

# Release Notes for ADuCM4x50 EZ-KIT Board Support Pack 3.1.0

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## **1** Introduction

This document describes the changes for the ADuCM4x50 EZ-KIT Board Support Pack 3.1.0, a software product supported in both Keil uVision, CrossCore Embedded Studio® (CCES) and IAR Embedded Workbench. The main modification in this version is the addition of IAR Embedded Workbench support in a CMSIS Pack, with examples now available for this integrated development environment.

# 2 Differences between version 3.1.0 and prior versions

The main changes in version 3.1.0 is the extended support for IAR Embedded Workbench 8.x.

# **3 Required Software**

#### 3.1 Keil uVision

To use this ADuCM4x50 EZ-KIT Board Support Pack with Keil uVision, you must first obtain and install:

- Keil uVision MDK v5.22 or later with ARM Compiler version 1.1.0 or later,
- Segger J-Link LITE v5.10p or later,
- ADuCM4x50 Device Family Pack 3.1.0.

Install the Keil software first, then the Segger J-Link LITE software and finally the software packages.

#### 3.2 CrossCore Embedded Studio

To use this ADuCM4x50 EZ-KIT Board Support Pack with CrossCore Embedded Studio, you must first obtain and install:

- CrossCore Embedded Studio 2.7.0 or later,
- ADuCM4x50 Device Family Pack 3.1.0.

Install the CrossCore Embedded Studio software first, then the software packages.

#### 3.3 IAR Embedded Workbench

To use this ADuCM4x50 EZ-KIT Board Support Pack with IAR Embedded Workbench for ARM, we recommend that you first obtain and install:

- IAR Embedded Workbench for ARM 8.20.1 or later,
- Segger J-Link LITE v5.10p or later,
- ADuCM4x50 Device Family Pack 3.1.0.

Install the IAR Embedded Workbench software first, then the Segger J-Link LITE software and finally the software packages.

## **4 Release Testing**

#### 4.1 Keil uVision

The ADuCM4x50 EZ-KIT Board Support Pack has been tested with

EZ-KIT		Emulator
ADuCM4050 LFC	SP EZ-KIT version 1.0 BOM Rev 1.2	J-Link Lite
ADuCM4050 WLC	SP EZ-KIT version 1.0 BOM Rev 2.1	J-Link Lite

#### 4.2 CrossCore Embedded Studio

The ADuCM4x50 EZ-KIT Board Support Pack has been tested with

EZ-KIT		Emulator
ADuCM4050 LFCSP EZ-KIT version 1.	.0 BOM Rev 1.2	ICE-1000
		ICE-2000
ADuCM4050 WLCSP EZ-KIT version 1.	.0 BOM Rev 2.1	ICE-1000
		ICE-2000

#### 4.3 IAR Embedded Workbench

The ADuCM4x50 EZ-KIT Board Support Pack has been tested with

EZ-KIT								Emulat	or
ADuCM4050	LFCSP	EZ-KIT	version	1.0	BOM	Rev	1.2	J-Link	Lite

EZ-KIT	Emulator
ADuCM4050 WLCSP EZ-KIT version 1.0 BOM R	ev 2.1 J-Link Lite

# **5 License Checking**

Use of the ADuCM4x50 EZ-KIT Board Support Pack software is subject to the Software License Agreement presented during installation.

The details of this Software License Agreement can be found in the CMSIS pack installation directory, in AnalogDevices\ADuCM4x50\_EZ\_KIT\_BSP\3.1.0\License.

### **6 Release Content**

This release contains the following sets of components:

- Source files for the drivers for off-chip peripherals which are on the ADuCM4x50 EZ-Kit. These components are authored by Analog Devices, for use on the ADuCM4x50 processor.
- Examples for all the drivers, device family and off-chip. These components are authored by Analog Devices, and demonstrate the use of the device drivers. Some of the examples make use of the FreeRTOS products, so have a dependency on FreeRTOS, which must be obtained separately.
- Documentation.

#### 6.1 Source files for off-chip peripherals drivers

adi_adxl363*.*	Acceleratometer ADXL363 driver
adi_w25q32*.*	W25Q32 SPI-flash driver

Various off-chip peripheral device driver sources and include files in "Source" and "Include" directories.

#### 6.2 Examples

All the examples available in ADuCM4x50 3.1.0 EZ-Kit Board Support Pack can be viewed using the Pack Installer, CCES Examples Viewer or IAR Embedded Workbench Examples Browser.

#### 6.2.1 Keil Pack Installer

Using, Keil Pack Installer, simply select the Analog Devices-ADuCM4050 device, in the Devices panel on the left side, and then the Examples panel on the right side: the list of examples will appear on the right side as in the following figure. Simply press *Copy* for the chosen example and follow the instructions.

🕸 Pack Installer - C:\Keil_v5\ARM\PACK	-	· · · · · · · · · · · · · · · · · · ·						
File Packs Window Help								
Device: Analog Devices - ADuCM4	050							
1 Devices Boards	Þ	4 Packs Examples		<u>ار</u>				
Search: 🗸 🗸	<	Show examples from installed Packs only						
Device /	Summary	Example	Action	Description				
🖃 😤 All Devices	3765 Devices	ADC_Channel_Read (ADuCM40	🚸 Сору	Example to read from ADC channel				
🗄 🔗 🖉 ABOV Semiconductor	10 Devices	Autobaud (ADuCM4050 EZ-KIT)	🚸 Сору	UART autobaud example				
🗄 🔗 🖉 Ambiq Micro	10 Devices	HelloWorld (ADuCM4050 EZ-KIT)	🚸 Сору	Hello World				
🖃 🔗 Analog Devices	21 Devices	LED_button_callback (ADuCM4	🚸 Сору	Push Button example using the GPIO driver				
🗄 🎋 ADuCM4x50 Series	1 Device	POST (ADuCM4050 EZ-KIT)	🚸 Сору	Application example with manufacturing tests for the EZ-KIT				
ADuCM4050	ARM Cortex	SPI_MasterSlave_LoopBack_Exa	🚸 Сору	Basic example demonstrating the SPI driver				
🕀 🔧 ADuCM32x Series	4 Devices	Spi_Loopback (ADuCM4050 EZ	🚸 Сору	Basic example demonstrating the SPI driver				
🕀 🏤 ADuCM36x Series	2 Devices	accel_fifo_lfcsp (ADuCM4050 EZ	🚸 Сору	Basic example demonstrating the accelerometer using FIFO for LFCSP boz				
🕀 🔧 ADuCM302x Series	2 Devices	accel_fifo_wlcsp (ADuCM4050 E	🚸 Сору	Basic example demonstrating the accelerometer using FIFO for WLCSP bc				
🕀 🏤 😌 CM4xx Mixed Signal Co	10 Devices	adxl363_accel_lfcsp (ADuCM405	🚸 Сору	Basic example demonstrating the accelerometer for LFCSP board				
🕀 🔧 CM41x Mixed Signal C	2 Devices	adxl363_accel_wlcsp (ADuCM40	🚸 Сору	Basic example demonstrating the accelerometer for WLCSP board				
🗄 🔗 ARM	35 Devices	beeper_example (ADuCM4050 E	🚸 Сору	Basic example demonstrating the BEEP driver				
🗄 🔗 Atmel	263 Devices	core_driven_crc (ADuCM4050 E	🚸 Сору	Basic example demonstrating the CRC driver (core driven)				
🗄 🖉 🗸 Cypress	425 Devices	crypto_example (ADuCM4050 E	🚸 Сору	Crypto driver example				
