



## ➔ AVR XMEGA

### 8/16-bit High Performance Low Power Flash Microcontrollers

Atmel® introduces the XMEGA™ – a brand new AVR® microcontroller. With the same acclaimed characteristics as the established AVR devices, the XMEGA operates from just 1.6 volt with up to 32 MIPS at 32 MHz.

Time critical real-time and interrupt driven applications become safer, more responsive, and predictable with XMEGA. AVR XMEGA features a CPU independent Event System, DMA controller, and Multilevel Interrupt Controller. With multiple time bases, extreme communication bandwidth and special features like Cryptography support, XMEGA is number one for demanding 8- and 16-bit embedded applications. At the same time XMEGA's 2nd generation picoPower™ technology with only 100 nA sleep current is the best choice for battery operated and energy critical applications.

#### XMEGA features

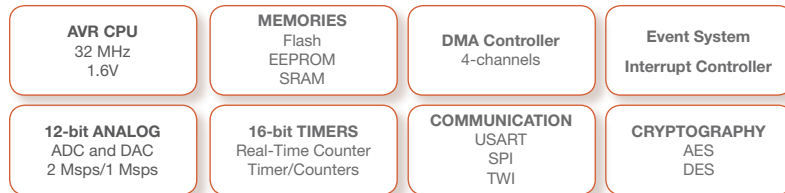
- ▶ Innovative Event System for fast, CPU independent inter-peripheral communication
- ▶ 4-channel DMA Controller boosts MCU performance
- ▶ 100% predictable timing
- ▶ High-speed 12-bit ADC and DAC
- ▶ Fast AES and DES crypto engine
- ▶ 2nd generation of picoPower technology

AVR XMEGA microcontrollers are the perfect solution for a wide range of applications:

- Industrial control
- Climate control
- Hand-held battery
- Factory automation
- ZigBee®
- Power tools
- Sensors
- Motor control
- HVAC
- Wireless encryption
- Networking
- Metering
- Optical transceivers
- Medical applications
- Alarm systems
- White goods

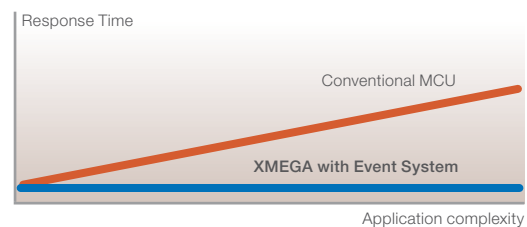
## The Complete Microcontroller - XMEGA

Atmel's AVR has grown to become the preferred MCU for demanding embedded projects<sup>[1]</sup>. With the brand new XMEGA operating from only 1.6 volts with speeds up to 32 MHz, designers now get even more performance and low power capabilities. With an impressive list of features and a drastically increased peripheral throughput, the CPU can spend less time handling peripherals and even more time in sleep mode.



### Event System

Like a reflex in the human body, the innovative XMEGA Event System enables inter-peripheral communication without CPU or DMA usage. This ensures 100% predictable and short response time. Up to 8 simultaneous events or interrupt conditions in the peripherals can automatically start actions in other peripherals.

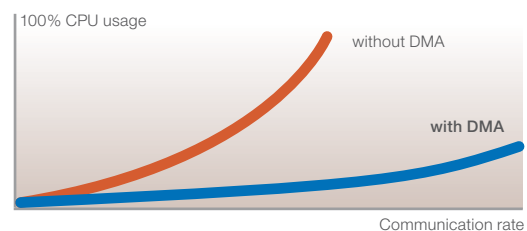


### