Atmel AVR1935: XMEGA-A3BU Xplained Getting Started Guide

Features

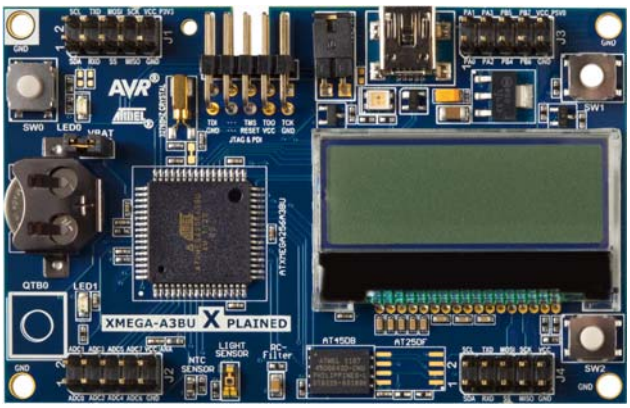
- Atmel® AVR® ATxmega256A3BU microcontroller
- FSTN LCD display with 128x32 pixels resolution
- Battery backup
- Analog sensors
  - Ambient light sensor
  - Temperature sensor
- Analog filter
- Digital I/O
  - Three mechanical buttons
  - Two user LEDs
  - One power LED
  - One status LED
  - Four expansion headers
- Touch
  - One Atmel AVR QTouch® button
- Memory
  - Atmel AVR AT45DB642D DataFlash® serial flash
- Footprints for external memory
- Atmel AVR AT25DF series industry standard serial

1 Introduction

The Atmel AVR XMEGA®-A3BU Xplained evaluation kit is a hardware platform to evaluate the Atmel ATxmega256A3BU microcontroller.

The kit offers a larger range of features that enables the Atmel AVR XMEGA user to get started using XMEGA peripherals right away and understand how to integrate the XMEGA device in their own design.

Figure 1-1. XMEGA-A3BU Xplained evaluation kit.



8-bit Atmel Microcontrollers

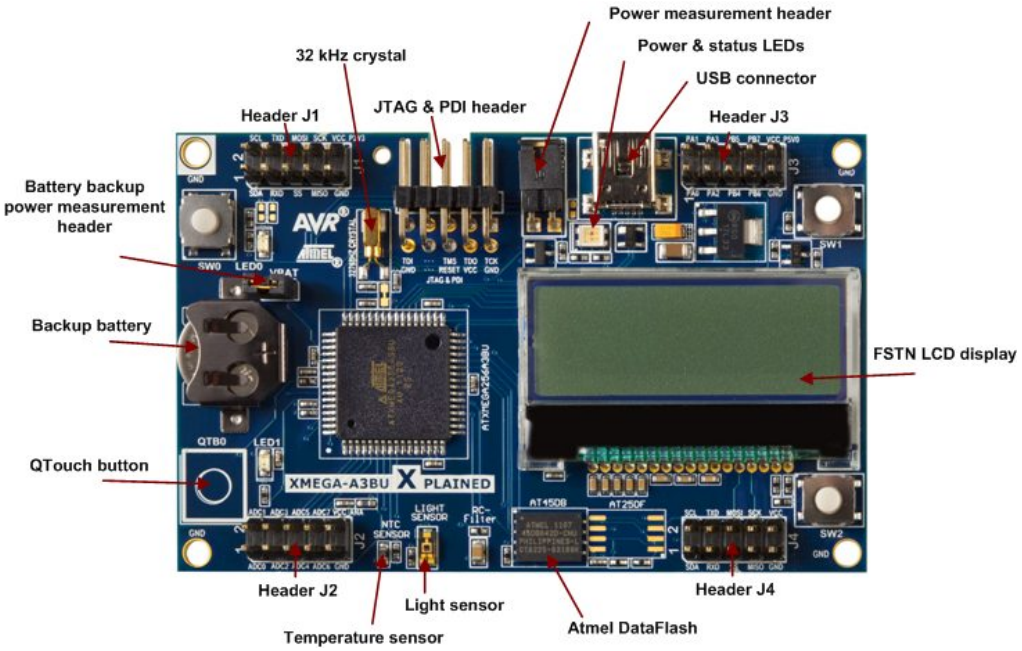
Application Note

Rev. 8324B-AVR-09/11

2 Board overview

Figure 2-1 shows most of the available features on the board. For more detailed information on the Atmel XMEGA-A3BU Xplained hardware, take a look at the Atmel application note “AVR1923: XMEGA-A3BU Xplained Hardware User’s Guide”.

