M.2 cards

Evaluation kit

User guide

Abstract

This document describes how to setup the u-blox wireless connectivity M.2 cards for use on an appropriate host platform.

UBX-22038617 - R04
C1-Public

Document information

Title	**M.2 cards**	
Subtitle	Evaluation kit	
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This document applies to the following products:

Product name	Ordering code
M2-JODY-W263 development kit	M2-JODY-W263-10C
M2-JODY-W377 development kit	M2-JODY-W377-10C
M2-MAYA-W161 development kit	M2-MAYA-W161-10C

⚠ Regulatory limitations: The M2 card development kits included in the scope of this document are supplied strictly as "application development platforms" / "evaluation kits" / "evaluation tools" only. The cards have not been RF certified with worldwide agencies and may not be offered for sale as an end-user product.

Contents

1 Product description

1.1 Overview

u-blox wireless connectivity M.2 cards combine the maximum performance of the host-based wireless connectivity modules with the flexibility and ease of use of a M.2 card. The cards support all features of the wireless connectivity modules.

The M.2 type 2230 Key E form factor gives access to all host interfaces that are supported by the module mounted on the card, such as PCIe, SDIO, UART and SPI, as well as PCM or I2S for Bluetooth audio.

The M.2 card is connected to a host processor running a Linux or Android operating system, through any of the available host interfaces depending on the M.2 card variant.

The module featured on the M.2 card, like all u-blox modules, undergoes extensive qualification tests to ensure reliability over its lifetime, and each M.2 card is fully tested before leaving the assembly line.

For details about the various features of each member of the M.2 cards product line refer to the respective product summary and datasheet documents [1], [2], [3], [4], [5], [6].

Product name	Description
M2-JODY-W263	Standard grade M.2 card module with two antenna connectors (one for 2.4 GHz and 5 GHz 802.11ac and another for Bluetooth/Bluetooth Low Energy (LE) 5.2). The module integrates NXP chipset 88W8987.
M2-JODY-W377	Standard grade M.2 card module with three antenna connectors and concurrent dual-band, 2x2, 2.4 GHz and 5 GHz, 802.11ax, Bluetooth/Bluetooth Low Energy (LE) 5.3 connectivity. The module integrates NXP chipset 88W9098.
M2-MAYA-W161	Standard grade M.2 card module equipped with two separate antenna connectors: one for 2.4 GHz and 5 GHz 802.11 a/b/g/n and another for Bluetooth/Bluetooth Low Energy (LE) 5.2). The module integrates the NXP IW416 chipset.

Table 1: Key features of the M.2 card variants

1.2 Kit includes

The M.2 card EVK box contains:

- The M.2 card in a plastic ESD-protective bag
- A proper number of antennas (Molex 146153-0050) to connect to each of the RF connectors on the M.2 card (not applicable to the M.2 cards that have integrated antennas)

1.3 System requirements

The u-blox wireless connectivity M.2 cards have been developed and tested on the following host computer platforms:

- NXP MCIMX8M-EVKB Evaluation Kit for the i.MX 8M Applications Processor (imx8qm) [13]
- NXP 8MMINILPD4-EVKB Evaluation Kit for the i.MX 8M Mini Applications Processor (imx8mm) [14]
- Toradex Ixora carrier board [12], hosting either a Toradex Apalis TK1 or a Toradex Apalis imx8 single-board computer

☞ Linux BSPs are available for the NXP host platforms from the following website: https://www.nxp.com/design/software/embedded-software/i-mx-software/embedded-linux-for-i-mx-applications-processors:IMXLINUX.

1.4 Software

A detailed description of the wireless interface drivers and configuration instructions for a Linux host computer are included in the system integration manual for each module type. [7], [8], [9]

The documentation for NXP software releases includes Wi-Fi and Bluetooth release notes and a list of supported software features. The driver source code is provided free of charge as open source under NXP license terms. As an open-source resource, the drivers may be integrated or ported to other non-NXP based host platforms. Yocto recipes for the driver and firmware, that can be used to develop custom Linux-based systems, are part of the NXP i.MX Linux BSP in the meta-imx and meta-freescale layers.

The latest version of the driver source code and Wi-Fi/Bluetooth firmware are available from the following open-source repositories:

- Wi-Fi driver: https://github.com/nxp-imx/mwifiex
- Firmware: https://github.com/NXP/imx-firmware

☞ Use the repository branches matching to the latest Linux BSP release version. At the time of publication, this is release 6.6.23_2.2.0.

