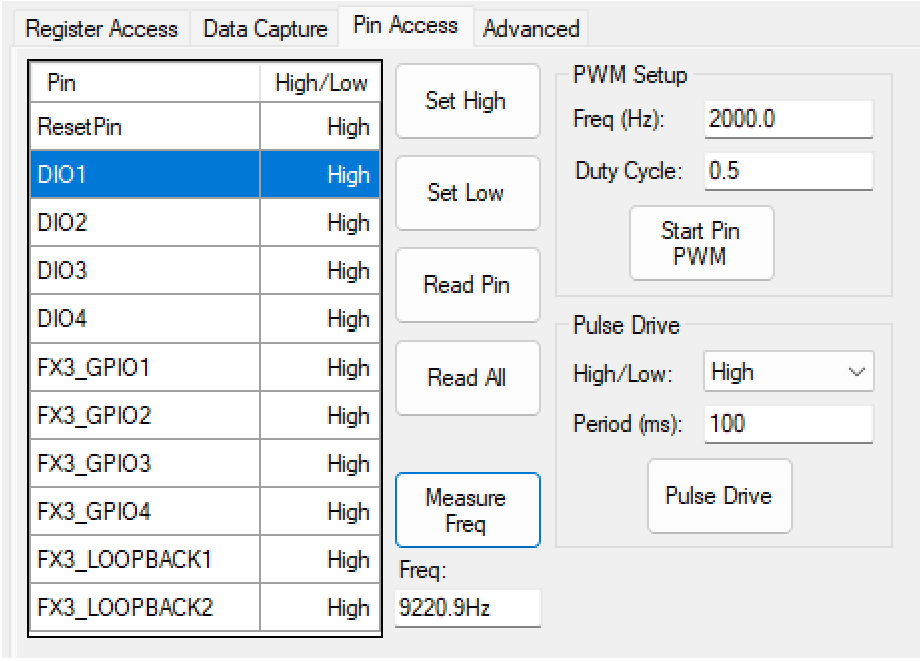


Figure 8. Pin Access Tab—GPIO Pins

GETTING STARTED

TIME DOMAIN PLOTTING DATA EXAMPLE

Take the following steps to create a time domain plotting data example:

1. Go to the **Data Plotting** tab and click **Time Domain Plotting** to open a new window (see Figure 9).
2. Modify the plot settings, if desired, then click **Start Plotting**. Data then streams on the right graphic as shown in Figure 10, and you can see the sensor outputs responding to physical motion.

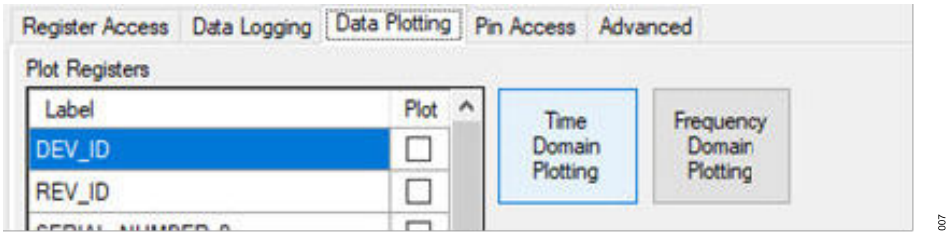


Figure 9. Data Plotting Tab, Time Domain Plotting

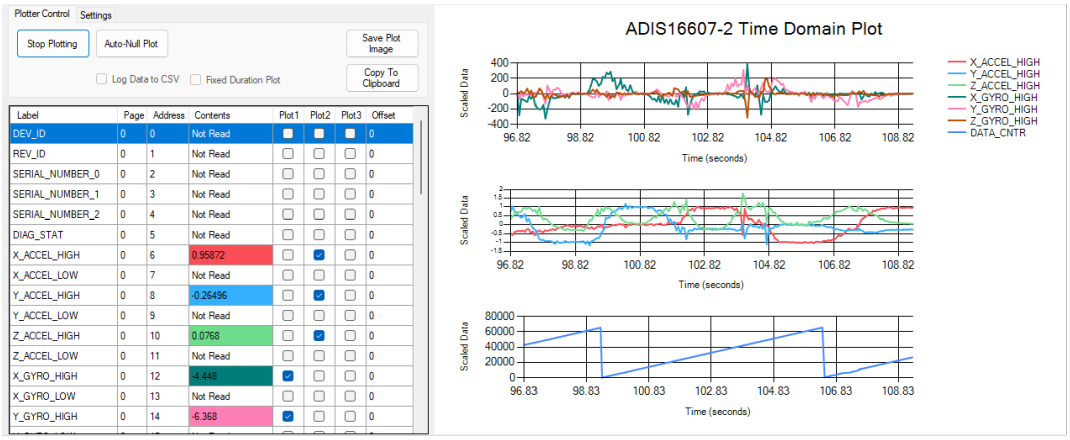


Figure 10. Plot Settings and Time Domain Plot Example

HANDLING CONSIDERATIONS, DIMENSIONS, AND MOUNTING HOLES

HANDLING CONSIDERATIONS

Dropping the ADIS16607/PCBZ on a firm surface can generate several thousand *g*s of acceleration, which can exceed the absolute maximum rating limits of the device. See the ADIS16607 data sheet and its Absolute Maximum Ratings section for additional details.

DIMENSIONS AND MOUNTING HOLES

The ADIS16607/PCBZ breakout board provides four mounting holes, one in each corner, which support attachment to another surface with M2 machine screws. See Figure 11 for additional details.

