

UM12394

MCXW236B-EXP Board User Manual

Rev. 2.0 — 17 April 2026

User manual

Document information

Information	Content
Keywords	UM12394, MCXW236B-EXP board, MCX W23 wireless MCU, MCXW236BHN, Bluetooth Low Energy (Bluetooth LE)
Abstract	This document describes the overview, features, and usage aspects of the MCXW236B-EXP board. It includes the board pictures, pin description, LEDs, buttons, and a usage example.



1 Introduction

This document describes the main features and hardware of the MCXW236B-EXP board. The MCXW236B-EXP is an add-on board designed to integrate Bluetooth Low Energy (Bluetooth LE) functionality into a wide range of applications. It features the MCXW236BHN, a highly integrated, single-chip, ultra-low-power Bluetooth LE 5.3 wireless transceiver with an embedded microcontroller and flash memory.

The board supports SPI, UART, and I2C communication interfaces. It comes preprogrammed for FSCI Host Interface mode, allowing control via the UART interface. Connecting this board with 'FRDM-MCXC' or 'FRDM-MCXN' boards enables Bluetooth Low Energy connectivity to the large MCX MCU family with a broad range of capabilities such as ADC/DAC, motor control, and more GPIOs.

The MCXW236B-EXP board has a compact design and provides versatile connectivity making it ideal for use in:

- Internet of Things (IoT) applications
- Health, sports, and wellness devices
- Industrial, home, and building automation
- Smartphone, tablet, and PC accessories

The MCXW236B-EXP board is fully compatible with the mikroBUS socket, making it easy to integrate into any host system that supports the mikroBUS standard.

1.1 Radio Equipment Directive 2014/53/EU

The following information is provided in alignment with Article 10.8 of the Radio Equipment Directive 2014/53/EU:

- The frequency band in which the equipment operates
- The maximum radio frequency (RF) power transmitted

Table 1. MCXW236B-EXP RF specifications

Part number	RF technology	Frequency range (EU)	Maximum transmitted RF power
MCXW236B-EXP	Bluetooth Low Energy	2.40 GHz – 2.480 GHz	+6 dBm

European Declaration of Conformity (Simplified DoC, Article 10.9 of the Radio Equipment Directive 2014/53/EU).

This apparatus, namely MCXW236B-EXP board, conforms to the Radio Equipment Directive 2014/53/EU. The full EU declaration of conformity for this apparatus is available at <https://www.nxp.com/products/MCXW236B-EXP>.

2 Block diagram

Figure 1 shows a high-level block diagram of the MCXW236B-EXP.

