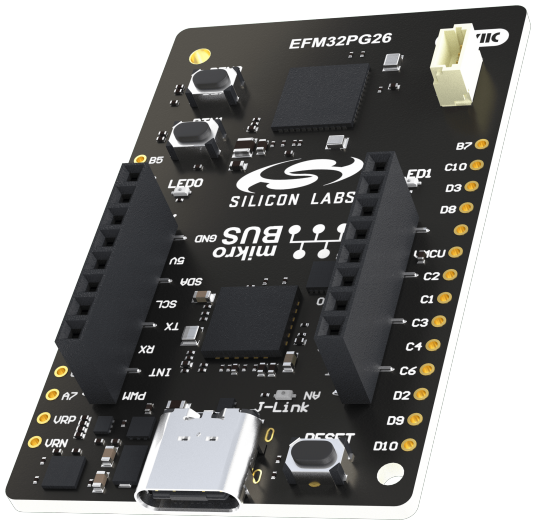
UG608: EFM32PG26 Explorer Kit User's Guide

The EFM32PG26 Explorer Kit is an ultra-low-cost, small form factor development and evaluation platform for the EFM32PG26 Gecko MCU.

The EFM32PG26 Explorer Kit is focused on rapid prototyping and concept creation of multipurpose applications. It is designed around the EFM32PG26 MCU, which is an ideal device family for developing energy-friendly embedded applications.

The kit features a USB interface, an on-board SEGGER J-Link debugger, two user-LEDs and two buttons, and support for hardware add-on boards via a mikroBUS™ socket and a Qwiic® connector. The hardware add-on support allows developers to create and prototype applications using a virtually endless combination of off-the-shelf boards from MIKROE, SparkFun, Adafruit, and Seeed Studio.



TARGET DEVICE

- EFM32PG26 Gecko MCU (EFM32PG26B500F3200IM68-B)
- 32-bit ARM® Cortex®-M33 with 80 MHz maximum operating frequency
- 3200 KB flash and 512 KB RAM

KIT FEATURES

- 2x User LEDs and 2x push buttons
- 28-pin 2.54 mm breakout pads
- mikroBUS™ socket
- Qwiic® connector
- SEGGER J-Link on-board debugger
- Virtual COM port
- USB-powered

SOFTWARE SUPPORT

- Simplicity Studio™

ORDERING INFORMATION

- PG26-EK2711A

Table of Contents

1. Introduction

The EFM32PG26 Explorer Kit has been designed to inspire customers to explore the Silicon Labs EFM32PG26 Gecko MCU. The kit includes a mikroBUS™ socket and Qwiic® connector, allowing users to add features to the kit with a large selection of off-the-shelf boards.

Programming the EFM32PG26 Explorer Kit is easy using a USB Type-C cable and the on-board J-Link debugger. A USB virtual COM port provides a serial connection to the target application. The EFM32PG26 Explorer Kit is supported in Simplicity Studio™ and a Board Support Package (BSP) is provided to give application developers a flying start.

You can connect external hardware to the EFM32PG26 Explorer Kit by using the 28 breakout pads, which present peripherals from the EFM32PG26 Gecko MCU such as I^2C, SPI, UART, and GPIOs. The mikroBUS socket allows inserting mikroBUS add-on boards that interface with the EFM32PG26 through SPI, UART, or I^2C. The Qwiic connector can be used to connect hardware from the Qwiic Connect System through I^2C.

1.1 Kit Contents

The following item is included in the box:

- 1x EFM32PG26 MCU Explorer Kit Board (BRD2711A)

1.2 Getting Started

Refer to the Silicon Labs web page: https://www.silabs.com/dev-tools for detailed instructions on getting started with your new EFM32PG26 Explorer Kit.

1.3 Hardware Content

The following key hardware elements are included on the EFM32PG26 Explorer Kit:

- EFM32PG26 Gecko MCU with 80 MHz operating frequency, 3200 KB flash, and 512 KB RAM
- Two LEDs and two push buttons
- On-board SEGGER J-Link debugger for easy programming and debugging, which includes a USB virtual COM port
- mikroBUS socket for connecting click boards™ and other mikroBUS add-on boards
- Qwiic connector for connecting Qwiic Connect System hardware
- Breakout pads for GPIO access and connection to external hardware
- Reset button

1.4 Kit Hardware Layout

The following figure shows EFM32PG26 Explorer Kit layout.

