

Murata Wi-Fi/BT (NXP) Solution for i.MX

FreeRTOS User Guide



Revision History

Revision	Date	Author	Change Description
1.0	August 30, 2021	TF	Initial Release
1.1	Sept 3, 2021	TF	Fix Murata MCUXpresso 2.10.0 SDK patch link.

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1 Introduction

This document details enabling <u>Murata's (NXP-based) Wi-Fi/Bluetooth modules</u> (2DS/1XK/1ZM) on <u>NXP i.MX RT Evaluation Kits</u> (RT500/600/1050/1060/1064/1160/1170) and <u>Embedded Artists i.MX RT</u> <u>Developer Kits</u> (RT1062/1064/1176), using <u>Embedded Artists' Wi-Fi/BT M.2 modules</u>.

Murata supports several NXP i.MX RT EVK's and Wi-Fi/Bluetooth M.2 modules with a <u>new</u> <u>MCUXpresso SDK 2.10 patch</u> – downloadable from Murata's Community Forum. Embedded Artists provides their own drop-in patch for their i.MX RT Developer Kits. Note that Wi-Fi support is consistent throughout. However, BT/BLE support is limited to specific NXP i.MX RT platforms such as RT1060 and RT1170 on 1XK/1ZM modules.

NXP's MCUXpresso <u>IDE</u> and <u>SDK</u> solution provides strong support to customers looking to get their wireless-enabled i.MX RT product to market quickly and easily. <u>Embedded</u> Artists provides drop-in hardware interconnect with the M.2 modules in addition to their own enhanced i.MX RT hardware solutions. Murata's Wi-Fi/Bluetooth modules are best of breed with comprehensive hardware, software, and regulatory support. <u>Murata's Community Forum</u> provides easy access to customers needing hands-on support.

Figure 1 below shows one such example – NXP i.MX RT1160 EVK with Type 1XK module (enabled by Embedded Artists' 1XK M.2 module).



Figure 1: NXP i.MX RT1160 EVK and Embedded Artists 1ZM M.2 Module

1.1 Acronyms

Acronym	Meaning
BT	Bluetooth
EA	Embedded Artists designs, manufactures and distributes current Wi-Fi/BT M.2 EVB's (<u>link here</u>). EA also have enhanced i.MX developer kits which provide comprehensive support for Murata modules (<u>link here</u>).
EULA	End User License Agreement
EVB	Evaluation Board (Embedded Artists' Wi-Fi/BT module)
EVK	Evaluation Kit
FTDI	Future Technology Devices International
IDE	Integrated Development Environment
JTAG	Joint Test Action Group
M.2	Formerly known as the Next Generation Form Factor (NGFF), is a specification for internally mounted computer expansion cards and associated connectors. The M.2 specification is defined by PCI-SIG (www.pcisig.com).
PC	Personal Computer
RF	Radio Frequency
RTOS	Real-time Operating System
RX	Receive
SD	Secure Digital
SDIO	Secure Digital Input Output
SDK	Software Development Kit
ТХ	Transmit
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
uSD	Micro SD
uSD-M.2	Micro SD to M.2 Adapter
Wi-Fi	Wireless LAN: "Wi-Fi" is a registered trademark of Wi-Fi Alliance
WLAN	Wireless Local Area Network

Table 1: Acronyms used in Quick Start Guide

1.1 References

1.1.1 Murata Wi-Fi/BT (NXP) Solution for i.MX FreeRTOS Quick Start Guide

This <u>Quick Start Guide</u> provides quick steps to get started with Murata Wi-Fi/BT NXP chipset-based solution with the help of an example.

1.1.2 Murata Wi-Fi/BT Solution for i.MX Hardware User Manual

This <u>manual</u> describes the Murata uSD-M.2 Adapter hardware. All interface signals to the NXP i.MX RT EVK's are described. Specifics on interfacing each i.MX EVK to Murata uSD-M.2 Adapter are provided.

1.1.3 Murata's Community Forum Support

Murata's Community provides online support for the Murata Wi-Fi/Bluetooth modules on various i.MX platforms. Refer to <u>this link</u> for existing support threads on i.MX RT MCUXpresso.

1.1.4 Murata uSD-M.2 Adapter Datasheet (Rev B1)

This <u>datasheet</u> documents the current version of the Murata' uSD-M.2 adapter hardware and its interfacing options.

1.1.5 Murata's uSD-M.2 Adapter Landing Page

This <u>website landing page</u> provides latest/comprehensive information on Murata's adapter including links to where it can be purchased.

1.1.6 Murata Patching Solution

<u>This archive file</u> contains the files necessary to enable the Murata modules for the Wi-Fi/BT examples on MCUXpresso SDK 2.10 for NXP i.MX RT EVKs.

1.1.7 Murata's i.MX Wireless Solutions Landing Page

This <u>website landing page</u> provides latest/comprehensive information on Murata's i.MX Wireless solutions which use the uSD-M.2 Adapter as a key enabler so customers can easily evaluate Murata's modules on i.MX processors.

1.1.8 Embedded Artists' Reference Documentation

Embedded Artists designed the 2DS/1XK/1ZM/1YM M.2 EVB's in close collaboration with Murata. It is *important to note* that Embedded Artists manufactures and distributes the Wi-Fi/BT M.2 EVB's. Refer to this main landing page for more information: <u>www.embeddedartists.com/m2</u>. **Table 2** lists some relevant documents published by Embedded Artists.

Documentation Filename	Note
Wi-Fi/BT M.2 EVB Primer	Introduction and drill-down on M.2 interface
M.2 SDIO Interface Schematic	Reference schematic for customers designing in WLAN-SDIO M.2 EVB.
M.2 PCIe Interface Schematic	Reference schematic for customers designing in WLAN-PCIe M.2 EVB.
2DS M.2 Module Datasheet	Comprehensive details on 2DS Wi-Fi/BT M.2 Module.
1XK M.2 Module Datasheet	Comprehensive details on 1XK Wi-Fi/BT M.2 Module.
1ZM M.2 Module Datasheet	Comprehensive details on 1ZM Wi-Fi/BT M.2 Module.
1YM M.2 Module Datasheet	Comprehensive details on 1YM Wi-Fi/BT M.2 Module.

Table 2: Embedded Artists Documentation Listing

1.2 Hardware Options

This section describes how to configure the hardware correctly, for both NXP and Embedded Artists i.MX RT series platforms. The following table lists the different platforms supported by Murata modules.

i.MX EVK / Dev kit	Manufacturer	Part number	Murata modules supported	Interconnect
<u>i.MX RT1170 EVK</u>	NXP	MIMXRT1170-EVK	<u>2DS, 1XK, 1ZM</u>	M.2, <u>uSD-M.2 Adapter</u>
<u>i.MX RT1160 EVK</u>	NXP	MIMXRT1160-EVK	<u>2DS, 1XK, 1ZM</u>	M.2, <u>uSD-M.2 Adapter</u>
<u>i.MX RT1064 EVK</u>	NXP	MIMXRT1064-EVK	<u>2DS, 1XK, 1ZM</u>	uSD-M.2 Adapter
<u>i.MX RT1060 EVK</u>	NXP	MIMXRT1060-EVK	<u>2DS, 1XK, 1ZM</u>	uSD-M.2 Adapter
<u>i.MX RT1050 EVK</u>	NXP	IMXRT1050-EVKB	<u>2DS, 1XK, 1ZM</u>	uSD-M.2 Adapter
<u>i.MX RT595 EVK</u>	NXP	MIMXRT595-EVK	<u>2DS, 1XK, 1ZM</u>	uSD-M.2 Adapter
i.MX RT685 EVK	NXP	MIMXRT685-EVK	<u>2DS, 1XK, 1ZM</u>	uSD-M.2 Adapter
i.MX RT1176 Dev Kit	Embedded Artists	EAK00380	<u>2DS, 1XK, 1ZM</u>	M.2
i.MX RT1064 Dev Kit	Embedded Artists	EAC00375	<u>2DS, 1XK, 1ZM</u>	M.2
i.MX RT1062 Dev Kit	Embedded Artists	EAK00310	<u>2DS, 1XK, 1ZM</u>	M.2

Table 3: Murata module support on NXP and Embedded Artists' platforms

1.3 Software Options

Several toolchains are supported by NXP as below, but MCUXpresso IDE is the primary focus in this document:

- NXP supports MCUXpresso IDE
- GNU toolchain for Arm® Cortex® -M with Cmake build system
- IAR Embedded Workbench
- Keil™ MDK-Arm

2 Hardware Setup for NXP EVKs with uSD-M.2 Adapter

To enable Murata's wireless solution on NXP's i.MX RT 1020/1050/1060/1064/595/685 Evaluation Kits, Embedded Artists' Wi-Fi/BT M.2 EVB's (Murata module onboard) must be connected to Murata's uSD-M.2 Adapter. The on-board debug adapter is supported. Refer to **Figure 2** for example of i.MX RT1050 EVK. Murata's uSD-M.2 Adapter plugs in directly to the EVK's microSD connector. The micro USB connector (J28) is used for USB-UART/JTAG. The NXP i.MX RT 1160/1170 EVKs have on-board M.2 slot that can be used, in addition to the uSD-M.2 adapter option.

Refer to **Section 9** on how to correctly connect Embedded Artists' Wi-Fi/BT M.2 EVB to the Murata Adapter and how to properly jumper the Adapter for default 1.8V VIO operation (not 3.3V override mode). Now insert the Murata Adapter into the microSD slot (J20) until you hear the click sound (push-push connector). Per **Section 9.3**, it is best to tape the uSD Adapter-microSD connection. Make sure the green LED (LED1) on the adapter board is illuminated when powered. Also, the blue LED (LED2) should <u>not be</u> illuminated. Repeating the Murata uSD-M.2 Adapter jumper settings:

- For rev B1 adapter, J12 is in 1-2 pos & J13 is in 1-2 pos.
- For (legacy) rev A adapter, J12 is open.

Additional connections between the EVK and the uSD-M.2 adapter are required for full functionality, using male-to-female jumper cables. Please refer to **Table 4** and **Table 5** for additional connection requirements on the various NXP i.MX RT EVKs.