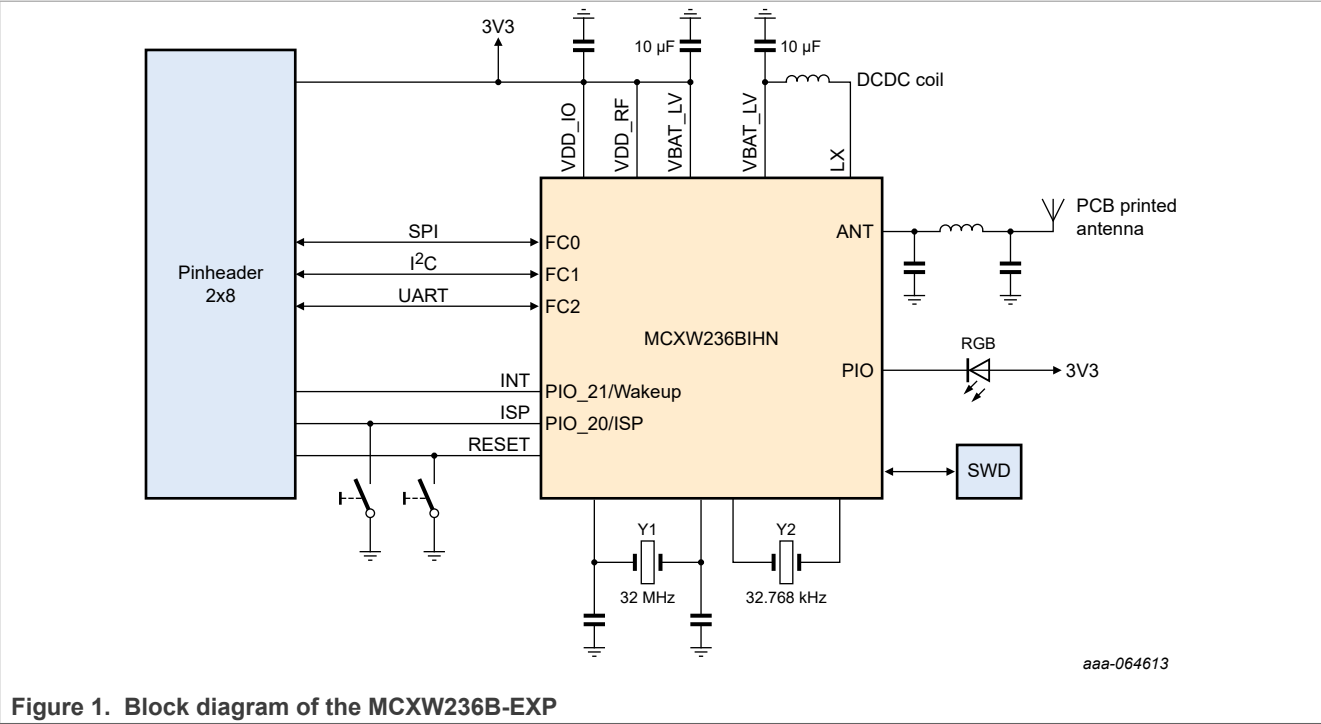


Figure 1. Block diagram of the MCXW236B-EXP

3 Board pictures

[Figure 2](#) shows the top view of the MCXW236B-EXP.

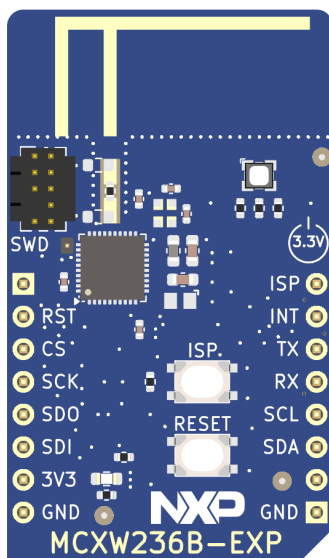


Figure 2. Top view of the MCXW236B-EXP

[Figure 3](#) shows the bottom view of the MCXW236B-EXP.



Figure 3. Bottom view of the MCXW236B-EXP

4 Board features

NXP supports tools and software that include a hardware radio development board. The MCXW236B-EXP is a small board with the **MCXW236BHN** device as the core processor. The minimum discrete components needed for a fully operational board are listed below:

- A 32 MHz reference oscillator crystal
- 32.768 kHz sleep clock
- DC/DC converter components
- Minimal RF circuitry

The MCXW236B-EXP Board has the features listed below:

- Ultralow power MCXW236BHN wireless MCU supporting Bluetooth LE
- Fully compliant with Bluetooth 5.3 Low Energy
- Reference design with a small-footprint and low-cost RF node:
 - Single-ended input/output port
 - Low count of external components
 - Maximum output power can reach up to +6 dBm
- On-chip DC/DC converter in Buck mode
- 32 MHz reference oscillator for RF operation
- 32.768 kHz reference oscillator used for low power operation
- RF transmitter level range
 - from -31 dBm to +2 dBm without capacitor–inductor–capacitor (CLC) filter or matching components
 - with CLC filter up to +6 dBm
- A PCB printed 2.4 GHz antenna preprogrammed with FSCI Host interface code
- A low-cost 2-layer PCB
- PCB marking: MCXW236B-EXP
- MCXW236B-EXP is compatible with the [mikroBUS](#) socket
- Serial interfaces
 - SPI peripheral up to 24 Mbit/s
 - UART, intended for debugging purpose
 - I²C, reserved for future use

5 Buttons and LEDs

The **MCXW236B-EXP** is equipped with two tactile pushbutton switches:

1. Reset switch: Actuating this switch initiates a hard reset of the MCXW236BHN microcontroller, reinitializing all internal states and peripherals.
2. ISP (In-System Programming) switch: When this switch is held down during a reset event, the MCXW236BHN enters ISP mode, enabling firmware updates or reprogramming via the designated interface.

