Release Notes for ADuCM302x EZ-KIT Board Support Package 2.0.0

Contents

Thank you for installing the ADuCM302x EZ-KIT® Board Support Package (BSP). The BSP provides software and documentation in support of the ADuCM302x EZ-KIT development board.

The BSP is designed to work with IAR Embedded Workbench software development tools.

For more details on IAR, please visit http://www.iar.com. The BSP provides comprehensive software support for the ADuCM3029 EZ-KIT development, including the drivers. The BSP also provides comprehensive examples which demonstrate the on-chip and off-chip device drivers. The device driver documentation is part of the BSP.

1 Required Software

To use this BSP in IAR Embedded Workbench environment, you must first obtain and install.

- IAR Embedded Workbench version 7.60.2 or later.
- Segger J-Link LITE v5.10p or later.

2 Release Testing

The BSP has been tested with

EZ-KIT	IAR
ADuCM3029 EZ-KIT version 1.2 BOM Rev 1.6	J-Link Lite emulator

3 License Checking

Use of the BSP software is subject to the Software License Agreement presented during installation.

4 Installation

It is recommended that you backup or delete your older BSP installation directory

`(e.g. C:\Analog Devices\ADuCM302x\ADuCM302x_EZ_Kit)`

before installing a newer BSP version. The BSP installer does not currently offer an uninstall option.

5 Differences between version 2.0.0 and prior versions

Although the underlying driver model is largely the same, version 2.0.0 introduces a smaller and faster driver model that targets IoT-based applications when compared to the 1.0.x version of the drivers. The version 1.x.x drivers are general purpose drivers which allow users to leverage every aspect of the ADuCM302x's hardware whereas the 2.0.x version of the drivers are designed to leverage the features of the hardware most commonly used in IoT-based applications.

The version 2.0.0 APIs are, therefore, different from the 1.0.0 APIs. If you were previously using the 1.0.x drivers please reference the following documents to help you decide whether or not to port to the 2.0.x drivers. All of the documents are in the "Documents" directory of the installation

- ADuCM302x_DFP_Device_Drivers_UsersGuide.pdf
  Outlines the device driver model
- ADuCM302x_Ver1.X.X_Ver2_X.X_Software_Differences.pdf
  Detailed summary of the differences between 2.0.x and 1.0.x.
  This document also includes information on porting between the two versions.

6 Release Content

This release contains the following sets of components:

- Source files for device drivers. These components are authored by Analog Devices, for use on the ADuCM302x processor.
- Examples for device drivers. These components are authored by Analog Devices, and demonstrate the use of the device drivers. Some of the examples make use of the Micrium RTOS products or FreeRTOS products, so have a dependency on the Micrium products, which must be obtained separately under license from Micrium, or FreeRTOS.
- Toolchain support. These components are authored by Analog Devices, and are installed into the toolchain to configure it to recognize the ADuCM302x processor family.
- Templates to create ADuCM302x projects. When creating a new project, the release includes a no-OS and a ucos3 project template which add the appropriate macro definitions, include paths and sources to support the ADuCM302x processors.
- Cycle Counting Framework. A framework for measuring cycle counts has been added to the release. Documentation for cycle counting has been added to the "Modules" section. Specifically look for the "Cycle Counting Framework" section.
  As of this release only the SPI, CRC, SPORT and UART drivers have been instrumented to allow cycle counting. In future releases all of the drivers will be instrumented. Also, please note that the framework is only available in a non-RTOS context. It will be made available in a RTOS context in a future release.
- Additional utilities. These components are authored by Analog Devices, and assist in the generation of applications for the ADuCM302x processor family.
- Documentation.

6.1 Source files for drivers

ADuCM302x.h	Device descriptions and macro files
System	Source and include files
Startup	Source and include files

Various peripheral device driver sources and include files in “Source” and “Include” directories.

6.2 Toolchain support files

The following common system infrastructure framework files are installed into the toolchain and should be used in all projects.

IAR tool chain configuration files

FlashADuCM3029.*	Flash loader files and sources for ADuCM3029.
ioADuM302x.ddf	Debugger register display
ADuCM3029.icf	ADuCM3029 linker control file for running the code from internal flash
FlashADuCM3027.*	Flash loader files and sources for ADuCM3027.
ADuCM3027.icf	ADuCM3027 linker control file for running the code from internal flash

6.3 Additional utilities

These utilities are installed into the tools subdirectory.

PinMuxUI	Java-based graphical utility for generating source code to configure pin multiplexing. Available for 32-bit and 64-bit Java Virtual Machines.
UartDivCalculator	Command-line utility for configuring the Baudrate for the UART device.

