



## ADuCM362/ADuCM363 Development Systems Getting Started Tutorial

### FEATURES

**ADuCM362/ADuCM363 evaluation board**

**2 power supply options: 5 V from a USB port connected to the Segger J-Link OB emulator or 1.8 V to 3.6 V from an external power supply**

**On-board resistance temperature detector (RTD) for temperature measurements**

**Access to all analog and digital pins**

**Power and general-purpose LEDs**

**Reset and download push-buttons**

**8-pin connector to the Segger J-Link OB emulator**

**32.768 kHz external crystal**

### EVALUATION KIT CONTENTS

**An evaluation board (EVAL-ADuCM362QSPZ or EVAL-ADuCM363QSPZ) that facilitates performance evaluation of the device with minimal external components**

**An Analog Devices, Inc., Segger J-Link OB emulator (USB-SWD/UART-EMUZ)**

**1 USB cable**

**1 installation DVD**

### ONLINE RESOURCES

**[ADuCM362/ADuCM363 data sheet](#)**

**[ADuCM362/ADuCM363 Hardware Reference Manual](#)**

### GENERAL DESCRIPTION

The ADuCM362/ADuCM363 development system allows evaluation of ADuCM362 or ADuCM363 silicon. This quick start guide introduces the support features and tools supplied with the ADuCM362/ADuCM363 evaluation kit. In addition, this guide describes how to connect the evaluation hardware.

The getting started guide works as a tutorial, providing instructions on how to download third party evaluation software tools. Instructions are also provided on how to load code examples supplied with the software tools.

The ADuCM362 is a fully integrated, 4 kSPS, 24-bit data acquisition system that incorporates dual, high performance multichannel sigma-delta ( $\Sigma$ - $\Delta$ ) analog-to-digital converters (ADCs), a 32-bit ARM<sup>®</sup> Cortex<sup>®</sup>-M3 processor, and Flash/EE memory on a single chip.

The ADuCM362 is designed for direct interfacing to external precision sensors in both wired and battery-powered applications. The ADuCM363 contains all the features of the ADuCM362 except for the ADC0, which is removed.

This guide gives users the ability to generate and download user code for use in unique end system requirements.

Complete specifications for the ADuCM362/ADuCM363 are provided in the ADuCM362/ADuCM363 data sheet and should be consulted in conjunction with this user guide when using the evaluation board.

### EVAL-ADuCM362QSPZ/EVAL-ADuCM363QSPZ EVALUATION BOARD

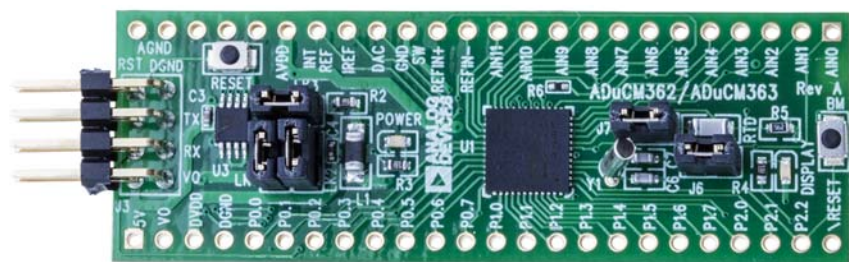


Figure 1.

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**REVISION HISTORY**

10/2016—Revision 0: Initial Version

## GETTING STARTED

### SOFTWARE INSTALLATION PROCEDURES

Perform the steps described in this section before plugging any USB devices into the PC.

1. Close all open applications.
2. Insert the installation DVD into the DVD drive.
3. Double-click **ADuCM36x.exe** and follow the on-screen instructions. A menu displays installation options as shown in Figure 2.

