

ASEK-35 Programmer User Guide

DESCRIPTION

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

The ASEK-35 programmer is engineered for efficient and precise calibration of Allegro Microsystems portfolio of programmable current sensors. It enables accurate Two-Point Programming within the customer's system application evaluation.

While similar in concept to a standard EEPROM programmer, the ASEK-35 offers enhanced functionality, including 24-bit voltage measurement capability, integrated programmable power supply and flexible configuration options. These features support a smooth transition from prototyping to full-scale production.

Designed for versatility, the programmer can be seamlessly integrated with a standard PC. Communication is established via a USB-C interface, requiring no custom configuration on the host PC.

This document details the ASEK-35 programmer's features, capabilities, and key specifications, including operational limits and performance parameters.

FEATURES

- Cost-effective solution
- Optimized for Allegro's Current Sensor portfolio
- High-precision calibration with Two-Point Programming
- Supports multiple communication protocols
- Robust hardware design with self-diagnostic functionality and ESD protection
- Modular architecture: feature set expandable via Interface and Accessory Boards (e.g. multiple devices are supported by Interface Board #2)
- Accelerated development using a universal programming software GUI
- USB-powered with support for USB-based firmware updates
- Software layer compatibility with the ASEK-3x programmer lineup (common AASP.dll library)
- Supported communication protocols are several Allegro proprietary protocols and standard I²C, SPI, UART, SENT protocols.



Figure 1: ASEK-35 programmer

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USING THE PROGRAMMER

Setup

The below steps outline how to set up and begin use of the ASEK-35 programmer.

1. Download the Allegro Current Sensor Programmer installation package from the Allegro Software Portal at <https://registration.allegromicro.com/login>. Registration is required. For additional guidance, refer to the ASEK-35 Allegro Current Sensor Programmer (ACSP) User Guide.
2. Connect the USB-C communications cable to the J1 port on the programmer and to the control PC.
3. Insert the selected Interface or Socket Board to the P1 port. For available options and details, see the ASEK-35 Hardware Selection Guide.

Board Connections and Description

1. USB-C (J1) connector: Provides connection to a PC and serves as the primary power source for the programmer via VBUS
2. P1-PORT: Facilitates connection to external boards (Interface, Accessory, or Socket Boards)
3. POWER LED Indicator: Displays microcontroller power status (3.3 V regulator)
4. STATUS LEDs: Indicate various system states and operational activity
5. BUSY LED Indicator: Shows active programming or processing status
6. RESET SWITCH: Double-click initiates firmware update; single-click resets the ASEK-35
7. HW INFO: Printed TED number and hardware revision date on the PCB bottom side
8. P2-PORT: Optional external power connector. Not needed for normal operation.
9. SWD connector: Serial Wire Debug interface for Atmel-ICE programmer. Not needed for normal operation or firmware update.

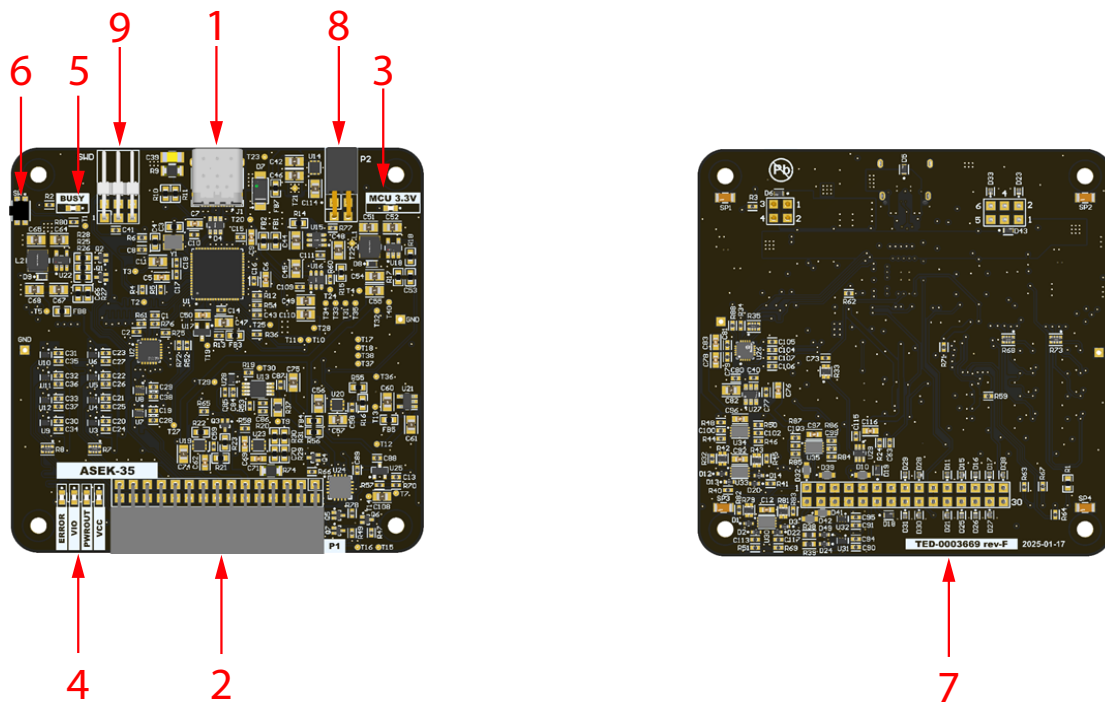


Figure 2: ASEK-35 programmer connections and labeling

Launch the ACSP control application.

P1-Port Terminal List

Number	Name	Description
1	MPP1	Multi-Purpose Pin 1 (AIN1: 24-bit + Fast ADC, GPIO, MANCHESTER-TX/RX, Buffered DAC, Analog Comparator)
2	MPP2	Multi-Purpose Pin 2 (AIN2: 24-bit + Fast ADC, GPIO, MANCHESTER-TX/RX, Buffered DAC, Analog Comparator)
3	AIN3	ADC Input 3 (24-bit ADC only)
4	AIN4	ADC Input 4 (24-bit ADC only)
5, 6	GND	Device ground terminal
7	VCC	Device Analog Power Supply
8, 9	GND	Device ground terminal
10, 12	PWR_OUT	Unregulated power supply for Accessory Boards
11	VIO	Device Digital Power Supply
13, 14	GND	Device ground terminal
15	I2C1_SCL	Clock of I2C interface #1 (Sensor interface)
17	I2C1_SDA	Data of I2C interface #1 (Sensor interface)
16	I2C2_SCL	Clock of I2C interface #2 (Auxiliary Interface for boardID, IO expanders etc.)
18	I2C2_SDA	Data of I2C interface #2 (Auxiliary Interface for boardID, IO expanders etc.)
19, 20	GND	Device ground terminal
21, 23, 25, 27	GPIO0-3/SPI1	Digital Interface #1 (GPIO or SPI or UART) (Sensor Interface)
22, 24, 26, 28	GPIO4-7/SPI2	Digital Interface #2 (GPIO or SPI or UART) (Auxiliary Interface)
29	BOARD_DETECT	Detection of external board connection
30	SPARE	Not used, reserved for future use

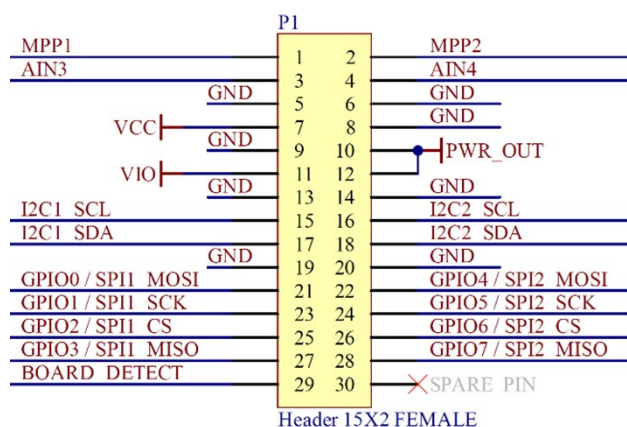


Figure 3: P1-Port Pinout diagram

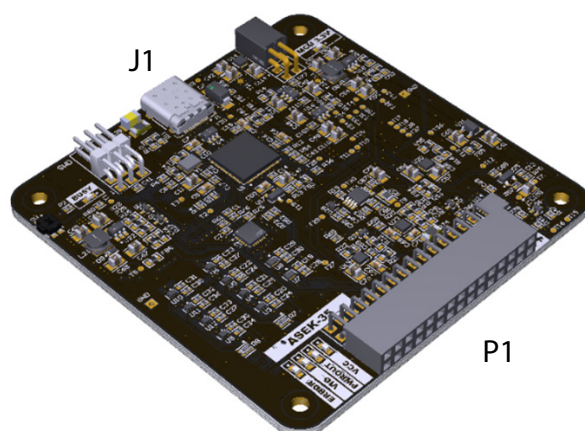


Figure 4: ASEK-35 programmer isometric view indicates J1 and P1 ports

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Notes	Min.	Max.	Unit
Input Supply Voltage	V_{IN_MAX}	V_{BUS} of USB-C connector (J1) or PWR_IN (P2)	-0.5	5.5	V
Maximum Supply Current	I_{IN_MAX}			3	A
ADC Input Maximum Voltage	ADC_{V_MAX}	MPP1, MPP2, AIN1, AIN2, AIN3, AIN4	-0.5	12	V
Digital Input Maximum Voltage	IOV_MAX	GPIO 0-7, I2C_1, I2C_2, BOARD_DETECT	-0.5	5.5	V
Storage Temperature Range	$T_{STORAGE}$		0	5.5	°C

POWER SUPPLY ELECTRICAL CHARACTERISTICS: Valid for ambient temperature only: $T_A = 25^{\circ}\text{C}$, $V_{IN} = V_{BUS}$ of USB-C port

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Units
SYSTEM POWER SUPPLY						
Supply Voltage	V_{IN}	V_{BUS} voltage of USB-C port	3.6	5.1	5.5	V
System Idle Current Consumption	I_{IN}	no load on VCC or VIO or PWROUT pin	–	30	–	mA
System Overcurrent Protection	I_{IN_OCP}	Maximum current supplied to the ASEK-35 internal system	–	1.5	–	A
DEVICE ANALOG POWER SUPPLY (VCC)						
Output Voltage Programmable Range	VCC		0	–	12	V
Output Voltage Setting Resolution	VCC_{LSB}		–	3	–	mA
Output Current Capability	VCC_{LOAD}	Maximum continuous load at T_A	–	150	–	mA
Output Current Limit	VCC_{IMAX}	Maximum current supplied to the VCC pin	–	280	–	mA
Output Capacitive Load	VCC_{CAP}	VCC to GND	–	0.1	10	μF
DEVICE DIGITAL POWER SUPPLY (VIO)						
Output Voltage	VIO	Selectable 3.3 V or 5 V only	3.3	–	5	V
Output Current Capability	VIO_{LOAD}	Maximum continuous load at T_A	–	150	–	mA
Output Current Limit	VIO_{IMAX}	Maximum current supplied to the VIO pin	–	280	–	mA
Output Capacitive Load	VIO_{CAP}	VIO to GND	–	0.1	10	μF
UNREGULATED POWER SUPPLY (PWR_OUT)						
Output Voltage Range	PWROUT	Unregulated V_{BUS} voltage	3.6	–	4.8	V
Power Out Over-Current Protection	I_{PWROUT_OCP}	Maximum current supplied to the PWR_OUT pin	–	1.5	–	A

MEASUREMENT SYSTEM ELECTRICAL CHARACTERISTICS: Valid for ambient temperature only: $T_A = 25^\circ\text{C}$, $V_{IN} = V_{BUS}$ of USB-C port

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Units
HIGH-PRECISION ADC (24-bit)						
Single-Ended Channels	ADC _{CH}	AIN1, AIN2, AIN3, AIN4	–	4	–	channels
Differential Channels	ADC _{CH}	(AIN1-AIN2), (AIN1-AIN3), (AIN1-AIN4), (AIN2-AIN4), (AIN3-AIN4)	–	5	–	channels
Measurement Range ^[1]	ADC _{MEAS}		0.01	–	5.1	V
Measurement Accuracy ^[1] [2]	ADC _{ACC}		–	±200	–	µV
Measurement Resolution ^[1]	ADC _{RES}		–	0.3	–	µV
Sampling Rate	ADC _{SR}	Slow configuration for maximum accuracy	–	10	–	S/s
Input Impedance	ADC _{IMP}	Selectable 1 MΩ (default) or High Impedance	1	–	1000	MΩ
Analog Bandwidth	ADC _{BW}	Channels AIN1, AIN2	–	–	1	MHz
		Channels AIN3, AIN4	–	–	150	kHz
FAST ADC (12-bit)						
Single-Ended Channels	ADC _{CH}	AIN1, AIN2, VCC, PRWIN	–	4	–	channels
Measurement Range ^[1]	ADC _{MEAS}		0.01	–	5.1	V
Measurement Accuracy ^[1] [2]	ADC _{ACC}		–	1.2	–	mV
Measurement Resolution ^[1]	ADC _{RES}		–	12	–	mV
Sampling Rate	ADC _{SR}	Temporarily set to fixed SR ^[3]	–	10	–	kS/s
Input Impedance	ADC _{IMP}	Selectable 1 MΩ (default) or High Impedance	1	–	1000	MΩ
Analog Bandwidth	ADC _{SR}	channels AIN1, AIN2, VCC, PWRIN	–	–	1	mHz
CURRENT MEASUREMENT ADC (12-bit)						
Single-ended Channels	ADC _{CH}	Sensor Supply Current (ICC)	–	1	–	channels
Measurement Range	ADC _{MEAS}		0.1	–	166	mA
Measurement Accuracy ^[1] [2]	ADC _{ACC}		–	±100	–	µA
Measurement Resolution ^[1]	ADC _{RES}		–	40	–	µA
Sampling Rate	ADC _{SR}	Slow configuration for maximum accuracy	–	1	–	kS/s
Analog Bandwidth	ADC _{SR}		–	–	30	kHz

[1] Validated by design and characterization

[2] After 30 minutes warm-up and calibration with ASEK-35-ACC-CAL board

[3] Adjustable Sampling Rate will be available in future

Revision History

Number	Date	Description
–	March 18, 2026	Initial release

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