ADuCM3029 EZ-KIT XXX EZ-KIT ®
Manual

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Analog Devices, Inc.
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ANALOG DEVICES

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Regulatory Compliance

Regulatory Compliance

The *ADuCM3029 EZ-KIT* is designed to be used solely in a laboratory environment. The board is not intended for use as a consumer end product or as a portion of a consumer end product. The board is an open system design which does not include a shielded enclosure and therefore may cause interference to other electrical devices in close proximity. This board should not be used in or near any medical equipment or RF devices.

The *ADuCM3029 EZ-KIT* is in the process of being certified to comply with the essential requirements of the European EMC directive 2004/108/EC and therefore carries the ***"CE"*** mark.

The *ADuCM3029 EZ-KIT* contains ESD (electrostatic discharge) sensitive devices. Electrostatic charges readily accumulate on the human body and equipment and can discharge without detection. Permanent damage may occur on devices subjected to high-energy discharges. Proper ESD precautions are recommended to avoid performance degradation or loss of functionality. Store unused boards in the protective shiping package.	

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1 Preface

Thank you for purchasing the *ADuCM3029 EZ-KIT* ®, Analog Devices, Inc. evaluation system for the ADuCM3029 processor.

The ADuCM3029 processor is based on the ARM® Cortex®-M3 processor core and is designed for motor control and industrial applications. The EZ-KIT is shipped with all of the necessary hardware—you can start the evaluation immediately. The package contains the standalone evaluation board, CE-approved power supply, and USB cable. The EZ-KIT Lite version ships with the J-Link Lite ARM, while the EZ-KIT® version requires the customer to provide an emulator.

The ADuCM3029 processor is based on the ARM® Cortex®-M4 processor core and is an ultra low-power integrated mixed-signal microcontroller system for processing, control and connectivity. The MCU system is based on an ARM® Cortex®-M3 processor, a collection of digital peripherals, embedded SRAM and flash memory, and an analog subsystem which provides clocking, reset and power management capability in addition to an ADC subsystem. The EZ-KIT is shipped with all of the necessary hardware—you can start the evaluation immediately. The package contains the standalone evaluation board, J-Link Lite emulator, CE-approved power supply, and USB cable.

The EZ-KIT contains three main expansion interfaces. An Expansion Interface 3 (EI3) connector, three ADF7xxx connectors and 4 Arduino connectors..

The evaluation board is designed to be used in conjunction with the IAR Embedded Workbench development tools to test capabilities of the ADuCM3029 processor. The development environment aids advanced application code development and debug, such as:

- Create, compile, assemble, and link application programs written in C++, C, and assembly
- Load, run, step, halt, and set breakpoints in application programs
- Read and write data and program memory Read and write core and peripheral registers

Purpose of This Manual

This manual provides instructions for installing the product hardware (board). The text describes operation and configuration of the board components and provides guidelines for running code on the board.

Intended Audience

The primary audience for this manual is a programmer who is familiar with an ARM Cortex-M3-based processor core.

The ADuCM3029 family of mixed-signal control processors is based on the ARM Cortex-M3 processor core.

The applicable documentation for programming the ARM Cortex-M3 processor core includes:

- *Cortex-M4 Devices Generic User Guide*
- *CoreSight ETM-M4 Technical Reference Manual*
- *Cortex-M3 Technical Reference Manual*

For additional information on this Analog Devices processor, see the *Hardware Reference Manual*. This document describes the processor core and memory architecture used on the ADuCM3029processor, but does not provide detailed programming information for the ARM core.

For more information about programming the ARM core, visit the ARM Information Center:

http://infocenter.arm.com/help/.

Manual Contents

The manual consists of:

- Using the board

  Provides basic board information.

- Hardware Reference

  Provides information about the hardware aspects of the board.

- BOM

  A companion file in PDF format that lists all of the components used on the board.

- Schematic

  A companion file in PDF format documenting all of the circuits used on the board.

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You can reach Analog Devices processors and DSP technical support in the following way

- Post your questions in the processors and DSP support community at EngineerZone®:

  http://ez.analog.com/community/dsp

- Submit your questions to technical support directly at:

http://www.analog.com/support

- E-mail your questions about processors, DSPs, and tools development software from ***CrossCore Embedded Studio*** or ***VisualDSP++***®:

  If using CrossCore Embeded Studio or VisualDSP++ choose ***Help*** > ***Email Support***. This creates an e-mail to processor.tools.support@analog.com and automatically attaches your CrossCore Embedded Studio or VisualDSP++ version information and `license.dat` file.

- E-mail your questions about processors and processor applications to:

  processor.tools.support@analog.com

  processor.china@analog.com

- Contact your Analog Devices sales office or authorized distributor. Locate one at:

  http://www.analog.com/adi-sales

- Send questions by mail to:

  Analog Devices, Inc.

  Three Technology Way

  P.O. Box 9106

  Norwood, MA 02062-9106

  USA

Supported Processors

This evaluation system supports the Analog Devices ADuCM3029 processor.

Supported Tools

Information on supported tools for the *ADuCM3029 EZ-KIT* and the ADuCM3029 family of processors is available at:

http://www.analog.com/ADuCM3029EZKIT

Product Information

Product information can be obtained from the Analog Devices Website and the CCES online help.

Product information can be obtained from teh Analog Devices Website

Analog Devices Web Site

The Analog Devices Web site, http://www.analog.com, provides information about a broad range of products—analog integrated circuits, amplifiers, converters, and digital signal processors.

To access a complete technical library for each processor family, go to http://www.analog.com/processors/technical_library. The manuals selection opens a list of current manuals related to the product as well as a link to the previous revisions of the manuals. When locating your manual title, note a possible errata check mark next to the title that leads to the current correction report against the manual.

Also note, MyAnalog.com is a free feature of the Analog Devices Web site that allows customization of a Web page to display only the latest information about products you are interested in. You can choose to receive weekly e-mail notifications containing updates to the Web pages that meet your interests, including documentation errata against all manuals. MyAnalog.com provides access to books, application notes, data sheets, code examples, and more.

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Use EngineerZone to connect with other DSP developers who face similar design challenges. You can also use this open forum to share knowledge and collaborate with the ADI support team and your peers. Visit http://ez.analog.com to sign up.

Notation Conventions

Text conventions used in this manual are identified and described as follows. Additional conventions, which apply only to specific chapters, may appear throughout this document.