Figure 2-1. Overview of the Atmel AVR XMEGA-A3BU Xplained kit.



3 Quick-start

To be able to run the preprogrammed code, you need to connect the Atmel AVR XMEGA-A3BU Xplained evaluation kit with a USB cable (standard A to mini-B or mini AB) to a PC or USB hub. Once the kit is powered it is possible to browse the menu system with the on-board mechanical buttons and the touch button. The functions for the buttons are:

- Top left mechanical button (SW0): Enter a menu
- Bottom left touch button (QTB0): Return from a menu
- Top right mechanical button (SW1): Browse the menu up
- Bottom right mechanical button (SW2): Browse the menu down

The demo application allows also the XMEGA-A3BU Xplained board to communicate with a computer using USB with a CDC (Communications Device Class) setup, allowing the keyboard to be used to navigate in the demo application. When the XMEGA-A3BU Xplained board is connected for the first time, Windows will try to install a driver for “Virtual CDC Com”. A driver file, XPLAINED_Virtual_Com_Port.inf, is located in the demo application directory or can be downloaded from the Atmel web-site (Xplained USB CDC driver download). If the driver is successfully installed, the board will show up in the Device Manager under Ports (XPLAINED Virtual Com Port (COM**)). This COM port can now be interfaced with your favorite terminal software. The connection parameters are as follows:

- Baud rate: 115200 baud
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: None

If the connection has been successfully established, you should be greeted by this text on the screen of your terminal:

```
Welcome to the XMEGA-A3BU Xplained Demo CDC interface!

Key bindings for LCD menu control:
    Enter       : Enter
    Backspace   : Back
    Arrow Up    : Up Arrow
    Arrow Down   : Down Arrow
```

The demo application for the XMEGA-A3BU Xplained is available through the Atmel AVR Software Framework (ASF), version 2.6.0 or later. The demo application is available as an example project in AVR Studio® 5 and can be accessed by clicking File -> New -> Example Project, and selecting “Demo application for XMEGA-A3BU Xplained”. In-depth documentation for the demo application is available in the XMEGA-A3BU Xplained Software User Guide.

To modify the example code or write new code and compile it, you need a toolchain for the Atmel AVR microcontrollers and an IDE to edit and debug code. Atmel provides both with Studio 5. More information about all available documentation and tools is available in the chapter 5.

3.1 Programming the kit

3.2 Using the bootloader

The kit can be programmed either from an external programming tool or through a USB bootloader which is pre-programmed on the device. The bootloader is evoked by pushing the push button (SW0) during power-on, for example. push and hold the button and hence connect an USB cable to the kit. Programming can be performed through the DFU programmer FLIP. How to use FLIP to download new firmware to the kit is described in-depth in the application note AVR1929: USB DFU Bootloader for XMEGA A3.

3.3 Using a programming tool

If it is desired to program the kit without the help of the on-chip bootloader, or if debugging is required, it is possible to do this with various tools. The most common tools and how they can be connected are listed in chapter 4. Atmel AVR Studio 5 can be used as front-end for these programming tools.

NOTE

Because JTAG TDO and PDI DATA are connected on the PCB for this kit, JTAG must be disabled on the device in order to use PDI. JTAG can be disabled by programming the JTAGEN fuse of the device.

4 Connecting the kit

4.1 USB power supply

Connect a USB cable between the board and a PC or a USB power supply to power the kit. This is all that is needed. When power is applied the power/status LED will light up in green.

Do not power the board without having the jumper next to the USB connector or an amperemeter mounted. Otherwise, the device may be damaged.

When connecting the Atmel XMEGA-A3BU Xplained to a PC, the operating system will request a driver file for installing the serial communication driver. This driver file is available in the zip-file associated with this document. The driver file supports both 32-bit and 64-bit versions of Windows® XP and Windows 7. Driver installs are not necessary on Linux® operating systems.

4.2 Atmel JTAGICE3

Figure 4-1. The 100mil JTAG adapter must be used to connect to the kit.



4.3 Atmel AVR ONE!

The AVR ONE! JTAG connector can be connected to the XMEGA-A3BU Xplained kit with a standoff adapter (adapter is marked with "nr.1").

