

Evaluating the ADIS16607 IMU Using the ADIS16607-x/PCBZ and EVAL-ADIS-FX3

FEATURES

- ▶ Small size: 30.74mm × 33.28mm
- ▶ Convenient connector: 16-pin (2 × 8), 2mm-pitch
- ▶ Mounting holes (2.3mm diameter) in each corner (4×)
- ▶ Fully compatible with EVAL-ADIS-FX3 evaluation board and software GUI
- ▶ ADIS16607-2/PCBZ includes an ADIS16607-2 IMU
- ▶ ADIS16607-3/PCBZ includes an ADIS16607-3 IMU

HARDWARE NEEDED

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

SOFTWARE NEEDED

- ▶ EVAL-ADIS-FX3 Drivers
- ▶ iSensor-FX3-Eval GUI

DOCUMENTS NEEDED

- ▶ [ADIS16607](#) data sheet
- ▶ [EVAL-ADIS-FX3](#) user guide

EVALUATION BOARD PHOTOGRAPH

GENERAL DESCRIPTION

The ADIS16607-x/PCBZ is an evaluation board for the ADIS16607 compact six DoF IMU that is designed to interface with the EVAL-ADIS-FX3 board (sold separately) or provide a prototype connection to another existing embedded processor platform.

This setup 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 in conjunction with this user guide when working with the ADIS16607-x/PCBZ evaluation board.



Figure 1. ADIS16607-x/PCBZ Evaluation Board Photograph

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EVALUATION BOARD HARDWARE

The ADIS16607 has multiple variants corresponding to the gyro-scope ranges, represented by the -x in ADIS16607-x/PCBZ. The accelerometer full scale range is fixed at 40g. Full specifications for the [ADIS16607](#) IMU are available in the product data sheet.

The ADIS16607-x/PCBZ is pin compatible with the [EVAL-ADIS-FX3](#) P3 connector pinout and can be directly connected to the EVAL-

Table 1. Ribbon Cable Connector Pinout

Pin	Signal
1	RST
2	SCLK
3	CS
4	MISO
5	DNC
6	MOSI
7	GND
8	GND
9	GND
10	VDD
11	VDD
12	VDD
13	DIO1
14	DIO2
15	DIO3
16	DIO4

ADIS-FX3 using the flat ribbon cable included on the EVAL-ADIS-FX3 evaluation kit, 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-x/PCBZ is shown in [Figure 9](#).

