

Allegro Current Sensor Programmer User Guide

DESCRIPTION

Allegro provides specialized tools to support the evaluation and configuration of its sensor products. The ASEK-35 programmer serves as the primary interface, enabling communication between the sensor and the associated software.

This document outlines the step-by-step procedure for using one such tool: the Allegro Current Sensor Programmer (ACSP). The supported sensor devices are listed in Table 1.

Before using the ACSP software, refer to the ASEK-35 Hardware Selection Guide to identify the appropriate interface or socket board for the specific sensor.

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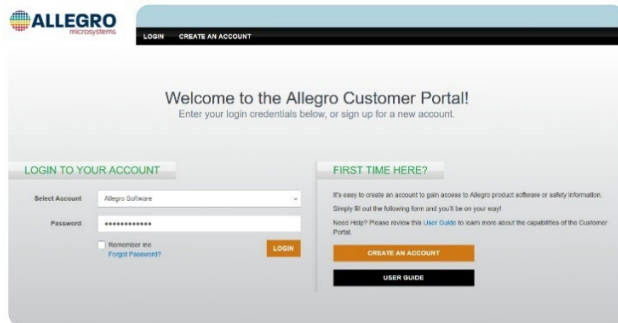
Table 1: List of Supported Sensors

Part Number	Allegro Package Designator	Available User Interface Scripts
A1367	KT	–
ACS37503	KT	TPP variant 1
ACS37504	KT	TPP variant 1
ACS37600	LU	–
ACS37601	KT	–
ACS37610	LU	–
ACS37610S	OK	–
ACS37611	LU	–
ACS37614	LU	UART ID assignment
ACS37630	OL	–
ACS70310	KT	–
ACS70311	KT	–

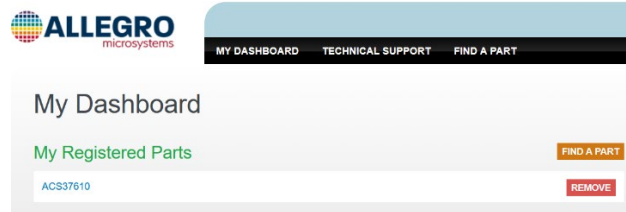
USING THE ACSP

1. Download ACSP installer:

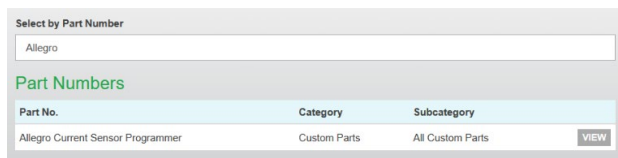
- A. Log into the Allegro Software Portal at <https://registration.allegromicro.com/login>. Registration is required.



- B. Click the Find a Part button.

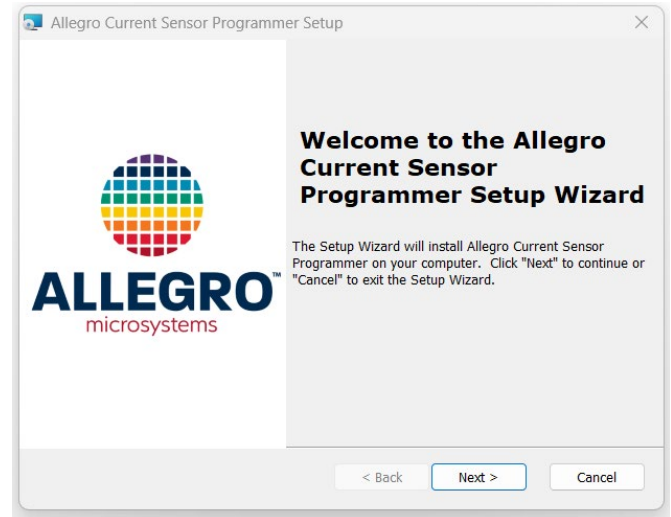


- C. In the Select by Part Number search field, type "Allegro Current Sensor Programmer."
- D. In the Part Numbers list, click the View button, then download the latest package to the PC.



2. Install the application:

- A. Execute the downloaded installer package.
- B. Proceed with the onscreen installation instructions.
- IMPORTANT: Administrator privileges are not necessary; however, the installation directory must be located in an area where the user has permission to write.



3. Start the application:

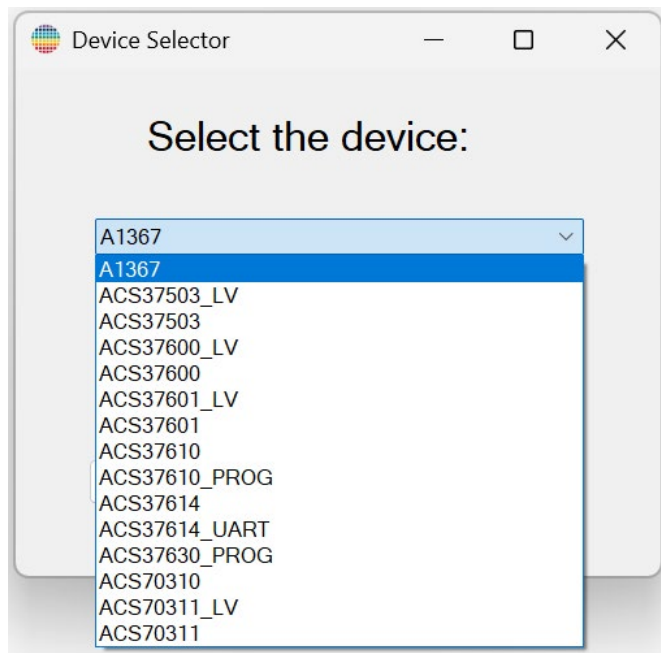
- A. Open the Allegro Current Sensor Programmer software.
- The ACSP is accessible via the Windows Start menu or a desktop shortcut, if one was created.



4. Select the sensor:

After the application starts, the Device Selector window displays. In this window, the user makes the following selections:

- A. In the list of supported devices, select the target sensor.
- B. In the Device Selector menu, select the appropriate configuration of the target sensor based on the following key:
 - **Part Number** uses a configuration in which V_{CC} increases to greater than the OVD threshold to enable communication (legacy-mode programming).
 - **Part Number_LV** uses a configuration in which V_{CC} remains constant during communication (low-voltage programming).
 - **Part Number_PROG** uses a configuration in which V_{CC} remains constant during communication (low-voltage programming). In this mode a dedicated pin, e.g., PROG, is used for communication.

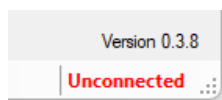


5. Establish communication (PC to ASEK-35):

After the user confirms the selected device configuration in step 4, the main application window loads.

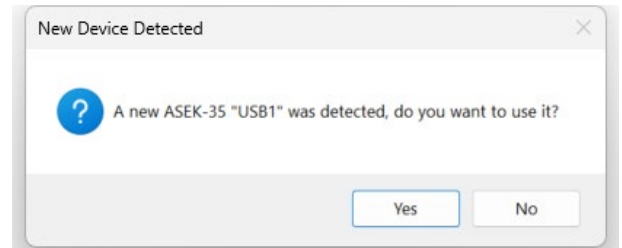
- A. Observe the status of communication with the ASEK-15.

The status indicator in the bottom right corner of the user interface displays the status of communication with the ASEK-35. If the status indicator displays a red unconnected status, the ASEK-35 programmer is not physically connected to the PC.

