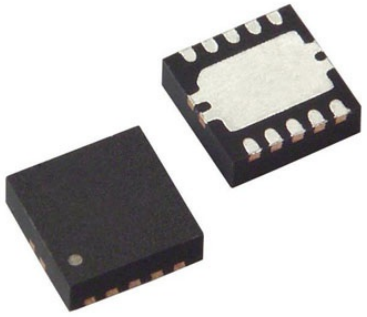
ATXMEGA16A4U-MH

Data Sheet

8 Bit MCU, Low Power High Performance, AVR ATxmega Family ATXmega A Series Microcontrollers, 32 MHz

Manufacturers	Microchip Technology, Inc
Package/Case	VQFN-44
Product Type	Embedded Processors & Controllers
RoHS	Rohs
Lifecycle	



Images are for reference only

Please submit RFQ for ATXMEGA16A4U-MH or Email to us: sales@ovaga.com We will contact you in 12 hours. RFQ

General Description

Low power, high performance 8/16-bit AVR microcontroller featuring 16KB self-programming flash program memory, 4KB boot code section, 2KB SRAM, 1024-Byte EEPROM, external bus interface, 4-channel DMA controller, 8-channel event system, and up to 32 MIPS throughput at 32MHz. The AVR XMEGA A4U series features 44-pin packages.

The device can be used in a wide range of applications, such as building, industrial, motor, board, and climate control; hand-held battery applications; factory automation; power tools; HVAC; networking, metering, large home appliances, and optical and medical devices.

Atmel AVR 8- And 32-bit Microcontrollers > AVR XMEGA > ATxmega16A4ULow power, high performance 8/16-bit AVR microcontroller featuring 16KB self-programming flash program memory, 4KB boot code section, 2KB SRAM, 1024-Byte EEPROM, external bus interface, 4-channel DMA controller, 8-channel event system, and up to 32 MIPS throughput at 32MHz. The ATxmega A4 series features 44-pin packages.

This document contains complete and detailed description of all modules included in the Atmel□AVR□XMEGA□AU microcontroller family. The Atmel AVR XMEGA is a family of low-power, high-performance, and peripheral-rich CMOS 8/16-bit microcontrollers based on the AVR enhanced RISC architecture. The available Atmel AVR XMEGA AU modules described in this manual are:

Atmel AVR CPU Memories DMA - Direct memory access controller Event system System clock and clock options Power management and sleep modes System control and reset Battery backup system WDT - Watchdog timer Interrupts and programmable multilevel interrupt controller PORT - I/O ports - 16-bit timer/counter AWeX - Advanced waveform extension Hi-Res - High resolution extension RTC - Real-time counter - 32-bit real-time counter USB - Universal serial bus interface TWI - Two-wire serial interface SPI - Serial peripheral interface USART - Universal synchronous and asynchronous serial receiver and transmitter IRCOM - Infrared communication module AES and DES cryptographic engine CRC - Cyclic redundancy check EBI - External bus interface ADC - Analog-to-digital converter DAC - Digital-to-analog converter AC - Analog comparator IEEE 1149.1 JTAG interface PDI - Program and debug interface Memory programming Peripheral address map Register summary Interrupt vector summary Instruction set summary

This document contains in-depth documentation of all peripherals and modules available for the Atme lAVR XMEGA AU microcontroller family. All features are documented on a functional level and described in a general sense. All peripherals and modules described in this manual may not be present in all Atmel AVR XMEGA AU devices. For all device-specific information such as characterization data, memory sizes, modules, peripherals available and their absolute memory addresses, refer to the device datasheets. When several instances of a peripheral exists in one device, each instance will have a unique name. For example each port module (PORT) have unique name, such as PORTA, PORTB,etc. Register and bit names are unique within one module instance. For more details on applied use and code examples for peripherals and modules, refer to the

Atmel AVR XMEGA AU specific application notes available from http://www.atmel.com/avr.

The main sections describe the various modules and peripherals. Each section contains a short feature list and overview describing the module. The remaining section describes the features and functions in more detail. The register description sections list all registers and describe each register, bit and flag with their function. This includes details on how to set up and enable various features in the module. When multiple bits are needed for a configuration setting, these are grouped together in a bit group. The possible bit group configurations are listed for all bit groups together with their associated Group Configuration and a short description. The Group Configuration refers to the defined configuration name used in the Atmel AVR XMEGA AU and assembler header files and application note source code. The register summary sections list the internal register map for each module type. The interrupt vector summary sections list the interrupt vectors and offset address for each module type.