Figure 4-2. Connecting AVR ONE! to a XMEGA-A3BU Xplained board.



4.4 Atmel AVR JTAGICE mkII

The grey female 10-pin header on JTAGICE mkII has to be used when connecting to the kit. The opening in the board is made to fit the orientation tab on the header.

NOTE

When using PDI with the JTAGICE mkII it is necessary to use the squid cable. Follow the instructions in the JTAGICE mkII manual and the silkscreen description for the programming header.

Figure 4-3. Connecting AVR JTAGICE mkII to an XMEGA-A3BU Xplained board.



4.5 Atmel AVR Dragon®

In order to connect the AVR Dragon to the XMEGA-A3BU Xplained, a 10-pin header cable is needed. Connect the cable between the JTAG connector on the AVR Dragon™ kit and the XMEGA-A3BU Xplained JTAG connector. Pin 1 on the XMEGA-A3BU Xplained kit is marked with a square pad.

5 Tools and documentation for XMEGA-A3BU Xplained

The following list contains links to the most relevant documents, software and tools for the XMEGA-A3BU Xplained:

Xplained products - Atmel AVR Xplained is a series of small-sized and easy-to-use evaluation kits for 8- and 32-bit AVR microcontrollers. It consists of a series of low cost MCU boards for evaluation and demonstration of feature and capabilities of different MCU families.

Xplained USB CDC driver – The driver file supports both 32-bit and 64-bit versions of Windows® XP and Windows 7. Driver installs are not necessary on Linux® operating systems.

XMEGA-A3BU Xplained schematics - Package containing schematics, BOM, assembly drawings, 3D plots, layer plots…

AVR1923: XMEGA-A3BU Xplained Hardware Users Guide - Hardware Users Guide for the XMEGA-A3BU Xplained.

AVR1935: XMEGA-A3BU Xplained Getting Started Guide – This document.

AVR1934: XMEGA-A3BU Xplained Software User Guide - User Guide for the XMEGA-A3BU Xplained demo software.

AVR1916: XMEGA USB DFU Bootloaders – User Guide for the XMEGA USB DFU bootloaders

Atmel AVR Studio 5 - Free Atmel IDE for development of C/C++ and assembler code for Atmel microcontrollers.

Atmel FLIP (Flexible In-system Programmer) – BatchISP (FLIP) is a command line tool for programming the flash and EEPROM memories of the AVR and is part of the FLIP installation. It can be used to communicate with the preprogrammed USB DFU bootloader.

Atmel JTAGICE 3 - Mid-range development tool for Atmel 8-bit and 32-bit AVR microcontrollers with on-chip debugging for source level symbolic debugging, NanoTrace (if supported by the device) and device programming.

Atmel AVR JTAGICE mkII - A mid-range development tool for Atmel 8-bit and 32-bit AVR devices with on-chip debugging for source level symbolic debugging, NanoTrace (if supported by the device) and device programming (superseded by JTAGICE 3).

Atmel AVR ONE! - A professional development tool for all Atmel 8-bit and 32-bit AVR devices with On-Chip Debug capability. It is used for source level symbolic debugging, program trace and device programming. AVR ONE! supports the complete development cycle and is the fastest debugging tool offered from Atmel.

AVR Dragon - The AVR Dragon sets a new standard for low cost development tools for 8-bit and 32-bit AVR devices with On Chip Debug (OCD) capability.

IAR Embedded Workbench® for Atmel AVR. This is a commercial C/C++ compiler that is available for 8-bit AVR. There is a 30 day evaluation version as well as a 4k (code size limited) kick-start version available from their website.

6 EVALUATION BOARD/KIT IMPORTANT NOTICE

This evaluation board/kit is intended for use for **FURTHER ENGINEERING, DEVELOPMENT, DEMONSTRATION, OR EVALUATION PURPOSES ONLY.** It is not a finished product and may not (yet) comply with some or any technical or legal requirements that are applicable to finished products, including, without limitation, directives regarding electromagnetic compatibility, recycling (WEEE), FCC, CE or UL (except as may be otherwise noted on the board/kit). Atmel supplied this board/kit "AS IS," without any warranties, with all faults, at the buyer's and further users' sole risk. The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies Atmel from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge and any other technical or legal concerns.

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