Example	*Description*
File **>** ***Close***	Titles in bold style indicate the location of an item within the CrossCore Embedded Studio IDE's menu system (for example, the ***Close*** command appears on the ***File*** menu).
`{this | that}`	Alternative required items in syntax descriptions appear within curly brackets and separated by vertical bars; read the example as `this` or `that`. One or the other is required.
`[this | that]`	Optional items in syntax descriptions appear within brackets and separated by vertical bars; read the example as an optional `this` or `that`.
`[this, …]`	Optional item lists in syntax descriptions appear within brackets delimited by commas and terminated with an ellipsis; read the example as an optional comma-separated list of `this`.

Example	*Description*
`.SECTION`	Commands, directives, keywords, and feature names are in text with `letter gothic` font.
`filename`	Non-keyword placeholders appear in text with `letter gothic` font and italic style format.
NOTE:	***NOTE:*** For correct operation, .. A note provides supplementary information on a related topic. In the online version of this book, the word ***NOTE:*** appears instead of this symbol.
CAUTION:	***CAUTION:*** Incorrect device operation may result if .. ***CAUTION:*** Device damage may result if .. A caution identifies conditions or inappropriate usage of the product that could lead to undesirable results or product damage. In the online version of this book, the word ***CAUTION:*** appears instead of this symbol.
ATTENTION:	***ATTENTION:*** Injury to device users may result if .. A warning identifies conditions or inappropriate usage of the product that could lead to conditions that are potentially hazardous for devices users. In the online version of this book, the word ***ATTENTION:*** appears instead of this symbol.

2 Using the Board

This chapter provides information on the major components and peripherals on the board along with instrustions for installing and setting up the emualtion software.

Product Overview

The board features:

- Analog Devices ADuCM3029 processor
  - 64-pin QFN package
  - 26 MHz oscillator
- SPI Flash (`SPI2`) chip
  - 32Mb
  - Windbond W25Q32
- Accelerometer (`SPI2`)
  - Analog Devices ADXL363
- Temp Sensor
  - Analog Devices ADT7420
- Universal Asynchronous Receiver/Transmitter (`UART0`)
  - FTDI FT232R USB to UART IC
  - USB mini -B
- Debug (SWD/SWO) interface
  - J-Link Lite ARM debugger
  - SWD/SWO 20-pin 0.1” header for use with IAR emulators
  - SWD/SWO 10-pin 0.05” header
- LEDs

    - Five LEDs: one power (green), one board reset (red), and three general-purpose (amber)
- Push buttons
    - Five push buttons: one reset, one wake, boot and two IRQ/Flag
- EI3 Connector
    - CLKOUT
    - SPORT0
    - SPI1
    - UART0
    - TWI0
    - Timers
    - GPIOs
    - RESET
    - GND/3.3V/5V output
- Arduino Connectors
- ADF7xxx Connectors
- External power supply
    - CE compliant
    - 5V @ 3.6 Amps
- Other features
    - Jumpers for processor current measurement

Package Contents

Your *ADuCM3029 EZ-KIT* package contains the following items.

- *ADuCM3029 EZ-KIT* board
- Universal 5V DC power
- USB 2.0 Cable
- J-Link Lite Emulator

Contact the vendor where you purchased your EZ-KIT or contact Analog Devices, Inc. if any item is missing.

Default Configuration

The *ADuCM3029 EZ-KIT* board is designed to run as a standalone unit.

The ***Default Hardware Setup***figure shows the default settings for jumper and switches and the location of the jumpers, switches, connectors, and LEDs. Confirm that your board is in the default configuration before using the board.

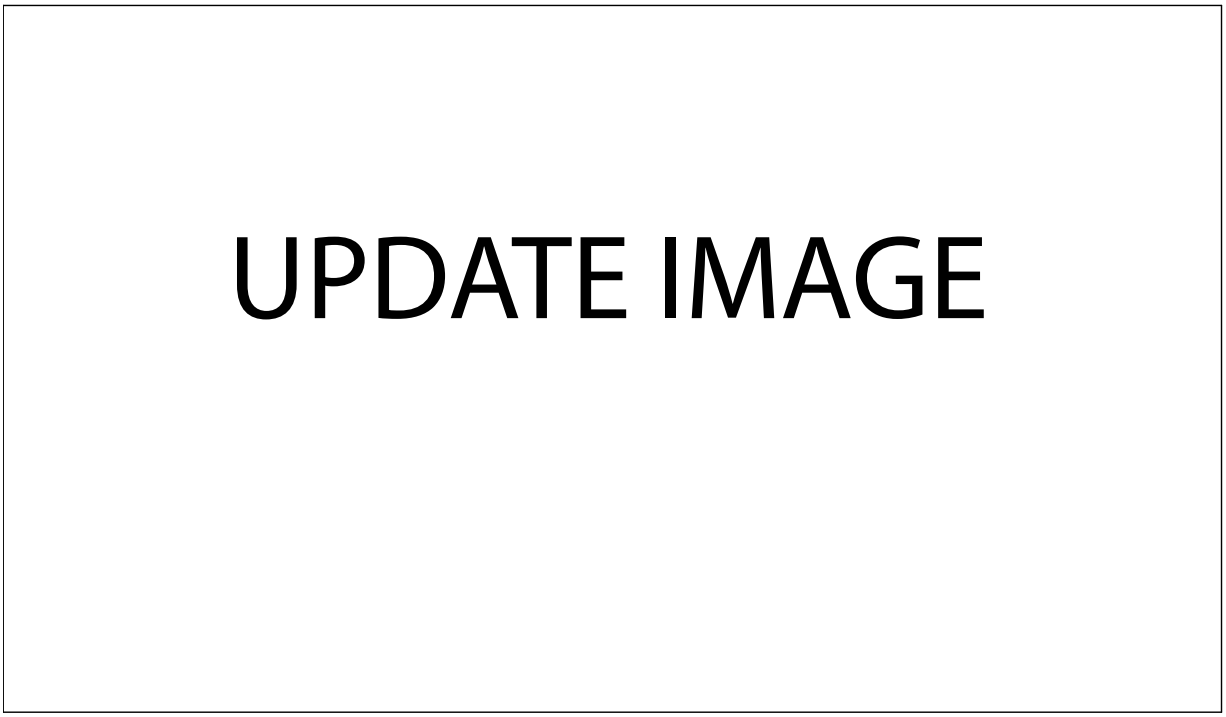

Figure 2-1: Default Hardware Setup

Using CCES and Board Installation

THIS NEEDS UPDATING

This is a test

IAR Embedded WorkBench and Board Installation

For information about the IAR Embedded WorkBench® product and software download, go to:

http://www.iar.com/en/Products/IAR-Embedded-Workbench.

The *ADuCM3029 EZ-KIT* software, based on the IAR Embedded WorkBench, can be found at:

http://www.analog.com/ADuCM3029EZKIT

Follow these instructions to ensure correct operation of the product software and hardware.

1. Connect the EZ-KIT board to a personal computer (PC) running ***IAR Embedded WorkBench***, using a J-Link/J-Trace emulator:
   a. Plug one side of the USB cable into the USB connector of the emulator. Plug the other side into a USB port of the PC running ***IAR Embedded WorkBench***.
   b. Attach the emulator to the header connector, `P1` or `P2`, on the EZ-Board board.
2. Attach the provided cord and appropriate plug to the 5V power adapter:
   a. Plug the jack-end of the power adapter into the power connector ***P9*** (labeled ***5V***) on the EZ-Board board.
   b. Plug the other side of the power adapter into a power outlet. The power LED (labeled *LEDx*) is lit green when power is applied to the board.

IAR Embedded WorkBench Session Startup

It is assumed that the IAR Embedded WorkBench software is installed and running on your PC.

1. Navigate to the ***IAR Embedded WorkBench*** environment via the ***Start*** menu.

   NOTE: IAR Embedded WorkBench is not connected to the target board.

2. Choose ***File*** > ***Open*** > ***Workspace*** to open a workspace for the project to download and debug.
3. Choose ***Project*** > ***Options***.

   The ***General Options***, ***Target*** page appears.
4. In ***Processor variant***, ensure ***Device*** is ***Analog Devices ADSP-CM41z-X_Y***, where ***X*** is the SRAM size in KB and ***Y*** is the internal flash size in KB of the part on the target board.

   On the Analog Devices ADSP-CM419F EZ-Board, SRAM size is 384 KB, and internal flash size is 2048 KB.
5. Choose ***Debugger*** in the ***Category*** pane.

   The ***Debugger***, ***Setup*** options page appears.
   a. In ***Driver***, choose ***J-Link/J-Trace*** as the emulator to be used to debug the target board.
   b. Click the ***Download*** tab. The ***Debugger***, ***Download*** options page appears.
   c. Ensure ***Use flash loader(s)*** is enabled. Note that other download settings are optional.
6. Choose ***Debugger*** > ***J-Link/J-Trace*** in the ***Category*** pane.

   The emulator ***Setup*** options page appears.
   a. On the ***Setup*** page,
      - In ***Reset***, select ***Connect during reset*** from the drop-down list.

- In ***JTAG/SWD speed***, select ***Auto***.
- (Optional) In ***Clock setup***, change the default values.

b. On the ***Connection*** page,

- In ***Communication***, select ***USB*** and ***Device 0***.
- In ***Interface***, select ***JTAG*** or ***SWD***.

7. Click ***OK*** to save the emulator settings.
8. Choose ***Project*** > ***Debug and Download*** to download the project and start debugging.

Debug Interface

The EZ-Board provides a JTAG/SWD/SWV connection via a connector (***P1***), which is a 0.1" header. A 4-bit trace connection also is available via a connector (***P2***). See JTAG/SWD Connector (P1) and TRACE and JTAG/SWD/SWV Connector (P2) for more information.

Power-On-Self Test

The Power-On-Self-Test Program (POST) tests all EZ-KIT peripherals and validates functionality as well as connectivity to the processor. Once assembled, each EZ-KIT is fully tested for an extended period of time with POST. All EZ-KITs boards are shipped with POST preloaded into flash memory. The POST is executed by resetting the board and pressing the proper push button(s). The POST also can be used as a reference for a custom software design or hardware troubleshooting.

Note that the source code for the POST program is included in the Board Support Package (BSP) along with the readme.txt file that describes how the board is configured to run POST.

Power Measurements

Locations are provided for measuring the current draw from various power planes. Precision 0.05 ohm shunt resistors are available on the `VDD_EXT`, `VDD_INT`, `USB_VBUS`, and 3.3V voltage domains. For current draw, the jumper is removed, voltage across the resistor can be measured using an oscilloscope, and the value of the resistor can be measured using a precision multi-meter. Once voltage and resistance are measured, the current can be calculated by dividing the voltage by the resistance. For the highest accuracy, a differential probe should be used for measuring the voltage across the resistor.

Example Programs

Example programs are provided with the *ADuCM3029 EZ-KIT* Board Support Package (BSP) to demonstrate various capabilities of the product. The programs can be found in the `ADuCM3029_EZ-KIT\examples` folder. Refer to a readme file provided with each example for more information.

Reference Design Information

A reference design info package is available for download on the Analog Devices Web site. The package provides information on the design, layout, fabrication, and assembly of the EZ-Board.

The information can be found at:

http://www.analog.com/ADuCM3029EZKIT

32M-bit Serial Flash Memory with Dual and Quad SPI (W25Q32)

The W25Q32BV (32M-bit) Serial Flash memory provides a storage solution for systems with limited space, pins and power. The 25Q series offers flexibility and performance well beyond ordinary Serial Flash devices. They are ideal for code shadowing to RAM, executing code directly from Dual/Quad SPI (XIP) and storing voice, text and data. The device operates on a single 2.7V to 3.6V power supply with current consumption as low as 4mA active and 1uA for power-down.

The W25Q32BV array is organized into 16,384 programmable pages of 256-bytes each. Up to 256 bytes can be programmed at a time. Pages can be erased in a group of 16 (4KB sector erase), groups of 128 (32KB block erase), groups of 256 (64KB block erase) or the entire chip (chip erase). The W25Q32BV has 1024 erasable sectors and 64 erase blocks respectively. The small 4KB sectors allow for greater flexibility in applications that require data and parameter storage.

The W25Q32BV supports the standard Serial Peripheral Interface (SPI), and a high performance Dual/Quad ouput as well as Dual/Quad I/O SPI: Serial Clock, Chip Select, Serial Data I/O0 (DI), I/O1 (DO), I/O2 (WP), and I/O3 (/HOLD). SPI clock frequencies of up to 104MHz are supported allowing equivalent clock rates of 208MHz (104MHz x 2) for Dual I/O and 320MHz (80MHz x 4) fro Quad I/O when using Fast Read Dual/Quad I/O instructions. These transfer rates can outperform standard Asynchronous 8 and 16-bit Parallel Flash memories. The Continous Read Mode allows for efficient memory access with as few as 8-clocks of instruction-overhead to read a 24-bit address, allowing true XIP (execute in place) operation.

16-Bit Digital I^2C Temperature Sensor (ADT7420)

The ADT7420 is a high accuracy digital temperature sensor offering breakthrough performance over a wide industrial range, housed in a 4 mm × 4 mm LFCSP package. It contains an internal band gap reference, a temperature sensor, and a 16-bit ADC to monitor and digitize the temperature to 0.0078°C resolution. The ADC resolution, by default, is set to 13 bits (0.0625°C). The ADC resolution is a user programmable mode that can be changed through the serial interface.

The ADT7420 is guaranteed to operate over supply voltages from 2.7 V to 5.5 V. Operating at 3.3 V, the average supply current is typi-cally 210 µA. The ADT7420 has a shutdown mode that powers down the device and offers a

shutdown current of typically 2.0 µA at 3.3 V. The ADT7420 is rated for operation over the –40°C to +150°C temperature range.

Pin A0 and Pin A1 are available for address selection, giving the ADT7420 four possible I2C addresses. The CT pin is an open-drain output that becomes active when the temperature exceeds a programmable critical temperature limit. The INT pin is also an open-drain output that becomes active when the tempera-ture exceeds a programmable limit. The INT pin and CT pin can operate in comparator and interrupt event modes.

Micropower 3-Sensor Combination Including Acceleration and Temperature (ADXL363)

The ADXL363 is an ultralow power, three-sensor combination consisting of a 3-axis MEMS accelerometer, a temperature sensor, and an on-board ADC input for synchronous conversion of an external signal. The entire system consumes less than 2 µA at a 100 Hz output data rate and 270 nA when in motion triggered wake-up mode.

The ADXL363 communicates via a serial port interface (SPI) and always provides 12-bit output resolution for all three sensors.

The ADXL363 accelerometer provides selectable measurement ranges of ±2 g, ±4 g, and ±8 g, with a resolution of 1 mg/LSB on the ±2 g range. Unlike accelerometers that use power duty cycling to achieve low power consumption, the ADXL363 does not alias input signals by undersampling; it samples the full bandwidth of the sensor at all data rates.

The ADXL363 temperature sensor operates with a scale factor of 0.065°C (typical). Acceleration and temperature data can be stored in a 512-sample multimode FIFO buffer, allowing up to 13 sec of data to be stored.

In addition to the accelerometer and temperature sensor, the ADXL363 also provides access to an internal ADC for synchronous conversion of an additional analog input.

The ADXL363 operates on a wide 1.6 V to 3.5 V supply range, and can interface, if necessary, to a host operating on a separate, lower supply voltage.

USB Uart IC (FT232R)

The FT232R is a USB to serial UART interface with the following advanced features:

- Single chip USB to asynchronous serial data transfer interface.
- Entire USB protocol handled on the chip. No USB specific firmware programming required.
- Fully integrated 1024 bit EEPROM storing device descriptors and CBUS I/O configuration.
- Fully integrated USB termination resistors.
- Fully integrated clock generation with no external crystal required plus optional clock output selection enabling a glue-less interface to external MCU or FPGA.

- Data transfer rates from 300 baud to 3 Mbaud (RS422, RS485, RS232) at TTL levels.
- 128 byte receive buffer and 256 byte transmit buffer utilising buffer smoothing technology to allow for high data throughput.
- FTDI's royalty-free Virtual Com Port (VCP) and Direct (D2XX) drivers eliminate the requirement for USB driver development in most cases.
- Transmit and receive LED drive signals.
- UART interface support for 7 or 8 data bits, 1 or 2 stop bits and odd / even / mark / space / no parity
- FIFO receives and transmits buffers for high data throughput.
- Device supplied pre-programmed with unique USB serial number.
- Supports bus powered, self-powered and high-power bus powered USB configurations.
- Integrated +3.3V level converter for USB I/O.
- Integrated level converter on UART and CBUS for interfacing to between +1.8V and +5V logic.
- True 5V/3.3V/2.8V/1.8V CMOS drive output and TTL input.
- Configurable I/O pin output drive strength.
- Integrated power-on-reset circuit.
- Fully integrated AVCC supply filtering - no external filtering required.
- UART signal inversion option.
- +3.3V (using external oscillator) to +5.25V (internal oscillator) Single Supply Operation.
- Low operating and USB suspend current.
- Low USB bandwidth consumption.
- UHCI/OHCI/EHCI host controller compatible.
- USB 2.0 Full Speed compatible.

ADF7xxx Interface

The ADF7xxx interface supports the ADF7023, ADF7024, ADF7242, ADF7030 and ADF7030-1 wireless transceivers. These are low power, high performance, integrated radio transceivers supporting a wide range of modulation schemes and channel widths in the sub-GHz and 2.4GHz frequency ranges

Arduino Interface

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Expansion Interface 3

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3 Hardware Reference

This chapter describes the hardware design of the *ADuCM3029 EZ-KIT* board.

System Architecture

This section describes the configuration on the board (see the ***Block Diagram*** figure).

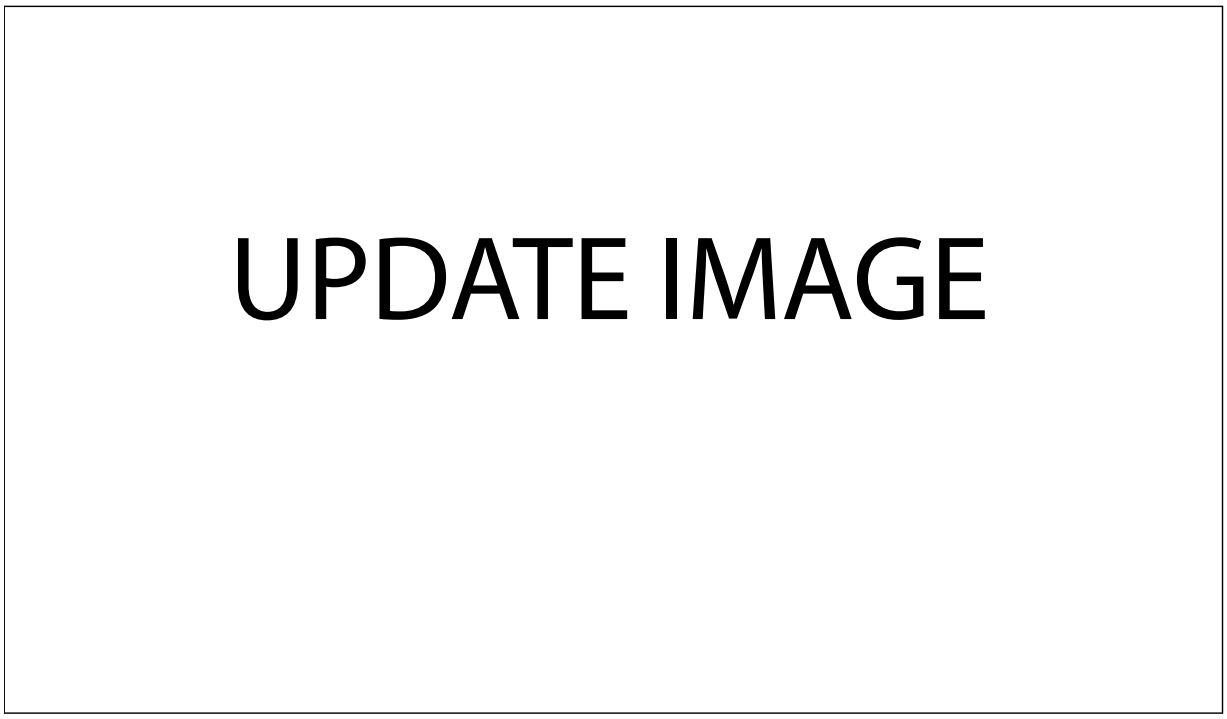

Figure 3-1: Block Diagram

This EZ-Board is designed to demonstrate the ADSP-CM419F processor's capabilities. The ADSP-CM419F EZ-Board has a 30 MHz input clock and runs at 240 MHZ internally.

