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# ADuCM322 Development Systems Getting Started Tutorial

## DEVELOPMENT SYSTEM KIT CONTENTS

**An evaluation board (EVAL-ADuCM322EBZ) that facilitates performance evaluation of the device with a minimum of external components**
**An Analog Devices, Inc., Segger J-Link OB emulator (USB-SWD/UART-EMUZ)**
**1 USB cable**
**1 installation DVD**

## INTRODUCTION

The ADuCM322 is an on-chip, dual-die stack system designed for diagnostic control on fixed wavelength laser optical module applications. It features a 16-bit (12-bit accurate) multichannel SAR analog-to-digital converter (ADC), an ARM® Cortex™-M3 processor, eight voltage digital-to-analog converters (DACs), four current output DACs, and flash/EE memory packaged in a 6 mm × 6 mm, 96-ball CSP_BGA package.

## GENERAL DESCRIPTION

The ADuCM322 development system evaluates the ADuCM322. This quick start guide introduces the support features and tools supplied with the evaluation kit. In addition, this guide shows and 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.

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

## TYPICAL SETUP OF THE EVAL-ADUCM322EBZ AND J-LINK OB EMULATOR

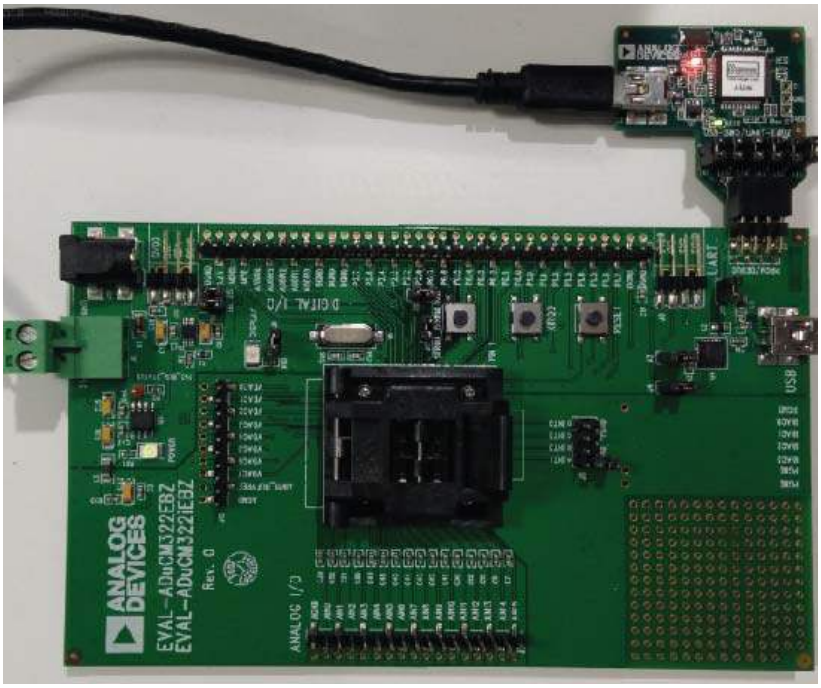


*Figure 1.*

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## REVISION HISTORY

**2/16—Revision 0: Initial Version**

# GETTING STARTED

## SOFTWARE INSTALLATION PROCEDURES

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

1. Close all open applications.
2. Insert the installation DVD into a DVD drive.
3. Double-click **ADuCM310_32x.exe** and follow the on-screen instructions. A menu displays installation options as shown in Figure 2.

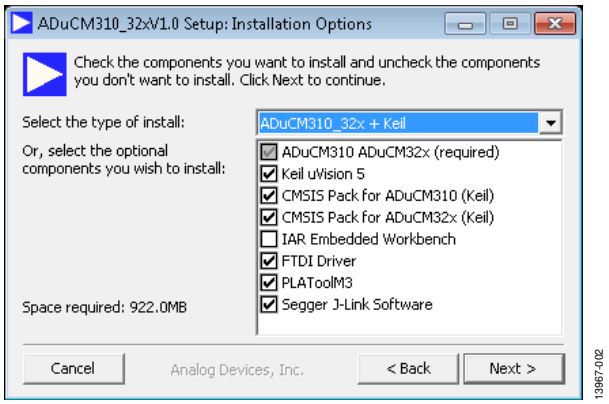


*Figure 2. Installation Options*

The following components install by default:

- FTDI drivers for the evaluation board.
- 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 software Revision v5.14 is used. Analog Devices added a patch to this revision of the MDK460 tools to support the ADuCM322.
- IAR development tools (a compiler, debugger, and programming tools).
- Segger J-Link drivers. These are the 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** as shown in Figure 3. If that step is missed, run **JLinkCDCInstaller_V1.2b.exe** located in the **ADuCM322\Segger** folder.

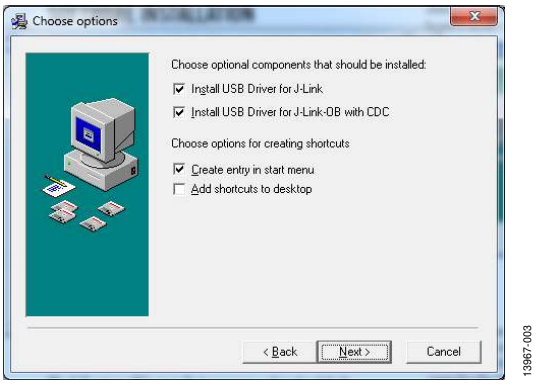


*Figure 3. Installing Link Software*

If using the IAR tools, the entire contents of the supplied arm directory (for example, **C:\ADuCM322…\IAR\IAR_M320_ Patch0.2.zip\arm**) must be copied to the IAR tools directory (for example, **C:\Program Files\IAR Systems\ Embedded Workbench 6.5 Kickstart\arm**).