Both switch signals are routed to one of the two onboard pin headers, where they are electrically connected in parallel with the corresponding tactile switches. This configuration allows external access to the reset and ISP control lines, facilitating integration with automated test setups or external programming tools.

The MCXW236B-EXP features two onboard LEDs:

1. Power Indicator LED: This LED is directly connected to the 3.3 V power rail and serves as a visual indicator of the presence of the regulated 3.3 V supply voltage. Its illumination confirms that the board is receiving power.
2. RGB LED: This multicolor LED is under the control of the MCXW236BHN, with each color channel (Red, Green, Blue) driven by separate GPIOs. Currently, the firmware running on the MCXW236BHN does not configure or drive the associated GPIOs to activate any of the LED channels. Therefore, the RGB LED is non-functional.

6 Pin description

The interconnection between the MCXW236B-EXP board and a host system is established via two single row pin headers at the bottom side of the PCB. These pins are labeled as J4 and J5 in the schematic. Each pin is clearly labeled on the silkscreen, making signal identification straightforward. [Table 3](#) and [Table 2](#) provide an overview of the signal assignments for each pin on these connectors. For a detailed description of the function of each pin, refer to the [MCXW236BHN data sheet](#). See [Section 12](#).

Table 2. Connector J4 pin description

Pin	Symbol	Direction	Description
1	GND	Input	Ground
2	-	-	-
3	SDA_FC1_I2C ^[1]	Input/output	I2C data input-output
4	SCL_FC1_I2C ^[1]	Input/output	I2C clock - Controller mode: output - Peripheral mode: input
5	RXD_FC2_UART ^[2]	Input	UART RXD
6	TXD_FC2_UART ^[2]	Output	UART TXD
7	INT	Input	Wake-up signal
8	ISP_ENb	Input	ISP enable (low active)

[1] Not supported in the current version.

[2] Default host communication interface port.