USB circuitry and a mini USB AB connector are provided for connecting to the EZ-Board as a host or a device. The frequency for the USB circuit is generated internally to the processor.

User I/O to the processor is provided in the form of two user push buttons and four LEDs. The software-controlled switches (SoftConfig) facilitate the switch multi-functionality by disconnecting the push buttons from their associated processor pins and reusing the pins elsewhere on the board. See the ***ADSP-CM419F EZ-Board Schematic*** for more information.

Switches

This section describes operation of the switches. The switch locations are shown in the ***Switch Locations*** figure.

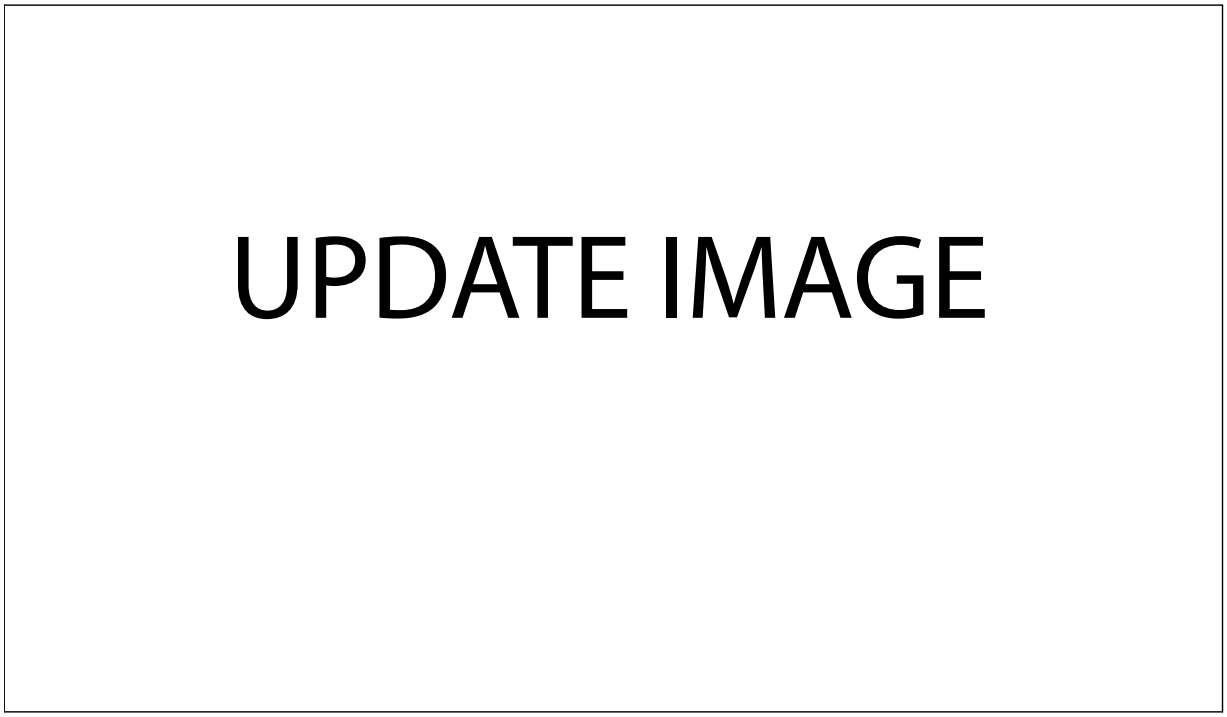

Figure 3-2: Switch Locations

Boot Mode Select (SW1)

The pushbutton switch determines the boot mode of the processor. The ***Boot Mode Select Switch*** table shows the available boot mode settings. By default, the processor boots from the internal flash memory.

Table 3-1: Boot Mode Select Switch

Position	*Processor Boot Mode*
0	UART download mode
1	*Flash boot. Boot from integrated flash memory.*

Reset Push Button (SW2)

The reset pushbutton resets the ADuCM3029 processor. The reset signal is also connected to the expansion connectors via the `SYS_HWRST` signal. Reset (LED1) is used to indicate when the board is in reset.

Wake Push Button (SW3)

The wake push button is connected to the processor's WAKE signal based on the setting WAKE Select Jumper (JP10)

GPIO Push Buttons (SW4-5)

The GPIO push buttons are connected to the processor's signals `P1_14/GPIO30/SPI0_RDY/TEST_DTD5` and `P2_06/GPIO38/ADC0_VIN3`, respectively.

Jumpers

This section describes functionality of the configuration jumpers. The ***Jumper Locations*** figure shows the jumper locations.

