EVAL-ADuCM342EBZ Development System Getting Started Tutorial

DEVELOPMENT SYSTEM KIT CONTENTS

- EVAL-ADuCM342EBZ evaluation board that facilitates evaluation of the device with minimum external components
- Analog Devices, Inc., J-Link OB emulator (USB-SWD/UART-EMUZ)
- USB cable

DOCUMENTS NEEDED

- ADuCM342 data sheet
- ADuCM342 hardware reference manual

INTRODUCTION

The ADuCM342 is fully integrated, 8 kSPS, data acquisition systems incorporating dual, high performance, Σ-Δ analog-to-digital converters (ADCs), with a 32-bit ARM Cortex™-M3 processor and Flash/EE memory on a single chip.

The ADuCM342 is complete system solutions for battery monitoring in 12 V automotive applications. The ADuCM342 integrates all of the required features to precisely and intelligently monitor, process, and diagnose 12 V battery parameters including battery current, voltage, and temperature over a wide range of operating conditions. The ADuCM342 has 128 kB program flash.

GENERAL DESCRIPTION

The EVAL-ADuCM342EBZ development system supports the ADuCM342 and allows a flexible platform for evaluation of the ADuCM342 silicon. The EVAL-ADuCM342EBZ development system allows quick removal and insertion of a device through a 32-lead LFCSP socket. It also provides the connections necessary to allow rapid measurement setups. Switches and LEDs are provided on the applications board to assist in debugging and simple code development. Sample code projects are also provided to show key features of each peripheral and examples of how they can be configured.

This user guide provides step-by-step details of how to set up and configure the example software available on the ADuCM342 Design Tools page.

By working through this user guide, users can start to generate and download their own user code for use in their own, unique end-system requirements.

Full specifications on the ADuCM342 are available in the ADuCM342 data sheet available from Analog Devices, Inc., and must be consulted with this user guide when using the EVAL-ADuCM342EBZ evaluation board.

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REVISION HISTORY

3/2023—Revision 0: Initial Version

EVAL-ADUCM342EBZ SOCKETED EVALUATION BOARD SETUP

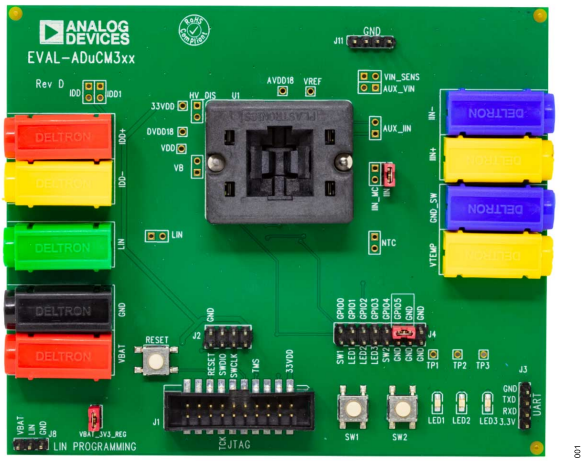

Figure 1. EVAL-ADuCM342EBZ Socketed Evaluation Board Setup

GETTING STARTED

SOFTWARE INSTALLATION PROCEDURE

Items required to get started are as follows:

- Keil µVision v5 or higher
- CMSIS pack for ADuCM342
- Segger debugger interface driver and utilities

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

Support files for Keil are provided at the ADuCM342 Design Tools page. For Keil v5 upwards, CMSIS pack is required and is available on the ADuCM342 product pages.

INSTALLING

To install the software, do the following steps:

1. Close all open applications.
2. From the Keil website, download and install the Keil µVision v5 (or higher).
3. From the Segger website, download and install the latest **J-Link software & documentation pack for Windows**.
4. From the ADuCM342 product page, download the CMSIS pack for the ADuCM342.

VERIFYING THE J-LINK DRIVER

To install the J-Link driver, do the following steps:

1. Follow the sequence of instructions provided by Segger to download and install the J-Link driver.
2. When the software installation is complete, plug the debugger/programmer into the USB port of your PC using the USB cable supplied.
3. Verify that the emulator board appears in the Windows® **Device Manager** window (see Figure 2).

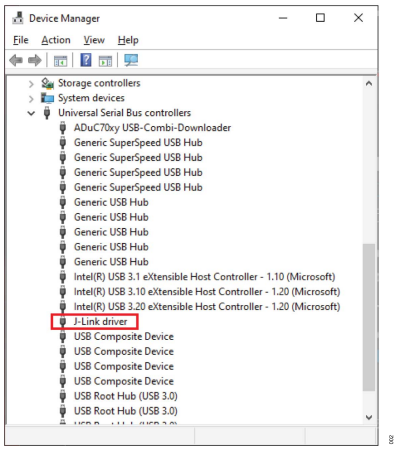

Figure 2. Device Manager

CONNECT THE DEVELOPMENT SYSTEM

To connect the development system, do the following steps:

1. Ensuring correct orientation, insert an ADuCM342 device. Note that a dot in the corner shows the Pin 1 of the device. The dot on the device must be orientated with the dot on the socket, as shown in Figure 3.