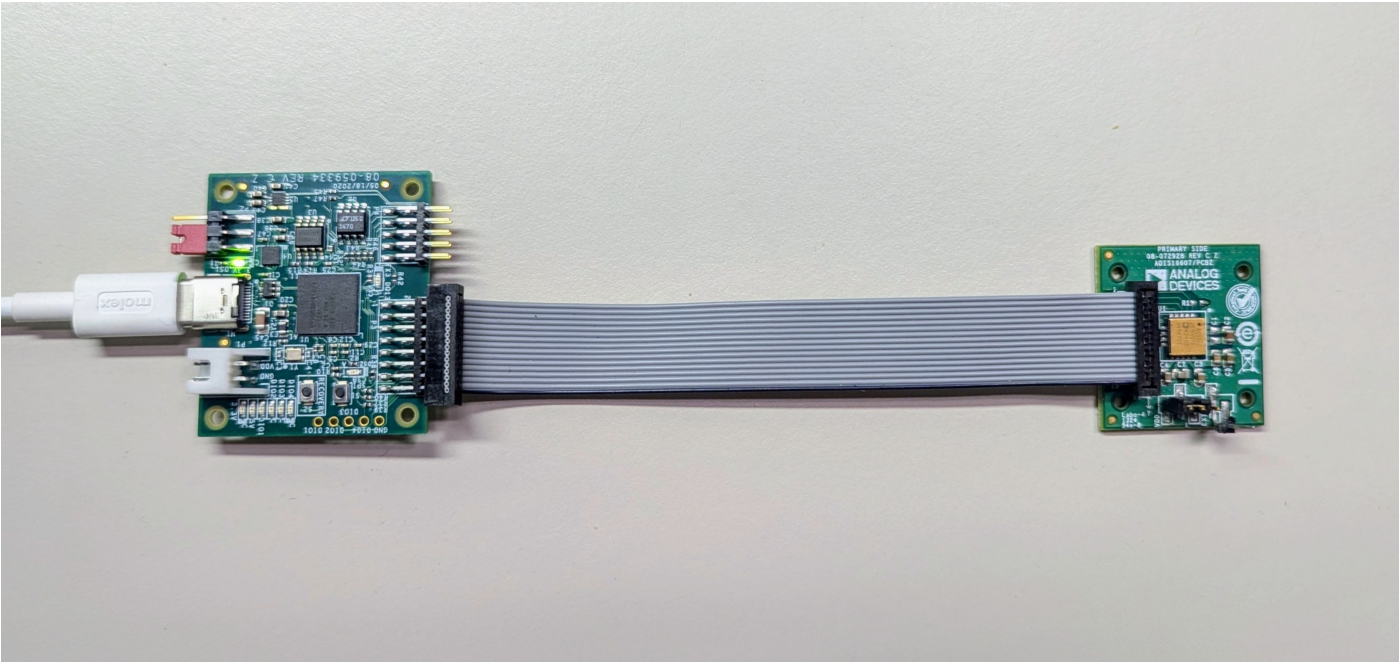


Figure 2. ADIS16607 Connected to the [EVAL-ADIS-FX3](#)

GETTING STARTED

To get started, take the following steps:

1. Download and install the [EVAL-ADIS-FX3](#) drivers.
2. Download the iSensor-FX3-Eval GUI Installer (version >=2.9.5.11) from [Github](#) and run the installer
3. Connect the ADIS16607-x/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 to a PC.
5. Run the **iSensorFX3Eval** application.
6. When you first open the application, you will see a welcome window, which shows detailed information about the GUI. If you are familiar with the interface, you can skip it and close it.
7. In the **Select Register Map** window, select the ADIS16607 model matching your part.
8. In the **iSensor FX3 Eval** window, click **Connect to FX3**.
9. The **iSensor FX3 Eval** window should now show the **FX3 Status** and **DUT Type** boxes in green as shown in [Figure 3](#).
10. To check the communication with the ADIS16607-x/PCBZ is correct, click **Read Page** to invoke a multibyte read of the entire register map. The DEV_ID register will show 0x6000.