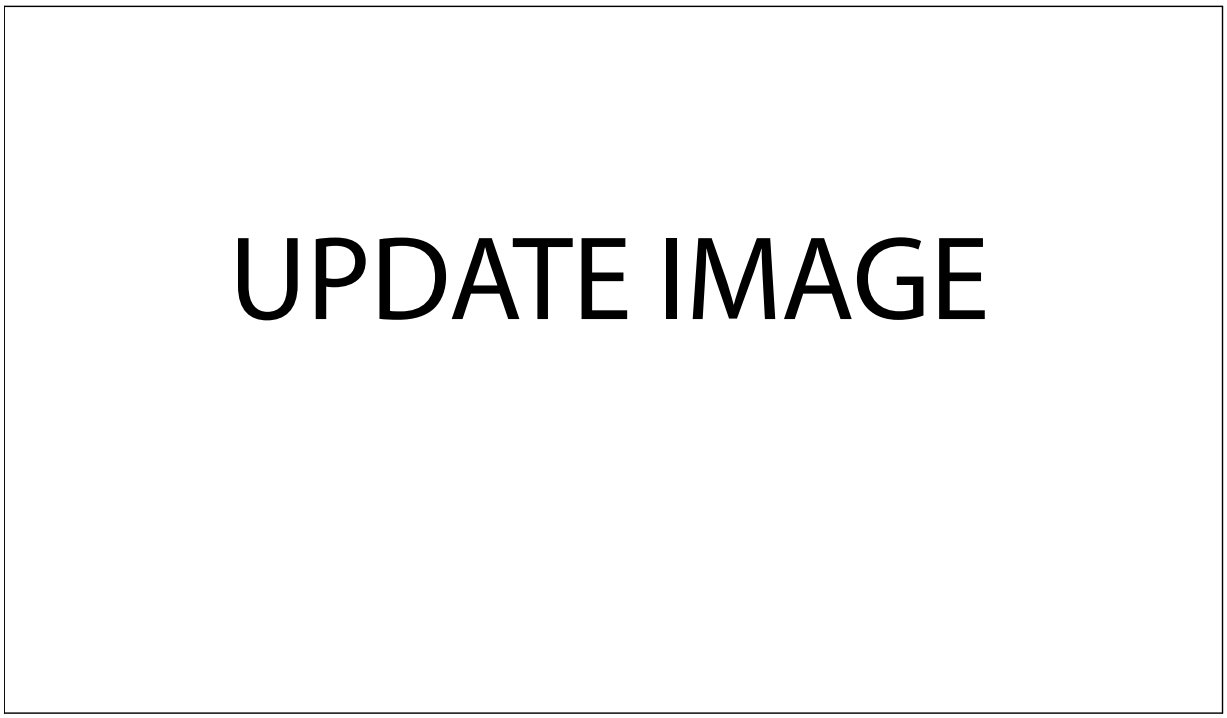

Figure 3-3: Jumper Locations

Main Power Select (JP1)

The main power select jumper selects whether the main power source for the board is provided from the emulator interface, USB or wall transformer. Refer to the ***Main Power Select Jumper*** table. The default setting is to power the board from the wall transformer.

Table 3-2: Main Power Select Jumper

Position	*Power Source*
1 & 3	Emulator 5V
3 & 4	USB 5V
3 & 5	*Wall 5V*

IO Power Select (JP2)

The IO power select jumper selects whether the IO power source for the board is provided from the on-board 3V regualtor, coin battery or PV cell battery. Refer to the ***IO Power Select Jumper*** table. The default setting is to power the IO from the on-board regualtor.

Table 3-3: IO Power Select Jumper

Position	*Power Source*
1 & 3	*on-board regualtor*
3 & 4	coin battery
3 & 5	PV cell battery

ADXL363 Power Enable (JP3)

The ADXL363 power enable jumper allows for the part to be connected or disconnected from the IO power rail. When the jumper is installed it is connected to power. When the jumper is removed power is disconnected from the device. The device can be removed from the power rail to allow for more accurate current measurements of the IO rail when the device is not needed. The default is for the jumper to be installed.

W25Q32 Power Enable (JP4)

The W25Q32 power enable jumper allows for the part to be connected or disconnected from the IO power rail. When the jumper is installed it is connected to power. When the jumper is removed power is disconnected from the device. The device can be removed from the power rail to allow for more accurate current measurements of the IO rail when the device is not needed. The default is for the jumper to be installed.

ADT7420 Power Enable (JP5)

The ADT7420 power enable jumper allows for the part to be connected or disconnected from the IO power rail. When the jumper is installed it is connected to power. When the jumper is removed power is disconnected from the device. The device can be removed from the power rail to allow for more accurate current measurements of the IO rail when the device is not needed. The default is for the jumper to be installed.

Current Measurement (JP6)

The current measurement jumper is used to measure the current draw of the processor and the 3V IO power rail. The default is for both jumpers to be installed. In order to measure the current draw of the processor remove the jumper from pins 1 & 3 and insert an ammeter in series. In order to measure the current draw on the 3V IO rail remove the jumper from pins 2 & 4 and insert an ammeter in series.

Remote Boot Select (JP8)

The remote boot select jumper allows the `SYS_BMODE0` to be controlled by the FT232 when the jumper is installed. The default is for the jumper not to be installed.

Remote Reset (JP9)

The remote reset jumper allows the `SYS_HWRST` to be controlled by the FT232 when the jumper is installed. The default is for the jumper not to be installed.

WAKE Select Jumper (JP10)

This jumper is used to determine what WAKE signal from the processor is connected to the Wake Push Button (SW3).

Table 3-4: WAKE Jumpers

Setting	*Signal*
1 & 2	SYS_WAKE0
3 & 4	SYS_WAKE1
5 & 6	SYS_WAKE2
7 & 8	

ADC VREF Select (JP11)

The ADC VREF select jumper it used to connect the ADC voltage reference of the processor to either the ADR441 or ADR127. When the jumper is placed on pins 1 and 2 the reference is conencted to the ADR441 which is a ultralow noise, LDO XFET voltage reference with current sink and source. When the jumper is placed on pins 2 and 3 the reference is connected to the ADR127 which is a precisoin micropower LDO voltage reference. By default the jumper is connected to pins 2 & 3.

Battery Select (JP12)

The battery select jumper is used to choose between powering the board with a coin battery or a AA battery. When the jumper is installed on pins 1 and 2 the coin cell battery is selected. When the jumper is installed on pins 2 and 3 the AA battery is selected. The default setting is the jumper only connected to pin 1 so neither battery is connected by default.

LEDs

This section describes the on-board LEDs. The ***LED Locations*** figure shows the LED locations.

