

AVR32907: AT32UC3C-EK Getting Started Guide

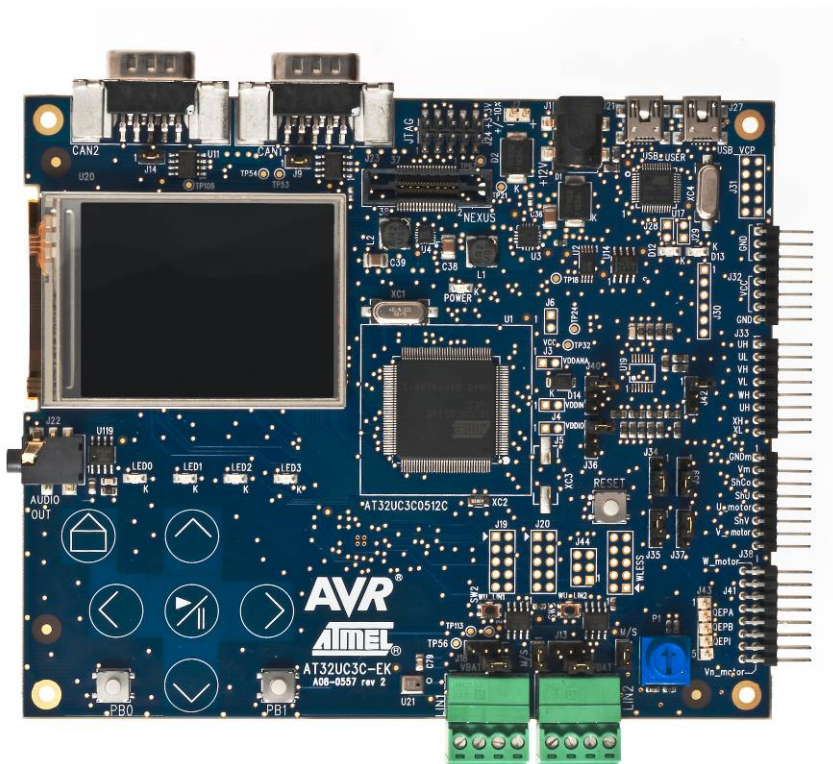
Features

- Powering up the board
- Block diagram
- Using the preloaded firmware

1 Introduction

The Atmel® AT32UC3C-EK is a reference design and development system for the Atmel® AVR® 32-bit AT32UC3C0512C microcontroller. The kit is equipped with a rich set of peripherals that make the AT32UC3C-EK a perfect evaluation platform. This guide shows the user how to quickly get started with this kit.

Figure 1-1. AT32UC3C-EK board



32-bit **AVR®**
Microcontrollers

Application Note

Rev. 32137A-AVR-10/10





2 Getting started

2.1 Powering up the board

The Atmel AT32UC3C-EK offers four interfaces to power the board: from the USB virtual COM port (USB VCP) interface, from the USB USER interface, or from an external source connected to either the J1 or J2 header. If two power sources are applied at the same time, the following priorities are used to select the current valid power source:

1. USB VCP (J27)
2. USB USER (J21)
3. External power supply jack (header J1)
4. External power supply two-pin header (header J2)

This means that if the board is connected to a USB host, it has the highest priority and will, therefore, serve as the current power supply. Other power supplies that are connected to the board at the same time will be ignored.