Embedded Artists 1XK Module + Control of the state of the

Figure 2: Connecting the EVB to the EVK

NXP i.MX RT 1050 EVKB

Table 4: Additional cabling for NXP i.MX RT EVK 1050/1060/1064

Pin name	uSD-M.2 adapter pin	i.MX RT 10XX pin	Pin name of RT10XX	GPIO name of RT10XX
BT_UART_TXD_HOST	J9 (pin 1)	J22 (pin 1)	LPUART3_RXD	GPIO_AD_B1_07
BT_UART_RXD_HOST	J9 (pin 2)	J22 (pin 2)	LPUART3_TXD	GPIO_AD_B1_06
RADIO_ENABLE	J9 (pin 3)	J22 (pin 3)	GPIO1_IO11	GPIO_AD_B0_11
BT_UART_RTS_HOST	J8 (pin 3)	J23 (pin 3)	LPUART3_CTS	GPIO_AD_B1_04
BT_UART_CTS_HOST	J8 (pin 4)	J23 (pin 4)	LPUART3_RTS	GPIO_AD_B1_05

Pin name	uSD-M.2 adapter pin	i.MX RT 10XX pin	Pin name of RT11XX	GPIO name of RT11XX
BT_UART_TXD_HOST	J9 (pin 1)	J25 (pin 13)	LPUART7_RXD	GPIO_AD_01
BT_UART_RXD_HOST	J9 (pin 2)	J25 (pin 15)	LPUART7_TXD	GPIO_AD_00
BT_UART_RTS_HOST	J8 (pin 3)	J25 (pin 11)	LPUART7_CTS	GPIO_AD_02
BT_UART_CTS_HOST	J8 (pin 4)	J25 (pin 9)	LPUART7_RTS	GPIO_AD_03

Table 5: Additional cabling for NXP i.MX RT EVK 1160/1170

3 Hardware Setup for Embedded Artists Dev Kits via M.2 interface

Embedded Artists' i.MX RT Developer Kits have a M.2 connector onboard for direct connection to the M.2 EVB (no adapter required). LPC-Link2 is recommended for the debug adapter. Embedded Artists' website provides support package. **Figure 3** shows the full connection of developer's kit with M.2 and debug probe. Micro USB connector (J22) is used for USB-UART. J10 is used for LPC-Link2 connection.

<u>NOTE</u>: The red line in the flex cable used to connect the debug probe to the developer's kit should align with the arrow at J10 (i.e., pin 1 of J10).



Figure 3: Embedded Artists i.MX RT 1062 Developer's Kit

4 Software Setup for NXP EVKs

If you are using Embedded Artists Board, please skip this section and go to **Section 5** of this document.

Click <u>here</u> to go the NXP landing page as shown in **Figure 4**. Follow the steps described in NXP web to install these tools:

- MCUXPresso IDE
- mbed Virtual COM Port Driver
- Terminal application (TeraTerm, Putty, etc.)

Figure 4: NXP Getting Started Web Page

Get Started v MIMXRT105	vith the O-EVK
Jump To	Plug It In
1. Plug It In 1.1 Attach the USB Cable 1.2 Run the Out-of-Box Demo	Let's take your MIMXRT1050-EVK / EVKB for a test drive! You have the choice of watching the sequence in a short video or following the detailed actions list below.
2. Get Software	Get Started with MIMXRT1050-EVK / EVKB Development Platform - How to
3. Build, Run	
 4. Leam Quick Reference Chip Documents Errata 	

You should now be able to see mbed Serial Port on the Device Manager as shown in **Figure 5** if you completed software installation successfully.

Figure 5: COM Port of NXP IMXRT1050-EVKB



For installing the required SDK(s) for MCUXpresso IDE, please refer to Section 6.

5 Software Setup for Embedded Artists Dev Kits

If you are using NXP Board, please skip this section and go back to Section 4 of this document.

Click <u>here</u> to go the EA landing page for i.MX RT 1176 as shown in **Figure 6**. Download the document <u>iMX RT Developers Kit Program Development Guide</u> from the resource tab for detailed instructions about downloading and setting up the SDK. The <u>patched SDK</u> is also accessible from this page that enables the EA Developers Kits on MCUXpresso. You can also download <u>Getting Started</u> with M.2 modules and i.MX RT to run the sample examples. Also install all the tools mentioned below:

- MCUXpresso IDE
- FTDI Virtual COM Port Driver
- Terminal application (TeraTerm, Putty, etc.)

Figure 6: Embedded Artists Resource Web



You should see LPC based USB device and USB Serial Port on the Device Manager as below if you completed software installation successfully. The driver for LPC-Link2 is included in the MCUXpresso.

Figure 7: COM Port and JTAG of Embedded Artists Kit



6 SDK Setup for MCUXpresso

MCUXpresso supports various processors, so it requires appropriate SDK for i.MX RT. To support Embedded Artists' Wireless M.2 Modules, additional components (NXP Wi-Fi and other related components) are required. There are two ways to install SDK in the new MCUXpresso IDE. Follow the steps below carefully to install right components.

6.1 Drag and drop SDK in the IDE

1. First download the MCUXpresso SDK by following this URL: <u>https://mcuxpresso.nxp.com</u>. You will need to login to your NXP account and then click "Select Development Board".



2. Type "1050", then select "EVKB-IMXRT1050" for i.MX RT 1050 EVKB.

Se	arch by Name
	1050
	Boards
Se	EVK-MIMXRT1050
Π	EVKB-IMXRT1050
	Kits

3. On the right, then click "Build MCUXpresso SDK"

Selection Details	EVKB-IMXRT1050 ⊕ NP.com ^I i.MX RT1050 Evaluation Kit
Build MCUXpresso SDK	v2.10.0 Additional Details
Matched Hardware Platform	15
Found 584 HW solutions that	at are matching selected example projects.
(Boards: 119), Kits: 77), Pro	cessors: (388)

4. Click "Select All" and then select "Download SDK" to download the SDK.

Build Generate a Developer E Selections here	Build SDK for EVKB-IMXRT1050 Generate a downloadable SDK archive for use with desktop MCUXpresso Tools. Developer Environment Settings Selections here will impact files and examples projects included in the SDK and Generated Projects							
	Host OS 📕 🍯 🎝	Toolchain / ID	E 💽 🎯 😵 Crm All					
Filter by Na	ame, Category, or Description		Select All					
	Name	Category	Description					
\checkmark	SDMMC Stack	Middleware	Stack supporting SD, MMC, SDIO					
\checkmark	CANopen	Middleware	MicroCANopen Stack from Embedded Solutions Academy					
	CJSON	Middleware	Ultralightweight JSON parser in ANSI C					
\checkmark	CMSIS DSP Library	CMSIS DSP Lib	CMSIS DSP Software Library					
	elQ	Middleware	elQ machine learning SDK containing: - ARM CMSIS-NN library (more)					
\checkmark	Embedded Wizard GUI	Middleware	Embedded Wizard GUI from TARA Systems					
	emWin	Middleware	emWin graphics library					
	Azure RTOS (7 selected)		Azure RTOS					
	FreeRTOS (4 selected)		Real-time operating system for microcontrollers from Amazon					
			Download SDK					

5. Agree to the EULA.

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Softwa	re Terms and Conditions	
Please read	the following agreement and click "I AGREE" at the bottom before downloading your software.	
EULA	Software Content Register	
LA_OPT_ IMPORTA the end of Agreement these term terms and shall contr govern yo	NXP_Software_License v27 July 2021 NT. Read the following NXP Software License Agreement ("Agreement") completely. By selecting the "I Accept" button at this page, or by downloading, installing, or using the Licensed Software, you indicate that you accept the terms of the t and you acknowledge that you have the authority, for yourself or on behalf of your company, to bind your company to s. You may then download or install the file. In the event of a conflic between the terms of this Agreement and any license conditions for NXP's proprietary software embedded anywhere in the Licensed Software file, the terms of this Agreement of. If a separate license agreement for the Licensed Software has been signed by you and NXP, then that agreement shall in use of the Licensed Software and shall supersede this Agreement.	
NXP SOF This is a le an individu source co- updates o consideral you do no- later, stop Licensed S Agreement 1. DEF 1.1. "	TWARE LICENSE AGREEMENT gal agreement between your employer, of which you are an authorized representative, or, if you have no employer, you as all ("your or "Licensee"), and NXP B.V. ("NXP"). It concerns your rights to use the software provided to you in binary or de form and any accompanying written materials (the "Licensed Software"). The Licensed Software may include any error corrections or documentation relating to the Licensed Software"). The Licensed Software may include any is for the terms of this Agreement. In the Licensed Software and delete all copies of the Licensed Software in your possession or control. Any copies of the Software that you have aiready distributed, where permitted, and on to destroy will continue to be governed by this t. Your prior use will also continue to be governed by this Agreement. In INTIONS Affiliate" means, with respect to a party, any corporation or other legal entity that now or hereafter Controls, is Controlled by	e /
or is under (50%) of the entity is con- 1.2 "Author program w 1.3. "Deriv	r common Control with such party: where "Control" means the direct or indirect ownership of greater than fifty percent he shares or similar interests entilled to vote for the election of directors or other persons performing similar functions. An insidered an Affiliate only so long as such Control exists. inzed System" means either (i) Licensee's hardware product which incorporates an NXP Product or (ii) Licensee's software which is used exclusively in connection with an NXP Product and with which the Licenseed Software will be integrated. altwe Work" means a work based upon one or more pre-existing works. A work consisting of editorial revisions, annotations are achiever and the software and the software and and the software line in the software will be integrated.	
I Agree		₽
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6. Click "Download SDK Archive" if download does not start automatically. You can also download SDK Documentation, then click "Close".