The configuration guide for NXP-based Wireless Modules [15] provides a useful reference for configuring and using the Wi-Fi and Bluetooth features for NXP-based wireless modules. The supported Wi-Fi features described in the guide include scanning for nearby access points, connecting to an access point, configuring the device as an access point, Wi-Fi security, Wi-Fi Direct, and throughput testing using the `iperf3` utility. The described Bluetooth features include scan, pair, connect to a Bluetooth or Bluetooth Low Energy (LE) device, A2DP profile, handsfree profile and Bluetooth LE device as a GATT server. Guidelines for enabling driver debug logging are also provided.

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For further support and contact information, visit us at www.u-blox.com/support.

☞ your local u-blox support team for information about additional software options.

2 Getting started

The M.2 card is designed for mounting on a host computer board equipped with an appropriate M.2 key E socket. M.2 cards can be used on an M.2 key socket with a maximum height of 4.2 mm (H4.2).

⚠ Always mount and unmount the M.2 card with the host computer powered off. Inserting or removing the card without first powering down the host can permanently damage both the M.2 card and the host computer board.

Use the following procedure to mount the M.2 card on a host computer board:

1. On the host computer board, locate the M.2 key E socket. The board has a retaining screw adjacent to the socket for securing the card in place.

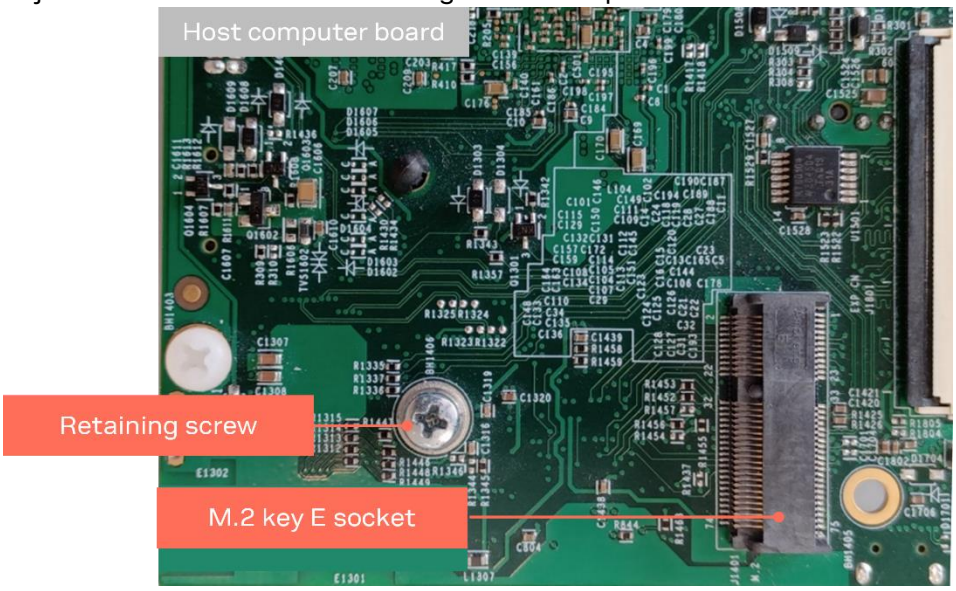

Figure 1: M.2 key E socket on a host computer board

2. Connect the M.2 card to the socket:
   a) Align the edge connector of the M.2 card with the socket
   b) Lift the other end of the M.2 card so that the M.2 card forms a 20-30° angle with the host computer board. Now, insert the M.2 card **gently** into the socket. The M.2 card rests at an angle of 20° with respect to the host computer board.

Figure 2: Inserting the M.2 card into the socket on the host computer board

c) Gently push down the card and mount the retaining screw to the spacer. Take care not to apply excessive force so as not to damage the M.2 card.