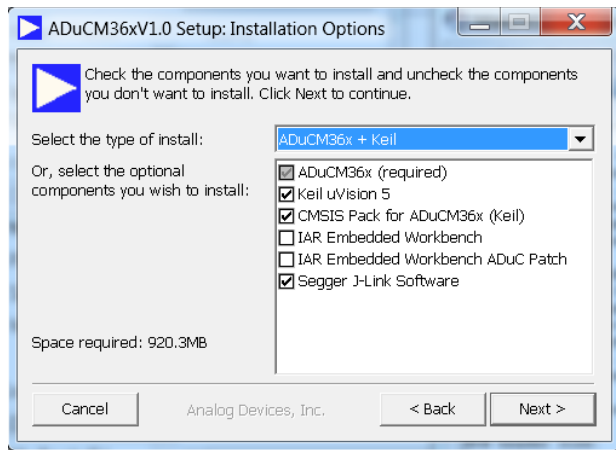


Figure 2. Installation Options

The following components install by default:

- Example code and function sets for most peripherals.
- An **Elves.exe** application to easily choose functions from the provided function sets followed by choosing from the function parameters.

The following components are optional installations:

- Keil development tools (a compiler, debugger, and programming tools). The Keil  $\mu$ Vision 5 software version is used.
- IAR Embedded Workbench development tools (a compiler, debugger, and programming tools).
- Segger J-Link drivers for the J-Link emulator.

The J-Link software is selected by default in the installation menu, shown in Figure 2. It is advised to leave it selected. The J-Link software automatically installs the J-Link serial port driver. Select **Install USB Driver for J-Link-OB with CDC**, shown in Figure 3. If that step is missed, run **JLinkCDCInstaller\_V1.2b.exe** located in the **ADuCM36x\Segger** folder.

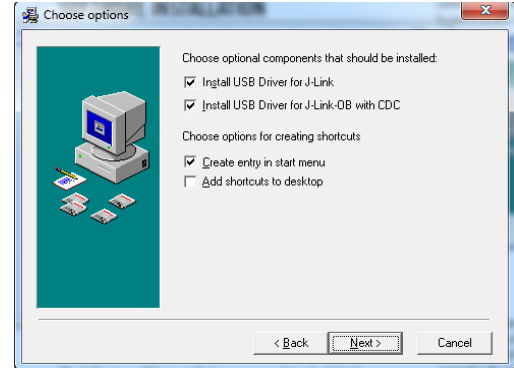


Figure 3. Installing Link Software

If using the IAR tools, the entire contents of the supplied **arm** directory (for example, **C:\ADuCM36x...IAR\IAR\_M36x\_Patch.zip\arm**) must be copied to the IAR tools directory (for example, **C:\Program Files\IAR Systems\Embedded Workbench 7.3 Kickstart\arm**).

Future updates are available from the Analog Devices FTP website.

### KEIL $\mu$ VISION5

The Keil  $\mu$ Vision5 integrated development environment (IDE) integrates all the tools necessary to edit, assemble, and debug code. The fastest way to start is to open an existing Keil  $\mu$ Vision5 project by following these steps:

1. In Keil  $\mu$ Vision5, select **Project > Open Project**.
2. Browse to the folder where the **ADuCM362/ADuCM363** software is installed (such as, **C:\ADuCM36x...**).
3. Open the file **DIO.uvproj** in the folder **code\ADuCM362\examples\DIO**. This file launches an example project.
4. Compile and download to the **ADuCM362/ADuCM363** on the evaluation board.
5. To run the example code, press **RESET** on the evaluation board or enter debug mode by clicking the **Start/Stop Debug Session (Ctrl+F5)** button (see Figure 4) and then click **Run (F5)** (see Figure 5).