Figure 3. ADuCM342 Device Orientation

2. Connect the debugger/programmer, noting the correct orientation as shown in Figure 4.
3. Connect a 12 V supply between V_{BAT} and GND.
4. Ensure that the board jumpers are in position, as shown in Figure 1.
5. Ensure that the GPIO5 jumper is in place. The GPIO5 jumper is used by the on-board kernel to determine program flow after a reset. For more details, see the Kernel section in the ADuCM342 hardware reference manual.
6. Press **RESET**.

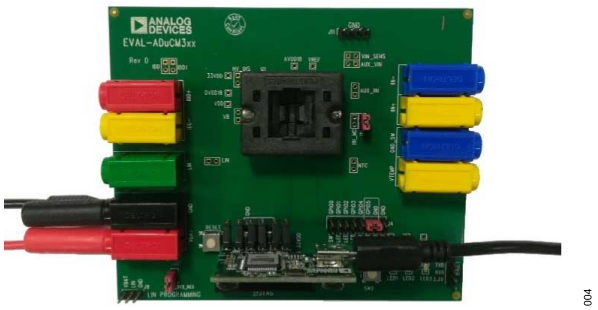

Figure 4. Mini-Link Debugger/Programmer Connection

CONNECT THE DEVELOPMENT SYSTEM

JUMPER FUNCTIONALITY

Table 1. Jumper Functionality

Jumper	Functionality
J4, GPIO0	These jumpers connect the SW1 push button to the GPIO0 pin of the device.
J4, GPIO1, GPIO2, GPIO3	These jumpers connect the LEDs to the GPIO1, GPIO2, and GPIO3 pins of the device.
J4, GPIO4	These jumpers connect the SW2 push button to the GPIO4 pin of the device.
J4, GPIO5	This jumper ties the GPIO5 pin of the device to GND. This jumper must be connected when programming the device or when accessing through serial wire debug (SWD).
VBAT_3V3_REG	This jumper enables the 3.3 V regulator on the underside of the printed circuit board (PCB). This jumper powers the LEDs, or an additional 3.3 V source.
LIN	This jumper is not inserted and connected through the 0 Ω link. This jumper can disconnect the LIN terminal (green banana socket) from the device when the 0 Ω link is removed.
IDD, IDD1	These jumpers are not inserted and connected through the 0 Ω link. This jumper allows the insertion of an ammeter in series with the VBAT supply through the I_{DD}+/I_{DD} sockets for current measurement when the 0 Ω link is removed.
VB	This jumper is not inserted and is connected through the 0 Ω link. This jumper disconnects the VBAT supply from the device VBAT input when the 0 Ω link is removed.
AUX_VIN	This jumper is not inserted. The VINx_AUX device pins are connected to GND through the 0 Ω link.
VIN_SENS	This jumper is not inserted. This jumper connects a sensor to the VINx_AUX input of the device when the 0 Ω link connecting the VINx_AUX to GND is removed.
IIN	This jumper shorts the inputs of the current channel ADC.
IIN_MC	This jumper is not inserted. This jumper connects to the signal at the IIN+ and IIN− pins of the device.
AUX_IIN	This jumper is not inserted. The IINx_AUX device pins are connected to GND through the 0 Ω link.
NTC	This jumper is not inserted. This jumper allows an external temperature device to be connected between VTEMP and GND_SW of the device.
J1	J1 is the JTAG programming interface. This interface allows the use of a JTAG with SWD capability.
J2	J2 is the SWD programming interface. See the orientation shown in Figure 4.
J3	J3 allows GPIO1 and GPIO4 to be used as UART connections, operating the device LIN logic in UART mode.
J4	J4 is a GPIO header.
J8	J8 is a header for programming the flash through LIN using the USB-I2C/LIN-CONVZ dongle.
J11	Ground header.

KEIL MVISION5 INTEGRATED DEVELOPMENT ENVIRONMENT

INTRODUCTION

The Keil µVision5 integrated development environment (IDE) integrates all the tools necessary to edit, assemble, and debug code. The ADuCM342 development system supports nonintrusive emulation limited to 32 kB code. This section describes the project setup steps to download and debug code on an ADuCM342 development system. It is recommended to use the J-Link debugger driver.

QUICK START STEPS

Starting µVision5

First, ensure that the CMSIS pack for the ADuCM342 is installed (see the Getting Started section).

After installing Keil µVision5, a shortcut appears on the PC desktop. Double click the shortcut to open Keil µVision5.