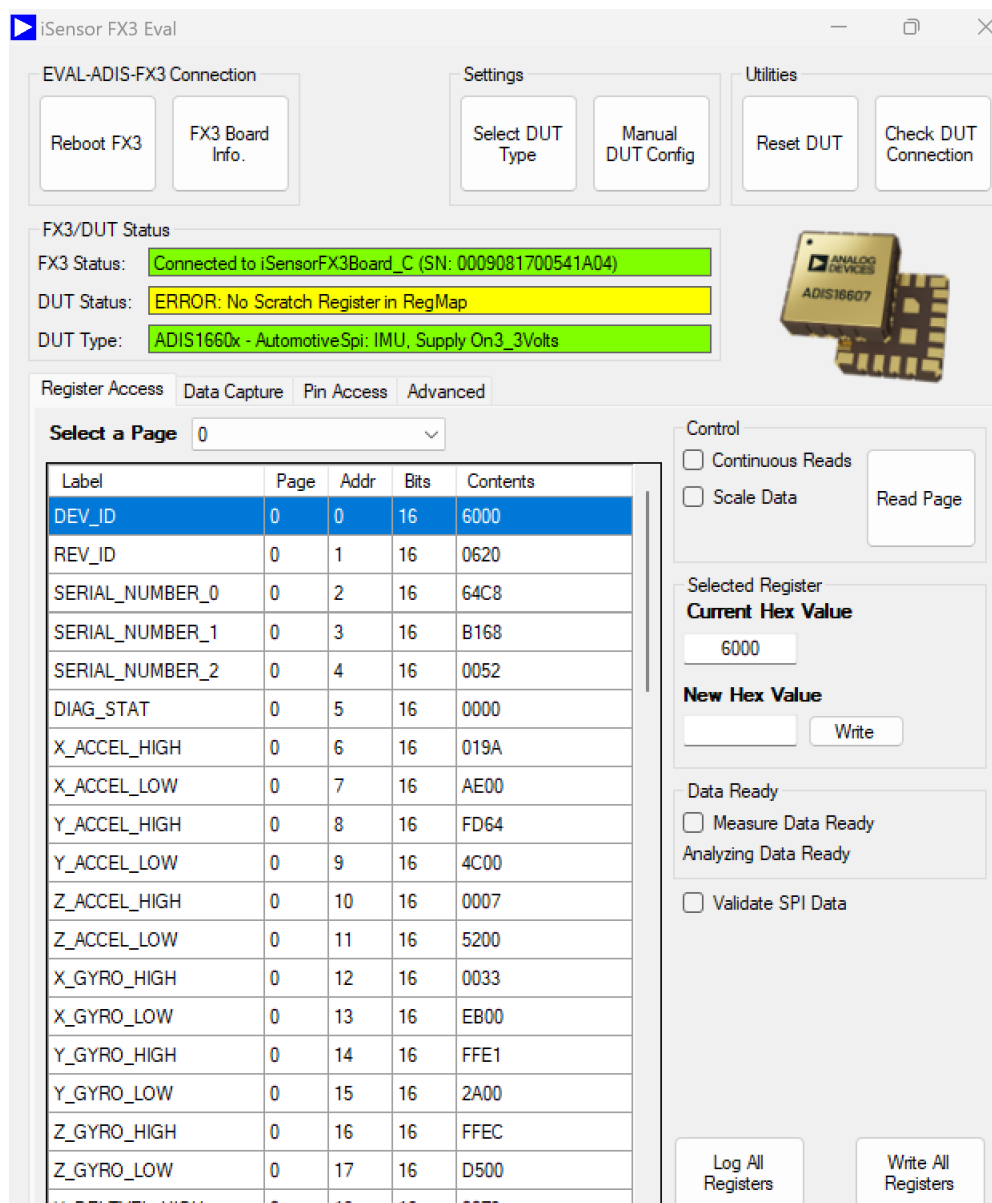


Figure 3. iSensor FX3 Eval Window

GETTING STARTED

REGISTERS READ AND WRITE EXAMPLE

Register Reads

As previously mentioned, by clicking **Read Page**, the entire register map is read. Alternatively, the user can select the register of interest, which will automatically perform 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, as shown in [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 (ACCEL_HIGH and GYRO_HIGH outputs will be scaled in gs and dps, respectively; all other registers are raw values).