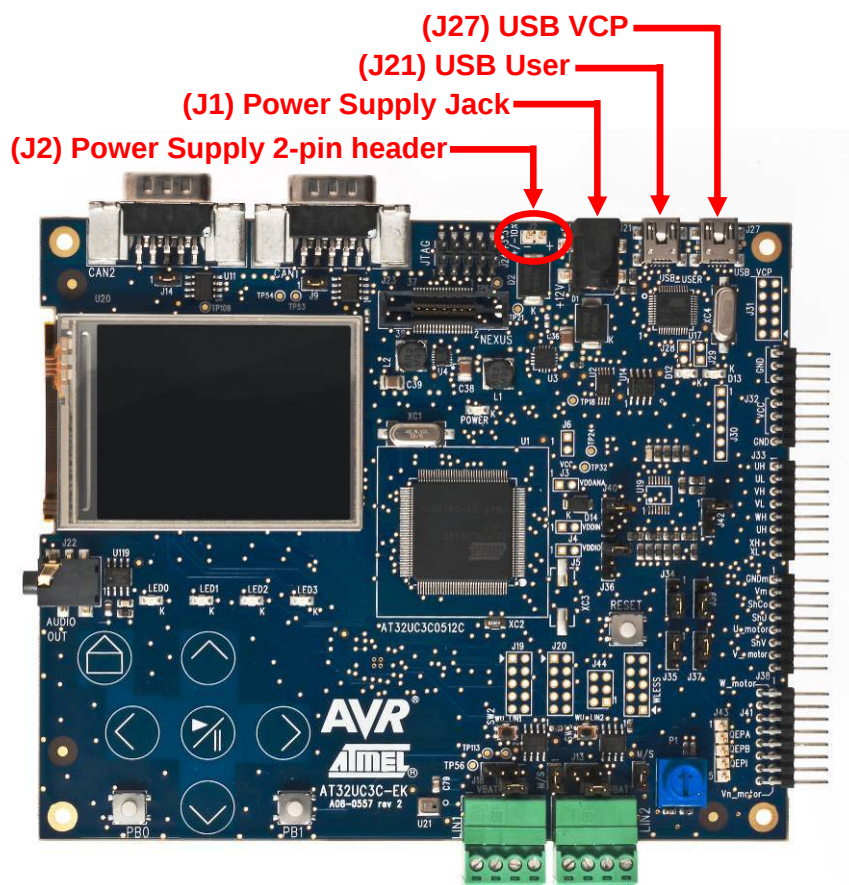
The input range on the external power supply header is from 3.3V to 5V for J2 and from 9V to 12V for J1.

To power the board from the USB VCP or from the USB USER connector, use the Mini-B plug to std-A plug 1.5m USB 2.0 cable that is included in the kit, and connect it between the host and the board USB VCP connector.

When the board is powered, the green LED (marked POWER) will light up and the default board firmware will start to run.

More information about the different power inputs is available in the hardware user's guide.

Figure 2-1. Possible power input interfaces on the AT32UC3C-EK



2.2 Connecting the CAN interface

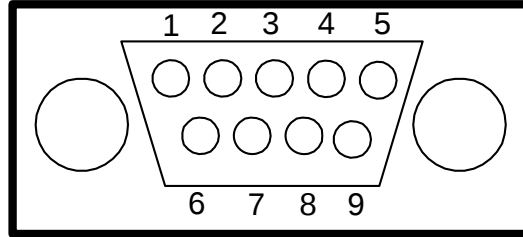
The Atmel AT32UC3C-EK offers two CAN interfaces to connect the board to external CAN networks:

1. DB9 connector CAN Node 1
2. DB9 connector CAN Node 2

Table 2-1. CAN connector DB9 pin-out

Pin #	Signal Names	Signal Description
1	Reserved	
2	CAN_L	Dominant Low
3	CAN_GND	Ground
4	Reserved	
5	CAN_SHLD	Shield, optional
6	GND	Ground
7	CAN_H	Dominant High
8	Reserved	
9	CAN_V+	Power, optional

Figure 2-2. CAN connector DB9 pin-out



The preloaded firmware requires a loopback between CAN Node 1 and CAN Node 2. That means that one of the 2-pin cables delivered in the kit should be used to connect:

CAN Node 1 pin 2 ←-----→ CAN Node 2 pin 2

CAN Node 1 pin 7 ←-----→ CAN Node 2 pin 7

Figure 2-3. CAN loopback on the AT32UC3C-EK



2.3 Connecting the LIN interface

The Atmel AT32UC3C-EK offers two LIN interfaces to connect the board to external LIN networks:

1. 3-pin header connector LIN Node 1
2. 3-pin header connector LIN Node 2

The pinout is shown in Table 2-2.

Table 2-2. LIN connector three-pin header

Pin #	Signal Names	Signal Description
1	GND	Ground
2	LIN	LIN Bus
3	VBAT	Power Supply

The preloaded firmware requires a loopback between LIN Node 1 and LIN Node 2. This means that one of the two-pin cables delivered in the kit should be used to connect:

LIN Node 1 pin 1 ←-----→ LIN Node 2 pin 1

LIN Node 1 pin 2 ←-----→ LIN Node 2 pin 2

2.4 Using the preloaded firmware

The preloaded application,

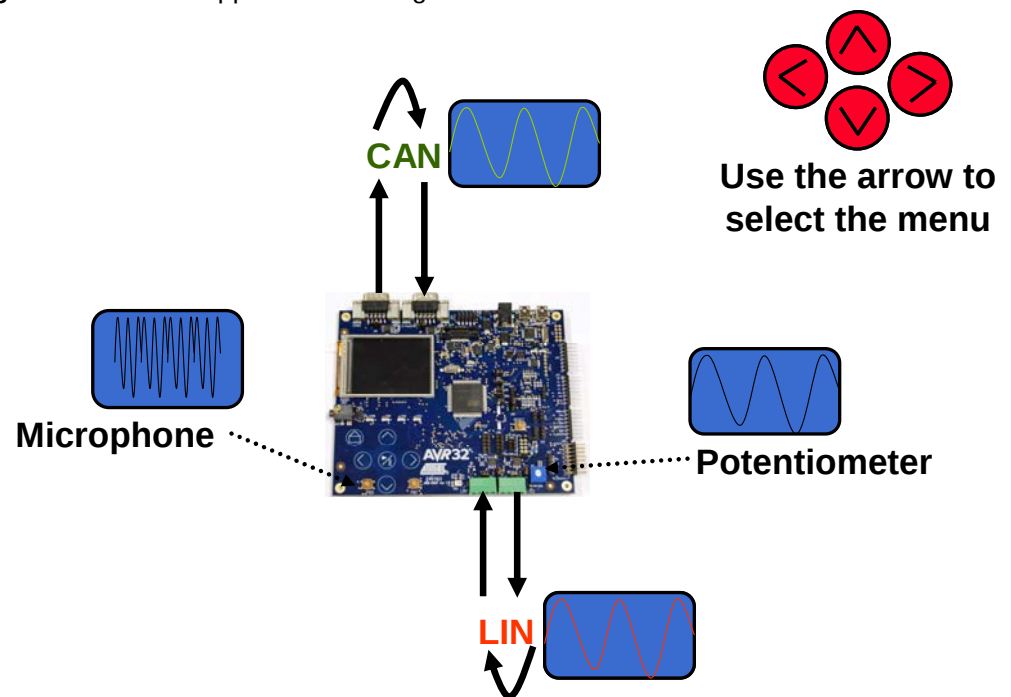
AT32UC3C_EK_CAN_LIN_LOOPBACKS_DEMO

is located under the directory,

APPLICATIONS/AT32UC3C_EK_CAN_LIN_LOOPBACKS_DEMO

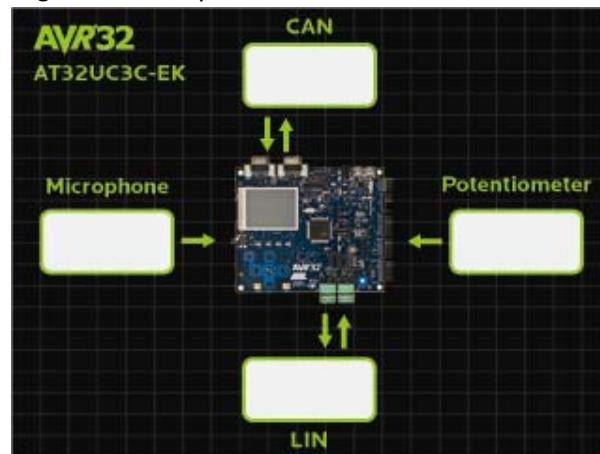
The source code of the application can be found in the AVR UC3 Software Framework (see section 4.3).

Figure 2-4. Default application running



This application gathers potentiometer data, displays it, and sends it to the CAN and LIN loopback interfaces. The graphical user interface (GUI) also displays CAN and LIN network and microphone activity.

Figure 2-5. Graphical user interface



The GUI is composed of four items:

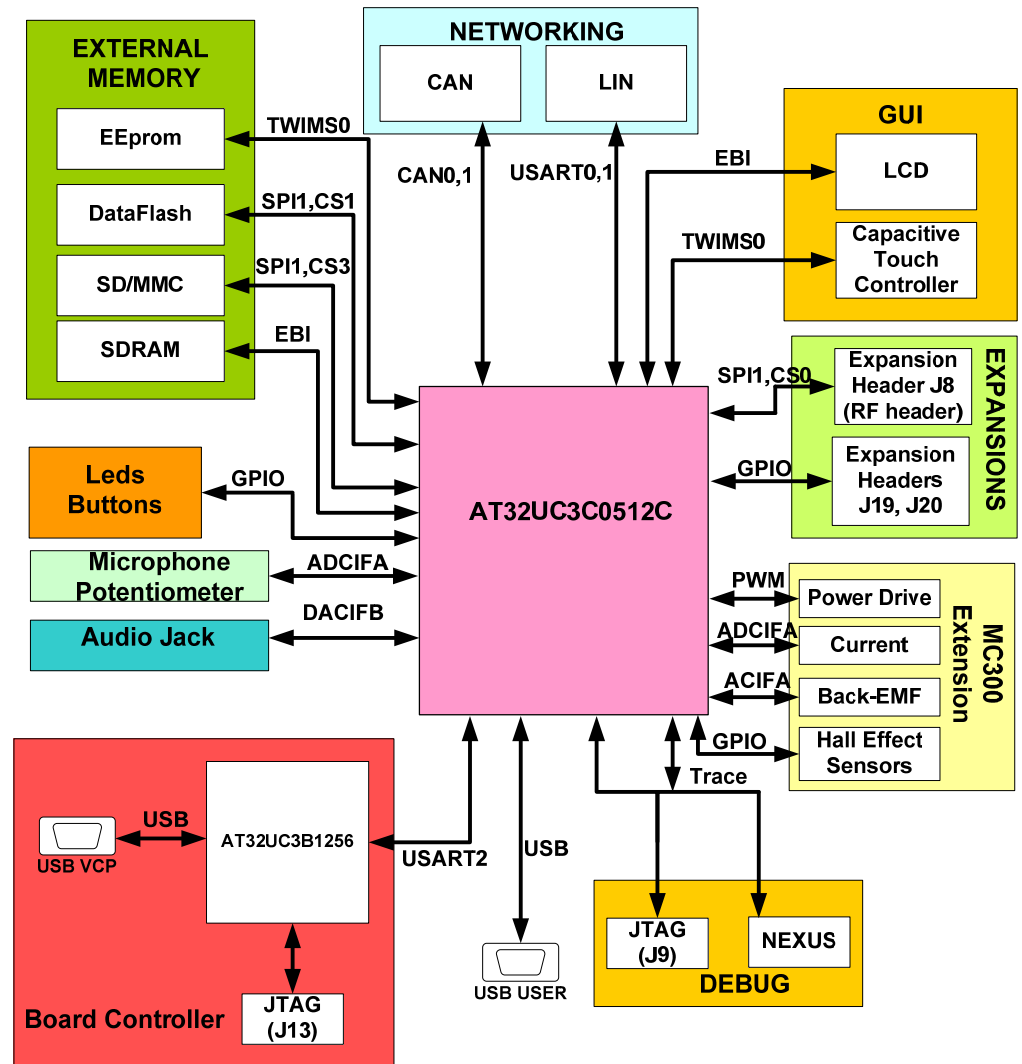
- Potentiometer and microphone
The potentiometer and the microphone are connected to ADC channels. The potentiometer and microphone values are displayed in the potentiometer and microphone boxes, respectively.
- CAN
The potentiometer value is sent via the CAN bus through CAN Node 1 and is received by CAN Node 2. The message content is displayed in the CAN box.
- LIN
The LIN message built from CAN Node 2 is sent on the LIN bus through LIN Node 1 and received by LIN Node 2. The content of this LIN message received by LIN Node 2 is displayed in the LIN box.

Touching:

- o the RIGHT (>) pad highlights the potentiometer item
- o the LEFT (<) pad highlights the microphone item
- o the UP (^) pad highlights the CAN item
- o the DOWN (v) pad highlights the LIN item
- o the PLAY/PAUSE (>||) focuses the highlighted item

3 AT32UC3C-EK block diagram

Figure 3-1. AT32UC3C-EK block diagram



4 References and further information

What is the next step?

If you want more detailed information concerning the hardware of this kit, if you want to check out all existing application notes and software running on this kit, if you want to start a development whether for evaluation or rapid prototyping, the following sections list the main available resources to actually get beyond getting started:

- Schematics and BOM
- Application notes
- Software framework
- Tools
- Support



4.1 Detailed hardware references (and associated errata)

More detailed hardware information for this kit can be found in two places:

- In the 32-bit AVR Studio®: contains the schematics, a logical block diagram, and the errata
- The file AT32UC3C-EK_Hardware-References.zip, available on the Atmel web page dedicated to this kit: www.atmel.com/

The Atmel® AVR® AT32UC3C family of devices is specified in the UC3C Series datasheet. Always use this document as a reference throughout the development life cycle of an application destined to run on a UC3C device.