A comprehensive set of development tools, application notes, and datasheets are available for download from http://www.atmel.com/avr.

Atmel AVR XMEGA AU device datasheets XMEGA application notes This manual contains general modules and peripheral descriptions. The AVR XMEGA AU device datasheets contains the device-specific information. The XMEGA application notes and AVR Software Framework contain example code and show applied use of the modules and peripherals. For new users, it is recommended to read the AVR1000 - Getting Started Writing C Code for Atmel XMEGA, and AVR1900 - Getting Started with Atmel ATxmega128A1 application notes.

The AVR XMEGA AU microcontrollers is a family of low-power, high-performance, and peripheral-rich CMOS 8/16-bit microcontrollers based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the Atmel AVR XMEGA AU devices achieve throughputs approaching one million instructions per second (MIPS) per megahertz, allowing the system designer to optimize power consumption versus processing speed. The AVR CPU combines a rich instruction set with 32 general purpose working registers. All 32 registers are directly connected to the arithmetic logic unit (ALU), allowing two independent registers to be accessed in a single instruction, executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs many times faster than conventional single-accumulator or CISC based microcontrollers. The Atmel AVR XMEGA AU devices provide the following features: in-system programmable flash with read-while-write capabilities; internal EEPROM and SRAM; four-channel DMA controller; eight-channel event system and programmable multilevel interrupt controller; to 78 general purpose I/O lines; or 32-bit real-time counter (RTC); up to eight flexible, 16-bit timer/counters with capture, compare and PWM modes; up to eight USARTs; up to four I2C and SMBUS compatible two-wire serial interfaces (TWIs); one full-speed USB 2.0 interface; up to four serial peripheral interfaces (SPIs); CRC module; AES and DES cryptographic engine; up to two 8-channel, 12-bit ADCs with programmable gain; up to two 2-channel, 12-bit DACs; up to four analog comparators with window mode; programmable watchdog timer with separate internal oscillator; accurate internal oscillators with PLL and prescaler; and programmable brown-out detection. The program and debug interface (PDI), a fast, two-pin interface for programming and debugging, is available. Selected devices also have an IEEE std. 1149.1 compliant JTAG interface, and this can also be used for on-chip debug and programming. The Atmel AVR XMEGA AU devices have five software selectable power saving modes. The idle mode stops the CPU while allowing the SRAM, DMA controller, event system, interrupt controller, and all peripherals to continue functioning. The power-down mode saves the SRAM and register contents, but stops the oscillators, disabling all other functions until the next TWI, USB resume, or pin-change interrupt, or reset. In power-save mode, the asynchronous real-time counter continues to run, allowing the application to maintain a timer base while the rest of the device is sleeping. In standby mode, the external crystal oscillator keeps running while the rest of the device is sleeping. This allows very fast startup from the external crystal, combined with low power consumption. In extended standby mode, both the main oscillator and the asynchronous timer continue to run. To further reduce power consumption, the peripheral clock to each individual peripheral can optionally be stopped in active mode and idle sleep mode. The devices are manufactured using Atmel high-density, nonvolatile memory technology. The program flash memory can be reprogrammed in-system through the PDI or JTAG interfaces. A boot loader running in the device can use any interface to download the application program to the flash memory. The boot loader software in the boot flash section will continue to run while the application flash section is updated, providing true read-while-write operation. By combining an 8/16-bit RISC CPU with In-system, self-programmable flash, the AVR XMEGA is a powerful microcontroller family that provides a highly flexible and cost effective solution for many embedded applications.

Features

Nonvolatile program and data memories

16KB of in-system self-programmable flash

4KB boot section

1KB EEPROM

2KB internal SRAM

One USB device interface

USB 2.0 full speed (12Mbps) and low speed (1.5Mbps) device compliant

32 Endpoints with full configuration flexibility

Related Products

ATSAMA5D36A-CU

Microchip Technology, Inc

LFBGA-324

ATMEGA32M1-AU

Microchip Technology, Inc

TQFP-32

ATXMEGA128D3-AU

Microchip Technology, Inc

TQFP-64

ATTINY2313V-10SU

Microchip Technology, Inc

SOIC-20

ATMEGA64M1-15AZ

Microchip Technology, Inc

TQFP-32

ATMEGA16L-8PU

Microchip Technology, Inc

PDIP-40

ATTINY48-MU

Microchip Technology, Inc

VQFN-32

ATTINY4-TSHR

Microchip Technology, Inc

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