



ADXL362 Datalogger & Development Board

Thanks for visiting!
This page is UNDER CONSTRUCTION.

Resources

Kit Contents

- 1 x ADXL362 Datalogger / Development Board
- 1 x MicroSD card with USB reader
- 1 x USB cable
- 1 x E-Ink electronic paper display
- 1 x Piece of double-sided foam tape

Not Included

1 x CR2450 coin cell battery, required only if stand-alone operation is desired. Full functionality of the board is available using USB power.

Design and Integration Files

Schematics:	PDF
Layouts:	PDF CAM

Programming Environment

The firmware for the EVAL-ADXL362Z-DB was developed for the Renesas RL78/G13 microcontroller using the Renesas Electronics CubeSuite+ environment. The links below offer downloads and installation instructions for these tools:

http://www.renesas.eu/products/tools/evaluation_software/downloads.jsp (Global site)

http://am.renesas.com/products/tools/evaluation_software/downloads.jsp (US site)

Getting Started

Using the Board

Firmware Options

Analog Devices has developed firmware for implementing the following functions via the EVAL-ADXL362Z-DB:

- **Datalogger and GUI (includes real-time data viewer and tilt sensor):** logs data onto (supplied) microSD card. [ZIP](#) (includes .hex firmware and .exe GUI)
- **Tilt Sensor:** shows tilt measurement on E-Ink display. [HEX](#) | [Source Code](#)
- **Ultralow Power Motion switch:** turns display icons on or off based on presence or absence of motion. [HEX](#) | [Source Code](#)
- Pedometer & fall detector coming soon

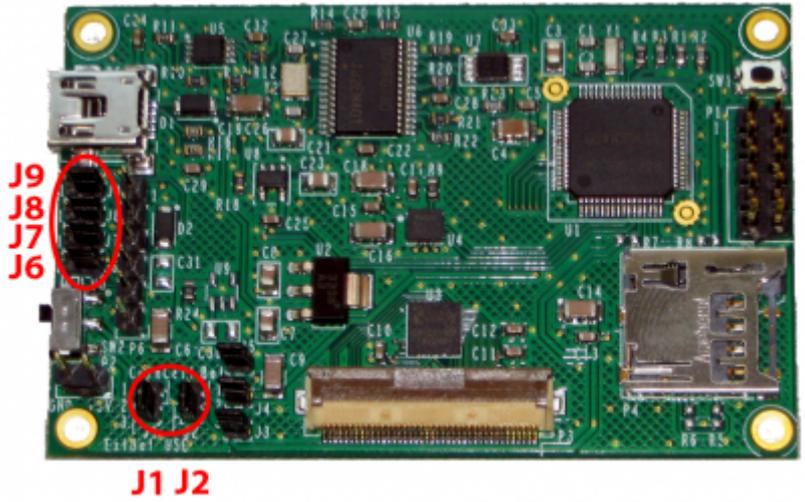
Reconfiguring the Board

The EVAL-ADXL362Z-DB firmware can be rewritten using the Renesas Flash Programmer (click [here](#) for download links). Instructions for rewriting the firmware are as follows:

Set jumpers: J6, J7, J8, and J9 (between the USB connector and the switch) to the 1-2 position. Set jumper J2 (near the display connector) to the 2-3 position for USB power.

⚠ *We know the jumpers are a pain and we apologize in advance.*

Jumper	Position		
J2	1	2	3
J6	1	2	3
J7	1	2	3
J8	1	2	3
J9	1	2	3





When flashing is complete, disconnect the USB cable (to power the board off) and set jumpers J6 - J9 back to the 2-3 position. Leave J2 where it is to USB power, or move it to the 1-2 position to power the board from the coin cell.

Jumper	Position		
	1	2	3
J2	1	2	3
J6	1	2	3
J7	1	2	3
J8	1	2	3
J9	1	2	3

[here](#). Save it in a known location.

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Renesas Flash Programmer V1.03 (download [here](#))

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Firmware User Guides

This section describes operation of the firmware options provided by Analog Devices for this development board. To download firmware, click [here](#) or scroll up to the Firmware Options section above.



Motion Switch

This firmware implements a simple motion switch. When the board is moving, all of the display icons turn on. When the board is stationary for about 10 seconds, most icons turn off and only the power icon and the EInk and Analog Devices logos remain on.

The neat thing about this board is how little power it consumes. Between the low-power Renesas microcontroller, the e-paper display, and our ADXL362, the entire board design showcases low power.

Can you tell us how much current consumption you measure, when the board is in motion and when it's not? Just edit the page and add your findings to the table!

Current Consumption [μ A]		
In Motion	Stationary	Measured by:
<i>Your measurement</i>	<i>Your measurement</i>	<i>Your Name</i>
<i>Your measurement</i>	<i>Your measurement</i>	<i>Your Name</i>

Tilt Sensor

Gravity makes tilt sensing easy for an accelerometer. The earth's gravity exerts a 1g pull, by definition, on everything, toward the center of the earth (which, in general, would like a vector perpendicular to the floor). If the axis of acceleration sensitivity of an accelerometer is perfectly aligned with the gravity vector, then the accelerometer will "feel" a 1g acceleration. If the axis is at any angle away from that gravity vector, it will only feel a portion of that 1g. More accurately, it will feel an acceleration of $1g \cdot \cos(\text{angle})$.

The tilt sensor demo uses the $1g \cdot \cos(\text{angle})$ formula to convert measured acceleration to tilt angle, and then displays that angle on the e-paper display.

To begin using the tilt sensor, first load the firmware onto the board. Turn the board on (you can power the board using either USB or a coin cell), and place it on a flat surface, with the display facing up. The screen will display **CAL**, indicating that it is performing an offset calibration. Do not move the board during this time. When calibration is complete, the screen will display **0°**, and you can begin measuring tilt!

To measure tilt, stand the board up so that it is perpendicular to the floor (parallel to your computer monitor, probably) with the USB connector on the left. This is the 0° position, in which the sensitive axis is exactly perpendicular to the gravity vector, so none of the acceleration due to gravity is felt by the sensitive axis.

From this point, rotate the board clockwise and counter-clockwise, and watch the tilt measurement change.

Note that tilt measurement is, in general, a slow measurement. This is because at any given moment, the motion of your hand, for example, could be producing acceleration that would interfere with the



tilt measurement. If we average the total acceleration measurement over time, we can get rid of the transient, or AC, effects, such as those due to your hand moving, and we are left only with long-term, or DC, effects -- in this case, gravity. So for best results, tilt slowly and wait for the display to refresh.

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