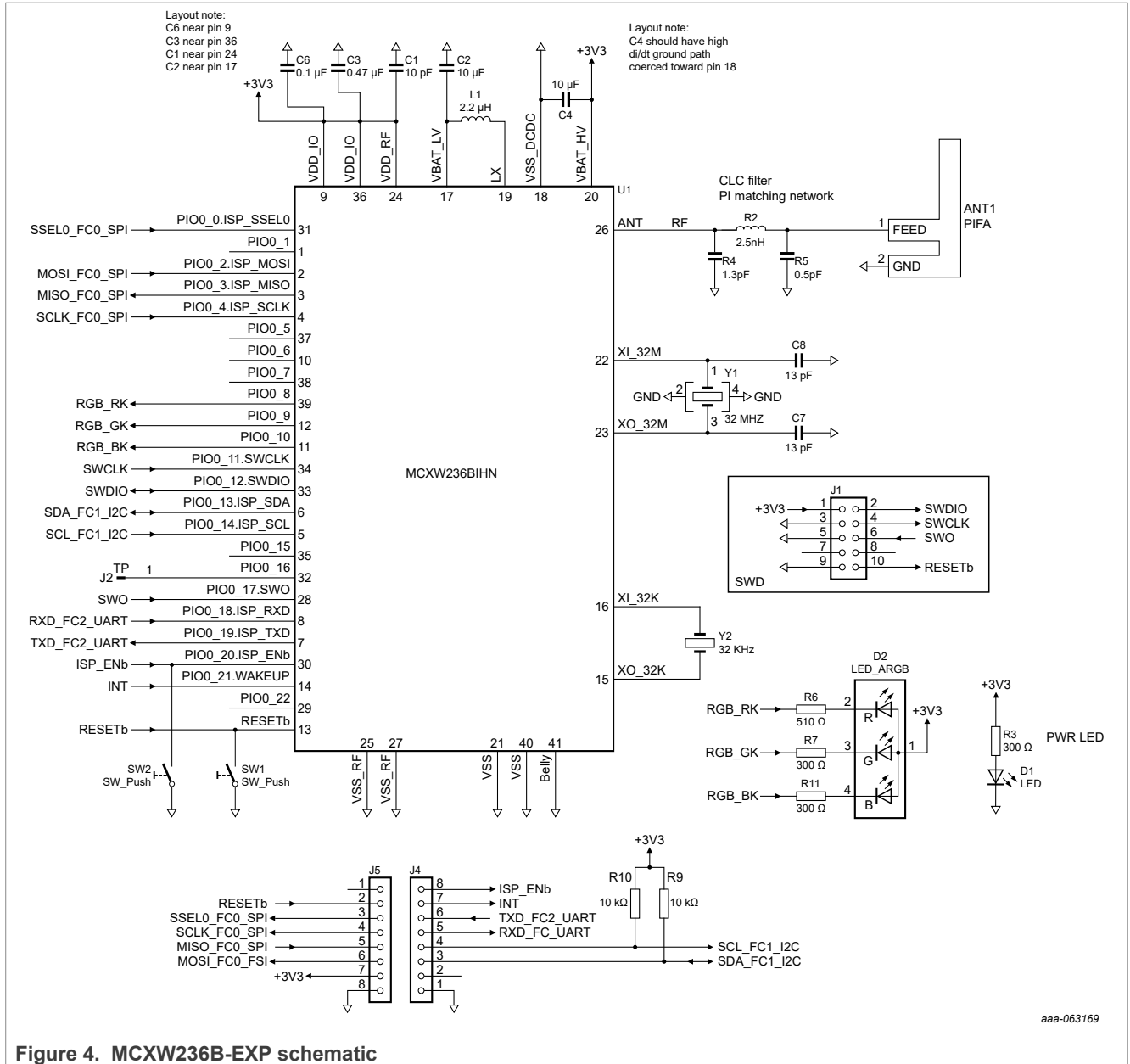
Table 3. Connector J5 pin description

Pin	Symbol	Direction	Description
1	-	-	-
2	RESETb	Input	Reset, low active
3	SSEL0_FC0_SPI ^[1]	Input	SPI chip select
4	SCLK_FC0_SPI ^[1]	Input	SPI clock
5	MISO_FC0_SPI ^[1]	Output	SPI data out
6	MOSI_FC0_SPI ^[1]	Input	SPI data in
7	+3V3	Input	Power supply
8	GND	Input	Ground

[1] Not supported in the current version.

7 Schematic

Figure 4 shows the schematic of the MCXW236B-EXP board.



8 Bill of materials (BOM)

[Table 4](#) describes the Bill of materials for the MCXW236B-EXP board.

Table 4. Bill of materials (BOM)

Reference Designator	Value	Description	Manufacturing Part Number (MPN)
C1	10 pF	MD MLCC, 10 pF, 6.3 V, 0402, $\pm 5\%$, C0G / NP0	04026D100JAT2A
C2, C4	10 μ F	SMD MLCC, 10 μ F, 6.3 V, 0603, $\pm 20\%$, X5R	C0603C106M9PACTU
C7, C8	13 pF	SMD MLCC, 13 pF, 50 V, 0402, $\pm 5\%$, C0G / NP0	CC0402JRNPO9BN130
C4	470 nF	SMD MLCC, 470 nF, 4 V, 0201, $\pm 20\%$, X5R	GRM155R61H474KE11D
C6	100 nF	SMD MLCC, 100 nF, 6.3 V, 0201, $\pm 10\%$, X5R	CL05A105KQ5NNNC
D1	LED	LED green 0603	QBLP601-IG5
D2	LED RGB	RGB LED, common anode	ASMB-KTF0-0A306
J1	FTSH-105-01-F-D-007-K	Pin header TH, 1.27 mm, 10P, 2 rows	FTSH-105-01-F-D-007-K
J4, J5	1x8 pin header	Pin header TH, 2.54 mm, 8P, single row	61300811121
L1	2.2 μ H	Inductor, 2.2 μ H, 500 mA, 0603, multilayer, 0.25 Ω	MLZ1608A2R2WT
R9, R10	10k	SMD resistor 10k 0402, generic part	RT0402BRD0710KL
R2	2.5 nH	Fixed IND 2.2 nH, 2.53 A, 22 M Ω	LQW15AN2N5G80
R4	1.3 pF	SMD MLCC, 1.3 pF, 250 V, 0603, ± 0.1 pF, COG/NPO	GQM1875C2E1R3BB12D
R5	0.5 pF	SMD MLCC, 0.5 pF, 250 V, 0603, ± 0.1 pF, COG/NPO	QSCP251Q0R5B1GV001T
R3, R7, R11	300R	SMD resistor 300R 0402, generic part	RC0402FR-07300RL
R6	510R	SMD resistor 510R 0402, generic part	RC0402FR-07510RL
SW1, SW2	Switches	Tactile switch SPST-NO 0.05 A 12 V	PTS815SJM250SMTRLFS