6.4 Documentation

ADuCM302x_EZ-Kit_BSP_GettingStartedGuide.pdf	Getting Started Guide
ADuCM302x_EZ-KIT_BSP_for_IAR_ReleaseNotes.pdf (this file)	Release Notes
ADuCM302x_EZ-Kit_BSP_UsersGuide.pdf	User's Guide
ADuCM302x_EZ-KIT_BSP_Device_Drivers_UsersGuide.pdf	Guidelines for using the Analog Devices device drivers.
ADuCM3029-EZ-KIT_Manual.pdf	ADuCM3029 EZ-Kit manual.
ADuCM3029-EZ-KIT-BOM.pdf	BOM for the ADuCM3029 EZ-Kit.
ADuCM3029-EZ-KIT-Schematic.pdf	Schematics for the ADuCM3029 EZ-Kit.
Html/index.html	Index file for HTML-based Device Driver API documentation

7 Examples

This section contains information about the example projects in the product.

7.1 Examples for drivers

Example projects have been provided for all on and off chip peripherals.

1.	ADC	• *adc_channel_read* : Demonstrate use of ADC Controller driver to sample the input signal at channel 0 and write the acquired samples to a file.
2.	ADXL363	• *accel* : Demonstrate how to use the ADXL363 driver to produce interrupts on activity events • *accel_using_FIFO* : Demonstrate how to use the ADXL363 driver, specifically using the on-chip FIFO to collect data
3.	Beeper	• *beeper_example*: Demonstrates the basic functionality of the beeper peripheral.
4.	CRC	• *core_driven_CRC* : Demonstrates how to use the CRC driver to compute the CRC, driven by the core. • *dma_driven_CRC_with_callback* : Demonstrates how to use the CRC driver to compute the CRC driven by the DMA with a callback function registered. • *dma_driven_CRC_without_callback* : Demonstrates how to use the CRC driver to compute the CRC driven by the DMA with no callback function registered.

5.	Crypto	• *crypto_cbc*: Demonstrates how to use the Crypto device driver in CBC cipher mode. • *crypto_ccm*: Demonstrates how to use the Crypto device driver in CCM cipher mode. • *crypto_cmac :* Demonstrates how to use the Crypto device driver in CMAC cipher mode. • *crypto_ctr:* Demonstrates how to use the Crypto device driver in ctr cipher mode. • *crypto_ecb*: Demonstrates how to use the Crypto device driver in ECB cipher mode. • *crypto_sha*: Demonstrates how to use the Crypto device driver in SHA cipher mode.
6.	Cycle Counting	• *SPI_cycle_counting*: Demonstrates how to obtain cycle counts for the SPI driver.
7.	Flash	• *flash_block_protect* : Demonstrates the use of the Flash device driver flash memory block-protection feature. • *flash_page_write* : Demonstrates the use of the Flash device driver for flash memory data page write(s).
8.	FreeRTOS	• *SPI_Loopback* : demonstrates how to integrate the BSP with the FreeRTOS V9.0.0 as well as how to use the SPI driver in the context of the FreeRTOS.
9.	GPIO	• *LED_button_callback*: Demonstrates how to use the GPIO driver to Toggle LED's when the push buttons are pressed on the ADuCM3029 EZ-Kit.
10.	I2C	• *temperature_sensor*: Demonstrates how to use I2C driver for reading the data from the temperature sensor.
11.	Power_On_Self_Test	• Allows users to test the many peripherals of the EZ-Kit with push buttons to select specific tests to run.
12.	RNG	• *RNG_Example*: Demonstrates how to use and configure the RNG device for generating random numbers.

13.	RTC	• *Rtc_alarm*: Demonstrates how to use and configure the RTC device for generating the alarm periodically. • *Rtc_IO_example*: Demonstrates how to configure an RTC device to use the input capture and output compare features of RTC device.
14.	RTOS	• *ucos-III* : Demonstrates uCOS-III RTOS in ADuCM302x processors. This example demonstrates task and semaphore creation and context switching.
15.	SPI	• *LoopBack*: Demonstrates how to use the SPI driver in blocking mode and non-blocking mode with DMA and PIO. • *MasterSlaveLoopBack*: Demonstrates how to use SPI device for transmitting /receiving the data both in master and slave mode. • *RTOS_Callback*: demonstrates how to use the SPI device driver both in Master and Slave mode, with an RTOS and using Callbacks.
16.	SPI-flash	• w25q32_example: Demonstrate how to use the W25Q32 driver.
17.	SPORT	• *loopback_dma*: Demonstrates how to use the SPORT driver in DMA mode. • *loopback_int* : Demonstrates how to use the SPORT driver in PIO mode.
18.	SysTick	• *systick_example*: Demonstrates the use of SysTick timer to wait for a specific number of interrupts.
19.	TMR	• *tmr_example_gp*: Demonstrates how to use the General Purpose (GP) timers to generate a periodic interrupt and capture events. • *tmr_example_rgb*: Demonstrates how to use the Red-Green-Blue (RGB) timer to generate 3 PWM output signals with the same period but different duty cycles
20.	UART	• *Autobaud*: Demonstrates how to use UART device driver for baudrate detection. • *Callback*: Demonstrates how to to use UART in DMA mode, PIO mode and register a callback. • *Loopback*: Demonstrates how to use the UART driver to loop back the data between the TX and RX.