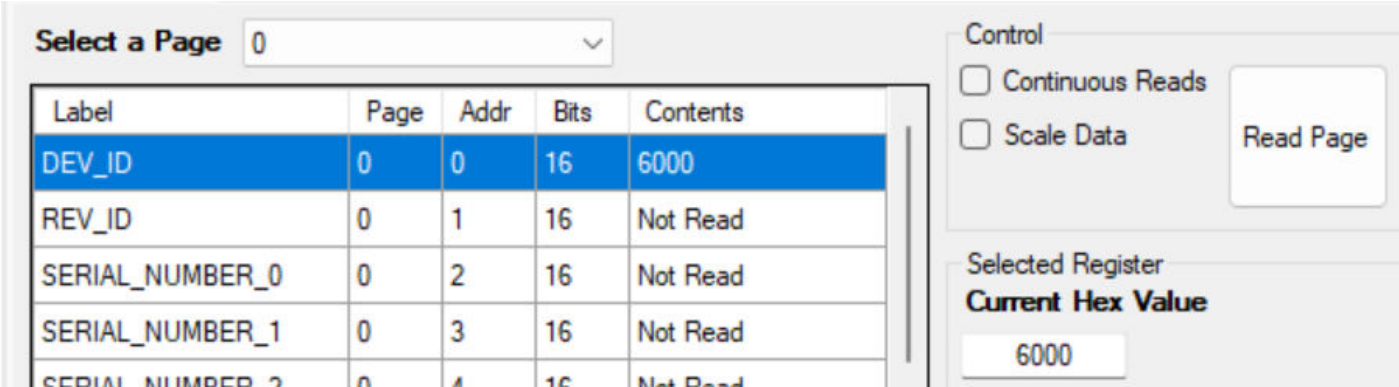


Figure 4. DEV_ID Read Example

GETTING STARTED

Register Writes

This tool allows users to run single register writes by selecting the desired register, typing the desired value into the **New Hex Value** box, and then clicking **Write**, as shown in [Figure 5](#). Note that, depending on whether the **Scale Data** box is checked, the value written will be interpreted as either hex or decimal.

This example writes 0x0209 to the USER_GPIO_CFG1 register, which configures the GPIO pins as follows:

- ▶ GPIO 0 = RESETB
- ▶ GPIO 1 = WAKE
- ▶ GPIO 3 = DATA_RDY

Select a Page: 0

Label	Page	Addr	Bits	Contents
WRITE_LOCK	0	45	16	0000
USER_BOOT	0	46	16	0000
USER_GPIO_CFG1	0	47	16	0009
USER_GPIO_CFG2	0	48	16	0002
SPI_FULLDUPLEX_KEY	0	49	16	0000
SPI_HALFDUPLEX_KEY	0	50	16	0000
USER_SYNC	0	51	16	0000

Control

☐ Continuous Reads

☐ Scale Data

Read Page

Selected Register

Current Hex Value

0009

New Hex Value

0209

Write

Figure 5. Single Register Writes Example

GETTING STARTED

GPIO PIN ACCESS

The example in the [Register Writes](#) section showed how the ADIS16607 GPIO pins were configured by writing to the USER_GPIO_CFG1 register. This evaluation tool also allows user interaction with the GPIO pins that are routed to the DIO pins on the ribbon connector cable between the EVAL-ADIS-FX3 and the ADIS16607-x/PCBZ.

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 6](#)). 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 handy 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. To drive a GPIO pin, select the GPIO pin from the table shown in [Figure 6](#) and then click **Set High**, **Set Low**, or **Start Pin PWM**. For example, one can configure the IMU to operate in external sync mode using the **Register Access** tab, then by using the **Pin Access** tab to generate a PWM signal on the sync input of the IMU. Note that users must ensure that they avoid making the EVAL-ADIS-FX3 try to drive a DIO line that is configured as an IMU output because this can cause permanent damage.

The screenshot displays the 'Pin Access' tab of the evaluation tool. It features a table of GPIO pins, a set of control buttons, and two configuration sections for PWM and Pulse Drive.

Pin	High/Low
ResetPin	High
DIO1	High
DIO2	High
DIO3	High
DIO4	High
FX3_GPIO1	High
FX3_GPIO2	High
FX3_GPIO3	High
FX3_GPIO4	High
FX3_LOOPBACK1	High
FX3_LOOPBACK2	High

Buttons: Set High, Set Low, Read Pin, Read All, Measure Freq

PWM Setup:

- Freq (Hz): 2000.0
- Duty Cycle: 0.5
- Start Pin PWM

Pulse Drive:

- High/Low: High
- Period (ms): 100
- Pulse Drive

Measure Freq Result: Freq: 9220.9Hz

Figure 6. 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 7](#)).
2. Modify the plot settings, if desired, then click **Start Plotting**. Data will stream on the right graphic as shown in [Figure 8](#) and you can see the sensor outputs responding to physical motion.