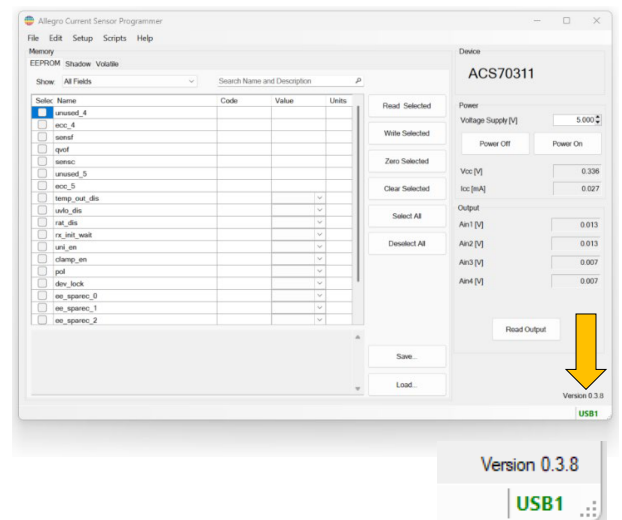


- B. Connect the ASEK-35 as follows:

- i. Attach the provided USB-C cable to the ASEK-35 USB port and connect the other end to the control PC.
- ii. When the ASEK-35 is detected for the first time, the New Device Detected dialog displays.
- iii. Click the Yes button to confirm.

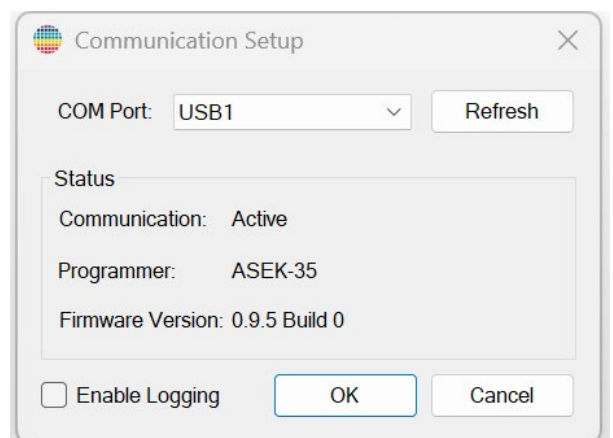


NOTE: Once the programmer virtual COM port (e.g., USB1) is detected, the user interface remembers this selection for future sessions. This setup does not need to be repeated each time.



- C. View communication details as follows:

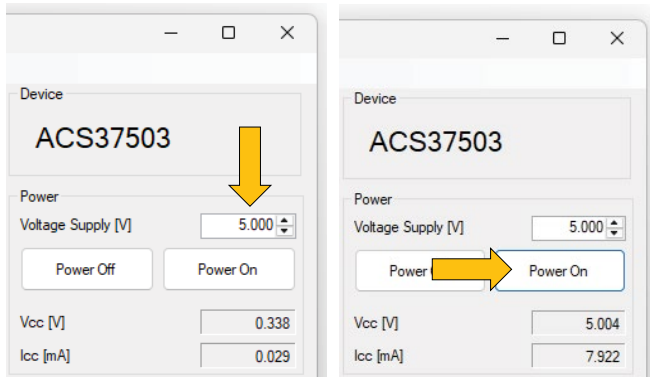
- i. Click the Status area in the bottom right corner. (Alternatively, navigate to Setup → Communication Setup.)



6. Power up the sensor:

Use the power-control panel located in the upper-right corner of the user interface to enable and monitor the device supply.

- Set the V_{CC} level to match the voltage requirements of the connected sensor.
- Click the Power On button to enable the power supply.
- After power is enabled, the user interface automatically measures and displays the actual V_{CC} level and sensor I_{CC} current consumption.
- Verify that the measured V_{CC} and I_{CC} values are within the expected operating range for the sensor.

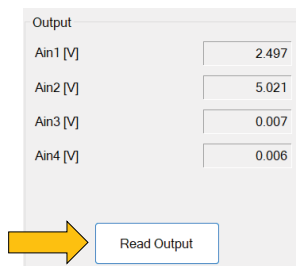


7. (Optional) Check the ADC:

This step allows the user to confirm the analog voltage levels present on the AIN1 through AIN4 channels.

- Review the schematics of the connected hardware, socket, or interface board to identify which signal is routed to each AIN channel.
- Confirm that the measured values align with the expected signal levels defined by the user-specific hardware and connected sensor.