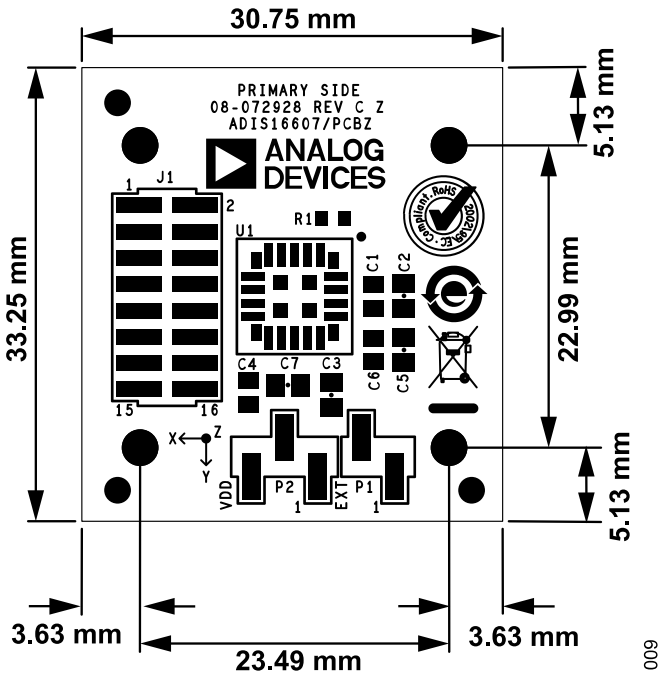


Figure 11. Breakout Board Dimensions

EVALUATION BOARD SCHEMATIC

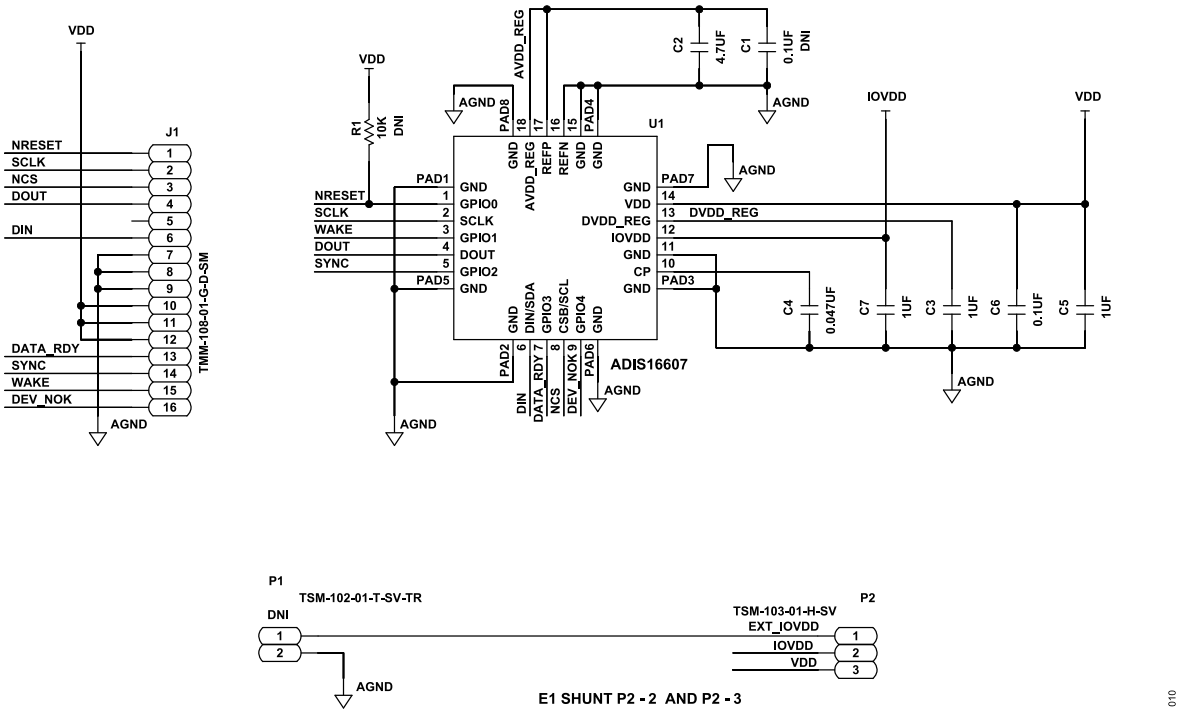


Figure 12. ADIS16607/PCBZ Schematic

ORDERING INFORMATION

ORDERING GUIDE

Model[1]	Description
ADIS16607-2/PCBZ	ADIS16607-2 Breakout Board
ADIS16607-3/PCBZ	ADIS16607-3 Breakout Board

[1] Z = RoHS-Compliant Part.

BILL OF MATERIALS

Table 2. Bill of Materials

Quantity	Designator	Description	Part Number
1	C2	Ceramic capacitor, 4.7µF, 35V, 10%, X7R, 0805, AEC-Q200, low effective series resistance (ESR)	CGA4J1X7R1V475K125AC
3	C3, C5, C7	Ceramic capacitors, 1µF, 50V, 10%, X7R, 0805, AEC-Q200	GCM21BR71H105KA03L
1	C4	Ceramic capacitor, 0.047µF, 100V, 10%, X7R, 0805	VJ0805Y473KXBAT
1	C6	Ceramic capacitor, 0.1µF, 50V, 5%, X7R, 0805	C0805C104J5RACTU
1	J1	Connector, PCB, 16 position, unshrouded, male header, dual-row, straight, 3.2mm post height, 2mm pitch	TMM-108-01-G-D-SM
1	P2	Connector, PCB, 3 position, male header, single-row, 0.64mm square post, 5.84mm post height, 2.54mm pitch	TSM-103-01-H-SV
1	U1	Precision, miniature MEMS IMU	ADIS16607-2LEZ or ADIS16607-3LEZ

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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