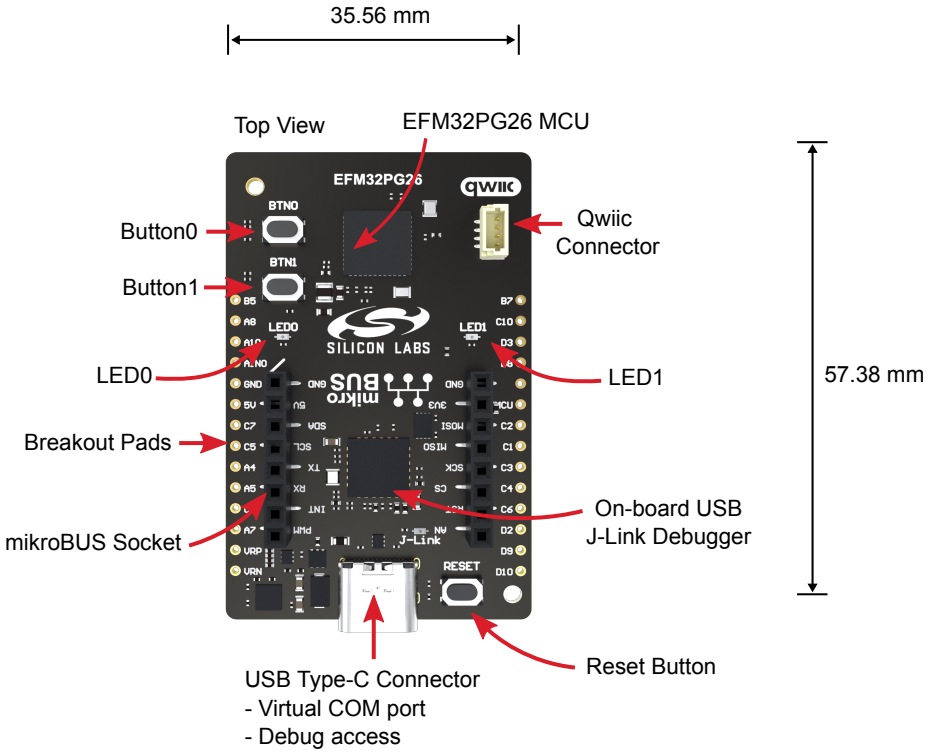


Figure 1.1. EFM32PG26 Explorer Kit Hardware Layout

2. Specifications

2.1 Recommended Operating Conditions

Table 2.1. Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
USB Supply Input Voltage	V_{USB}	—	+5.0	—	V
Supply Input Voltage (VMCU supplied externally)	V_{VMCU}	—	+3.3	—	V

2.2 Current Consumption

The operating current of the board greatly depends on the application and the amount of external hardware connected. The following table attempts to provide some indication of typical current consumptions for the EFM32PG26 and the on-board debugger. Note that the numbers are taken from the data sheets for the devices. Refer to the device-specific data sheet for a full overview of conditions.

Table 2.2. Current Consumption

Parameter	Symbol	Condition	Typ	Unit
EFM32PG26 Current Consumption[1]	I_{EM4}	No BURTC, no LF oscillator	0.23	µA
	I_{EM2}	EM2 mode with 512 KB RAM, RTC running from LFXO (VREGVDD = 3.0 V. AVDD = DVDD = IOVDD = 1.8 V from DCDC)	5.0	µA
	I_{EM0}	EM0 mode with all peripherals disabled (VREGVDD = 3.0 V. AVDD = DVDD = IOVDD = 1.8 V from DCDC, VSCALE2, 80 MHz HFRCO, CPU running Prime from flash)	41.8	µA/MHz
On-board Debugger Sleep Current Consumption [2]	I_{DBG}	On-board debugger current consumption when USB cable is not inserted (EFM32GG12 EM4S mode current consumption)	80	nA

1 From EFM32PG26 data sheet.
2 From EFM32GG12 data sheet.

3. Hardware

The core of the EFM32PG26 Explorer Kit is the EFM32PG26 Gecko MCU. Refer to section 1.4 Kit Hardware Layout for placement and layout of the hardware components.