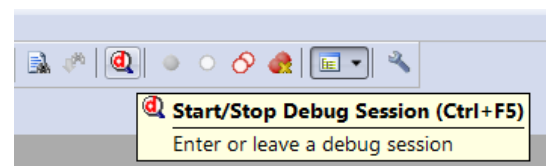


Figure 4. Download and Debug Button

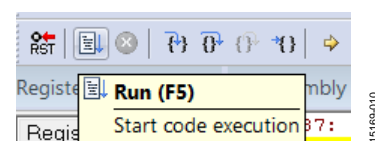


Figure 5. Run (F5) Button

6. When running, the red LED marked **DISPLAY** on the evaluation board flashes.

**IAR EMBEDDED WORKBENCH**

The IAR Embedded Workbench integrates all the tools necessary to edit, assemble, and debug code. The fastest way to get started is to open an existing workspace by following these steps:

1. Open the IAR tools from the **Start Menu**.
2. Within the IAR IDE, click **File > Open > Workspace** and open a workspace provided by Analog Devices (for example, **C:\ADuCM36x...\code\ADuCM362\examples\Blink\DI O.eww**).
3. Compile and download the code to the device using **Project > Rebuild All** and then **Project > Download Active Application**.
4. Click **No** if a pop-up window appears identifying an unknown device.
5. To run the code, press RESET on the evaluation board or enter debug mode by clicking the **Download and Debug** button (see Figure 6) and then click **Go** (see Figure 7).

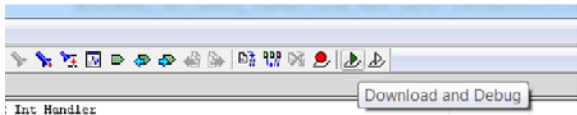


Figure 6. Download and Debug Button

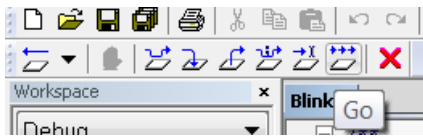


Figure 7. Go Button

6. When running, the red LED marked DISPLAY on the evaluation board flashes.

**ELVES.EXE**

Elves.exe is an application that chooses functions from the provided function sets and function parameters. Elves.exe can be integrated into the Keil µVision5 and IAR tools under the tool menus. For instructions, run **Elves.exe** (for example, at **C:\ADuCM36x...\Software Tools\Elves\Elves.exe**) and press the F1 key or click the **Help** button.

**EVALUATION BOARD SETUP PROCEDURES**

**Assembling and Connecting the Hardware**

Do not plug in the USB cable before the software is installed. Use the following steps to connect the hardware:

1. Insert the USB cable provided between the PC and the J-Link OB emulator (emulator shown in Figure 8).
2. The red LED (LED1) flashes until initialization of the drivers completes.

3. Details for installation of the drivers appear on the screen the first time the user plugs the evaluation board into the PC or if using a different USB port. Allow the installation of these drivers to complete as they provide a virtual communication port on the PC that allows the evaluation board to appear as a virtual serial communication port to the UART port of the **ADuCM362/ADuCM363** device.
4. If using the virtual serial communication port to the UART, ensure Jumpers LK3 and LK5 are in place on the evaluation board (see Figure 9).
5. Plug the 10-pin DIL connector of the J-Link OB emulator into the **EVAL-ADuCM362QSPZ** or **EVAL-ADuCM363QSPZ**
6. The evaluation board is powered by computer from the the USB cable connected to the J-Link OB emulator. The green POWER LED turns on.

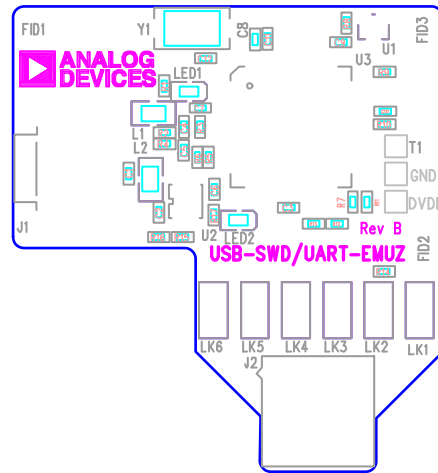
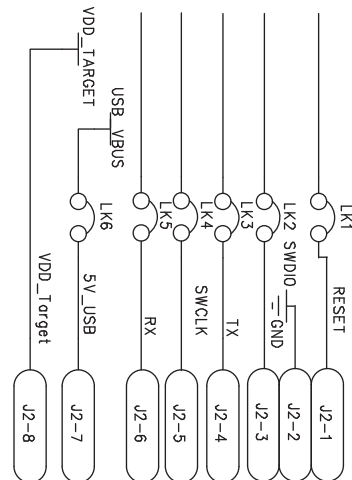