The 32-bit AVR architecture manual can be found here:

http://www.atmel.com/dyn/resources/prod_documents/doc32000.pdf

The 32-bit AVR UC technical reference guide can be found here:

http://www.atmel.com/dyn/resources/prod_documents/doc32002.pdf

4.2 Application notes running on this kit

Several application notes are supported by this kit to enable you to further investigate the Atmel® AT32UC3C and/or the Atmel AT32UC3C-EK. These can be found on the ATMEL web page dedicated to this kit: www.atmel.com/. All the 32-bit AVR application notes can be found on this Atmel web page:

http://www.atmel.com/dyn/products/app_notes.asp?family_id=607

NOTE

Some application notes are bundled with a standalone software package. To be able to build the software example, program the binary, and step through the code in debug mode, tools are necessary: references to the tools are mentioned in all application notes, but are also given here below.

4.3 Software framework

To start a development, whether for evaluation or rapid prototyping, the 32-bit AVR Software Framework is a complete and useful source of existing source code a developer can start from. It has been designed to help developers glue together the different components of a software design and easily integrate them into an operating system (OS), as well as to operate in a standalone way.

The 32-bit AVR Software Framework is available in two formats:

- As a standalone zip package containing IAR® projects and GNU makefile projects, downloadable from this Atmel web page: <http://asf.atmel.no/source/asf-2.0.0.zip>
- As a plug-in in 32-bit AVR Studio that allows the user to create pre-defined example 32-bit AVR Studio projects and to add pre-written drivers to existing 32-bit AVR Studio projects:
http://www.atmel.com/dyn/products/tools_card.asp?tool_id=4116. This web page also contains all 32-bit AVR Studio-related application notes.

To be able to build the software example, program the binary, and step through the code in debug mode, other tools are necessary: references to these tools are provided here below

4.4 Tools

To be able to develop applications for 32-bit AVR devices, build binaries for 32-bit AVR targets, and program a 32-bit AVR device, Atmel and its partners provide several tools supported on multiple host targets.

4.4.1 IDE and compilers: design software

- **32-bit AVR Studio:** 32-bit AVR Studio is a free integrated development environment (IDE) for AVR32 that enables you to write, build, deploy, and debug your C/C++ and assembler code. It also includes the 32-bit AVR Software Framework plug-in:
http://www.atmel.com/dyn/products/tools_card.asp?tool_id=4116. This web page also contains all AVR32 Studio-related application notes
- **32-bit AVR GNU Toolchain:** 32-bit AVR GNU Toolchain is a set of standalone command line programs used to create applications for 32-bit AVR microcontrollers: http://www.atmel.com/dyn/products/tools_card.asp?tool_id=4118
- **IAR Embedded Workbench®:** IAR Embedded Workbench, with its optimizing C and C++ compiler, provides full support and generates very compact and efficient code for 32-bit AVR devices of the AP7000 and UC3 families:
<http://www.iar.se/website1/1.0.1.0/124/1/>

4.4.2 Programming and on-chip debugging tools: debug tools

- **AVR JTAGICE mkII:** The AVR JTAGICE mkII from Atmel is a powerful development tool for on-chip debugging of all 8-bit AVR RISC MCUs and 32-bit AVR DSP/MCUs with IEEE 1149.1 compliant JTAG interface:
http://www.atmel.com/dyn/products/tools_card.asp?tool_id=3353
- **AVR ONE!:** The AVR ONE! is a powerful development tool for on-chip debugging and programming of all 32-bit AVR and Atmel® AVR® XMEGA® devices:
http://www.atmel.com/dyn/products/tools_card.asp?tool_id=4279
- **AVR Dragon:** The AVR Dragon sets a new standard for low-cost development tools and supports all programming modes for the AVR device family:
http://www.atmel.com/dyn/Products/tools_card.asp?tool_id=3891

4.5 Support

Atmel has several support channels available:

- Web portal: <http://support.atmel.no/> All Atmel microcontrollers
- Email: avr@atmel.com All AVR products
- Email: avr32@atmel.com All AVR32 products

Please register on the web portal to gain access to the following services:

- Access to a rich FAQ database
- Easy submission of technical support requests
- History of all your past support requests
- Receive Atmel microcontrollers' newsletters



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