NOTE: This check also refreshes the V_{CC} level and the I_{CC} sensor consumption.



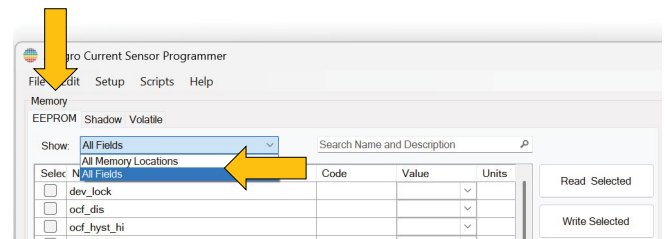
8. Configure the memory view:

A. Select the memory section to be inspected:

- EEPROM
- Shadow memory
- Volatile memory

B. Choose how the memory contents are displayed:

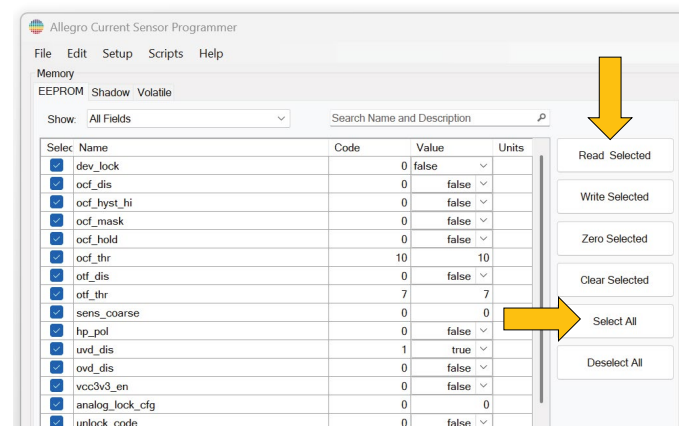
- All Fields** shows every individual bit, allowing fine-grain control and inspection.
- All Memory Locations** groups data by registers, enabling read/write access to full register contents.



9. Perform a read operation:

- Select the individual Select checkboxes or, to enable the read operation for all bits, click the Select All button.
- Click the Read Selected button. This initiates the read operation. As data are retrieved, the Code and Value columns update.

NOTE: By default, code is in decimal format. The format can be changed to hexadecimal. If this is desired, in the menu, navigate to Setup → Display in Hexadecimal.



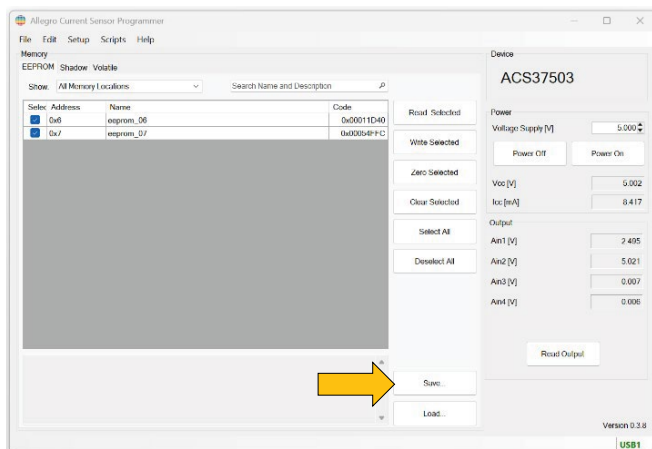
10. Save memory:

Before performing any write operation to the EEPROM, it is recommended to save the factory-programmed memory content for backup purposes.

After completing a read operation in step 9, click Save, or navigate to File → Save Memory from the menu. A dialog displays prompting the user to save the data in CSV format.

NOTE: The contents of the generated CSV file depend on the current display selection (i.e., the Show menu options):

- If individual bits are displayed, the CSV file contains bit-level values.
- If the All Memory Locations option is selected, the CSV file contains the register values by address.

