MCUSDKARTOSRN

MCUXpresso SDK Azure RTOS Release Notes

Rev. 2.16.000 — 17 June 2024 **Release notes**

Document information

Information	Content
Keywords	AzureRTOS, Azure, MCUXSDK, MCUXpresso, Release Notes, MCUSDKARTOSRN
Abstract	This document describes the MCUXpresso SDK release notes for MCUXpresso SDK Azure RTOS.

1 MCUXpresso SDK Azure RTOS introduction

Azure RTOS is an embedded development suite including a small but powerful operating system that provides reliable, ultrafast performance for resource-constrained devices. It is easy-to-use and market-proven, deployed on more than 6.2 billion devices worldwide. Azure RTOS supports the most popular 32-bit microcontrollers and embedded development tools. Azure RTOS components include Azure RTOS ThreadX, Azure RTOS ThreadX Modules, Azure RTOS FileX, Azure RTOS GUIX, Azure RTOS NetX Duo, and Azure RTOS USBX. This release includes the above components and corresponding examples. For more information and getting started instructions, see Getting Started with MCUXpresso SDK for Azure RTOS (document MCUXSDKAZURERTOSGSUG).

Table 1. Azure RTOS component version

Azure RTOS components	Version
ThreadX	6.4.1
FileX	6.4.1
LevelX	6.4.1
NetX DUO	6.4.1
USBX	6.4.1
GUIX	6.4.1

In this release, Azure RTOS supports Open-CMSIS-Pack (OCP). It is an open standard delivery mechanism for software components, device parameters, and evaluation board support. Users are able to easily download required packs in CMSIS-Pack managers of IDEs. For example, the Azure RTOS source code is available in NXP.AZURE_RTOS.1.0.0.pack, and example projects related to Azure RTOS are available in NXP. MIMXRT1160-EVK_AZURE_RTOS_Examples.1.0.0.pack for MIMXRT1160 EVK board.

2 Supported development systems

This release supports the boards and examples listed in the following table.

Table 2. Supported boards and examples

Components	Example Name	Boards	Description
ThreadX	i2c_example	evkmimxrt1020, evkmimxrt1040 evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s06, lpcxpresso55s16, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69	The example shows an application using Azure RTOS ThreadX with the I2C driver.
	spi_b2b_example_master	evkmimxrt1010,	The example shows how to use the LPSPI driver in the

Table 2. Supported boards and examples*...continued*

Components	Example Name	Boards	Description
		evkmimxrt1015, evkmimxrt1020, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064	master mode with Azure RTOS.
	spi_b2b_example_slave	evkmimxrt1010, evkmimxrt1015, evkmimxrt1020, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064	The example shows how to use the LPSPI driver in the slave mode with Azure RTOS.
	spi_example	evkbimxrt1050, lpcxpresso55s06, lpcxpresso55s16, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69	The example shows how to use the SPI driver with Azure RTOS.
	threadx_demo	evkmimxrt1010, evkmimxrt1015, evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s06, lpcxpresso55s16, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69, mcxn9xxevk	An example of creating multiple threads.
	uart_example	evkmimxrt1010, evkmimxrt1015, evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050,	The example demonstrates how to use the UART driver in Azure RTOS.

Table 2. Supported boards and examples*...continued*

Components	Example Name	Boards	Description
		evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s06, lpcxpresso55s16, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69	
ThreadX Modules	threadx_module_manager	evkmimxrt1060	This example creates a ThreadX Module Manager thread that manages module loading, starting, stopping and unloading.
	threadx_module	evkmimxrt1060	This example includes two threads of same priorities, using two message queue to communicate between these two threads and calling the uart interface to print information.
FileX	filex_ram_disk	evkmimxrt1010, evkmimxrt1015, evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s06, lpcxpresso55s16, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69, mcxn9xxevk	This is a small demo of the high-performance FileX FAT file system.
	filex_sdcard	evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060,	The example shows how to use the SD card middleware with Azure RTOS.

Table 2. Supported boards and examples*...continued*

Components	Example Name	Boards	Description
		evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s28, lpcxpresso55s69	
LevelX	filex_levelx_spiflash	lpcxpresso55s06, lpcxpresso55s16, lpcxpresso55s28, lpcxpresso55s69	The example shows how to use FileX and LevelX based on SPI NOR flash.
	filex_levelx_mflash	evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s36	The example shows how to use FileX and LevelX with the mflash component.
GUIX	guix_washing_machine	evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064	A GUI example of a washing machine. Support PXP acceleration.
	guix_washing_machine_hd	evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170	A high-definition GUI example of a washing machine. Support PXP acceleration.
NetX Duo	azure_iot_embedded_sdk	evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s28, lpcxpresso55s69, mcxn9xxevk	An example communicating with Azure IoT Hub using Azure IoT SDK.

Table 2. Supported boards and examples*...continued*

Components	Example Name	Boards	Description
	azure_iot_embedded_sdk_pnp	evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, mcxn9xxevk	An example communicating with Azure IoT Hub using Azure IoT SDK and enabling Azure IoT Plug and Play feature.
	azure_iot_embedded_sdk_adu	evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1170	This example showcases the Azure device update (ADU) feature. It connects to Azure IoT Hub and starts interacting with the service, Device Update for IoT Hubs. When the example is running, it will report the device status, and fetch the device update information. In this example, the device credential is stored in flash securely.
	azure_iot_mqtt	evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, mcxn9xxevk	An example communicating with Azure IoT Hub using MQTT
	ethernet_over_usb	lpcxpresso55s28, lpcxpresso55s69	An example doing the iperf network test over a HP USB Ethernet adapter.
	netx_duo_iperf	evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064,	An example doing the iperf network test.

Table 2. Supported boards and examples*...continued*

Components	Example Name	Boards	Description
		evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, mcxn9xxevk	
	netx_duo_ping	evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, mcxn9xxevk	A network ping example.
	pnp_temperature_controller	evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, mcxn9xxevk	An example communicating with Azure IoT Hub using Azure IoT SDK and enabling Azure IoT Plug and Play feature, constantly reporting the device temperature value.
	azure_iot_embedded_sdk_adu_se050	evkmimxrt1060, evkbmimxrt1060, evkmimxrt1170	This example is similar to azure_iot_embedded_sdk_adu. The difference is using SE050 to store device credential (private key and device certificate) and support device authentication when connecting with Azure IoT hub.
USBX	usbx_device_audio_loopback	lpcxpresso55s16, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69	This example works as a USB audio device. When connecting it to a PC, it will appear as a USB speaker and a USB microphone device.
	usbx_device_audio_microphone	evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060,	This example works as a USB Audio Microphone device. It will appear as a USB Audio Microphone when connected to PC.

Table 2. Supported boards and examples*...continued*

Components	Example Name	Boards	Description
		evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170	
	usbx_device_audio_speaker	evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170	This example works as a USB Audio Speaker device. It will appear as a USB Speaker device when connected to PC.
	usbx_device_cdc_acm	lpcxpresso55s16, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69	An example works as a USB CDC ACM device.
	usbx_device_cdc_acm_ecm	mcxn9xxevk	An example works as a USB composite device with CDC ACM and CDC ECM.
	usbx_device_composite_cdc_acm_cdc_acm	evkmimxrt1010, evkmimxrt1015, evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s16, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69, mcxn9xxevk	This example works as two USB CDC ACM devices.
	usbx_device_hid_keyboard	evkmimxrt1010, evkmimxrt1015, evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060,	An example works as a USB HID keyboard device.

Table 2. Supported boards and examples*...continued*

Components	Example Name	Boards	Description
		evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s16, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69, mcxn9xxevk	
	usbx_device_hid_mouse	evkmimxrt1010, evkmimxrt1015, evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s16, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69, mcxn9xxevk	This example works as a USB HID mouse device.
	usbx_device_mass_storage	evkmimxrt1010, evkmimxrt1015, evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69, mcxn9xxevk	USB mass storage device example.
	usbx_device_hid_generic	evkmimxrt1010, evkmimxrt1015,	This example works as a USB generic HID device. A

Table 2. Supported boards and examples*...continued*

Components	Example Name	Boards	Description
		evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170	PC can communicate with it. The example has one EP IN and one EP OUT.
	usbx_host_cdc_acm	lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69	This example works as a USB host. It can communicate with a USB CDC ACM device
	usbx_host_hid_keyboard	evkmimxrt1010, evkmimxrt1015, evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69, mcxn9xxevk	An example works as a USB HID keyboard host. When connecting a USB HID keyboard and pressing keys, the serial port will output which key has been pressed.
	usbx_host_hid_mouse	evkmimxrt1010, evkmimxrt1015, evkmimxrt1020, evkmimxrt1024. evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69,	This example works as a USB HID mouse host. When connecting a USB HID mouse and clicking the mouse buttons, the serial console will output which button has been clicked.

Table 2. Supported boards and examples*...continued*

Components	Example Name	Boards	Description
		mcxn9xxevk	
	usbx_host_mass_storage	evkmimxrt1010, evkmimxrt1015, evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkcmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkmimxrt1170, evkbmimxrt1170, lpcxpresso55s28, lpcxpresso55s36, lpcxpresso55s69, mcxn9xxevk	USB mass storage host example.
combined examples	combine_usbx_netxduo_filex	evkmimxrt1020, evkmimxrt1024, evkmimxrt1040, evkbimxrt1050, evkmimxrt1060, evkbmimxrt1060, evkmimxrt1064, evkmimxrt1160, evkcmimxrt1060, evkmimxrt1170, evkbmimxrt1170	An example combined a ping example and a USB mass storage device example. It uses these components: ThreadX, FileX, USBX, NetX Duo.

3 Known issues

This section lists the known issues, limitations, and/or workarounds.

3.1 NetX Duo iperf example

The NetX Duo iperf example works for Linux but not for Windows 10.

3.2 ThreadX Module example

The ThreadX Module example currently only supports the IAR toolchain.

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