🗄 🖉 🖌 Holtek	22 Devices	dma_driven_crc_with_callback (	🚸 Сору	Basic example demonstrating the CRC driver (DMA driven with callback fu				
🗉 🔗 Infineon	166 Devices	dma_driven_crc_without_callba	🚸 Сору	Basic example demonstrating the CRC driver (DMA driven with no callbac				
🗄 🖉 🖉 Maxim	4 Devices	flash_block_protect (ADuCM405	🚸 Сору	Example for flash block protection				
🗄 🖉 🖉 MediaTek	2 Devices	flash_page_write (ADuCM4050 E	🚸 Сору	Example to write page to flash				
🗄 🔗 Microsemi	6 Devices	rng_example (ADuCM4050 EZ-K	🚸 Сору	Basic example demonstrating the RNG driver				
🗄 🔗 MindMotion	2 Devices	rtc_IO_example (ADuCM4050 EZ	🚸 Сору	Example demonstrates the SensorStrobe feature of RTC device.				
🗄 🔗 Nordic Semiconductor	10 Devices	rtc_alarm (ADuCM4050 EZ-KIT)	🚸 Сору	Example demonstrating the RTC alarm feature				
🗄 🖉 🔗 Nuvoton	436 Devices	spi_loopback_freertos (ADuCM4	🚸 Сору	Example uses the SPI driver in the context of FreeRTOS				
🔗 NXP	571 Devices	sport_loopback_dma (ADuCM4	🚸 Сору	Basic example demonstrating the SPORT driver (DMA driven)				
🗄 🔗 Renesas	3 Devices	sport_loopback_int (ADuCM405	🚸 Сору	Basic example demonstrating the SPORT driver (interrupt driven)				
🗄 🖉 🔗 Silicon Labs	397 Devices	systick_example (ADuCM4050 E	🚸 Сору	Example to demonstrate SysTick timer to generate specific number of inte				
🗄 🔗 SONiX	35 Devices	temperature_sensor (ADuCM40	🚸 Сору	Temperature Sensor example using the I2C driver				
🗄 🖉 🖉 STMicroelectronics	910 Devices	tmr_example_gp (ADuCM4050 E	🚸 Сору	Basic example demonstrating the TMR driver to generate a periodic interr				
🛨 🗝 🗸 Texas Instruments	342 Devices	tmr_example_rgb (ADuCM4050	🚸 Сору	Basic example demonstrating the TMR driver to generate PWM output sig				
🗄 🔗 Toshiba	90 Devices	uart_callback (ADuCM4050 EZ	🚸 Сору	Basic example demonstrating the UART driver using Callback mode				
± ♀ Zilog	5 Devices	uart_loopback (ADuCM4050 EZ	🚸 Сору	Basic example demonstrating the UART driver using the Non-Blocking AF				
		w25q32_example (ADuCM4050	🚸 Сору	Basic example demonstrating the on-board SPI Flash				
		wakeup_button (ADuCM4050 E	🚸 Сору	Basic example demonstrating the XINT driver				
		wdt_example_interrupt (ADuCM	🚸 Сору	Example demonstrating the WDT driver(configured to interrupt on timeou				
		wdt_example_reset (ADuCM405	🚸 Сору	Example demonstrating the WDT driver(configured to reset on timeout)				
		1						
L	·	<u> </u>						

#### 6.2.2 CCES Examples View

Similarly, using **CMSIS Pack Manager** in CCES, selecting the Analog Devices-ADuCM4050 device, in the Devices panel on the left side, and then the Examples panel on the right side, the list of examples will appear on the right side as shown in the following figure.