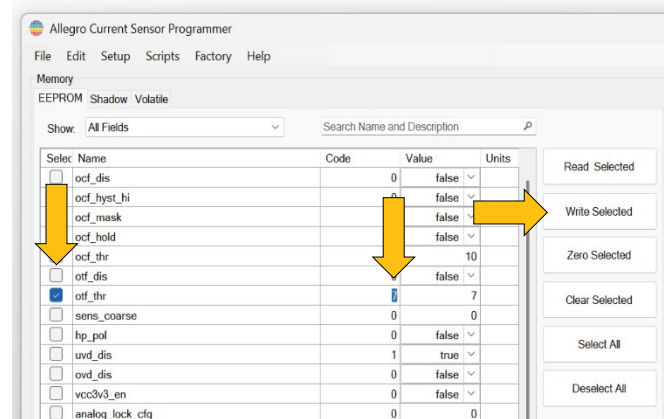


11. (Optional) Load memory:

To load a previously saved memory-data file, click the Load button or navigate from the menu to File → Load Memory.

12. Execute a write operation:

- In the Select panel, enable the checkbox next to the field to be modified.
- In the corresponding code field, enter the new value.
- Click the Enter button.
- If it is desired for the software to automatically read back and verify each written value, enable this option by navigating to Setup → Verify All Writes.
- Once all desired fields are updated, click the Write Selected button to execute the write operation.



EXTRA FEATURES: MEMORY MAP DIAGRAM

For a memory map of the EEPROM, shadow memory, or volatile memory sections, navigate to Help → Device Register Diagram.

NOTE: To display additional details about a bit field, such as address, description etc., hover over the field name.

ACS37503 Registers Diagram

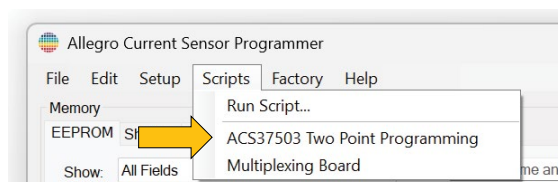
EEPROM Shadow Volatile

	Bit Number																																					
Address	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00						
0x06	ecc_6						spare_rbow		jumi		jund		analog		lvcc		ovd		jvd		hdp		sens_col		otf_thr		jotf		ocf_thr		jocf		jocf		jocf		dev	
0x07	ecc_7						faulttest		seq		fault		teivout		tes								sens_fine						qvo_fine									

EXTRA FEATURES: SCRIPTS

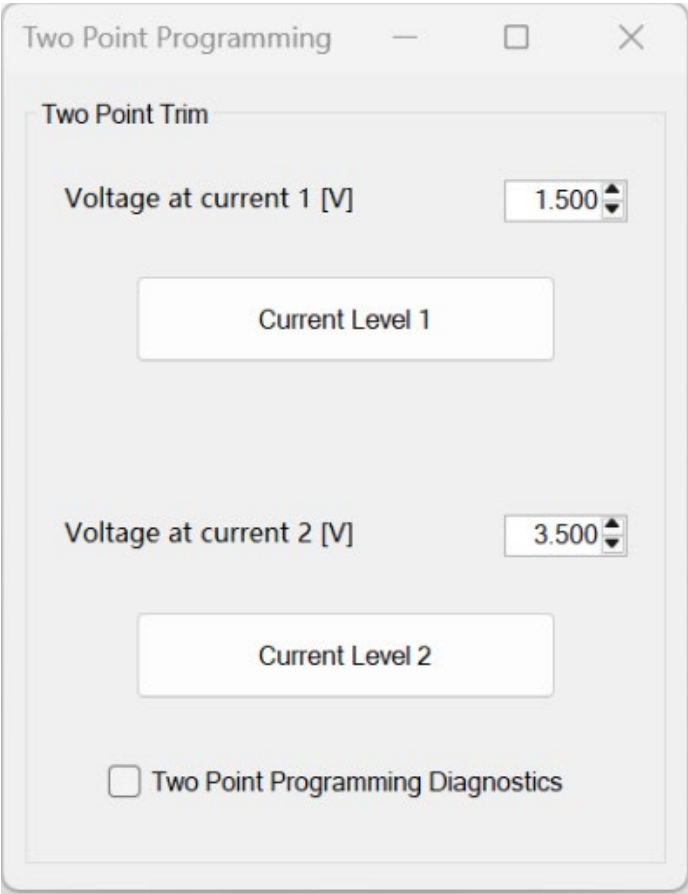
The Script menu provides several advanced tools that extend the functionality of the application:

- **Run Script** executes Allegro-supplied CS scripts to enhance the flexibility and capabilities of the user interface.
- **Two-Point Programming** opens a guided window that walks the user through the two-point programming (TPP) procedure. The goal of two-point programming is to calculate and set device sensitivity using two known points. The user must know the values of the magnetic field and the desired output voltage at two levels.
- **Multiplexing Board** enables control of the ASEK35-INT-02 multiplexing interface board.



Script: Two-Point Programming (Variant 1)

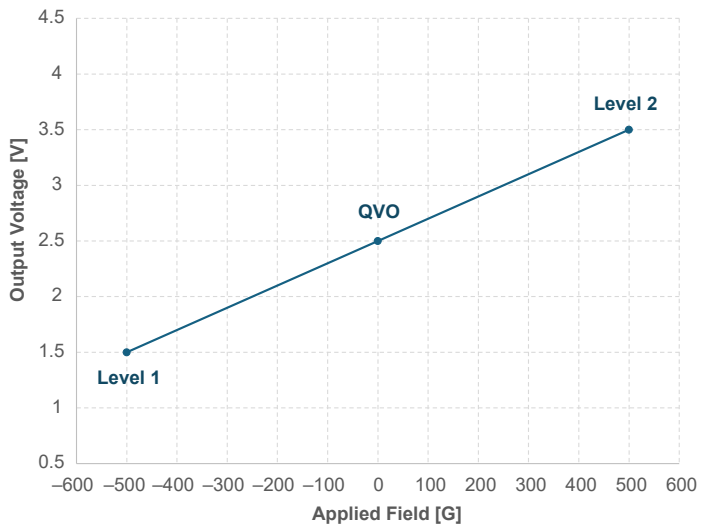
The software automatically loads the appropriate two-point programming (TPP) variant based on the connected sensor. This section describes variant 1.



Procedure

1. Prepare a test bench with the sensor, a ferromagnetic core, and a current-carrying conductor.
 2. In the Voltage at current level 1 field, enter the target value (e.g., 1.5 V).
 3. Apply a known magnetic field (e.g., -500 G).
 4. Click the Current Level 1 button.
 5. In the Voltage at current level 2 field, enter the target value (e.g., 3.5 V).
 6. Apply a known magnetic field (e.g., +500 G).
 7. Click the Current Level 2 button.
 8. Wait for the user interface to complete processing.
 9. Remove the magnetic field (apply zero field).
- The TPP script automatically calculates and programs the required sensitivity (mV/G).

A detailed description of the TPP algorithm is available from Allegro upon request.



In this example, the device sensitivity is calculated as::

$$\frac{3.5\text{ V} - 1.5\text{ V}}{500\text{ G} - (-500\text{ G})} = 2\text{ mV/G}$$

Based on this result, the user interface programs the device fine sensitivity register to 2 mV/G.

In addition, the user interface automatically adjusts the device quiescent output voltage (QVO) to its ideal target value. (For example, a 5 V bidirectional sensor has a nominal QVO target of 2.5 V).

NOTE: The coarse gain sensitivity of the device cannot be modified via the user interface. This restriction prevents an overwrite of the factory-trimmed compensation values, which are essential for proper device operation.

For example, if the user enters two voltage and field levels that correspond to a device sensitivity of 10 mV/G, but the sensor coarse gain is 1, the user interface generates an error. In this case, the device cannot achieve the requested 10 mV/G sensitivity because the coarse gain setting fundamentally limits the achievable range.