Dow	mloads	×
MCUX	Constant SDK (138 MB) Download SDK Archive (138 MB) Download SDK Documentation Download Standalone Example Project	
	For MCUXpresso IDE, example projects can be imported as standalone projects directly within the IDE by downloading the SDK Archive	
Addit	ional Tools nload additional tools from NXP or its partners to create new projects and if example projects using the associated software components included in this	
ß	Embedded Wizard Studio	
Onlin	e Documentation	
Ø	View SDK API Reference Manual	
MCUX	ISSDK API Reference Manual	
±	Download Config Tools data	
	Close	se

7. To install the SDK in the MCUXpresso, drag and drop the SDK Archive file on "Installed SDKs window".



6.2 Install SDK directly from MCUXpresso IDE

1. To install the SDK in the MCUXpresso IDE, click on "Download and Install SDKs". To switch to normal IDE, click on IDE.

File Edit Naviga	MW_BLE - MCUApresso IDE ate Search Project Conf	igTools Run Analysis Fre	eRTOS Window Help		- 0 ×
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and integ	profiling, multicore de grated configuration to	bugging, and pols.	Import SDK Examples		
	NP				
M	CUXpresso			Always sh	iow Welcome at start up
				:0	

2. Type "1060" in the filter box. Click on "evkmimxrt1060" and click on "install" to download and install the SDK for i.MX RT 1060 EVK.

ld device support to MCU nd install one or more M	Xpresso IDE allowing projects to be created and debugged. CUXpresso SDKs to provide device knowledge, drivers, middle	eware, and reference example	applications f	or your development	board or N	1CU.		
	Boards Processors							
ICUXpresso	Board	SDK	Version	Package	Flash	RAM	Status	F ter: 1060
NIFIED SUITE OF	evkbmimxrt1060	SDK_2.x_MIMXRT	2.10.0	MIMXRT1062D	0	1024		Min Flash (KB): Max Flash (KB):
EVELOPMENT	evkbmimxrt1060_agm01	SDK_2.x_MIMXRT	2.10.0	MIMXRT1062D	0	1024		Min RAM (KB): Max RAM (KB):
	evkmimxrt1060	SDK_2.x_EVK-MI	2.10.0	MIMXRT1062D	0	1024	æ	Cores
	evkmimxrt1060_agm01	SDK_2.x_EVK-MI	2.10.0	MIMXRT1062D	0	1024	ø	All Cores O Cortex-M0+ O Cortex-M33 O Cortex-M4 O Cortex-M7
LEARN MORE >								Keywords Alexa IoT Service (AIS) Alibabas Cloud (Aliyun) Amazon Web Service (AWS) Audio Azure RTOS Bixetooth LE Bootloader (MCUBoot) Brown Out Detection But Encryption Engine (BEE) CAN CAN FD CANspen CANpen (FD) CMSS NN Crank Storyboard Cryptography DHCP Digital Microphone OSP CH (M/A) Embedded RPC Embedded Wizard

3. Accept the license agreement and click on 'Finish' to start the download.

Install			×
Review Licenses Licenses must be reviewed and accepted before the software can be installed.		0	
License text (for SDK_2.x_EVK-MIMXRT1060 2.10.0.201911251446):			
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< Back		Cance	2

7 Patching the examples

The examples provided with MCUXpresso SDK (2.10 or later) does not support Murata modules outof-the-box. Some of the example files need to be modified to enable the Murata modules. Murata has simplified this "patching" process by providing the modified files and a script based one-click patching mechanism.

Note: Before executing the following steps, import all the exampled that needs to be patched for Murata module support. The following mechanism only modifies the examples currently present in the user workspace.

7.1 Import example(s)

1. Click on **Import SDK example(s)...** in the Quickstart Panel. (If the Welcome page is still open, either close it, or click on the **IDE** icon).



2. Select the target EVK (e.g evkbimxrt1050) and click the Next button.



3. Expand **wifi_examples** and select one or more examples to import. Click **Finish**. Ensure **SDK Debug Console** is set as **UART** in **Project Options**.

> 🗌 🗧 usb_examples		
🗸 🔳 🗧 wifi_examples		
🔲 🧮 wifi_cli	wifi_cli	
🔽 🚋 wifi_iperf	wifi_iperf	
🗌 🧮 wifi_setup	wifi_setup	
🗌 🗮 wifi_test_mode	wifi_test_mode	
🔲 🧮 wifi_webconfig	Simple AP to Client configuration over web.	
<		>
(?)	< <u>B</u> ack <u>N</u> ext > <u>F</u> inish Cancel	

7.2 Modify the imported examples

1. Right click on the imported project in the Project Explorer and select **Utilities -> Open directory browser here**.



2. The project source folder will open. Go to the parent folder (one level up). This is the workspace folder used by MCUXpresso. Download the <u>Murata patch file</u>.

↑ His PC → Documents → MCUXpressolDE_11.4.0_6224 → workspace		د مر ا ن ب	Search workspace
Name	Date modified	Туре	Size
📑 .mcuxpressoide_packages_support	11-08-2021 06:29 PM	File folder	
📑 .metadata	11-08-2021 06:29 PM	File folder	
AzureRTOS_TAD_logs	16-08-2021 06:05 PM	File folder	
bluetooth_rf_test_mode.zip_expanded	27-07-2021 05:56 PM	File folder	
📑 evkbimxrt1050_wifi_iperf	17-08-2021 11:06 AM	File folder	
FreeRTOS_TAD_logs	16-08-2021 06:05 PM	File folder	
Murata_patching_solution_2_10_SDK-08-13-2021-Ver-1.0.zip	16-08-2021 07:53 PM	Compressed (zipp	2,643 KB

3. Extract the downloaded file. Double click on the Murata_patch_example.bat file. This will replace all the example files necessary to enable Murata modules.

This PC > Documents > MCUXpressolDE_11.4.0_6224 > workspace	✓ Č 🖉 Search workspace		
Name	Date modified	Туре	Size
.mcuxpressoide_packages_support	11-08-2021 06:29 PM	File folder	
📑 .metadata	11-08-2021 06:29 PM	File folder	
AzureRTOS_TAD_logs	16-08-2021 06:05 PM	File folder	
bluetooth_rf_test_mode.zip_expanded	27-07-2021 05:56 PM	File folder	
📑 evkbimxrt1050_wifi_iperf	17-08-2021 11:06 AM	File folder	
FreeRTOS_TAD_logs	16-08-2021 06:05 PM	File folder	
2_10_SDK_Examples.zip	14-08-2021 03:16 AM	Compressed (zipp	2,642 KB
🚳 Murata_patch_examples.bat	14-08-2021 03:16 AM	Windows Batch File	1 KB
Murata_patching_solution_2_10_SDK-08-13-2021-Ver-1.0.zip	17-08-2021 11:08 AM	Compressed (zipp	2,059 KB

Note: This will patch all the valid examples in the workspace, including ones that may have been imported previously. The script provides a warning to the user to this effect and gives a chance to make backups if required.

For SDK 2.10, the following files are replaced (not all files apply to all examples) -



7.3 Selecting the module

Enable the correct compiler flag in source/app_config.h file to select the Murata module -WIFI_BOARD_MURATA_1XK / WIFI_BOARD_MURATA_2DS / WIFI_BOARD_MURATA_1ZM (for connecting via uSD-M.2 adapter, valid for all EVKs)

or WIFI_BOARD_MURATA_1XK_M2 / WIFI_BOARD_MURATA_2DS_M2 /

WIFI_BOARD_MURATA_1ZM_M2 (for directly connecting via M.2 interface, valid for only i.MX RT 1160 and 1170 EVKs)

ſ	.h ap	p_co	onfig.h 🕱
	10	/*	
	2	*	Copyright 2021 NXP
	3	*	All rights reserved.
	4	*	5
	5	*	SPDX-License-Identifier: BSD-3-Clause
	6	*/	
	7		
	80	/*	
	9	*	Supported Wi-Fi boards (modules):
	10	*	WIFI BOARD MURATA 2DS
	11	*	WIFI BOARD MURATA 1XK
	12	*	WIFI BOARD MURATA 1ZM
	13	*	WIFI BOARD PAN9026 SDIO
	14	*	WIFI BOARD AW NM191
	15	*	WIFI BOARD AW AM457
	16	*	WIFI BOARD AW CM358
	17	-7	
	18	#de	fine WIFI_BOARD_MURATA_1XK
	19		
	20	#in	clude "wifi_config.h"
	21		

7.4 Selecting the region

By default, US region (FCC) is used for TX power limit values in Wi-Fi. However, the following regions are supported by the Murata modules.

- US (FCC)
- Canada (IC)
- European Union
- Japan
- Worldwide Safe List

Edit the file source/wifi_config.h and select the required macro from the selection (**MURATA_US**, **MURATA_EU**, **MURATA_CA**, **MURATA_JP**, **MURATA_WW**).



8 Running Sample Applications

Various sample applications are provided by the SDK. For example, there are seven Wi-Fi examples included in the 2.10 SDK for i.MX RT 1060 EVK:

- **evkmimxrt1060_wifi_cert**: Provides CLI access to common and advanced Wi-Fi certification test operations.
- **evkmimxrt1060_wifi_cli**: Provides CLI access to common Wi-Fi operations, including throughput measurements.
- **evkmimxrt1060_wifi_cli_fw_dump**: Provides Wi-Fi CLI Firmware dump example to demonstrates the ability to capture a FW memory dump on a micro-USB memory device connected to the host platform.
- evkmimxrt1060_wifi_iperf: Provides RF measurement tests.
- evkmimxrt1060_wifi_setup: Provides a simple Wi-Fi setup demo (scan-connect-ping).
- evkmimxrt1060_wifi_test_mode: Provides CLI access to common Wi-Fi certification test operations.
- **evkmimxrt1060_wifi_webconfig**: Provides a STA + SoftAP test with an embedded web server.

Additionally, there are 15 Bluetooth examples included in the 2.10 SDK for i.MX RT 1060 EVK.

- evkmimxrt1060_a2dp_sink: Demonstrates how to use the a2dp sink feature.
- **evkmimxrt1060_a2dp_source**: Demonstrates how to use the a2dp source feature.
- evkmimxrt1060_audio_profile: Demonstrates an audio control application using AWS cloud.
- **evkmimxrt1060_central_hpc**: Demonstrates basic BLE Central role functionality, connecting to a HPS Server.
- **evkmimxrt1060_central_ht**: Demonstrates basic BLE Central role functionality, connecting to a health thermometer sensor.
- **evkmimxrt1060_central_ipsp**: Demonstrates basic BLE Central role functionality, connecting to an IPSP Service.
- **evkmimxrt1060_central_pxm**: Demonstrates basic BLE Central role functionality, connecting to a Proximity Reporter.
- evkmimxrt1060_handsfree: Demonstrates the HFP HF basic functionality.
- evkmimxrt1060_handsfree_ag: Demonstrates the HFP Ag basic functionality.
- **evkmimxrt1060_peripheral_hps**: Demonstrates basic BLE Peripheral role functionality, exposing an HTTP Proxy GATT Service.
- **evkmimxrt1060_peripheral_ht**: Demonstrates basic BLE Peripheral role functionality, exposing a Health Thermometer GATT Service.
- **evkmimxrt1060_peripheral_ipsp**: Demonstrates basic BLE Peripheral role functionality, exposing an Internet Protocol Support GATT Service.
- **evkmimxrt1060_peripheral_pxr**: Demonstrates basic BLE Peripheral role functionality, exposing a Proximity Reporter GATT Service.
- **evkmimxrt1060_spp**: Demonstrates how to use the SPP feature.
- **evkmimxrt1060_wifi_provisioning**: Demonstrates how the EVK Wi-Fi can be configured by Android mobile application, via Bluetooth.

The following sections detail the process of running some of the examples on i.MX RT 1060 EVK. The procedures will be similar in other EVKs as well, for the examples available for them.

8.1 Example evkmimxrt1060_wifi_cert

- 1. Refer to **Section 7** to import and patch the evkmimxrt1060_wifi_cert example, and select the current module (2DS, 1XK or 1ZM).
- 2. Click Debug in the QuickStart Panel.



3. For the very first attempt, you need to select the appropriate JTAG adapter. Select the adapter and click OK, and then wait for a while for the build. You can see the log on console window.

S Probes discovered - C X								
Connect to target: MIMXRT1062xxxxA								
1 probe found. Select the probe to use:								
Available attached probes								
Name	Serial number	Туре	Manufactur	IDE Debug Mo				
S DAPLink CMSIS-DAP	022900001297	Link	ARM	Non-Stop				
Supported Probes (tick/untick	to enable/dicable)							
MCUXpresso IDE LinkServe	er (inc. CMSIS-DAP) probes						
P&E Micro probes	,	· 1						
SEGGER J-Link probes								
Probe search options								
Search again								
Remember my selection (for	this Launch config	uration)						
?		C	OK	Cancel				

4. After the Debug process is complete, open the "Device Manager" in windows and go to "Ports (COM & LPT)" to check the mbed COM port number. In this case, COM 22 is our COM port number.

📇 Device Manager —		×
File Action View Help		
V Ports (COM & LPT)		^
Intel(R) Active Management Technology - SOL (COM3)	
mbed Serial Port (COM22)		~

5. Now the example is ready to run. Open Tera Term on the appropriate COM port (i.e. COM 22 in this case). Configure port for 115200 bps, 8 bits data, no parity, and 1 stop bit (115200/8/N/1).

🔟 Tera Term - [disconnected] VT		
File Edit Setup Control Window Help		
Terminal		
Window		
Font	Tera Term: Serial port setup	×
Keyboard	reiu reini senar port setap	^
Serial port	Port: 0	сом22 🗸 ок
SSH	Speed: 1	115200 ~
SSH Authentication	Data	8 bit v Cancel
SSH Forwarding	Data.	
SSH KeyGenerator	Parity:	none v
TCP/IP	Ston hits:	1 hit 🗸 Help
General		
Additional settings	Flow control:	none v
Save setup		
Restore setup	Transmit delay	
Setup directory	0 msec/ch	1ar 0 msec/line
Load key map		

6. Click resume button in MCUXpresso.

File Edit Source Refactor Navigate Search Project ConfigTools Run RTOS Analysis Window <u>H</u>elp 📩 🕶 🔚 🐚 🛛 💥 🗸 💊 👘 🐼 🗸 🔳 🔊 🥆 🔊 🖻 3.7 🕩 🦚 20 🎦 Project Explorer 🛛 🔠 Registers 🛛 🗱 Faults 🛛 🗛 Perir Resume (F8) 🏇 Debug 🖾

7. You should see this output from i.MX RT.



8. Type any of the command(s) and press enter to execute.



9. Click Terminate button in MCUXpresso to stop the test.



8.2 Example evkmimxrt1060_wifi_cli

- 1. Refer to **Section 7** to import and patch the evkmimxrt1060_wifi_cli example, and select the current module (2DS, 1XK or 1ZM).
- 2. Click Debug in the QuickStart Panel.



3. For the very first attempt, you need to select the appropriate JTAG adapter. Select the adapter and click OK, and then wait for a while for the build. You can see the log on console window.

X	Probes discovered					×		
Cor	nnect to target: MIMXR1	1062xxxxA						
1 p	1 probe found. Select the probe to use:							
Av	ailable attached pro	obes						
	Name	Serial number	Туре	Manufactur	IDE Debug N	Mo		
LS	DAPLink CMSIS-DAP	022900001297	Link	ARM	Non-Stop			
-								
Su	pported Probes (tick/untick	to enable/disable)						
	MCUXpresso IDE LinkServe	er (inc. CMSIS-DAP) probes					
	SEGGER J-Link probes							
Pr	obe search options							
S	Search again							
⊡ F	Remember my selection (for this Launch configuration)							
Ċ	D			ОК	Cancel			

4. After the Debug process is complete, open the "Device Manager" in windows and go to "Ports (COM & LPT)" to check the mbed COM port number. In this case, COM 22 is our COM port number.

ᡖ Device Manager	_		\times
File Action View Help			
🗇 🏟 📰 👔 🖬			
V 🛱 Ports (COM & LPT)			^
Intel(R) Active Manageme	nt Technology - SOI	. (COM3)	
mbed Serial Port (COM22)	J		×

5. Now the example is ready to run. Open Tera Term on the appropriate COM port (i.e. COM 22 in this case). Configure port for 115200 bps, 8 bits data, no parity, and 1 stop bit (115200/8/N/1).

Tera Term - [disconnected] VT		
File Edit Setup Control Window Help		
Terminal		
Window		
Font	Tera Term: Serial nort setup	×
Keyboard	Tera Termi Senar port Setap	^
Serial port Proxy	Port: CO	M22 ~ OK
SSH	Speed: 11	5200 ~
SSH Authentication	Data' 8 h	it Cancel
SSH Forwarding	Data.	
SSH KeyGenerator	Parity: no	ne v
TCP/IP	Stop hits'	uit V Help
General		
Additional settings	Flow control: no	ne 🗸
Save setup		
Restore setup	Transmit delay	
Setup directory	0 msec/chai	0 msec/line
Load key map		

6. To download the iperf, follow the following link:

For Windows: <u>https://iperf.fr/download/windows/iperf-2.0.5-win32.zip</u> For Linux: Follow the steps to install iperf.

- 1. Download the .deb file for iperf 2.05 via <u>https://iperf.fr/download/ubuntu/iperf_2.0.5+dfsg1-</u> 2_amd64.deb
- 2. Change directory to where the .deb file is.
- Run the following commands to install it.
 \$ dpkg -I iperf_2.0.5+dfsg1-2_amd64.deb
 \$ sudo dpkg -i iperf_2.0.5+dfsg1-2_amd64.deb
 \$ sudo apt install iperf

7. Click resume button in MCUXpresso.



8. You should see this output from i.MX RT.



9. Type any of the command(s) and press enter to execute.



10. Some common actions are:

- a. Scan Wi-Fi networks # wlan-scan
- b. Connect to an Open AP
 # wlan-add test_network ssid <AP SSID>
 # wlan-connect test_network
- c. Ping host after connection # ping <target host IP>
- 11. Click Terminate button in MCUXpresso to stop the test.



8.3 Example evkmimxrt1060_wifi_cli_fw_dump

Note: This example is almost similar to the evkmimxrt1060_wifi_cli example in terms of output and behavior. However, this example has the added capability of storing a FW memory dump on an external mass storage device in case of any errors.

- 1. Refer to **Section 7** to import and patch the evkmimxrt1060_wifi_cli_fw_dump example, and select the current module (2DS, 1XK or 1ZM).
- 2. Connect a micro–USB Mass Storage Device to the host platform's USB OTG (J9) slot. Make sure the mass storage device has an USB 2.0 interface and is formatted as FatFS.
- 3. Edit the file source/wifi_config.h and enable the compiler flag **CONFIG_WIFI_FW_DEBUG** (line 81). Save the changes.

679	/*
68	* Wifi extra debug options
69	*/
70	#undef CONFIG_WIFI_EXTRA_DEBUG
71	#undef CONFIG_WIFI_EVENTS_DEBUG
72	#undef CONFIG_WIFI_CMD_RESP_DEBUG
73	#undef CONFIG_WIFI_SCAN_DEBUG
74	#undef CONFIG_WIFI_IO_INFO_DUMP
75	#undef CONFIG_WIFI_IO_DEBUG
76	#undef CONFIG_WIFI_IO_DUMP
77	#undef CONFIG_WIFI_MEM_DEBUG
78	#undef CONFIG_WIFI_AMPDU_DEBUG
79	#undef CONFIG_WIFI_TIMER_DEBUG
80	#undef CONFIG_NIFI_SDIO_DEBUG
81	#define CONFIG_WIFI_FW_DEBUG
82	
83	<pre>#endif /* _WIFI_CONFIG_H_ */</pre>
84	

4. Click Debug in the QuickStart Panel.



5. For the very first attempt, you need to select the appropriate JTAG adapter. Select the adapter and click OK, and then wait for a while for the build. You can see the log on console window.

X	Probes discovered				×					
Cor	nnect to target: MIMXRT	1062xxxxA								
1 p	1 probe found. Select the probe to use:									
A.,	- linkin attack ad un	- h								
AV	allable attached pro	opes								
	Name Serial number Type Manufactur IDE Debug Mo									
LS	DAPLink CMSIS-DAP	022900001297	Link	ARM	Non-Stop					
—										
c	un extend Deals as (tight/untight	to enable/disable)				_				
l Su	MCUXpresso IDF LinkServe	er (inc. CMSIS-DAP) probes							
	P&E Micro probes	er (inc. civibio bAr) probes							
	SEGGER J-Link probes									
Pr	obe search options									
S	Search again									
	Remember my selection (for this Launch configuration)									
(0		L	OK	Cancel					

6. After the Debug process is complete, open the "Device Manager" in windows and go to "Ports (COM & LPT)" to check the mbed COM port number. In this case, COM 22 is our COM port number.

ᡖ Device Manager —		×
File Action View Help		
V 📮 Ports (COM & LPT)		^
Intel(R) Active Management Technology - SOL	(COM3)	
mbed Serial Port (COM22)		Υ.

7. Now the example is ready to run. Open Tera Term on the appropriate COM port (i.e. COM 22 in this case). Configure port for 115200 bps, 8 bits data, no parity, and 1 stop bit (115200/8/N/1).

Itra Term - [disconnected] VT		
File Edit Setup Control Window Help		
Terminal		
Window		
Font	Tera Term: Serial port set	un X
Keyboard	feld feldin bendi port set	
Serial port	Port:	СОМ22 ~ ОК
SSH	Speed:	115200 ~
SSH Authentication	Data'	8 hit V Cancel
SSH Forwarding	D'ata.	o bit
SSH KeyGenerator	Parity:	none ~
TCP/IP	Stop bits:	1 bit 🗸 Help
General		
Additional settings	Flow control:	none v
Save setup		
Restore setup	I ransmit dela	ıy
Setup directory	0 mse	c/char 0 msec/line
Load key map		

8. Click resume button in MCUXpresso.



9. You should see this output from i.MX RT.



10. Type any of the command(s) and press enter to execute.



- 11. Whenever a Wi-Fi firmware or SDIO communication failure occurs, the FW dump will be stored on the connected mass storage device.
- 12. Click Terminate button in MCUXpresso to stop the test.

<u>F</u> ile	<u>E</u> dit	<u>S</u> ource	Refac <u>t</u> or	<u>N</u> avigate	Se <u>a</u> rch	<u>P</u> roject	Config	Tools	<u>R</u> un	RTOS	Analysis	<u>W</u> indow	<u>H</u> elp
- 🗂	- 8	6 8	- 🔨 -	B : 49 4	> 📮	`≈ ∎►		4	2 3	<u>r</u>	5. R [Þ 🗓 🖷	2 🗟
Pi	roject l	Explorer 🖇	3 1919 Re	gisters 🐐	Faults 🚪	Periphe	erals+	Termi	inate (Ct	trl+F2)	🎋 Debug	×	

8.4 Example evkmimxrt1060_wifi_iperf

- 1. Refer to **Section 7** to import and patch the evkmimxrt1060_wifi_iperf example, and select the current module (2DS, 1XK or 1ZM).
- 2. Edit the source/main.c file to modify the EXT_AP_SSID, EXT_AP_PASSPHRASE and IPERF_SERVER_ADDRESS to match the test setup.



3. Click Debug in the QuickStart Panel.



4. For the very first attempt, you need to select the appropriate JTAG adapter. Select the adapter and click OK, and then wait for a while for the build. You can see the log on console window.

X Probes discovered			_		×			
Connect to target: MIMXRT	1062xxxxA							
I probe found. Select the probe to use:								
Available attached pro	obes							
Name Serial number Type Manufactur IDE Debug Mo								
LS DAPLink CMSIS-DAP	022900001297	Link	ARM	Non-Stop				
Supported Probes (tick/untick	to enable/disable)							
MCUXpresso IDE LinkServe	er (inc. CMSIS-DAP) probes						
P&E Micro probes								
SEGGER J-Link probes								
Prohe search ontions								
Search again								
Search again								
Remember my selection (for this Launch configuration)								
?		E	ОК	Cance				

5. After the Debug process is complete, open the "Device Manager" in windows and go to "Ports (COM & LPT)" to check the mbed COM port number. In this case, COM 22 is our COM port number.

ᡖ Device Manager	—	×		
File Action View Hel				
🗢 🏟 🛛 🖬 📔 🎫				
 Ports (COM & LPT) Intel(R) Active Management Technology - SQL (COM3) 				
🛱 mbed Serial P	rt(COM22)	*		

6. Now the example is ready to run. Open Tera Term on the appropriate COM port (i.e. COM 22 in this case). Configure port for 115200 bps, 8 bits data, no parity, and 1 stop bit (115200/8/N/1).

Tera Term - [disconnected] VT				
File Edit Setup Control Window Help				
Terminal				
Window				
Font	Tera Term: Serial port setup	~		
Keyboard	Tera Territ, Seriar port setup	^		
Serial port	Port: COM22 ~	ОК		
SSH	Speed: 115200 ~			
SSH Authentication	Data: 8 bit v	Cancel		
SSH Forwarding	o bit			
SSH KeyGenerator	Parity: none ~			
TCP/IP	Stop bito'	Help		
General		•		
Additional settings	Flow control: none ~			
Save setup				
Restore setup	Transmit delay			
Setup directory	0 msec/char 0	msec/line		
Load key map				

7. To download the iperf, follow the following link:

For Windows: <u>https://iperf.fr/download/windows/iperf-2.0.5-win32.zip</u> For Linux: Follow the steps to install iperf.

- 1. Download the .deb file for iperf 2.05 via <u>https://iperf.fr/download/ubuntu/iperf_2.0.5+dfsg1-</u> 2_amd64.deb
- 2. Change directory to where the .deb file is.
- Run the following commands to install it.
 \$ dpkg -I iperf_2.0.5+dfsg1-2_amd64.deb
 \$ sudo dpkg -i iperf_2.0.5+dfsg1-2_amd64.deb
 \$ sudo apt install iperf
- 8. Click resume button in MCUXpresso.

<u>F</u> ile	<u>E</u> dit	<u>S</u> ource	Refac <u>t</u> or	<u>N</u> avigate	Se <u>a</u> rch	Project	Config	Tools	<u>R</u> un	RTOS	Analysis	<u>W</u> indow	<u>H</u> elp
1	T	6 8	- 🔨 -	📑 🖉 4) 📮	`≈ ∎►		N 3	3	_R	5. R 1) i 🖕	5 6
P	roject l	Explorer S	2 1919 Reg	gisters 🐐 I	Faults 🍃	Perip Res	sume (F	B)	-		🎋 Debug	23	

9. You should see this output from i.MX RT.

_____ wifi iperf demo Initialize WLAN Driver Setting up new cal data MAC Address: 2C:4C:C6:F4:D4:40 _____ For Soft AP demonstration Start a Soft AP using option "A" in WPA2 security mode from menu This also starts DHCP Server with IP 192.168.10.1, NETMASK 255.255.255.0 _____ For Station demonstration Start an External AP with SSID as "nxp_wifi_demo" in Open mode Start DHCP Server on External AP Station network is configured with Dynamic address assignment Application provides IPerf support Set IPERF SERVER ADDRESS while using as IPerf Client A Start Soft AP S Stop Soft AP s Start Scan for external APs c Connect to External AP (SSID='nxp wifi demo') D Disconnect from External AP I Enable IEEE PS on Station i Disable IEEE PS on Station d Enable Deep sleep on Station e Disable Deep sleep on Station p Print All Network info Print DHCP Server info TCP server mode (RX only test) 1 TCP client mode (TX only test) 2 TCP client dual mode (TX and RX in parallel) 3 4 TCP client tradeoff mode (TX and RX sequentially) 5 UDP server mode (RX only test) 6 UDP client mode (TX only test) UDP client dual mode (TX and RX in parallel) 7 8 UDP client tradeoff mode (TX and RX sequentially) h Help (print this menu) H Print extended help [net] Initialized TCP/IP networking stack _____ app_cb: WLAN: received event 10 app_cb: WLAN initialized WLAN Driver Version : v1.3.r33.p2 WLAN Firmware Version : IW416-V0, RF878X, FP91, 16.91.10.p214, WPA2_CVE_FIX 1, PVE_FIX 1 _____

10. Type 'c' to connect.
11. Type '4' to perform a TCP bidirectional iPerf test. The available test options are:

- 1: TCP server mode (RX only test)
- 2: TCP client mode (TX only test)
- 3: TCP client dual mode (TX and RX in parallel)
- 4: TCP client tradeoff mode (TX and RX sequentially)
- 5: UDP server mode (RX only test)
- 6: UDP client mode (TX only test)
- 7: UDP client dual mode (TX and RX in parallel)
- 8: UDP client tradeoff mode (TX and RX sequentially)

```
Key '4': TCP client tradeoff mode (TX and RX sequentially)
TCP_DONE_CLIENT (TX)
Local address : 192.168.1.142 Port 49153
Remote address : 192.168.1.147 Port 5001
Bytes Transferred 27894784
Duration (ms) 10000
Bandwidth (Mbitpsec) 22
New TCP client (settings flags 0x30313233)
TCP_DONE_SERVER (RX)
Local address : 192.168.1.142 Port 5001
Remote address : 192.168.1.147 Port 42654
Bytes Transferred 35650148
Duration (ms) 10037
Bandwidth (Mbitpsec) 28
```

12. Click Terminate button in MCUXpresso to stop the test.



8.5 Example evkmimxrt1060_wifi_setup

- 1. Refer to **Section 7** to import and patch the evkmimxrt1060_wifi_setup example, and select the current module (2DS, 1XK or 1ZM).
- 2. Edit the source/wifi_setup.c file to modify the AP_SSID, AP_PASSPHRASE and PING_ADDR to match the test setup.



3. Click Debug in the QuickStart Panel.



4. For the very first attempt, you need to select the appropriate JTAG adapter. Select the adapter and click OK, and then wait for a while for the build. You can see the log on console window.

X Probes discovered			_		×		
Connect to target: MIMXRT	1062xxxxA						
I probe found. Select the prob	e to use:						
Available attached pro	obes						
Name	Serial number	Туре	Manufactur	IDE Debug	Mo		
LS DAPLink CMSIS-DAP	022900001297	Link	ARM	Non-Stop			
Supported Probes (tick/untick	to enable/disable)						
MCUXpresso IDE LinkServe	er (inc. CMSIS-DAP) probes					
P&E Micro probes							
SEGGER J-Link probes							
Prohe search ontions							
Search again							
John ugun							
Remember my selection (for this Launch configuration)							
?		E	ОК	Cance			

5. After the Debug process is complete, open the "Device Manager" in windows and go to "Ports (COM & LPT)" to check the mbed COM port number. In this case, COM 22 is our COM port number.

ᡖ Device Manager	—	×
File Action View Hel		
🗢 🏟 🛛 🖬 📔 🎫		
✓ Ports (COM & LP ☐ Intel(R) Active) Management Technology - SOL (COM3)	^
🛱 mbed Serial P	rt(COM22)	*

6. Now the example is ready to run. Open Tera Term on the appropriate COM port (i.e. COM 22 in this case). Configure port for 115200 bps, 8 bits data, no parity, and 1 stop bit (115200/8/N/1).

🔟 Tera	Term - [d	sconnecte	d] VT									
File Edit	Setup	Control	Window	Help								
	Т	erminal										
	v	/indow										
	F	ont			Tera	Term: Serial	nort setun					×
	К	eyboard				renn benar	pontoctup					~
	S	erial port	J			Port:		COM2	2	\sim	01/	
	P	roxy						11500	0	_	UK	
	S	5H				Speed:		11520	U	~		_
	S	6H Authen	tication			Data:		8 bit		\sim	Cancel	
	5	HForward	ding			Doritor						
	ы т	n KeyGen	erator			Parity.		none		~		
		oporal				Stop bits:		1 bit		\sim	Help	
	A	dditional s	ettings			Flow cont	rol:	none		\sim		
	S	ve setup				-						
	R	estore setu	p			Iransm	nit delay					
	S	etup direct	ory			0	msec/	char	0	ms	sec/line	
	L	oad key ma	ар				_					

7. Click resume button in MCUXpresso.



8. You should see this output from i.MX RT. The example will automatically perform a scan, connect to the AP specified (in step 2) and ping the host address specified (in step 2).



9. Click Terminate button in MCUXpresso to stop the test.



8.6 Example evkmimxrt1060_wifi_test_mode

- 1. Refer to **Section 7** to import and patch the evkmimxrt1060_wifi_test_mode example, and select the current module (2DS, 1XK or 1ZM).
- 2. Click Debug in the QuickStart Panel.



3. For the very first attempt, you need to select the appropriate JTAG adapter. Select the adapter and click OK, and then wait for a while for the build. You can see the log on console window.

Probes discovered – D X							
Connect to target: MIMXRT1062xxxxA 1 probe found. Select the probe to use:							
Available attached pr	obes						
Name	Serial number	Туре	Manufactur	IDE Debug Mo			
S DAPLink CMSIS-DAP	022900001297	Link	ARM	Non-Stop			
Supported Probes (tick/untick	to enable/disable)						
MCUXpresso IDE LinkServ	er (inc. CMSIS-DAP) probes					
P&E Micro probes							
SEGGER J-Link probes							
Probe search options							
Search again							
Remember my selection (for this Launch configuration)							
?			ОК	Cancel			

4. After the Debug process is complete, open the "Device Manager" in windows and go to "Ports (COM & LPT)" to check the mbed COM port number. In this case, COM 22 is our COM port number.

ᡖ Device Manager	_		×		
File Action View Help					
🗇 🏟 📰 🚺 🎫					
V 🛱 Ports (COM & LPT)					
Intel(R) Active Management Technology - SOL (COM3)					
mbed Serial Port (COM22)			×		

5. Now the example is ready to run. Open Tera Term on the appropriate COM port (i.e. COM 22 in this case). Configure port for 115200 bps, 8 bits data, no parity, and 1 stop bit (115200/8/N/1).

Itera Term - [disconnected] VT		
File Edit Setup Control Window Help		
Terminal		
Window		
Font	Tera Term: Serial port set	un X
Keyboard	reio reini senor por sen	
Serial port Proxy	Port:	СОМ22 ~ ОК
SSH	Speed:	115200 ~
SSH Authentication	Data:	8 hit v Cancel
SSH Forwarding	D didi	
SSH KeyGenerator	Parity:	none v
TCP/IP	Stop bits:	1 bit 🗸 Help
General		
Additional settings	Flow control:	none v
Save setup	T	
Restore setup		VY
Setup directory	0 mse	c/char 0 msec/line
Load key map		

6. Click resume button in MCUXpresso.

File Edit Source Refactor Navigate Search Project ConfigTools Run RTOS Analysis Window <u>H</u>elp 📑 🗕 🔚 🐘 📎 🕶 🔦 🖛 🔜 🖉 🏷 📃 🔌 🔳 🔊 🥆 🔊 🖻 3.7 🕩 🚻 20 Project Explorer 🔀 👭 Registers 💠 Faults 🚼 Perig Resume (F8) 🏇 Debug 🖾

7. You should see this output from i.MX RT.



8. Type any of the command(s) and press enter to execute.



9. Click Terminate button in MCUXpresso to stop the test.



8.7 Example evkmimxrt1060_wifi_webconfig

- 1. Refer to **Section 7** to import and patch the evkmimxrt1060_wifi_webconfig example, and select the current module (2DS, 1XK or 1ZM).
- 2. Click Debug in the QuickStart Panel.



3. For the very first attempt, you need to select the appropriate JTAG adapter. Select the adapter and click OK, and then wait for a while for the build. You can see the log on console window.

Probes discovered >								
Connect to target: MIMXRT1062xxxxA 1 probe found. Select the probe to use:								
Available attached pro	obes							
Name	Serial number	Туре	Manufactur	IDE Debug Mo				
S DAPLink CMSIS-DAP	022900001297	Link	ARM	Non-Stop				
Supported Probes (tick/untick	to enable/disable)				ή			
MCUXpresso IDE LinkServe	er (inc. CMSIS-DAP) probes						
P&E Micro probes		*1						
SEGGER J-Link probes								
Decks seconds anticare					_			
Search again	Probe search options							
Search again								
Remember my selection (for this Launch configuration)								
?		E	ОК	Cancel				

4. After the Debug process is complete, open the "Device Manager" in windows and go to "Ports (COM & LPT)" to check the mbed COM port number. In this case, COM 22 is our COM port number.

ᡖ Device Manager	_		×		
File Action View Help					
🗇 🏟 📰 🚺 🎫					
V 🛱 Ports (COM & LPT)					
Intel(R) Active Management Technology - SOL (COM3)					
mbed Serial Port (COM22)			×		

5. Now the example is ready to run. Open Tera Term on the appropriate COM port (i.e. COM 22 in this case). Configure port for 115200 bps, 8 bits data, no parity, and 1 stop bit (115200/8/N/1).

Itera Term - [disconnected] VT		
File Edit Setup Control Window Help		
Terminal		
Window		
Font	Tera Term: Serial port set	un X
Keyboard	reio reini senor por sen	
Serial port	Port:	СОМ22 ~ ОК
SSH	Speed:	115200 ~
SSH Authentication	Data:	8 hit V Cancel
SSH Forwarding	D'ata.	o bit
SSH KeyGenerator	Parity:	none v
TCP/IP	Stop bits:	1 bit 🗸 Help
General		
Additional settings	Flow control:	none ~
Save setup		
Restore setup	Transmit dela	IY
Setup directory	0 mse	c/char 0 msec/line
Load key map		

6. Click resume button in MCUXpresso.

<u>F</u> ile	<u>E</u> dit	<u>S</u> ource	Refac <u>t</u> or	<u>N</u> avigate	Se <u>a</u> rch	Project	ConfigTo	ools <u>R</u>	un RTOS	Analysis	<u>W</u> indow	<u>H</u> elp
 -		@ 📎	- 🔨 -	B : 4 4) 📮	`≈ ∎►	10 🔲 8	V 3	🔁 _r - :	5. Tr. 1) 🗓 🖷	2 0
陷 Pr	oject l	Explorer 🛛	3 1919 Reg	gisters 🐐	Faults 🚪	A Perir Re	sume (F8)		🎄 Debug	×	

7. You should see this output from i.MX RT on Tera Term.



8. From a wireless client device (can be a laptop, or a phone), search for available wireless networks and connect to "nxp_configuration_access_point" SSID. The password is "NXP0123456789".



9. Open the web browser on the client device (Microsoft Internet Explorer is not supported) and go to "192.168.1.1" IP address. The wifi_webconfig example creates a web-based configuration interface to set up the Wi-Fi client configurations here. The EVK is currently set up as an AP, as can be seen in the UI. You can scan for available networks here.

	Wi-Fi web configuration	
MIMXRT1060-EVK 192.168.1.1 Current Wi-Fi Mode:	Available Wi-Fi Networks - Click to Join:	
AP Client	dlink (WPA2)BSSID:E8:CC:18:C6:66:BDChannel:11Signal Strength:-91dBm	
Clear Board settings	Murata_5 (Open) [5GHz]BSSID:60:38:E0:9A:A3:9CChannel:161Signal Strength:-45dBm	
	RNMKR_2 (WPA2) BSSID: 30:49:50:29:5A:51 Channel: 11 Signal Strength: -54dBm	
	RNMKR_5 (WPA2) [5GHz] BSSID: 30:49:50:29:5A:52 Channel: 44 Signal Strength: -52dBm	

10. Click on a network of your selection to connect to it.

Available Wi-Fi Networks - C	Click to Join:
Murata_5 (Open) [5GHz] BSSID: Channel: Signal Strength:	60:38:E0:9A:A3:9C 161 -45dBm
RNMKR_2 (WPA2) BSSID: Channel: Signal Strength:	30:49:50:29:5A:51 11 -53dBm
RNMKR_5 (WPA2) [5GHz] BSSID: Channel: Signal Strength:	30:49:50:29:5A:52 44 -51dBm

11. Enter the network password (if required) and click on connect.

Enter Credentials				
SSID:	2	d		
Murata_5				
Connect	Attempting conn You will get disconnected to board switches as a client to Please connect your device	from the current Wi-Fi Accesto your selected network. e to that network to continue	<u>5</u> Network ass-point while the e.	
			Succes Now join the <u>192.168.1.142</u>	Sfully connected Murata_5 network and browse to the IP:

12. If connection is successful, the credential will be saved on the EVK mflash and will be used automatically after the EVK reboots. The AP will be turned off. You should see this output on Tera Term. Note the IP address shown.

Clie	nt => 28:3A:4D:	36:5B:6D Associated with Soft AP
Init	iating scan	
	R	NMKR 2
	BSSID	: 30:49:50:29:5A:51
	RSSI	: -53dBm
	Channel	: 11
	BSSID	: 32:49:50:19:5A:51
	RSSI	: -54dBm
	Channel	: 11
RNMK	R_5	
	BSSID	: 30:49:50:29:5A:52
	RSSI	: -51dBm
	Channel	: 44
	BSSID	: 32:49:50:19:5A:52
	RSSI	: -51dBm
	Channel	: 44
Mura	ta_5	
	BSSID	: 60:38:E0:9A:A3:9C
	RSSI	: -45dBm
	Channel	: 161
[i]	Chosen ssid: Mu	irata_5
[i]	Chosen passphra	se: ""
[i]	Joining: Murata	_5
Conn	ected to follow	ning BSS:SSID = [Murata_5], IP = [192.168.1.142]
[i]	Successfully jo	ined: Murata_5
Now	join that netw	ork on your device and connect to this IP: 192.168.1.142
[i]	mflash_save_fil	e success
Clie	nt => 28:3A:4D:	36:5B:6D Associated with Soft AP
[i]	Stopping AP!	
Soft	AP stopped suc	cessfully

Upon reboot, the EVK will henceforth automatically connect to the saved network.

- 13. Connect the wireless client device to the same network as the EVK, open the web browser and go to the IP address shown on the Tera Term window (192.168.1.142 in this example).
- 14. The web-based configuration interface will be accessible here. The EVK is currently set up as a Wi-Fi client, as can be seen in the UI.

N	P	Wi-Fi web cor	nfiguration
MIMXRT 192.16 Current V	1060-EVK 58.1.142 Vi Ei Modo:	Available Wi-Fi Network	ks - Click to Join:
AP	Client	dlink (WPA2) BSSID: Channel: Signal Strength:	E8:CC:18:C6:66:BD 11 -89dBm
Clear Boa	ard settings	Murata_5 (Open) [5GHz] BSSID: Channel: Signal Strength:	60:38:E0:9A:A3:9C 161 -40dBm
		RNMKR_2 (WPA2) BSSID: Channel: Signal Strength:	30:49:50:29:5A:51 11 -54dBm

15. You can use the "Clear Board settings" button on the interface to remove the saved network settings.

	Wi-Fi web configuration
MIMXRT1060-EVK 192.168.1.142 Current Wi-Fi Mode:	Available Wi-Fi Networks - Click to Join:
AP Client	dlink (WPA2) BSSID: E8:CC:18:C6:66:BD Channel: 11
Scan Wi-fi Networks	Signal Murat BSSIL Chant Signal This will clear the saved Wi-Fi credentials from the board flash and reset the board back to AP mode. You will have to manually reconnect to the board access point. RNMP BSSIL Chant Clear
	Signa Cancel Success Successfully cleared the flash memory and reset to an AP. Please connect you device back to the AP and browse to the IP: 192.168.1.1.

8.8 Example evkmimxrt1060_spp

- 1. Refer to **Section 7** to import and patch the evkmimxrt1060_spp example, and select the current module (2DS, 1XK or 1ZM).
- 2. Click Debug in the QuickStart Panel.



3. For the very first attempt, you need to select the appropriate JTAG adapter. Select the adapter and click OK, and then wait for a while for the build. You can see the log on console window.

X	Probes discovered					×
Cor	nect to target: MIMXRT	1062xxxxA				
I P	robe found. Select the prob	e to use:				
Av	ailable attached pro	obes				
	Name	Serial number	Туре	Manufactur	IDE Debug M	lo
LS	DAPLink CMSIS-DAP	022900001297	Link	ARM	Non-Stop	
						_
Su	pported Probes (tick/untick	to enable/disable)				
	MCUXpresso IDE LinkServe	er (inc. CMSIS-DAP) probes			
	P&E Micro probes					
	SEGGER J-Link probes					
⊢ Pro	Probe search ontions					
Search again						
Remember my selection (for this Launch configuration)						
				ОК	Cancel	

4. After the Debug process is complete, open the "Device Manager" in windows and go to "Ports (COM & LPT)" to check the mbed COM port number. In this case, COM 22 is our COM port number.

ᡖ Device Manager	_		×
File Action View Help			
🗇 🏟 📰 🚺 🎫			
V Ports (COM & LPT)			^
Intel(R) Active Managemer	it Technology - SOL	. (COM3)	
mbed Serial Port (COM22)			×

5. Now the example is ready to run. Open Tera Term on the appropriate COM port (i.e. COM 22 in this case). Configure port for 115200 bps, 8 bits data, no parity, and 1 stop bit (115200/8/N/1).

Itera Term - [disconnected] VT		
File Edit Setup Control Window Help		
Terminal		
Window		
Font	Tera Term: Serial nort set	un X
Keyboard	reid ferni bendi pore set	ф <u>х</u>
Serial port	Port:	СОМ22 ~ ОК
SSH	Speed:	115200 ~
SSH Authentication	Data:	8 hit V Cancel
SSH Forwarding	D d d	
SSH KeyGenerator	Parity:	none ~
TCP/IP	Stop bits:	1 bit 🗸 Help
General		
Additional settings	Flow control:	none v
Save setup	T	
Restore setup		ју
Setup directory	0 mse	c/char 0 msec/line
Load key map		

6. Click resume button in MCUXpresso.

<u>F</u> ile	<u>E</u> dit	<u>S</u> ource	Refac <u>t</u> or	<u>N</u> avigate	Se <u>a</u> rch	Project	Config	Tools	<u>R</u> un	RTOS	Analysis	<u>W</u> indow	<u>H</u> elp
: 📬 ·	F	@ 📎	- 🔨 -	B : 4 4) 🗉	`≈ ∎►		N 3	•	R.		Þ 🗓 🖷	2 3
Pr	oject l	Explorer 🛛	3 1919 Reg	gisters 救	Faults 💡	a Perir Re	sume (F	8)			🎄 Debug	X	

7. You should see this output from i.MX RT on Tera Term.



- 8. Given below are the list of supported commands.
 - bt discover: Start scan to find BT devices
 - bt connect: Connect to one of the found devices. For example: bt connectdevice n (indexing starts from 1)
 - bt disconnect: Disconnect current connection
 - bt delete: Delete all devices. Ensure to disconnect the HCI link connection with the peer device before attempting to delete the bonding information
 - spp register [5|3]: Register an SPP server channel
 - spp discover: Discover SPP server channel on peer device
 - spp connect [channel]: Create SPP connection
 - spp disconnect: Disconnect current SPP connection
 - spp send [1|2|3|4]: Send data over SPP connection
- 9. Click Terminate button in MCUXpresso to stop the test.



9 Murata's uSD-M.2 Adapter

9.1 Connecting the Wi-Fi/BT M.2 EVB to uSD-M.2 Adapter

When connecting the Wi-Fi/BT M.2 EVB to uSD-M.2 Adapter Rev B1 (**Figure 8**), make sure to (#1) firmly insert it before using M.2 screw to (#2) secure it in place. Important Jumpers (J12, J13, and J1) are highlighted.



Figure 8: Connecting the Wi-Fi/BT M.2 EVB to uSD-M.2 Adapter

9.2 Configuring uSD-M.2 Adapter Jumpers for Correct VIO Signaling

Figure 9 shows a block diagram highlighting the Host (i.MX EVK) and Wi-Fi/BT M.2 EVB VIO signaling voltages. The legacy i.MX 6 EVK's (excluding the i.MX 6UL(L) EVK's) have J13/J12 set to 1-2/2-3 positions respectively for the 3.3V VIO override mode setting (WLAN-SDIO, BT-UART, and WLAN/BT control signals all at 3.3V VIO).

All other i.MX EVK's (i.MX 8M Mini/Nano & i.MX 6UL(L) EVK's) have J13/J12 set to 1-2/1-2 positions respectively for the 1.8V VIO default configuration (WLAN-SDIO VIO at 1.8V VIO; BT-UART and WLAN/BT control signals at 3.3V VIO).

Figure 9: Host/M.2 IO Voltage Level Shift Options on Rev B1 Adapter



9.3 Securing uSD-M.2 Adapter to NXP i.MX EVK

On NXP i.MX RT EVK's, a common issue that customers run into is an unreliable uSD electrical connection when using Murata's uSD-M.2 Adapter. The poor interconnect is caused by the pushpush (micro) SD card connectors on NXP i.MX EVK's.

To properly secure the uSD-M.2 Adapter interconnect on the i.MX RT EVK's, Murata *strongly recommends* to simply tape the <u>uSD Adapter-EVK</u> connection as shown in **Figure 10**. Note that taping the <u>uSD Adapter-EVK</u> connection makes the platform a little less flexible to work with. However, removing and re-applying clear tape is straightforward.



Figure 10: Securing uSD Connection

9.4 uSD-M.2 Adapter High-Level Description

Figure 11 and **Figure 12** show the features on the uSD-M.2 Adapter; with text explanation in **Table 6.** The uSD-M.2 Adapter supports additional signals to WLAN-SDIO using either Arduino headers (J5, J8, and J9) or 20 pin FFC connector (J6). For more details on Murata's uSD-M.2 Adapter, refer to the <u>Adapter Datasheet</u> or <u>Hardware User Manual</u>.

Table	6:	uSD-N	1.2 A	dapter	Features
10010	•••			aaptor	1 04(4) 00

Char	Description
Α	microSD connector provides Power (VBAT, GND) and WLAN-SDIO
В	SDIO bus test points (CLK, CMD, DAT0, DAT1, DAT2, DAT3)
С	Power LED Indicator (green): if not illuminated then no power applied to M.2 EVB
D	J11 = Optional BT Disable Jumper (not used)
E	J9 = BT UART TX/RX and WLAN/BT Control Signals (8 pin header)
F	J5 = Optional BT PCM and WLAN/BT Debug Signals (2x8 pin header)
G	Threaded mount for M.2 screw: 30mm distance from M.2 connector
н	Regulator to step down optional 5V VBAT from USB or Arduino header to 3.3V
l	External sleep clock input (32.768kHz)
J	J7 = Optional Arduino Header Power Supply (8 pin header; 5V or 3.3V VBAT)
K	J8 = BT UART RTS/CTS Signals (6 pin header)
L	J13 = Host IO Voltage: J13 in 1-2 pos for 3.3V VDDIO (default); J13 in 2-3 pos for 1.8V
Μ	J12 = M.2 IO Voltage: J12 in 1-2 pos for 1.8V VDDIO (default); J12 in 2-3 pos for 3.3V
Ν	J2 = Optional 5V USB Power Supply via Micro-AB USB Connector
Ο	LED2 = 3.3V M.2 IO Voltage Indicator (Blue) – not illuminated in default configuration
Ρ	Regulator to provide optional 1.8V VIO to M.2 interface (M.2 EVB's have own 1.8V onboard)
Q	J1 = Power Supply Selector Jumper must be installed to power Adapter (unless J5 Arduino Header Pins #15/16 are connected to external GND/3.3V VBAT). Position 1-2: 5V/3.3V VBAT supply from micro-USB (J2); or Arduino (J7) Position 2-3: VBAT supply (typical 3.1~3.3V) from microSD connector
R	M.2 Connector: type 2230-xx-E
S	microSD connector pins: provides Power (VBAT, GND) and WLAN-SDIO
Т	WLAN JTAG header (header pins not populated)
U	20 pin FFC connector (BT UART, BT PCM, WLAN/BT Control signals)
V	Additional test points from 20pin flat/flex connector



Figure 12: uSD-M.2 Adapter Features (Bottom View)



9.5 uSD-M.2 Adapter Schematic and Layout

For more specifics on adapter circuit and layout refer to Figure 13, Figure 14, and Figure 15.



Figure 13: uSD-M.2 schematic







Figure 14: uSD-M.2 Adapter Layout (top)

Figure 15: uSD-M.2 Adapter Layout (bottom)



10 Technical Support Contact

Table 7 lists all the support resources available for the Murata Wi-Fi/Bluetooth solution.

Support Site	Notes
Murata Community Forum	Primary support point for technical queries. This is an open forum for all customers. Registration is required.
Murata i.MX Landing Page	No login credentials required. Murata documentation covering hardware, software, testing, etc. is provided here.
<u>Murata uSD-M.2 Adapter Landing</u> Page	Landing page for uSD-M.2 Adapter. In conjunction with Murata i.MX Landing Page, this should provide the user with comprehensive getting started documentation.
Murata Module Landing Page	No login credentials required. Murata documentation covering all Cypress-based Wi-Fi/BT modules is provided here.

Table 7: List of Support Resources

11 Additional Useful Links

In addition to **Table 7** listings of support resources, **Table 8**, **Table 9**, **Table 10** and **Table 11** provides some useful links.

Link	Notes
MCUXpresso IDE	Landing page to download MCUXpresso IDE
MCUXpresso SDK	Comprehensive information of MCUXpresso SDK
MCUXpresso SDK Builder	Customize and build MCUXpresso SDKs
LPC-Link 2	Landing page of the debug probe for i.MX RT EVKs
i.MX RT 1050 EVK	Landing page of the i.MX RT 1050 EVK
i.MX RT 1060 EVK	Landing page of the i.MX RT 1060 EVK
i.MX RT 1064 EVK	Landing page of the i.MX RT 1064 EVK
i.MX RT 1160 EVK	Landing page of the i.MX RT 1160 EVK
i.MX RT 1170 EVK	Landing page of the i.MX RT 1170 EVK
i.MX RT 595 EVK	Landing page of the i.MX RT 595 EVK
i.MX RT 685 EVK	Landing page of the i.MX RT 685 EVK
i.MX RT 1050 Getting Started	Getting started guide for the i.MX RT 1050 EVK
i.MX RT 1060 Getting Started	Getting started guide for the i.MX RT 1060 EVK
i.MX RT 1064 Getting Started	Getting started guide for the i.MX RT 1064 EVK
i.MX RT 1160 Getting Started	Getting started guide for the i.MX RT 1160 EVK
i.MX RT 1170 Getting Started	Getting started guide for the i.MX RT 1170 EVK

Table 8: NXP links

Table 9: Embedded Artists' Landing Pages

Landing Pages	Notes
Embedded Artists' Website	The Art of Embedded Systems Development – made EASY™
i.MX RT COM Boards	Listing of Computer-on-Module boards.
i.MX RT COM Carrier Board V2	Main baseboard which all the COM boards plug into.
M.2 Module Family	Top level listing of 1ZM, 1YM, 1XK, 2DS M.2 EVBs.

Table 10: Embedded Artists' Datasheets and Schematics

Datasheets and Schematics	Notes					
i.MX RT COM Carrier Board V2 Datasheet	Comprehensive definition of COM Carrier (baseboard).					
i.MX RT COM Carrier Board V2 Schematics	Complete schematics including clear definition of uSD-M.2 Adapter.					
M.2 SDIO Interface Schematic	Reference schematic for customers designing in WLAN-SDIO M.2 EVB.					
M.2 PCIe Interface Schematic	Reference schematic for customers designing in WLAN-PCIe M.2 EVB.					
EACOM Board Specification Guide	Comprehensive definition of Embedded Artists' Computer-On-Module's.					
1ZM M.2 Module Datasheet	Comprehensive details on 1ZM Wi-Fi/BT M.2 Module.					
1YM M.2 Module Datasheet	Comprehensive details on 1YM Wi-Fi/BT M.2 Module.					
1XK M.2 Module Datasheet	Comprehensive details on 1XK Wi-Fi/BT M.2 Module.					
2DS M.2 Module Datasheet	Comprehensive details on 2DS Wi-Fi/BT M.2 Module.					

Table 11: Embedded Artists' User Manuals and Software

User Manuals and Software	Notes
Getting Started with M.2 modules and i.MX RT	How to bring up Embedded Artists i.MX RT Dev Kits.
Wi-Fi/BT M.2 EVB Primer	Introduction and drill-down on M.2 interface.

12 Appendix: HOST/M.2 VDDIO Voltage Settings (Rev B1 vs. Rev A)

Table 12 summarizes J13/J12 jumper settings for **Rev B1 of the uSD-M.2 Adapter**, indicating what Host and M.2 VIO voltages are being configured. The default configuration for J13/J12 (Host/M.2 VIO) is setting both jumpers in 1-2 position. This configures the M.2 VIO for WLAN-SDIO (and optional PCM) at 1.8 volts. The BT-UART and select WLAN-BT CTRL signals are level shifted from Host 3.3V to M.2 1.8V as necessary to adhere to the M.2 specification.

The "**3.3V Override**" configuration is used when the Host MPU/MCU platform **can only support 3.3V VIO signaling on WLAN-SDIO interface**. This override feature **only** works with M.2 EVB's that support 3.3V VIO signaling (currently 1DX and 1MW). The J13/J12 settings for this override mode are 1-2/2-3 respectively as shown in the block diagram.

Revision A of the uSD-M.2 Adapter **does not support level shifting** on BT-UART nor on select WLAN/BT CTRL signals. The limitation with the Rev A adapter is that the Host and/or M.2 interface may over-drive certain pins at 3.3V VIO which are configured for 1.8V input. This limitation has been **corrected** with Revision B1. Note the Rev A of the uSD-M.2 Adapter "3.3V Override" configuration is configured by connecting Jumper J12.

 Table 12: HOST/M.2 IO Voltage Levels Settings Figure 16: Rev A (left) and Rev B1 (right) Adapter configured for default 1.8V VIO



Figure 17: Rev A (left) and Rev B1 (right) Adapter configured for default 3.3V VIO Override



Figure 16 and **Figure 17** shows comparison between jumper J12 setting in between rev A and rev B1 adapter.

Figure 16: Rev A (left) and Rev B1 (right) Adapter configured for default 1.8V VIO



Figure 17: Rev A (left) and Rev B1 (right) Adapter configured for default 3.3V VIO Override





To configure 1.8V VIO (default) mode (blue LED2 is not illuminated):

- For Rev A uSD-M.2 Adapter: Jumper J12 is removed/open.
- For Rev B1 uSD-M.2 Adapter:
 - Jumper J12 is installed in 1-2 position.
 - Jumper J13 is installed in 1-2 position.

To configure 3.3V VIO Override mode (blue LED2 illuminated):

- For Rev A uSD-M.2 Adapter: Jumper J12 is installed/shorted.
- For Rev B1 uSD-M.2 Adapter:
 - Jumper J12 is installed in 2-3 position.
 - Jumper J13 is installed in 1-2 position.

For more specifics on rev A adapter circuit and layout refer to Figure 18: rev A uSD-M.2 Adapter Schematic, Figure 19: rev A uSD-M.2 Adapter Layout (top), and Figure 20: rev A uSD-M.2 Adapter Layout (bottom).

	Multiple signals	Pin Headers	SDIO_CMD SDIO_DATA_0 SDIO_DATA_1 SDIO_DATA_2 SDIO_DATA_3	uSD VDD SDIO_CLK	micro SD Interface
	←				Functional Block Diagram
	→ Multiple signals		SDIOCMD (p11) SDIODATA0 (p13) SDIODATA1 (p15) SDIODATA2 (p17) SDIODATA3 (p19)	VDD33 (p1/2/72//4) SDIOCLK (p9)	M.2 Connector
UL = UnLoaded = normally not mounted component. Default jumper settings are indicated in the schematic. However, always check jumper positions on actual boards since there is no guarantee that all jumpers are in default place. Rev A Public release. Initial design. Initial design. (C) Embedded Artists AB TITLE: USD M.2 Adapter fixed 3U3 rev A Document Number: Date: 2013-02-13 (03:31:39)					





Figure 20: rev A uSD-M.2 Adapter Layout (bottom)