Figure 8. Emulator, Top View



TO MINIKIT BOARD CONNECTOR

Figure 9. J-Link OB Connection Details

## WINDOWS SERIAL DOWNLOADER

The Windows® Serial Downloader for Cortex-M3-based devices (named CM3WSD.exe) is a Windows software program that allows a user to serially download Intel Extended Hex files as created by assembler/compiler to the [ADuCM362/ADuCM363](#) via the serial port. The Intel Extended Hex file is downloaded into the on-chip Flash/EE program memory via a selected PC serial port.

### PREPARING FOR DOWNLOAD

1. Connect the [EVAL-ADuCM362QSPZ](#) or [EVAL-ADuCM363QSPZ](#) to the USB-SWD/UART-EMUZ emulator board, and the USB-SWD/UART-EMUZ to the PC using a USB cable.
2. Ensure all links are inserted on both boards.
3. Place the [ADuCM362/ADuCM363](#) into serial download mode using the following sequence:
4. Pull the P2.2 pin low.
5. Pull the RESET pin low and then high (float).
6. P2.2 can be left floating once the RESET pin is high.

### DOWNLOADING USING CM3WSD

1. In the software tools \CM3WSD folder, open the file **CM3WSD.exe**.
2. Select the file at `C:\ADuCM36x...\code\ADuCM362\examples\Blink\Obj\Blink.hex`.
3. In the **Serial Port** drop-down menu, select the **JLink CDC UART Port** and a baud rate of 38400.
4. Select **Start**. The CM3WSD sends a reset command to the [ADuCM362/ADuCM363](#). If the [ADuCM362/ADuCM363](#) is in serial download mode and the COM port between the PC and the [EVAL-ADuCM362QSPZ](#) or [EVAL-ADuCM363QSPZ](#) are setup correctly, then the CM3WSD begins downloading the hex file and displays a progress bar while the file is downloading. Once the file successfully downloads, the monitor status box updates with the message **Flashing Complete Click Reset to run program**.

### RUNNING THE DOWNLOADED FILE

#### Running Using the CM3WSD

Select **Reset** with the P2.2 pin floating or pulled high. The monitor status box updates with the message **Running**.

#### Manual Run Option

Pull the RESET pin low, then high (or float) on the [EVAL-ADuCM362QSPZ](#) or [EVAL-ADuCM363QSPZ](#) to reset the [ADuCM362/ADuCM363](#), with the P2.2 pin floating or pulled high. The program starts running automatically.

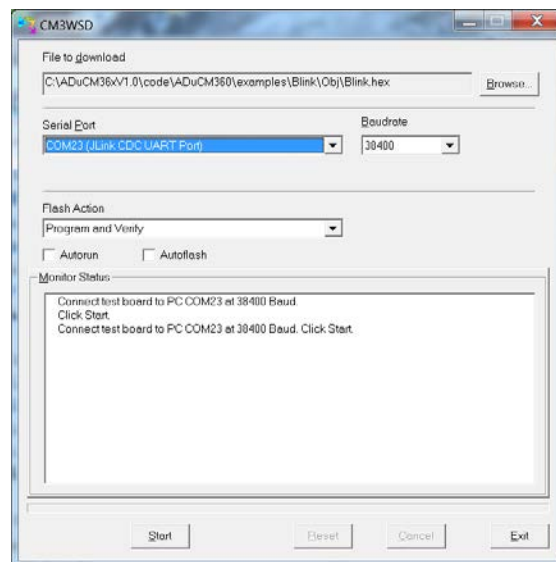


Figure 10. Preparing for Download

## NOTES

**ESD Caution**

**ESD (electrostatic discharge) sensitive device.** Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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