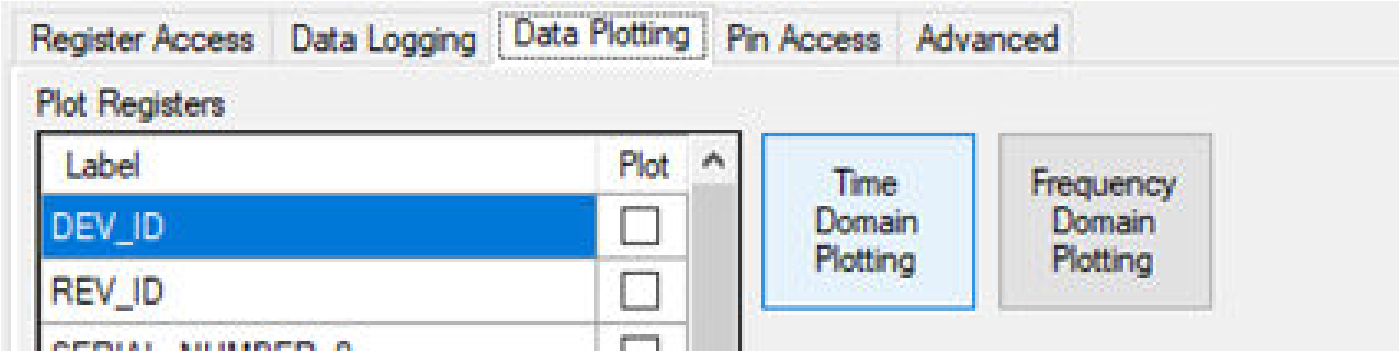


Figure 7. Data Plotting Tab—Time Domain Plotting

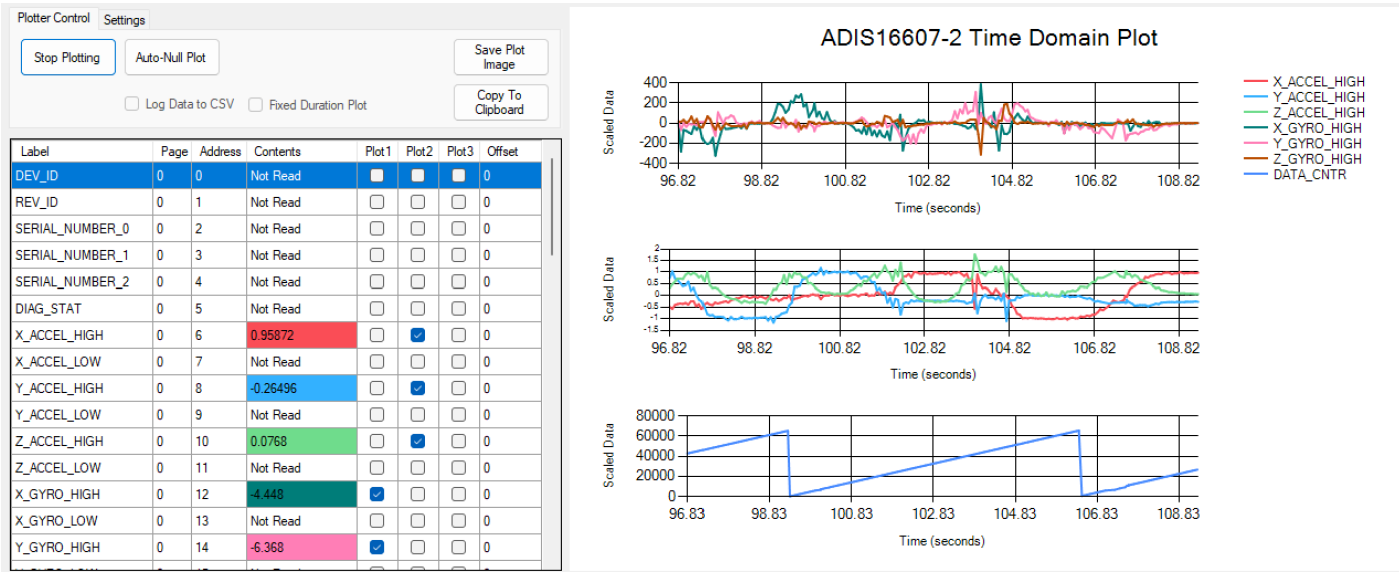


Figure 8. Plot Settings and Time Domain Plot Example

EVALUATION BOARD SCHEMATIC

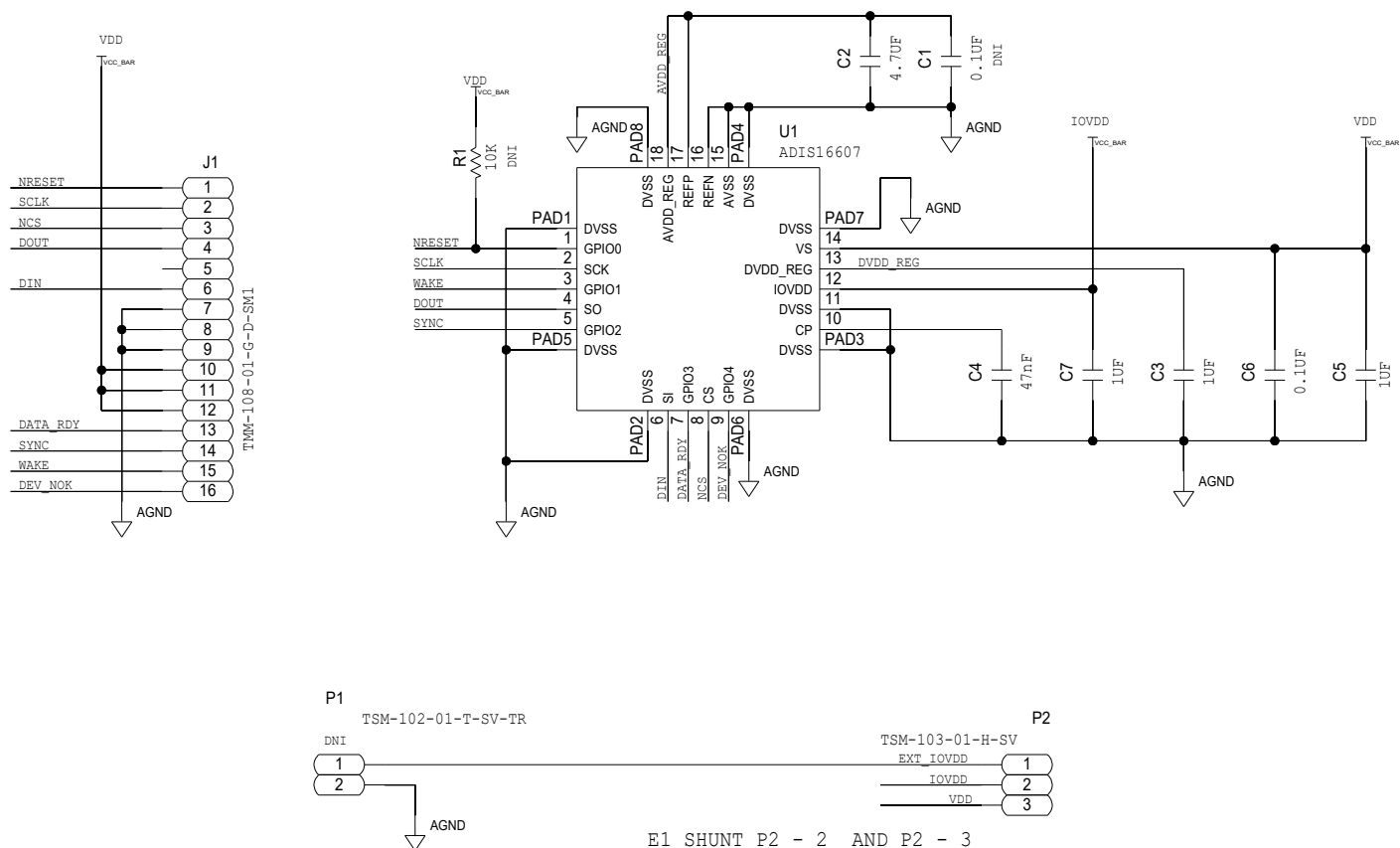


Figure 9. ADIS16607-x/PCBZ Schematic

HANDLING CONSIDERATIONS

Dropping the ADIS16607-x/PCBZ on a firm surface can generate several thousand g of acceleration, which may exceed the absolute maximum rating limits of the device.

**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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