CMSIS Pack Manager - CrossCore Embedded Studio			A REAL PROPERTY AND INCOME.	
File Edit Navigate Search Project Run Wind	low Help			
2 - 13 - 13 - 13	• @ • Q • Q • A • Ø • ½ • % •	• = = =	Quick Access 📑 📴 C/C++	🔯 Debug   CMSIS Pack Manager
📕 Devices 🛛 📕 Boards 🛛 🖓 🗖	😢 Packs 📑 Examples 🛛 🗌 Only show ex	amples from inst	alled packs   🕜   🛟 😕 🦑 🔻 🗖 🗋	💷 Pack Properties 🛛 📃 🗖
E C 💥 🗸				
Search Device	🔺 🌐 AnalogDevices.ADuCM4x50_EZ			
Davier Summers	Decel fife lfeen (0Du/CM4050 FZ //TD)	Action	Pasis example demonstrating the accelerome	Boards
Device Summary	accel fife wicsp (ADuCM4050 EZ-KTT)	Copy	Basic example demonstrating the accelerome	Components
A 13 Devices 13 Devices	ADC Channel Read (ADuCM4050 EZ-KTT)	Copy	Example to read from ADC channel	Examples
Analog Devices 3 Devices	adv1363 accel Ifcsp (ADuCM4050 EZ-KTT)	Conv	Basic example demonstrating the accelerome	
ADUCIVIAXOU Serie I Device	adx1363_accel_wesp (ADuCM4050 EZ-KTT)	Conv	Basic example demonstrating the accelerome	
ADUCIVI4050 ARIVI CONTEX-IVI4 52 1	Autobaud (ADuCM4050 EZ-KTD)	Conv	LIABT autohaud example	
ADUCIVISUES Serie 2 Devices	heeper example (ADuCM4050 EZ-KTD	Conv	Basic example demonstrating the BEEP driver	
ARM IU Devices	core driven crc (ADuCM4050 EZ-KTT)	Copy	Basic example demonstrating the CBC driver (	
	coverto example (ADuCM4050 EZ-KTT)	Copy	Counto driver example	
	dma driven crc without callback (ADuCM4050 EZ-	Copy	Basic example demonstrating the CBC driver (	
	dma_driven_crc_with_callback (ADuCM4050 EZ-KTD	Copy	Basic example demonstrating the CRC driver (	
	flash block protect (ADuCM4050 EZ-KTD)	Copy	Example for flash block protection	
	flach page write (ADuCM4050 EZ-KTD)	Copy	Example to write nage to flack	
	HelloWorld (ADuCM4050 EZ-KT)	Copy	Hello World	
	LED button callback (ADuCM4050 EZ-KT)	Copy	Bush Button example using the GDIO driver	
	POST (ADucM4050 EZ-KT)	Copy	Application example with manufacturing test	
	rng example (ADuCM4050 EZ-KTD)	Copy	Basic example demonstrating the BNG driver	
	rtc alarm (ADuCM4050 EZ-KTD)	Copy	Evample demonstrating the RTC alarm feature	
	to IO example (ADuCM4050 EZ-KT)	Copy	Example demonstrator the SensorStroke feature	
	Spilloophack (0DuCM4050 EZ-NT)	Copy	Pagic example demonstrating the SDI driver	
	spi_coopdack (ADuCM4030 EZ-NT)	Copy	Basic example demonstrating the sentent of C	
	SPI_100pBack_ireertos (ADucivi4030 E2-N11)	Copy	Example uses the SPI unver in the Context of P	
	SPI_Masterslave_coopBack_example (ADucM4050 E.	Copy	Basic example demonstrating the SPORT drive	
	sport_loopback_uma (ADuCM4050 EZ-NT)	Copy	Basic example demonstrating the SPORT drive	
	sport_loopback_int (ADuCM4050 EZ-KIT)	Copy	Basic example demonstrating the SPORT drive	
	systick_example (ADUCM4050 EZ-KIT)	Copy	Example to demonstrate sys lick timer to gen	
	temperature_sensor (ADuCM4050 EZ-KIT)	Copy	Period and the sensor example using the I2C drive	/er]
	tmr_example_gp (ADuCM4050 EZ-KIT)	😻 Copy	Basic example demonstrating the TMR driver	
	tmr_example_rgb (ADuCM4050 EZ-KIT)	Copy	Basic example demonstrating the LIADT driver.	
	uart_callDack (ADuCIVI4030 EZ-NT)	Copy	Dasic example demonstrating the UART driver	
	uarc_toopback (ADUCIVI4000 EZ-NT)	Copy	Dasic example demonstrating the OART driver	
	wzpąsz_example (ADuCM4050 EZ-KIT)	Copy	Basic example demonstrating the on-board SF	
	wakeup_button (ADUCIVI4000 EZ-N1)	Copy	Dasic example demonstrating the AINT driver	
	wat_example_interrupt (ADuctV14050 EZ-KII)	Copy	Example demonstrating the WDT driver(config	
	wat_example_reset (ADUCM4000 EZ-KIT)	🐨 Copy	example demonstrating the WDT driver(config	
4	٠ III	1	4	۰ III ۲
😑 Console 🛛 🤜 Progress	۱ ۲ <u>ــــــــــــــــــــــــــــــــــــ</u>			