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Figure 5. Keil µVision5 Desktop Shortcut

1. When Keil opens, click **Pack Installer** button on the toolbar.

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Figure 6. Pack Installer Button

2. The **Pack Installer** window appears.

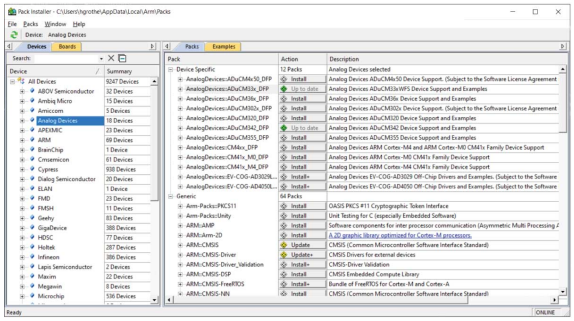

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Figure 7. Pack Installer Window

3. Install the CMSIS pack. In the **Pack Installer** window, click **File** > **Import** and locate the downloaded CMSIS pack. Follow the on-screen prompts to install.
4. In the left-hand side of the window, under the **Devices** tab, click **Analog Devices** > **ADuCM342 Device** > **ADuCM342**.

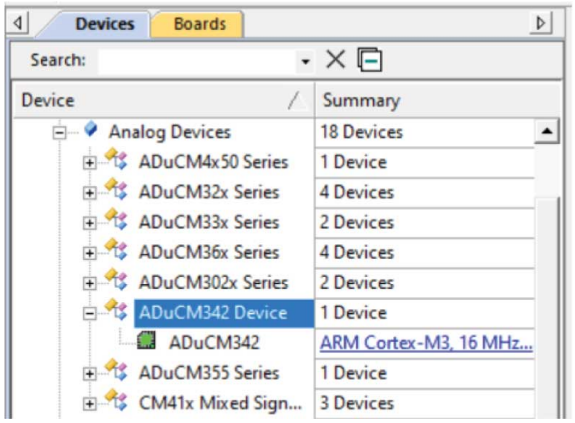

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Figure 8. Devices Tab

5. In the right-hand side of the window, click **Examples** tab.

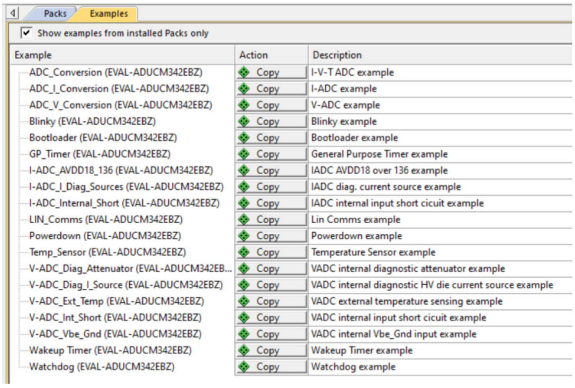

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Figure 9. Examples Tab

6. Select the **Blinky** example and click **Copy**.
7. Choose a destination folder and click **ok**. This installs the **Blinky** example and necessary startup files to your PC.

KEIL MVISION5 INTEGRATED DEVELOPMENT ENVIRONMENT

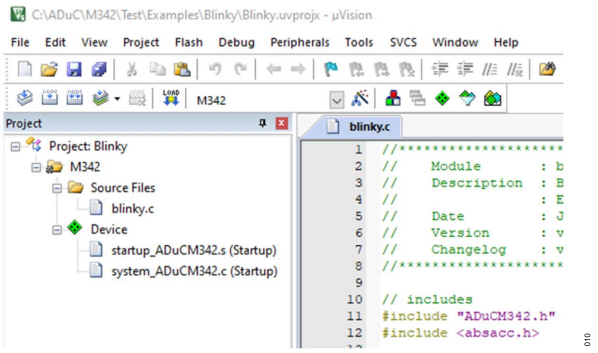

Figure 10. Blinky Example

8. The example must be compiled by clicking the **Rebuild** button on the toolbar.

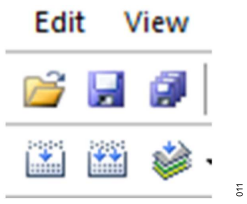

Figure 11. Rebuild Button

9. When the build is complete, the message shown in Figure 12 appears.

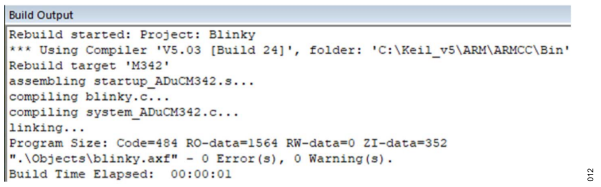

Figure 12. Build Output

10. To download the code to the EVAL-ADuCM342EBZ board, click **Load**.

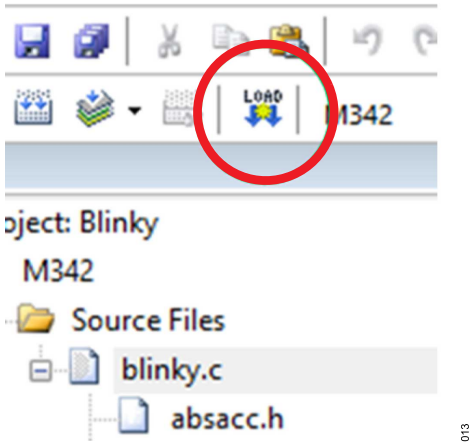

Figure 13. Load Button

11. When the code is downloaded to the applications board, press the RESET button and LED2 and LED3 start blinking repeatedly.

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.