3.1 Block Diagram

The following figure provides an overview of the EFM32PG26 Explorer Kit.

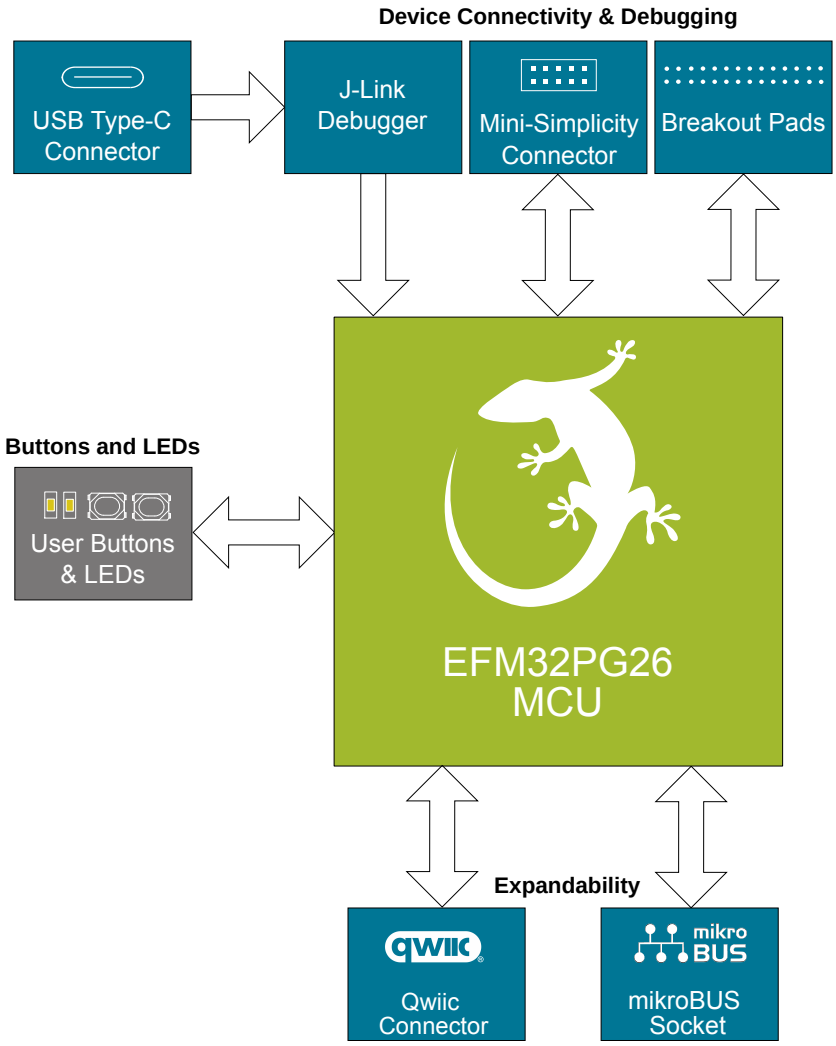


Figure 3.1. Kit Block Diagram

3.2 Power Supply

The debug USB cable powers the EFM32PG26 Explorer Kit, as illustrated in the following figure.

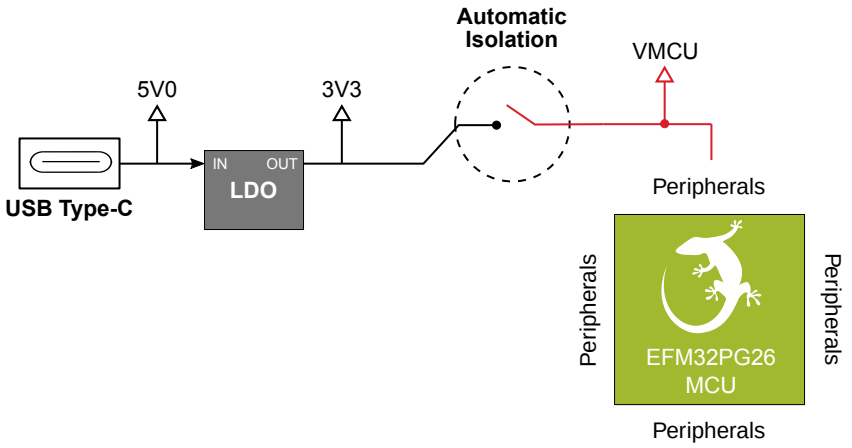


Figure 3.2. EFM32PG26 Explorer Kit Power Topology

The 5 V power net on the USB bus is regulated down to 3.3 V using a low-dropout regulator (LDO). An automatic isolation circuit isolates the LDO when the USB cable is not plugged in.

Power can be injected externally on the VMCU net if the USB cable is removed and no other power sources are present on the kit. Failure to follow this guideline can cause power conflicts and damage the LDO.

3.3 EFM32PG26 Reset

To reset the EFM32PG26, use one of the following methods:

- Press the RESET button.
- Use the on-board debugger to pull the #RESET pin low.
- Deploy the Mini Simplicity connector (not mounted), which allows an external debugger to reset the target.

3.4 Push Button and LED

The kit has two user push buttons, marked BTN0 and BTN1, that are connected to GPIOs on the EFM32PG26. The buttons are connected to pin PB00 and PB01, respectively, and they are debounced by an RC filter with a time constant of 1 ms. The logic state of a button is high while that button is not being pressed, and low when it is pressed.

The kit also features two yellow LEDs, labeled LED0 and LED1, that are controlled by GPIO pins on the EFM32PG26. The LEDs are connected to pin PC08 and PC09, respectively, in an active-high configuration.

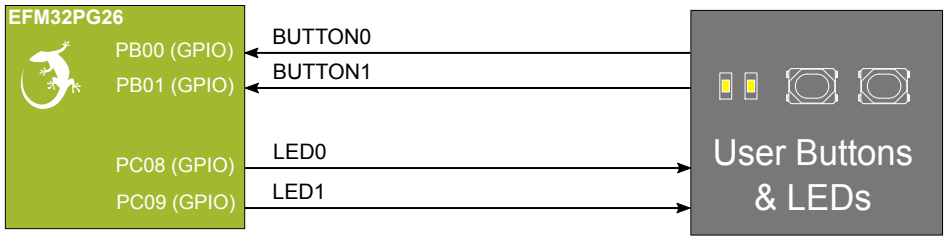


Figure 3.3. Buttons and LEDs

3.5 On-board Debugger

The EFM32PG26 Explorer Kit contains a microcontroller separate from the EFM32PG26 Gecko MCU that provides the user with an on-board J-Link debugger through the USB Type-C port. This microcontroller is referred to as the "on-board debugger", and is not programmable by the user. Removing the USB cable causes the on-board debugger to enter into a very low power shutoff mode (EM4S), consuming around 80 nA typically (EFM32GG12 data sheet number).

In addition to providing code download and debug features, the on-board debugger also presents a virtual COM port for general purpose application serial data transfer.

The following figure shows the connections between the target EFM32PG26 device and the on-board debugger.

Refer to section 4. Debugging for more details on debugging.

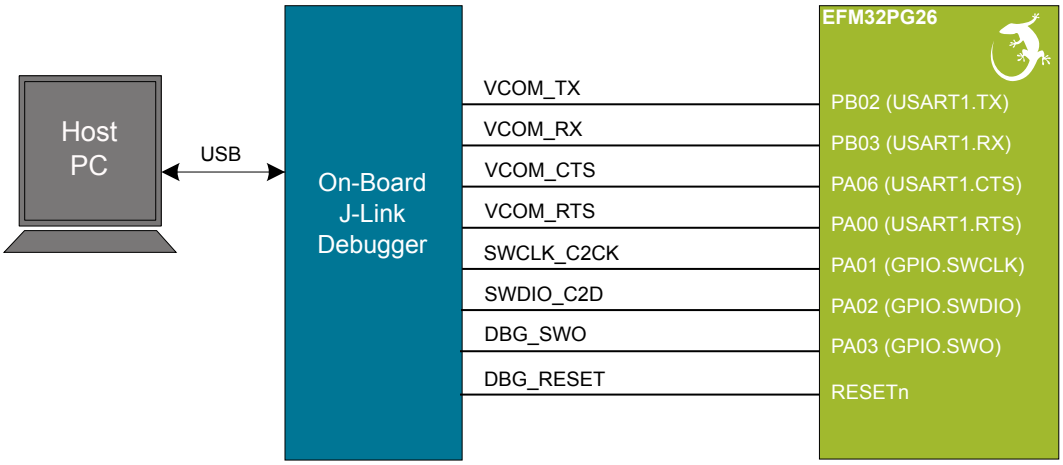


Figure 3.4. On-Board Debugger Connections

3.6 Connectors Overview

The EFM32PG26 Explorer Kit features a USB Type-C connector, 28 breakout pads, a mikroBUS connector for connecting mikroBUS add-on boards, and a Qwiic connector for connecting Qwiic Connect System hardware. The following figure illustrates the placement and pinout of these connectors on the top side of the board. For detailed specifications and usage instructions, refer to the corresponding sub-chapters.

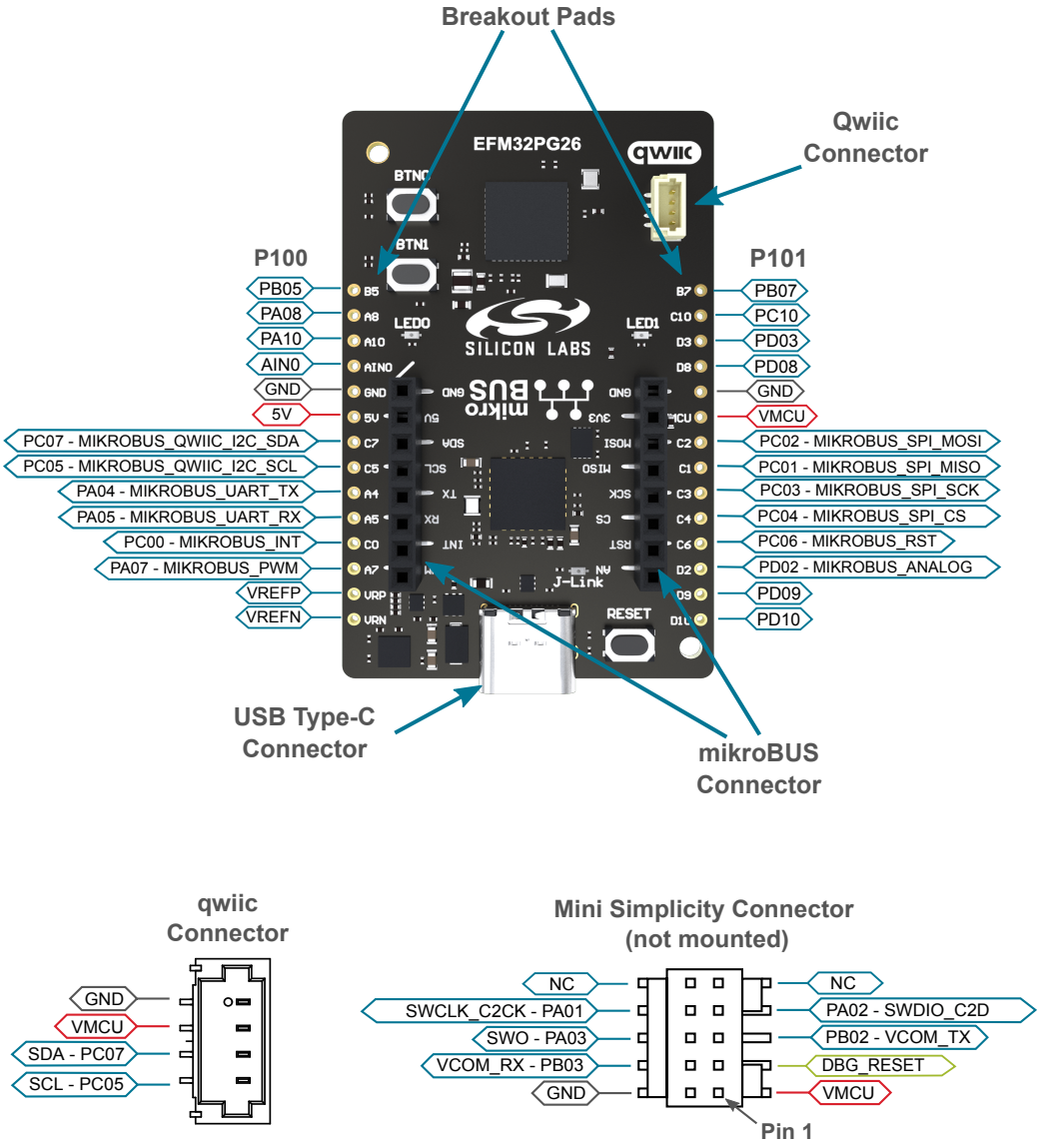


Figure 3.5. EFM32PG26 Explorer Kit Connectors

3.6.1 Breakout Pads

The EFM32PG26 Explorer Kit includes 28 breakout pads that enable you to connect external peripherals directly to the board. These pads (14 pads on the left side and 14 on the right side of the board) support most features of the EFM32PG26 Gecko MCU. Additionally, the exposed VMCU (main board power rail), 3V3 (LDO regulator output), and 5V power rails also enable external use.

The Gecko MCU's flexible pin-routing architecture enables you to map most peripherals to nearly any available pin. However, some pins on the breakout pads may also serve other functions on the Explorer Kit. The table below outlines the breakout pad assignments and highlights any shared functionality.

Table 3.1. Breakout Pads Pinout

Pin	Connection	Shared Feature	Peripheral Mapping
Left-side Breakout Pins			
1	PB05	—	GPIO
3	PA08	—	GPIO
5	PA10	—	GPIO
7	AIN0	—	AIN / GPIO
9	GND	Ground	
11	5V	Board USB voltage	
13	PC07	QWIIC_I2C_SDA, MIKROBUS_I2C_SDA	I2C_SDA / GPIO
15	PC05	QWIIC_I2C_SCL, MIKROBUS_I2C_SCL	I2C_SCL / GPIO
17	PA04	MIKROBUS_TX	UART_TX / GPIO
19	PA05	MIKROBUS_RX	UART_RX / GPIO
21	PC00	MIKROBUS_INT	EXT_INT / GPIO
23	PA07	MIKROBUS_PWM	PWM
25	VREFP	—	ADC VREF Positive Input
27	VREFN	—	ADC VREF Negative Input
Right-side Breakout Pins			
2	PB07	—	GPIO
4	PC10	—	GPIO
6	PD03	—	GPIO
8	PD08	—	GPIO
10	GND	Ground	
12	VMCU	EFM32PG26 voltage domain	
14	PC02	MIKROBUS_MOSI	SPI_MOSI / AIN
16	PC01	MIKROBUS_MISO	SPI_MISO / AIN
18	PC03	MIKROBUS_SCK	SPI_SCLK
20	PC04	MIKROBUS_CS	SPI_CS
22	PC06	MIKROBUS_RST	RST / GPIO
24	PD02	MIKROBUS_AN	AIN / GPIO
26	PD09	—	GPIO
28	PD10	—	GPIO

3.6.2 Mini Simplicity Connector

The Mini Simplicity Connector (not mounted) is a 10-pin, 1.27 mm pitch connector that allows the use of an external debugger such as the one found on a Silicon Labs Wireless Starter Kit mainboard. The following table describes the board connector pinouts, using the pin names from the EFM32PG26.

Table 3.2. Mini Simplicity Connector Pin Descriptions

Pin number	Function	Connection	Description
1	AEM	VMCU	Target voltage on the debugged application.
2	GND	GND	Ground
3	RST	RESET	EFM32PG26 reset
4	VCOM_RX	PB03	Virtual COM Rx
5	VCOM_TX	PB02	Virtual COM Tx
6	SWO	PA03	Serial Wire Output
7	SWDIO	PA02	Serial Wire Data
8	SWCLK	PA01	Serial Wire Clock
9	PTI_FRAME	NC	Packet Trace Frame
10	PTI_DATA	NC	Packet Trace Data

3.6.3 mikroBUS Socket

The EFM32PG26 Explorer Kit features a mikroBUS socket compatible with mikroBUS add-on boards. The mikroBUS add-on boards can expand the functionality of the kit with peripherals such as sensors and LCDs. Add-on boards follow the mikroBUS socket pin mapping and communicate with the on-kit EFM32PG26 through UART, SPI, or I^2C. Several GPIOs are exposed on the mikroBUS socket. MikroBUS add-on boards can be powered by the 5V or VMCU power rails, which are available on the mikroBUS socket.

The EFM32PG26 kit pinout is made such that all required peripherals are available on the mikroBUS socket. The I^2C signals are, however, shared with the Qwiic connector.

When inserting a mikroBUS add-on board, refer to the orientation notch on the EFM32PG26 Explorer Kit, shown in the following figure, to ensure correct orientation. Add-on boards have a similar notch that needs to be lined up with the one shown below.

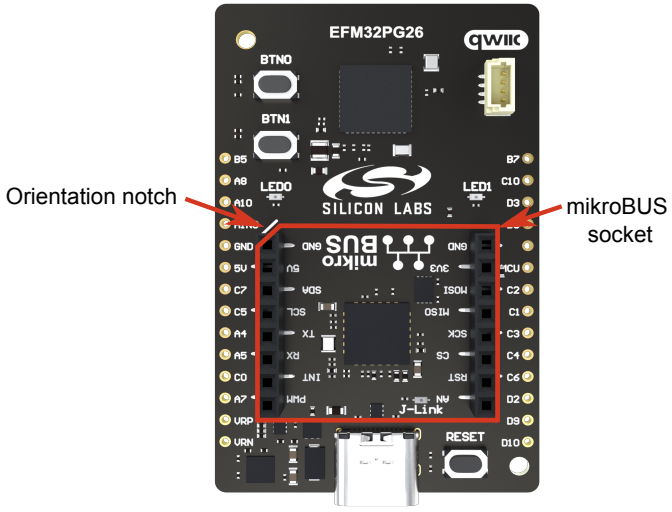


Figure 3.6. mikroBUS Add-on Board Orientation

The following table gives an overview of the mikroBUS socket pin connections to the EFM32PG26.

Table 3.3. mikroBUS Socket Pinout

mikroBUS Pin Name	mikroBUS Pin Function	Connection	Shared Feature	Suggested Peripheral Mapping
AN	Analog	PD02	—	IADC0
RST	Reset	PC06	—	—
CS	SPI Chip Select	PC04	—	USARTx.CS
SCK	SPI Clock	PC03	—	USARTx.CLK
MISO	SPI Main Input Secondary Output	PC01	—	USARTx.RX
MOSI	SPI Main Output Secondary Input	PC02	—	USARTx.TX
PWM	PWM Output	PA07	—	TIMER0.CCx
INT	Hardware Interrupt	PC00	—	—
RX	UART Receive	PA05	—	USARTx.RX
TX	UART Transmit	PA04	—	USARTx.TX
SCL	I2C Clock	PC05	QWIIC_I2C_SCL	I2Cx.SCL
SDA	I2C Data	PC07	QWIIC_I2C_SDA	I2Cx.SDA

mikro-BUS Pin Name	mikroBUS Pin Function	Connection	Shared Feature	Suggested Peripheral Mapping
3V3	VCC 3.3V power	VMCU	EFM32PG26 voltage domain	
5V	VCC 5V power	5V	Board USB voltage	
GND	Reference Ground	GND	Ground	

3.6.4 Qwiic Connector

The EFM32PG26 Explorer Kit features a Qwiic connector compatible with Qwiic Connect System hardware. The Qwiic connector provides an easy way to expand the functionality of the EFM32PG26 Explorer Kit with sensors, LCDs, and other peripherals over the I^2C interface. The Qwiic connector is a 4-pin polarized JST connector, which ensures the cable is inserted the right way.

Qwiic Connect System hardware is daisy chain-able as long as each I^2C device in the chain has a unique I^2C address.

The Qwiic connector and its connections to Qwiic cables and the EFM32PG26 are illustrated in the figure below.

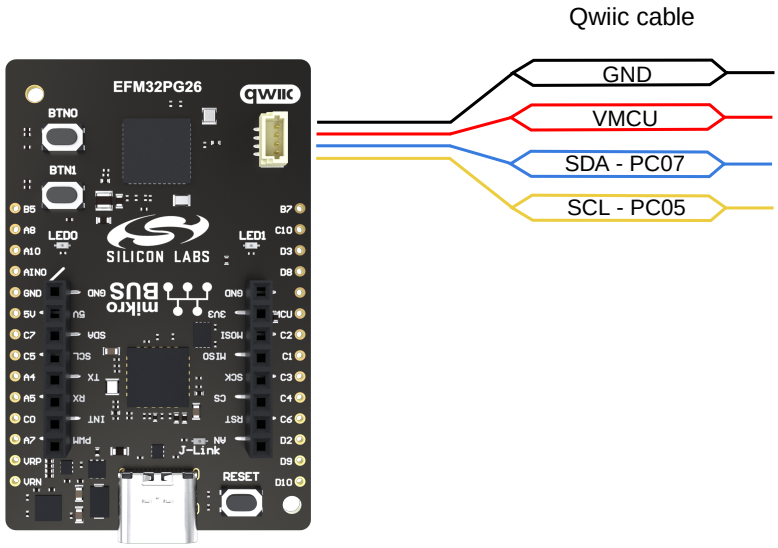


Figure 3.7. Qwiic Connector

The following table gives an overview of the Qwiic connections to the EFM32PG26.

Table 3.4. Qwiic Connector Pinout

Qwiic Pin	Connection	Shared Feature	Suggested Peripheral Mapping
Ground	GND	Ground	
3.3V	VMCU	EFM32PG26 voltage domain	
SDA	PC07	MIKROBUS_I2C_SDA	I2Cx.SDA
SCL	PC05	MIKROBUS_I2C_SCL	I2Cx.SCL

3.6.5 Debug USB Type-C Connector

You can use the debug USB port as a Virtual COM port and to upload code and debug. See Section 4. Debugging for more information.

4. Debugging

The EFM32PG26 Explorer Kit contains an on-board SEGGER J-Link Debugger that interfaces to the target EFM32PG26 using the Serial Wire Debug (SWD) interface. The debugger allows the user to download code and debug applications running in the target EFM32PG26. Additionally, it provides a virtual COM port (VCOM) to the host computer that is connected to the target device's serial port for general purpose communication between the running application and the host computer. The on-board debugger is accessible through the USB Type-C connector.

4.1 On-board Debugger

The on-board debugger is a SEGGER J-Link debugger running on an EFM32 Giant Gecko. The debugger is directly connected to the debug and VCOM pins of the target EFM32PG26.

Inserting the debug USB cable automatically activates the on-board debugger, which takes control of the debug and VCOM interfaces. This means that debug and communication will **not** work with an external debugger connected at the same time. The on-board LDO is also activated, providing power to the board.

4.2 Virtual COM Port

The virtual COM port is a connection to a UART of the target EFM32PG26 and allows serial data to be sent and received from the device. The on-board debugger presents this as a virtual COM port on the host computer that shows up when the USB cable is inserted.

Data is transferred between the host computer and the debugger through the USB connection, which emulates a serial port using the USB Communication Device Class (CDC). From the debugger, the data is passed on to the target device through a physical UART connection.

The serial format is 115200 bps, 8 bits, no parity, and 1 stop bit by default.

Note: Changing the baud rate for the COM port on the PC side does not influence the UART baud rate between the debugger and the target device.

5. Schematics, Assembly Drawings, and BOM

You can access the schematics, assembly drawings, and Bill of Materials (BOM) through Simplicity Studio after installing the kit documentation package. You may also access these materials from the kit page on the Silicon Labs website: silabs.com.

6. Kit Revision History and Errata

6.1 Revision History

The kit revision number is printed on the box label of the kit, as outlined in the figure below. The kit revision history is summarized in the table below.

Figure 6.1. Revision Info

Table 6.1. Kit Revision History

Kit Revision	Released	Description
A01	28 March 2025	Kit revised due to BRD2711A upped to A03.
A00	18 November 2024	New kit introduction of PG26-EK2711A.

6.2 Errata

There are no known errata at present.

7. Board Revision History and Errata

7.1 Revision History

You can find the board revision laser printed on the board, and the following table summarizes the board revision history.

Table 7.1. Board Revision History

Revision	Released	Description
A03	28 March 2025	PTI connections have been removed, and breakout connections have been updated.
A02	13 November 2024	Initial production release.

7.2 Errata

Table 7.2. Board Errata

Board Revision	Problem	Description
A02	PTI pins are not supported	PTI pins are not supported for the 'EFM32PG26B500F3200IM68-B.' PTI connectivity will be removed from the design in future revisions.

8. Document Revision History

Revision 1.1

June 2025

- Updated user guide to reflect new board revision.

Revision 1.0

January 2025

- Initial document release.

Simplicity Studio

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