



A31301 Evaluation Kit User Guide

DESCRIPTION

The ASEK-31301-IC06-SUBKIT-T allows for quick evaluation of the A31301 3D sensor. The A31301 is a three-axis Hall-effect sensor IC—a flexible magnetic sensor capable of measuring the raw field strength in any one, two, or three axes, as well as calculating the angle in up to any two userdefined planes. The board includes an A31301 device and test points. The board is perforated, allowing the snapping off of the sensor board for use in custom magnetic setups.

FEATURES

The evaluation kit includes a microcontroller for communicating with the A31301. Evaluation software is available to demonstrate the basic functionality and configurability of the A31301 device.

EVALUATION KIT CONTENTS

• ASEK-31301 Evaluation Board (ASEK-31301-IC06-SUBKIT-T)

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Additional Hardware and Software Required

- Micro-B USB communication cable
- Evaluation board software, available on the website: https://registration.allegromicro.com/
- Personal computer capable of running evaluation board software



Figure 1: ASEK31301 Evaluation Board (ASEK-31301-IC06-SUBKIT-T)

USING THE EVALUATION BOARD

The Allegro GUIs provided to evaluate magnetic position sensors contain a variety of features to assist in the evaluation of devices. For this reason, not all features are covered by this document. The focus of this procedure is to familiarize the user with setting up the GUI to communicate with the ASEK-31301. For additional information on available GUI features, refer to the user manual on the Allegro Software Portal.

Downloading the Software

- 1. Sign into the Allegro Software Portal: https://registration.allegromicro.com/login#/
- 2. Click Find A Part to open the Available Parts page.
- 3. Enter A31301 into the search box.
- 4. Click View on the A31301 Position Sensors row.
- 5. Within the A31301 Product page, click the Download box for the Demonstration Application.

A. Additional information is available on the software portal including a detailed user manual for the software GUI.

Installing the Software

Place the ZIP file where you want the software to be run. Unpack the ZIP file. A folder called Allegro A31301 Demonstration V2.0.x should have been created. All the required files should be in the folder.

Starting the Application

1. Double click on the application. It is the file called Allegro A31301 Demonstration.exe in the Allegro A31301 Demonstration V2.0.x folder. The main window will appear (see Figure 2).



Figure 2: Main Window

- 2. Connect one end of the USB communications cable to a personal computer.
- 3. Connect the other end of the USB communications cable to the USB port on the ASEK-31301 module.
- 4. A window may appear that looks like the one in Figure 3.





Figure 3: New Device Detected Dialog

5. Click the Yes button.

DEVICE SETUP

Reading the sensor values

- 1. Make sure the Demo tab is shown.
- 2. Click Power On
- 3. Click Start Reads.
- 4. The angle will be displayed in the compass on the lefthand section of the window. The X, Y, and Z values will be added to the left edge of the graph which is on the righthand side of the window.
- 5. To stop the reading, click Stop Reads.



Figure 4: Sensor readings started and stopped

Reading Memory

Reading a Field

- 1. Select the EEPROM tab.
- 2. In the memory box, the Show popup should be showing All Fields. If it is not, then select All Fields from the popup menu.
- 3. Scroll down the table to the $SPARE_{15}$ row.
- 4. Click on the checkbox that is on the left side of the SPARE_15 row.



5. Click Read Selected. The memory field will appear similar to Figure 5.

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Select	Name	Code	Value	Units	Read Selected	Output
	SMPL_INT_POL		~		Write Selected	X [LSBs]
	CIC_BW_SEL					Y [LSBs]
	CIC_BW_SEL_LPM				Zero Selected	7 [SBs]
	INTERFACE_SELECT		~		Clear Selected	
	DATA_LATCH		~		Select All	Angle [Degrees]
	SPARE_15	0	0			Radius
	I2C_DIS_SLV_ADDR		~		Deselect All	Sine
	I2C_THRESH_SEL		~			Cosine
	I2C_SLV_ADDR					Temperature [°C]
	I2C_SLV_ADDR_IGNORE		~			Read Output
	I2C_CRC_EN		~	· · · · ·		
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Figure 5: Reading a Field

Reading a Memory Location

- 1. Click on the Show popup menu and select All Memory Locations.
- 2. Click on the checkbox that is on the left side of the row labeled 0x15.
- 3. Click on Read Selected. The window should appear as it does in Figure 6. The value of SPARE_15 is at bits 2 to 7 of location 0x15.