Parameter	Symbol	Description	Min.	Typ.	Max.	Unit
Sensitivity Programming Range	Sens _{PR}	SENSE_COARSE = 0	0.5	–	1.2	mV/G
		SENSE_COARSE = 1	1.2	–	2.5	mV/G
		SENSE_COARSE = 2	2.5	–	5.5	mV/G
		SENSE_COARSE = 3	5.5	–	11.5	mV/G

Script: Two-Point Programming (Variant 2)

The software automatically loads the appropriate two-point programming (TPP) variant based on the connected sensor. This section describes variant 2.

Two Point Programming

Two Point Trim

Desired Output Voltage at calibration current [V]
3.00

Desired Output Voltage at zero current [V]
2.50

Sample Count
10

Apply zero current and press the button below

Apply Zero Current

Apply Calibration Current

Adjust Zero Current

Write codes to EEPROM

☐ Auto-write to EEPROM

☐ Two Point Programming Diagnostics

Procedure

1. Prepare a test bench with the sensor, a ferromagnetic core, and a current-carrying conductor.
2. In the Voltage at calibration current field, enter the target value (e.g., 3.0 V).
3. In the Voltage at zero current field, enter the target value (e.g., 2.5 V).
4. Remove the magnetic field
5. Click the Apply Zero Current button.
6. Apply a known magnetic field (e.g., +500 G).
7. Click the Apply Calibration Current button.
8. Remove the magnetic field (apply zero field).
9. Click the Adjust Zero Current button.
10. (Optional) To store the results permanently, click the Write codes to EEPROM button.

A detailed description of the TPP algorithm is available from Allegro upon request.

In this example, the device sensitivity is calculated as:

$$(3\text{ V} - 2.5\text{ V})/500\text{ G} = 1\text{ mV/G}$$

NOTE: The device coarse gain sensitivity cannot be modified via the user interface. This restriction prevents an overwrite of the factory-trimmed compensation values, which are essential for proper device operation.

Script: Multiplexing Board

The software supports programming of up to four sensors when used with the ASEK-35-INT-02 multiplexing interface board.

1. Connect the ASEK-35-INT-02 board to the ASEK-35 programmer.
2. Wire the selected sensors according to the ASEK-35 Hardware Selection Guide.
3. Open the Multiplexing Control window by navigating to Menu: Script → Multiplexing Board
4. Select and activate one of the available sensor channels (sensor analog-to-digital; sensor A–D).
5. Return to the main user interface and click the Power On button.
6. Continue using the graphical interface as per typical operation guidelines.

Script: ACS37614 UART ID Assignment

The interface of this script is designed specifically to configure the UART communication of the ACS37614 current sensor.

NOTE: When a sensor leaves the factory, the default UART ID is 0x0. This allows for ease of part testing: When a single sensor is connected to a bus, testing can immediately begin without the need to assign the UART ID. However, if more than one sensor is connected to the bus, UART ID assignment should be the first step: Without this assignment, the sensors on the same bus react to the same commands, and their responses collide with one another.

For detailed setup instructions and UART ID assignment procedures, refer to the device datasheet.

The screenshot shows a software window titled "UART ID Assignment". It contains several sections for configuring UART ID assignment for different sensor types:

- Set ID:** A section with a label "ID = 0x" followed by a numeric input field set to "0" and a "Set ID" button.
- ID Assignment Type 1:** A section with a "Send Type 1 Command" button.
- ID Assignment Type 2:** A section with a "Send Type 2 Command" button, a "Voltage level =" label with a numeric input field set to "0", and a "New ID = 0x" label with a numeric input field set to "0".
- ID Assignment Type 3:** A section with a "Send Type 3 Command" button, a "New ID = 0x" label with a numeric input field set to "0", a "t_wait =" label with a dropdown menu set to "2 ms", and a label "*VOUT -> MPP1".
- ID Assignment Type 4:** A section with a "Send Type 4 Command" button, a "New ID = 0x" label with a numeric input field set to "0", and a "Reset/ Query" label with a dropdown menu set to "Reset".

Revision History

Number	Date	Description
–	March 6, 2026	Initial release
1	August 11, 2026	Release to web

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