Future updates may be available from the Analog Devices FTP site.

## KEIL µVISION5

The Kiel µVision5 integrated development environment (IDE) integrates all the tools necessary to edit, assemble, and debug code. The fastest way to get started is to open an existing Kiel µVision5 project by following these steps:

1. In Keil µVision5, select **Project** > **Open Project**.
2. Browse to the folder where the ADuCM322 software is installed (such as, **C:\ADuCM322...**).
3. Open the file **DIO.uvproj** in the folder **code\ADuCM322\examples\DIO**. This file launches an example project.
4. Compile and download to the device.
5. To run the example code, press RESET on the board or enter debug mode and select **Run**.
6. When running, the red LED marked DISPLAY on the board flashes.

## IAR EWARM

The IAR EWARM IDE 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 **C:\Program Files (x86)\IAR Systems\Embedded Workbench 6.5\common\binIarIdePm.exe**.
2. Within the IAR IDE, click **File** > **Open** > **workspace** and open a workspace provided by Analog Devices (for example, **C:\ADuCM322…\code\ADuCM322\examples\DIO\DIO.eww**).
3. Compile and download the code to the device using **Project** > **Rebuild All** and then to **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 board or enter debug mode and select **Go**.
6. When running, the red LED marked DISPLAY on the 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:\ADuCM322…\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 4).
2. The red LED (LED1) flashes until initialization of the drivers is complete.
3. Details for installation of the drivers may appear on the screen. 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 ADuCM322 device.
4. If using the virtual serial communication port to the UART, ensure Jumpers LK3 and LK5 are in place on the board (see Figure 5). If using the UART on the J8 connector, remove Jumpers LK3 and LK5 to prevent contention.
5. Plug the 10-pin DIL connector of the J-Link OB emulator into the EVAL-ADuCM322EBZ.
6. To power up the evaluation board, apply a voltage between 4 V and 5.5 V to the J5 connector or a voltage between 4.7 V and 6.2 V to the J14 connector. The green POWER LED turns on.

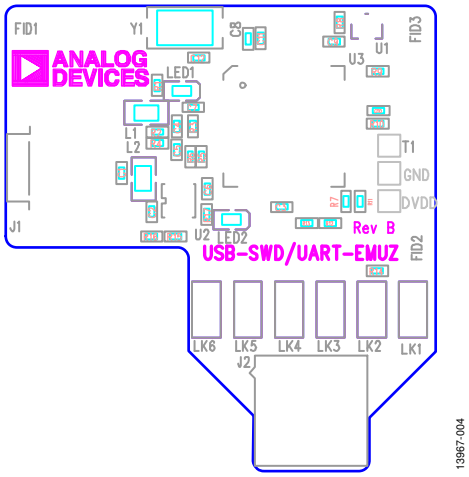


*Figure 4. Emulator, Top View*

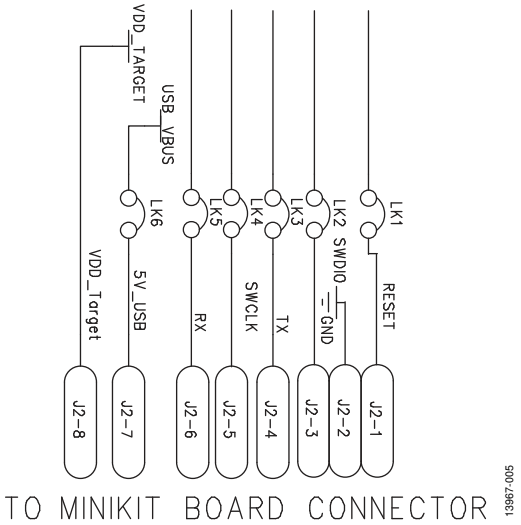


*Figure 5. J-Link OB Connection Details*

### *Evaluating the MSDIO Download Mode*

To evaluate the MSDIO download mode using the MDIOWSD software, use the SUB-20 multi interface USB adapter (not included). This allows connectivity between the ADuCM322 evaluation board and PC via the MDIOWSD software. The following is the procedure to download code to the device using the MSDIO interface.

1. Connect the relevant pins of the SUB-20 board to the pins of the EVAL-ADuCM322EBZ as detailed in Table 1.

**Table 1. Pin Connection Guide**

| EVAL-ADuCM322EBZ Pins | SUB-20 Pins |
|---|---|
| DGND | J6-10 |
| 1.2 V | J6-9 |
| MDIO | J6-7 |
| MCK | J6-1 |

2. On the SUB-20 board, ensure
   a. Pin J7 is set to 3.3 V.
   b. Pins JP1, JP2 JP3, JP4, and JP5 are set to connect Pin 1 to Pin 2.
   c. Pin JP6 is set to connect Pin 2 to Pin 3.
3. Connect the USB cable from the PC to the SUB-20 board and run **C:\ADuCM322…\Software Tools\ MDIOWSD\MDIOWSD.exe**
4. Click **Browse** and navigate to a specific code to download.
5. To download the code, select **Program and Verify, Start** and follow the instructions.