21.	WDT	• *wdt_example_interrupt*: Demonstrates how the Watchdog Timer (WDT) can be used to trigger an interrupt on timeout. • *wdt_example_reset:* Demonstrate how the Watchdog Timer (WDT) can be used both avoid and trigger a system reset.
22.	XINT	• *wakeup_button*: Demonstrates the use of XINT driver to Toggle LED when the wakeup button is pressed on the ADuCM302x EZ-Kit.

7.2 Example for Micrium Components

The example "ucos-III" in the examples\rtos directory relies on the uC/OS-III RTOS component from Micrium - refer to the example's README file for details.

To make use of this example:

1. Obtain the uC/OS-III product from Micrium. the integrated cortex-m port released with version 3.06.00 is recommended. This version requires the following minimum versions:
   - uC-CPU V1.31.00
   - uC-LIB V1.38.02
2. Choose a directory where you will store the unzipped Micrium source files.
3. Set the Windows environment variable ADUCM302x_MICRIUM_DIR to the pathname of this directory.
4. Unzip all Micrium components into `$ADUCM302x_MICRIUM_DIR`
5. Start the IAR Embedded Workbench environment.
6. Import the appropriate example, and build it. The example is configured to make use of the `$ADUCM302x_MICRIUM_DIR` environment variable.

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

7.3 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.

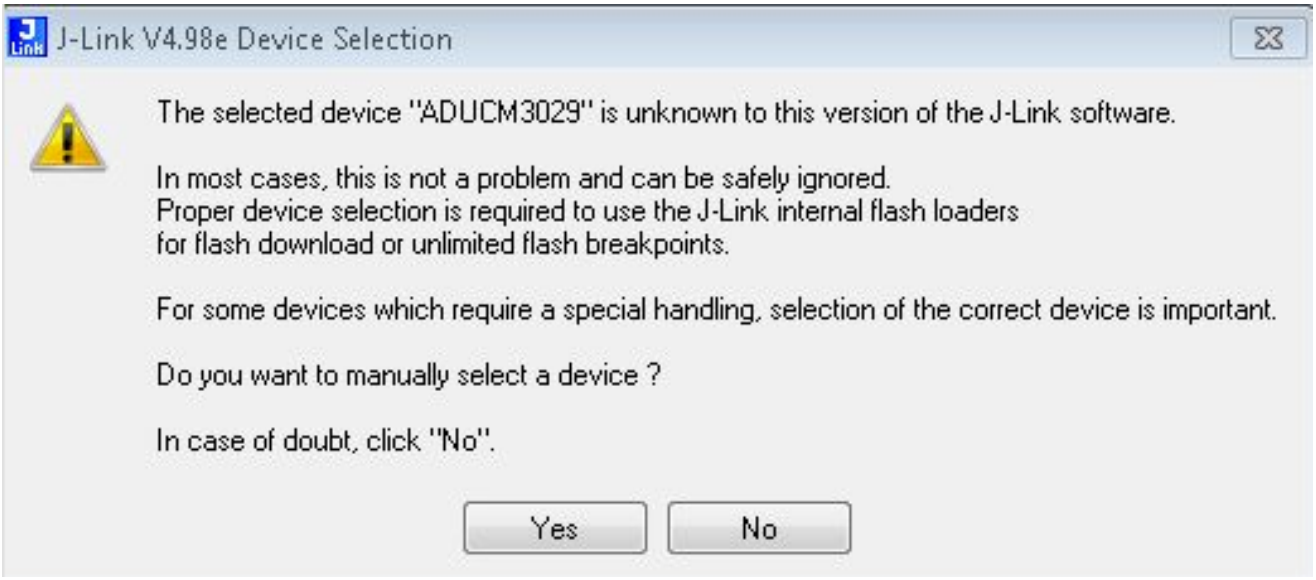
2. Follow the step describe in the Readme_freertos_spi_loopback.txt file for IAR.

8 Location

By default, the BSP will be installed into the directory `C:\Analog Devices\ADuCM302x\ADuCM302x_EZ_Kit`.

9 J-Link Device Selection

You may see a warning like the one below after loading the executable to the ADuCM302x EZ-KIT. Please press “NO” and proceed.



10 Device Driver Thread Safety

All Device Drivers are **not** thread-safe. They are re-entrant but not thread-safe. If an RTOS is present, then drivers will use the RTOS semaphores for implementing the blocking calls.

11 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®.
- 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.
- For IAR tool chain support please visit: http://www.iar.com/support

12 Known Issues

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