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Select	Address 0x08	EEPROM_8	Code	Read Selected	X [LSBs]	106
	0×09	EEPROM_9		vvinte Selected	Y [LSBs]	84
	0×0D	EEPROM_D		Zero Selected	Z [LSBs]	-49
	0x0E	EEPROM_E		Clear Selected	Angle [Degrees]	38 364
	0x0F	EEPROM_F		Select All	Partice [Degrees]	00.004
	0x10	EEPROM_10		Deselect All	Radius	0
	0x11	EEPROM_11		Desciect Ai	Sine	84
	0x12	EEPROM_12			Cosine	106
	0x13	EEPROM_13			Temperature [°C]	26.625
	0x14	EEPROM_14			Read Ou	tput
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Figure 6: Reading a Memory Location

Writing to the Device

- 1. In the Memory field, select All Fields from the Show popup menu.
- 2. Scroll down the table to the $SPARE_{15}$ row.
- 3. Click in the text entry box in the Code column of the SPARE_15 row.



- 4. Type 16 and press Enter. The Select checkbox should be checked and the cell in the Value column will be set to 16.
- 5. Click Write Selected. The window should appear as it does in Figure 7.
- 6. To verify that the SPARE_15 field was written to the device:

A. Click Clear Selected. The values in the Code and Value cells should disappear.

B. Click Read Selected. The values that were written will reappear in the Code and Value cells.

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DEMO	EEPROM Low Power Duty Cycle					Power		
Show:	All Fields \checkmark		Search	ą		Power Off	Power O)n
Select	Name	Code	Value	Units	Read Selected	Output		
	INTERFACE_SELECT		~		Write Selected	X [LSBs]		
	DATA_LATCH		~			Y [LSBs]		
	SPARE_15	16	16		Zero Selected	Z [LSBs]		_
	I2C_DIS_SLV_ADDR		×		Clear Selected	Apple [Degmen]		_
	I2C_THRESH_SEL		~		Select All	Algie [Deglees]		_
	I2C_SLV_ADDR				Developt All	Radius		
	I2C_SLV_ADDR_IGNORE		~		Deselect All	Sine		
	I2C_CRC_EN		~			Cosine		
	SPI_CRC_EN		~			Temperature [°C]		
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Figure 7: Writing a field

Writing a Memory Location

Writing to a memory location is done the same way.

- 1. From the Show popup menu, select All Memory Locations.
- 2. To ensure that there is not any memory locations selected, click Deselect All.
- 3. Scroll down the table and click the checkbox in the Select column next to 0x15.
- 4. Click Read Selected. The value in the last two digits in the Code column should be 40 when the device is communicating using I²C and 41 when communicating with SPI.
- 5. If communicating using I²C, change the last two digits to 10; otherwise, change the last two digits to 11, and press Enter.
- 6. Click Write Selected.
- 7. To verify that the memory location has been changed, select All Fields from the Show popup menu and scroll down to the spare_15 row. Click Read Selected and the field should now read 4.



SCHEMATIC



Figure 8: Board Schematic





Figure 9: Board Top Layout



Figure 10: Board Bottom Layout

Table 1: A31301 Evaluation Board Bill of Materials	- ASEK-31301-IC06-SUBKIT-T
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ELECTRICAL C	OMPONEN	rs		
Designator	Quantity	Description	Manufacturer	Manufacturer Part Number
U1	1	IC, DFN10, sensor	Allegro	A31301EEJASR-XYZ-IC-06
X1	1	Module, through-hole, Arduino module // comes with pins	STMicro	nucleo-G431KB
C1, C2	2	Capacitor, 0603, mono, X7R, 50 V, 100 nF	AVX	06035C104K4T2A
R1, R2, R3, R4, R5, R6, R7	7	Resistor, 0603, 100 mW, thick film, 1%, 10.0 k Ω	Yageo	RC0603FR-0710KL
L1	1	Ferrite bead, 0603, 220 $\Omega,1.4$ A, 0.1 Ω DCR	Murata	BLM18PG221SN1D
R8	1	Jumper, 0603, zero ohm jumper	Yageo	RC0603JR-070RL
Q1	1	Transistor, SOT-23, PFET	Diodes Inc	BSS84-7-F
header1, header2	2	Connector, through-hole, header, 1 × 15, 100 mil pitch	Sullins	PPPC151LFBN-RC
PCB	1	PCB, as from 85-1063-001 Rev 1 gerber files	Allegro	-

ADDITIONAL SUPPORT

Software support is available on our website: https://registration.allegromicro.com/



REVISION HISTORY

Number	Date	Description
-	September 15, 2023	Initial release
1	March 20, 2025	Updating for new revision of evaluation kit and software

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