Table 4. Bill of materials (BOM)...continued

Reference Designator	Value	Description	Manufacturing Part Number (MPN)
U1	MCXW236BHN	Ultra-low power Bluetooth Low Energy solution	MCXW236BIHNAR
X1	32 MHz	Crystal unit SMD 1.2x1.0 32 MHz	XRCGB32M000F2P01R0
X2	Crystal	Crystal 32.768 kHz	NX2012SA-32.768KHZ-EXS00A-MU00530

9 RF antenna

The MCXW236B-EXP integrates a printed **F-type antenna** optimized for Bluetooth LE communication. The Bluetooth LE transceiver supports a maximum RF transmit power of **+6 dBm**, **although the default transmit power is limited to +2 dBm**.

An external CLC (Capacitor–Inductor–Capacitor) filter is implemented on the RF output path to ensure continued compliance with EMC standards. [Figure 5](#) illustrates the filter design.

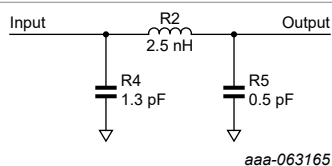


Figure 5. CLC filter

10 Board usage example

The MCXW236B-EXP is designed to interface seamlessly with any host system that supports the mikroBUS standard, ensuring broad compatibility across development platforms. [Figure 6](#) shows an example of such integration.

The MCXW236B communicates with the MCXN947 (a highly integrated multicore microcontroller unit) via a serial interface using the FSCI (Framework Serial Communication Interface) protocol. The serial link operates at 115200 baud/s and provides reliable and efficient data exchange between the host MCU and the peripheral.