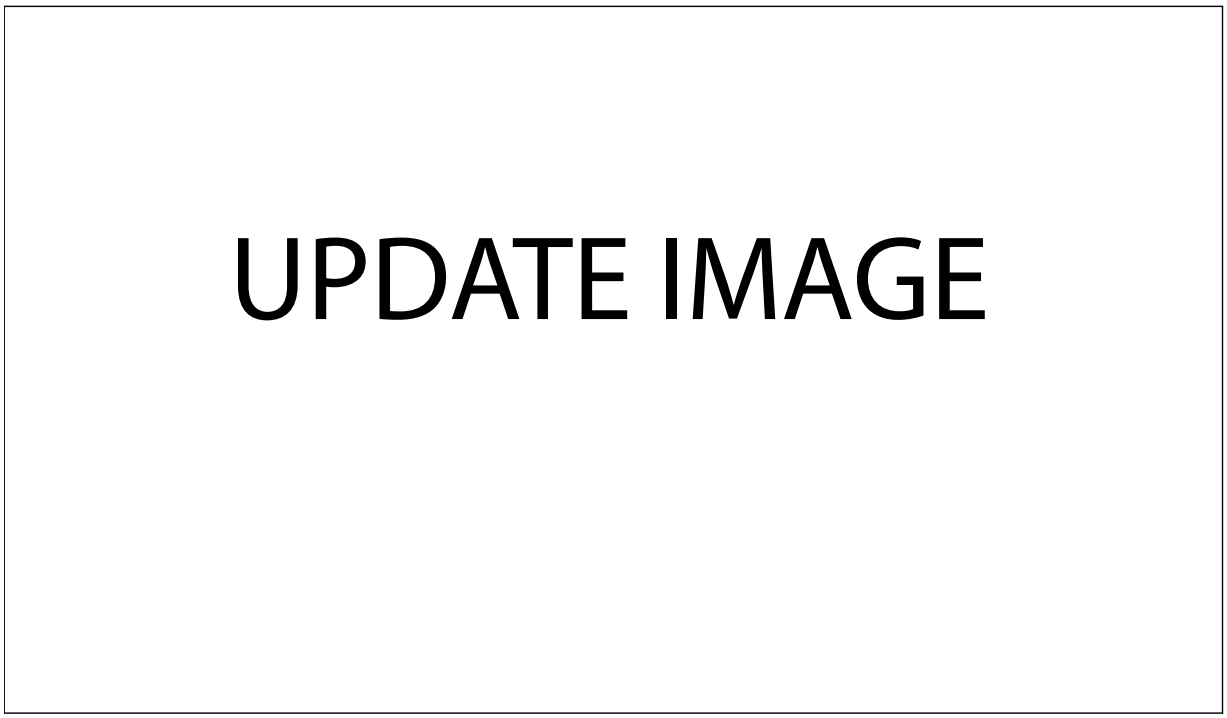

Figure 3-4: LED Locations

Reset (LED1)

When ***LED5*** is ON (red), it indicates that the master reset of all the major ICs is active. The reset LED is controlled by the Analog Devices ADM708 supervisory reset circuit. A master reset is asserted by pressing ***SW25*** which activates ***LED5***. For more information, see Reset Push Button (SW2).

Power (LED2)

When ***LED7*** is ON (green), it indicates that power is being supplied to the board properly. For more information, see Power Architecture.

GPIO (LED3–5)

Four LEDs are connected to the general-purpose I/O pins of the processor (see the ***GPIO LEDs*** table). The LEDs are active high and are ON (amber) by writing a 1 to the correct processor signal.

Table 3-5: GPIO LEDs

LED Reference Designator	*Processor Programmable Flag Pin*
LED1	`PE_07`

Table 3-5: GPIO LEDs (Continued)

LED Reference Designator	*Processor Programmable Flag Pin*
LED2	PE_06
LED3	PE_05
LED4	PE_04

Connectors

This section describes connector functionality and provides information about mating connectors. The connector locations are shown in the ***Connector Locations*** figure.

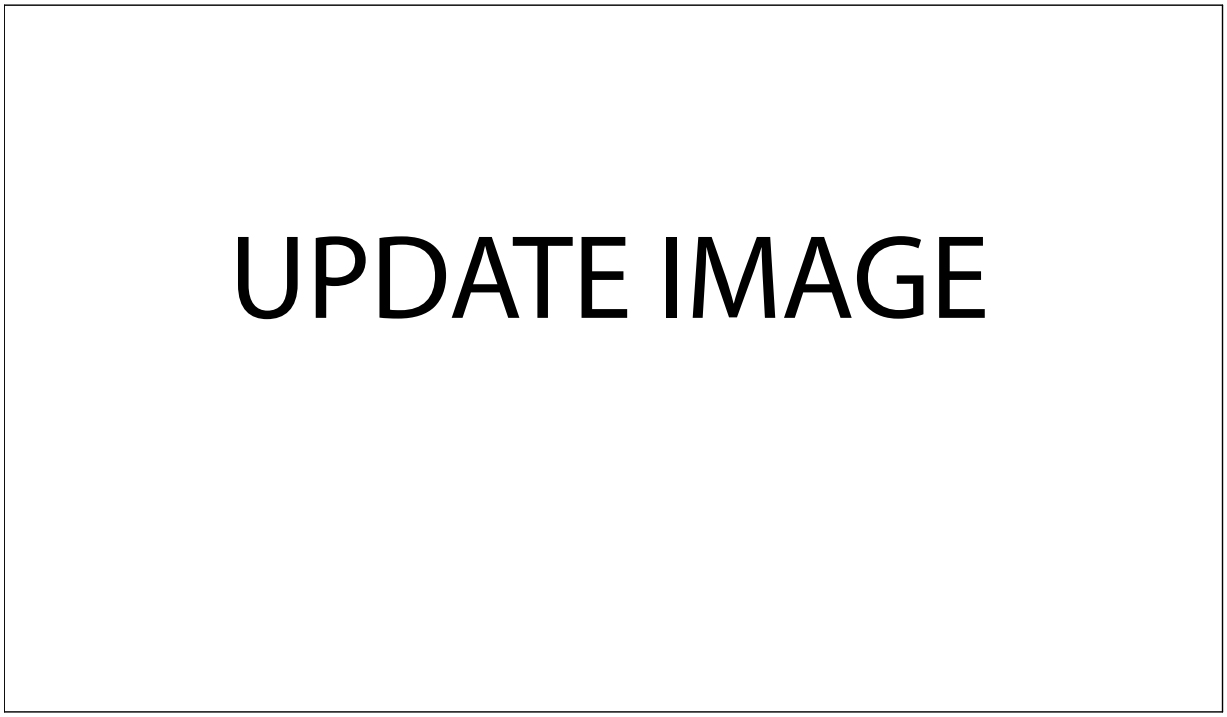

Figure 3-5: Connector Locations

NOTE: Connectors on the back of the board are noted with dotted lines.

Expansion Interface 3 (P1A)

Part Description	*Manufacturer*	*Part Number*
180-pin high-speed socket	SAMTEC	QSH-090-F-D_A
Mating Connector		
180-pin high-speed socket	SAMTEC	QTH-090-01-F-D-A

ADF7xxx (P1 - P3, P9)

Debug (P4 & P5)

The debug connectors provides a connection point for the emualtor to interface with the processor. There are two debig conenctors on the board. The P4 conenctor is a 0.1” connector from SAMTEC (SHF-110-01-L-D-TH). The P5 connector is a 0.05" connector. For more information, see Debug Interface.

USB Connector (P6)

Part Description	*Manufacturer*	*Part Number*
USB mini-B	Hirose	UX60SC-MB-5S8

Power Connector (P8)

The power connector provides power to the board when the jumper of Main Power Select (JP1) is placed on pins 3 and 5.