Using **CMSIS Pack Manager** to copy examples is not fully supported yet in CCES. Consequently, we recommend the use of the **Example Browser** feature for the time being.

#### 6.2.3 CCES Examples Browser

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Accessing the **Example Browser** is achieved by selecting **Help/Browse Example**.



Then select the *Type* to **Example Project** and the *Product* to **ADuCM4x50\_EZ\_KIT\_BSP [3.1.0]** as shown in the figure below. A list of examples is displayed in the right part of the window. Select the example to be used and click **Open example**.

😵 Brows	e Examples		?
Search for ins open an exan To find more	stalled example projects by selecting y nple in the IDE, select it in the results examples please visit <u>http://www.anal</u>	our desired criteria on the left and clicking the Search k list on the right and click 'Open example'. og.com/swexamples.	outton below. To
Filter exam	ples by:	Search results:	
Туре:	Any ~		^
Product:	ADuCM4x50_EZ_KIT_BSP [3.1.0] ~	ADC_channel_read ADuCM4x50_EZ_KIT_BSP [3.1.0]	
Add-in:	Any ~	ADC_channel_read	
Family:	Any ~		
Processor:	Any ~	adxl363_accel_lfcsp ADuCM4x50_EZ_KIT_BSP [3.1.0]	
Platform:	Any ~	ADXL363 accel Example for LFCSP board	
Languages:	Assembly		
	⊡c		
	✓ C++	ADXL363 accel Example for WLCSP board	
Keywords:			
		ADUCIVI4X30_22_KIT_BSP [3.1.0] ADXL363 USING FIFO Example for LFCSP	~
	Search	The search found 40 matching examples.	Open example

The example is loaded in CrossCore Embedded Studio and ready to be built and executed, as illustrated in the figure below.



#### 6.2.4 IAR Embedded Workbench Example Browser

To see the list of examples with IAR 8.20.1, start with selecting **Project Create New Project** as illustrated in the figure below.



Then select CMSIS Pack example as shown in the figure below and click OK.

	alaal Maulataa												$\sim$
WIAK Embed	aed workbe	IDE											^
File Edit View	Project Too	ols Window	Help										
	00 0C	÷ < (	Q > <b>\$ +</b> ≅ <	♥ > ₹ ₽ 🛢 🖷 🚥	•••								
Workspace	<b>▲</b> 廿 ×												
	~												
Files	••			reate New Proje	ct				×				
			C	reate New Proje	ci				^				
			т	Fool chain:	ARM			$\sim$					
				Project templates:									
				-b Empty project									
				asm									
				• 🗀 C++									
				• 🗀 C									
				Externally built	executable								
					Rack project								
				> Empty enrole	r ack project								
			D	Description:									
			C	Create project from (	CMSISPack exam	ples							
							OK	Ca	ncel				
Ready											CAP	NUM OV	/R 💶 🔐
													111

Select Analog Devices ADuCM4x50 Series ADuCM4050, and click Next.