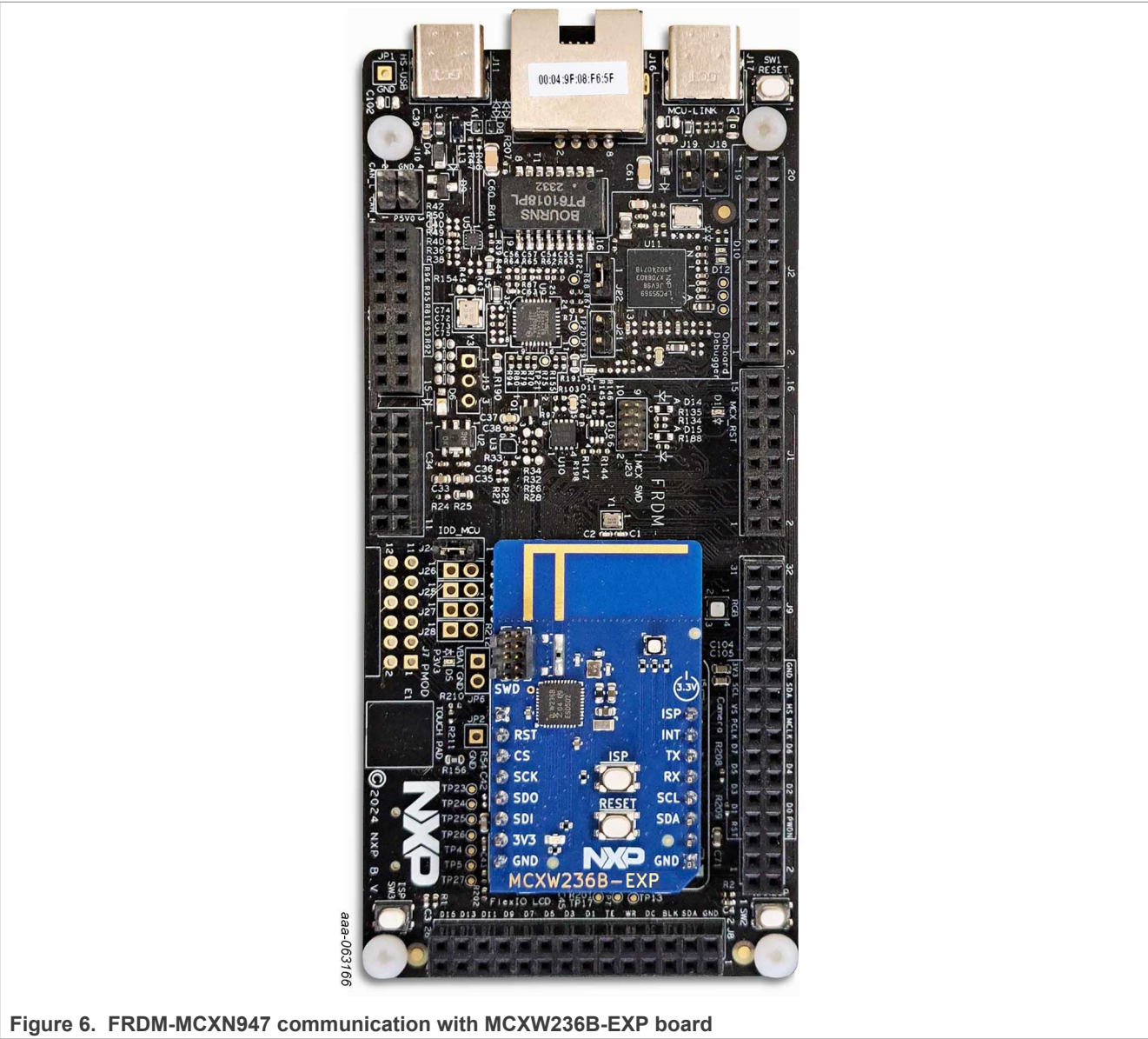


Figure 6. FRDM-MCXN947 communication with MCXW236B-EXP board

11 Acronyms

[Table 5](#) lists the acronyms described in this document.

Table 5. Acronyms

Term	Description
Bluetooth LE	Bluetooth Low Energy
BOM	Bill of materials
CLC	Capacitor–inductor–capacitor
EMC	Electromagnetic compatibility
I2C	Inter-Integrated Circuit
EXP	Expansion
ISP	In-system programming
FSCI	Framework serial communication interface
LED	Light-emitting diode
MCU	Microcontroller unit
MLCC	Multilayer ceramic capacitor
PCB	Printed-circuit board
RF	Radio frequency
SMD	Surface-mount device
UART	Universal asynchronous receiver/transmitter

12 Related documentation

[Table 6](#) lists and explains the additional documents and resources that you can refer to for more information on the board. Some of the documents listed below are available only under a nondisclosure agreement (NDA). To request access to these documents, contact your local field applications engineer (FAE) or sales representative.

Table 6. Related documentation

Document	Description	Link / How to access
<i>MCX W23 Reference Manual</i> (document MCXW23RM)	Intended for system software and hardware developers and application programmers who want to develop products with MCX W23 MCU	MCX W23 Reference Manual
<i>MCX W23 data sheet</i> (document MCXW23)	Provides information about the MCX W23 electrical characteristics, hardware design considerations, and ordering information	MCX W23 data sheet
MCXW236B-EXP board design files and schematics	Provides a circuit representation showing the functionality and connectivity of the MCXW236B-EXP board components.	MCXW236B-EXP design resources
MCXW236B-EXP board getting started user guide	Provides steps to get started with the MCXW236B-EXP board	MCXW236B-EXP getting started guide

For more product details and features of the MCX W23 MCU, refer [MCX W23](#).

For more documentation related to the board, refer [MCXW236B-EXP Documentation](#)

13 Revision history

[Table 7](#) summarizes the revisions to this document.

Table 7. Revision history

Document ID	Release date	Description
UM12394 v.2.0	17 April 2026	Updated Table 2
UM12394 v.1.0	5 February 2026	Initial public release

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