Part Description	*Manufacturer*	*Part Number*
0.65 mm power jack	CUI	045-0883R
Mating Connector		
5.0VDC@3.6A power supplier	GLOBETEK	GS-1750(R)

Battery (J1 & J5)

This is the battery connectors.

PV Cell (J2)

PV connector

Clock (J3 & J4)

Arduino (J6 - J9)

These are the Arduino connectors

4 ADuCM302x GP I/O Multiplexing

The table identifies the pin functions that are multiplexed on the general-purpose I/O pins of the package

Table 4-1: Signal Muxing Table Port 0

Signal Name	Multiplexed Function 0	Multiplexed Function 1	Multiplexed Function 2	Multiplexed Function 3
P0_00	P0_00	SPI0_CLK	SPT0_BCLK	
P0_01	P0_01	SPI0_MOSI	SPT0_BFS	
P0_02	P0_02	SPI0_MISO	SPT0_BD0	
P0_03	P0_03	SPI0_CS0	SPT0_BCNV	SPI2_RDY
P0_04	P0_04	I2C0_SCL		
P0_05	P0_05	I2C0_SDA		
P0_06	SWD0_CLK	P0_06		
P0_07	SWD0_DATA	P0_07		
P0_08	P0_08	$\overline{\text{BEEP0\_TONE}}$		
P0_09	P0_09	BEEP0_TONE	SPI2_CSn	
P0_10	P0_10	$\overline{\text{UART0\_TX}}$		
P0_11	P0_11	$\overline{\text{UART0\_RX}}$		
P0_12	P0_12	SPT0_AD0		
P0_13	P0_13			
P0_14	P0_14	TMR0_OUT	SPI1_RDY	
P0_15	P0_15			

Table 4-2: Signal Muxing Table Port 1

Signal Name	Multiplexed Function 0	Multiplexed Function 1	Multiplexed Function 2	Multiplexed Function 3
P1_00	P1_00			
P1_01	SYS_BMODE0	P1_01		

Table 4-2: Signal Muxing Table Port 1 (Continued)

Signal Name	Multiplexed Function 0	Multiplexed Function 1	Multiplexed Function 2	Multiplexed Function 3
P1_02	P1_02	SPI2_CLK		
P1_03	P1_03	SPI2_MOSI		
P1_04	P1_04	SPI2_MISO		
P1_05	P1_05	SPI2_CSn		
P1_06	P1_06	SPI1_CLK		
P1_07	P1_07	SPI1_MOSI		
P1_08	P1_08	SPI1_MISO		
P1_09	P1_09	SPI1_CS0		
P1_10	P1_10	SPI0_CS1		SPI1_CS3
P1_11	P1_11		TMR1_OUT	
P1_12	P1_12			
P1_13	P1_13			
P1_14	P1_14		SPI0_RDY	
P1_15	P1_15	SPT0_ACLK		

Table 4-3: Signal Muxing Table Port 2

Signal Name	Multiplexed Function 0	Multiplexed Function 1	Multiplexed Function 2	Multiplexed Function 3
P2_00	P2_00	SPT0_AFS		
P2_01	P2_01		TMR2_OUT	
P2_02	P2_02	SPT0_ACNV	SPI1_CS2	
P2_03	P2_03			
P2_04	P2_04			
P2_05	P2_05			
P2_06	P2_06			
P2_07	P2_07		SPI2_CSn	
P2_08	P2_08		SPI0_CS2	
P2_09	P2_09		SPI0_CS3	
P2_10	P2_10		SPI2_CSn	
P2_11	P2_11	SPI1_CS1		

ADuCM302x GP I/O Multiplexing

The table identifies the pin functions that are multiplexed on the general-purpose I/O pins of the package

Table 6-1: Signal Muxing Table Port 0

Signal Name	Multiplexed Function 0	Multiplexed Function 1	Multiplexed Function 2	Multiplexed Function 3
P0_00	P0_00	SPI0_CLK	SPT0_BCLK	
P0_01	P0_01	SPI0_MOSI	SPT0_BFS	
P0_02	P0_02	SPI0_MISO	SPT0_BD0	
P0_03	P0_03	SPI0_CS0	SPT0_BCNV	SPI2_RDY
P0_04	P0_04	I2C0_SCL		
P0_05	P0_05	I2C0_SDA		
P0_06	SWD0_CLK	P0_06		
P0_07	SWD0_DATA	P0_07		
P0_08	P0_08	$\overline{\text{BEEP0\_TONE}}$		
P0_09	P0_09	BEEP0_TONE	SPI2_CSn	
P0_10	P0_10	$\overline{\text{UART0\_TX}}$		
P0_11	P0_11	$\overline{\text{UART0\_RX}}$		
P0_12	P0_12	SPT0_AD0		
P0_13	P0_13			
P0_14	P0_14	TMR0_OUT	SPI1_RDY	
P0_15	P0_15			

Table 6-2: Signal Muxing Table Port 1

Signal Name	Multiplexed Function 0	Multiplexed Function 1	Multiplexed Function 2	Multiplexed Function 3
P1_00	P1_00			
P1_01	SYS_BMODE0	P1_01		
P1_02	P1_02	SPI2_CLK		
P1_03	P1_03	SPI2_MOSI		
P1_04	P1_04	SPI2_MISO		
P1_05	P1_05	SPI2_CSn		
P1_06	P1_06	SPI1_CLK		
P1_07	P1_07	SPI1_MOSI		
P1_08	P1_08	SPI1_MISO		

Table 6-2: Signal Muxing Table Port 1 (Continued)

Signal Name	Multiplexed Function 0	Multiplexed Function 1	Multiplexed Function 2	Multiplexed Function 3
P1_09	P1_09	SPI1_CS0		
P1_10	P1_10	SPI0_CS1		SPI1_CS3
P1_11	P1_11		TMR1_OUT	
P1_12	P1_12			
P1_13	P1_13			
P1_14	P1_14		SPI0_RDY	
P1_15	P1_15	SPT0_ACLK		

Table 6-3: Signal Muxing Table Port 2

Signal Name	Multiplexed Function 0	Multiplexed Function 1	Multiplexed Function 2	Multiplexed Function 3
P2_00	P2_00	SPT0_AFS		
P2_01	P2_01		TMR2_OUT	
P2_02	P2_02	SPT0_ACNV	SPI1_CS2	
P2_03	P2_03			
P2_04	P2_04			
P2_05	P2_05			
P2_06	P2_06			
P2_07	P2_07		SPI2_CSn	
P2_08	P2_08		SPI0_CS2	
P2_09	P2_09		SPI0_CS3	
P2_10	P2_10		SPI2_CSn	
P2_11	P2_11	SPI1_CS1		