A list of examples is displayed, as illustrated in the next figure. Select the example to be used: its description can be read in the right part of the window. Click **Finish**,

Create new project	— 🗆 X
Select example	
Select the example to create	
<ul> <li>Getting Started HelloWorld</li> <li>Driver Examples 52MHzPLL_HFOSC ADC_Channel_Read adxl363_accel_lfcsp adxl363_accel_wlcsp</li> </ul>	<ul> <li>Pack: AnalogDevices.ADuCM4x50_EZ_KIT_BSP.3.1.0</li> <li>Board: ADuCM4050 EZ-KIT (AnalogDevices)</li> <li>Description: Example to read from ADC channel</li> <li>Keywords: ADC</li> <li>Documentation:</li> <li>Analog Devices, Inc. ADuCM4x50 Application</li> </ul>
accel_fifo_lfcsp accel_fifo_wlcsp beeper_example core_driven_crc dma_driven_crc_without_callback dma_driven_crc_with_callback crypto_cbc_example crypto_ccm_example crypto_cmac_example	Overview: ======= This example demonstrate how to use the ADC Controller driver. The example uses the ADC to sample the input signal at channel 0 and write the acquired samples to a file (when the WRITE_SAMPLES_TO_FILE macro is defined). This examples operates on non-blocking mode. v User Configuration Macros:
	< Back Next > Finish Cancel

A window pops up to select the location where the example will be copied, as shown in the following figure. Choose the destination and click **OK**.

🔮 Choose destin	nation folder			×
Look in:	ADuCM4x50 EZKIT	v © 🕫 i	୭ ⊞ ▼	
Quick access Desktop Libraries This PC	Name	^ No items match your search.	View Menu Date moainea	Т
	<			>
			Ok Cance	)

The example is copied in the chosen destination and loaded in IAR Embedded Workbench, ready to be built and executed.

IAR Embedded Work	kbench II	E - ARM 8.20.1		×
File Edit View Project	J-Link To	ols Window Help		
5000X8050		< Q > \$ ≠ < Q > 1 ≥		
Workspace	<b>▼</b> ₽ ×	Readme_adc_channel_read ×		-
Debug	~	Sealor Davises Teo Shu/MdwEO Sealostion		fo
Files	•	Coverview: This example demonstrate how to use the ADC Controller driver. The example uses the ADC to sample the input signal at channel 0 and write the ac to a file (when the WRITE_SAMPLES_TO_FILE macro is defined). This examples operates on non-blocking mode. User Configuration Macros: This example sets ADI_ADC_ENABLE_MULTI_ACQUIRE to 1, in adi_ado_config.h, which means that DNA transfers will be used to extract data from the ADC. Using DNA is the advised method of data transfer when: - reading multiple channels at the same time - successively reading multiple values from the same channel - or a combination of both. Setting this macro to 0 will force interrupt-driven data transfers, which is best-suited to reading a single values from a single channel.	quired sample:	,
		The number of samples to read can be changed in adc_channel_read.h, using the ADC_NUM_SAMPLES macro. The default is 100.		
adc_channel_read		<		> v
Debug Log				<b>▼</b> ₽ ×
Log Mon Jan 15, 2018 16:27:11: IAR Embedd	led Workbench	.20.1 (C\Program Files (x86)\IAR Systems\Embedded Workbench 8.0\arm\bin\armproc.dll)		
<				>
Ready		Ln 1, 0	Col 1 Sys	stem

#### 6.2.5 Examples for drivers

The following array details the examples found in ADuCM4x50 3.1.0 EZ-Kit Board Support.

52MHzPLL_HFOSC	• <i>52MHzPLL_HFOSC</i> : Demonstrate how to program the ADuCM4050 to operate at 52 MHz
ADC	• <i>ADC_Channel_Read</i> : Demonstrate use of ADC Controller driver to sample the input signal at channel 0 and write the acquired samples to a file.
ADXL363	<ul> <li><i>adxl363_accel_</i>*: Demonstrate how to use the ADXL363 driver to produce interrupts on activity events</li> <li><i>accel_fifo_</i>*: Demonstrate how to use the ADXL363 driver, specifically using the on-chip FIFO to collect data</li> </ul>
Beeper	• <i>beeper_example</i> : Demonstrates the basic functionality of the beeper peripheral.

CRC	<ul> <li><i>core_driven_crc</i> : Demonstrates how to use the CRC driver to compute the CRC, driven by the core.</li> <li><i>dma_driven_crc_with_callback</i> : Demonstrates how to use the CRC driver to compute the CRC driven by the DMA with a callback function registered.</li> <li><i>dma_driven_crc_without_callback</i> : Demonstrates how to use the CRC driver to compute the CRC driven by the DMA with no callback function registered.</li> </ul>
Crypto	• <i>crypto_*</i> : Demonstrate how to use Crypto device driver in various cipher modes.
Cycle Counting	• spi_cycle_counting: Demonstrates how to obtain cycle counts for the SPI driver.
Flash	<ul> <li><i>flash_block_protect</i> : Demonstrates the use of the Flash device driver flash memory block-protection feature.</li> <li><i>flash_page_write</i> : Demonstrates the use of the Flash device driver for flash memory data page write(s).</li> </ul>
FreeRTOS	• <i>spi_loopback_freertos</i> : demonstrates how to integrate the ADuCM4x50 EZ-KIT Board Support Pack with the FreeRTOS V9.0.0 as well as how to use the SPI driver in the context of the FreeRTOS.
GPIO	• <i>LED_button_callback</i> : Demonstrates how to use the GPIO driver to Toggle LED's when the push buttons are pressed on the ADuCM4050 EZ-Kit.
I2C	• <i>temperature_sensor</i> : Demonstrates how to use I2C driver for reading the data from the temperature sensor.
Power_On_Self_Test	• <i>POST</i> : Allows users to test the many peripherals of the EZ-Kit with push buttons to select specific tests to run.
RNG	• <i>rng_example</i> : Demonstrates how to use and configure the RNG device for generating random numbers.
RTC	<ul> <li><i>rtc_alarm</i> : Demonstrates how to use and configure the RTC device for generating the alarm periodically.</li> <li><i>rtc_IO_example</i> : Demonstrates how to configure an RTC device to use the input capture and output compare features of RTC device.</li> </ul>

SPI	<ul> <li><i>Spi_Loopback</i> : Demonstrates how to use the SPI driver in blocking mode and non-blocking mode with DMA and PIO.</li> <li><i>SPI_MasterSlave_LoopBack_Example</i> : Demonstrates how to use SPI device for transmitting/receiving the data both in master and slave mode.</li> </ul>
SPI-flash	• <i>w25q32_example</i> : Demonstrate how to use the W25Q32 driver.
SPORT	<ul> <li><i>sport_loopback_dma</i> : Demonstrates how to use the SPORT driver in DMA mode.</li> <li><i>sport_loopback_int</i> : Demonstrates how to use the SPORT driver in PIO mode.</li> </ul>
SysTick	• <i>systick_example</i> : Demonstrates the use of SysTick timer to wait for a specific number of interrupts.
TMR	<ul> <li><i>tmr_example_gp</i> : Demonstrates how to use the General Purpose (GP) timers to generate a periodic interrupt and capture events.</li> <li><i>tmr_example_rgb</i> : Demonstrates how to use the Red-Green-Blue (RGB) timer to generate 3 PWM output signals with the same period but different duty cycles</li> </ul>
UART	<ul> <li><i>Autobaud</i> : Demonstrates how to use UART device driver for baudrate detection.</li> <li><i>uart_callback</i> : Demonstrates how to to use UART in DMA mode, PIO mode and register a callback.</li> <li><i>uart_loopback</i> : Demonstrates how to use the UART driver to loop back the data between the TX and RX.</li> </ul>
WDT	<ul> <li>wdt_example_interrupt : Demonstrates how the Watchdog Timer (WDT) can be used to trigger an interrupt on timeout.</li> <li>wdt_example_reset : Demonstrate how the Watchdog Timer (WDT) can be used both avoid and trigger a system reset.</li> </ul>
XINT	• <i>wakeup_button</i> : Demonstrates the use of XINT driver to Toggle LED when the wakeup button is pressed on the ADuCM4x50 EZ-Kit.

#### 6.2.6 Using Micrium RTOS

To make use of Micrium RTOS,

1. Obtain the uC/OS-III product from Micrium and install it.

- 2. Use the Run-Time Environment Manager for your application to select the Software Component "Device/Global Configuration"
- 3. In the adi\_global\_config.h header file, located in the Device group in your application, set the ADI\_CFG\_RTOS macro to ADI\_CFG\_RTOS\_MICRIUM\_III:

#define ADI\_CFG\_RTOS ADI\_CFG\_RTOS\_MICRIUM\_III

Please note that the Micrium components are licensed products, and you must obtain the necessary licenses directly from Micrium to use them.

#### 6.2.7 Example for FreeRTOS Components

The example "SPI\_Loopback" in the examples\FreeRTOS directory relies on FreeRTOS version 9.0.0 - refer to the example's README file for details.

To make use of this example:

- 1. Obtain FreeRTOS version 9.0.0 from http://www.freertos.org.
- 2. Follow the step describe in the Readme\_freertos\_spi\_loopback.txt file for the targeted development environment.

#### 6.3 Location

The ADuCM4x50 EZ-KIT Board Support Pack will be installed into the CMSIS pack directory for the targeted development environment:

Keil uVision	<keil_root>\ARM\PACK\AnalogDevices\ADuCM4x50_EZ_KIT_BSP\3.1.0</keil_root>
CCES	<cces_root>\ARM\PACK\AnalogDevices\ADuCM4x50_EZ_KIT_BSP\3.1.0</cces_root>
IAR Embedded Workbench	<iar_packrepo>\AnalogDevices\ADuCM4x50_EZ_KIT_BSP\3.1.0</iar_packrepo>

with

Symbol	Meaning	Example Value
<keil_root></keil_root>	Keil installation path	C:\Keil_v5

Symbol	Meaning	Example Value
<cces_root></cces_root>	CCES installation path	C:\Analog Devices\CrossCore Embedded Studio 2.7.0
<iar_packrepo></iar_packrepo>	IAR pack repository	C:\Users\ <windows_username>\AppData\local\IAR Embedded Workbench\PackRepo</windows_username>

# **7 Contacting Technical Support**

You can reach Analog Devices software and tools technical support in the following ways:

- Post your questions in the software and development tools support community at EngineerZone<sup>®</sup>.
- E-mail your questions about processors and processor applications to processor. support@analog.com.
- For Greater China, Processors and DSP applications and processor questions can be sent to: processor.china@analog.com.
- Submit your questions to technical support directly via http://www.analog.com/support.
- Contact your Analog Devices sales office or authorized distributor.

### 8 Known Issues

For the latest anomalies please consult our Software and Tools Anomalies Search page.

#### 8.1 RTC Example RTC\_Alarm (MSKUV01-99)

When executing this example, it should be let to run till completion, until "All done!" is seen. If the execution is stopped midway, then it will lock up the board.

If this happens, the board can be unlocked with the following actions: Hold the Boot Button(SW1) and Toggle the Reset Button(SW2) twice and then release the Boot Button(SW1).

#### 8.2 UCOS-III Example

The ucos-iii example located in Examples\rtos\ucos-III cannot be used with CCES. This example will be ported to CCES in a future release.