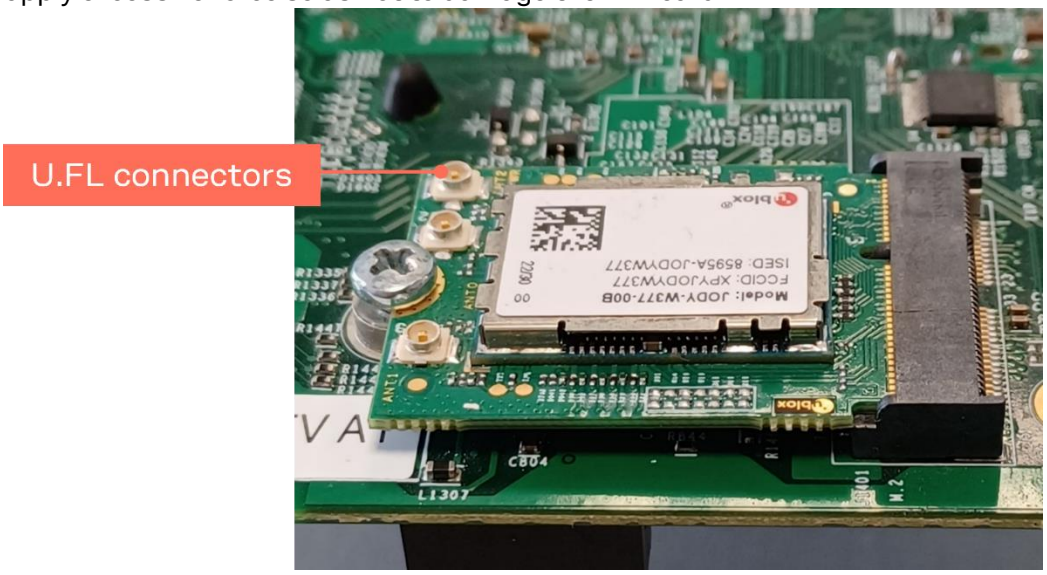

Figure 3: Securing the M.2 card in place

3. If the M.2 card has antenna connectors, special care should be taken so not to damage the antenna connectors that are either on the M.2 card or on the antenna cables:
   - The antenna connectors on the M.2 cards, wherever used, are of U.FL male type. Use appropriate U.FL or U.FL compatible female connectors to mate with them.
   - Avoid contamination with dust, dirt, or oily substances and avoid water vapor condensation.
   - Use clean hands when connecting and disconnecting the antenna cables.
   - It is advisable to use special insertion or extraction tools to connect or disconnect the antenna cables from the M.2 card.
   - To avoid unnecessary stress and potential damage to the card, secure the cables to a point close to the U.FL connectors. For more information, visit the manufacturer's website [10].

⚠ Do not operate the M.2 card without antennas attached to it. Transmitting without an antenna may cause permanent damage to the card.

Appendix

A Glossary

Abbreviation	Definition
A2DP	Advanced Audio Distribution Profile
ESD	Electro-Static Discharge
GATT	Generic Attribute Profile
I2C	Inter-Integrated Circuit
I2S	Inter-Integrated Sound
PCIe	Peripheral Component Interconnect Express
PCM	Pulse-Coded Modulation
SDIO	Secure Digital Input / Output
SPI	Serial Peripheral Interface
UART	Universal Asynchronous Receiver / Transmitter

Table 2: Explanation of the abbreviations and terms used

Related documentation

[1] M2-JODY-W2 product summary, UBX-21008722
[2] M2-JODY-W3 product summary, UBX-21004747
[3] M2-MAYA-W1 product summary, UBX-21040109
[4] M2-JODY-W2 data sheet, UBX-21008472
[5] M2-JODY-W3 data sheet, UBX-21000485
[6] M2-MAYA-W1 data sheet, UBX-22004354
[7] JODY-W2 system integration manual, UBX-18068879
[8] JODY-W3 system integration manual, UBX-19011209
[9] MAYA-W1 system integration manual, UBX-21010495
[10] Hirose U.FL series (https://www.hirose.com/product/series/U.FL)
[11] Molex 146153-0050 IoT antenna product details (https://www.molex.com/molex/products/part-detail/antennas/1461530050)
[12] Toradex Ixora Carrier Board product information (https://www.toradex.com/products/carrier-board/ixora-carrier-board)
[13] NXP MCIMX8M-EVKB product information (https://www.nxp.com/part/MCIMX8M-EVKB#)
[14] NXP 8MMINILPD4-EVKB product information (https://www.nxp.com/part/8MMINILPD4-EVKB#)
[15] NXP UM11490, Feature Configuration Guide for NXP-based Wireless Modules on i.MX 8M Quad EVK (https://www.nxp.com/webapp/Download?colCode=UM11490)
[16] Product packaging reference guide, UBX-14001652

☞ For product change notifications and regular updates of u-blox documentation, register on our website, www.u-blox.com.

Revision history

Revision	Date	Name	Comments
R01	10-Feb-2023	gmet	Initial release
R02	15-Feb-2023	gmet	Updated product status.
R03	03-May-2023	gmet	Updated contact details and links in Related documentation
RO4	17-Jul-2024	mzes	Updated Linux software versions and references in Software. Added Regulatory limitations notice.

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M2-JODY-W263-00C M2-MAYA-W161-00C M2-JODY-W377-00C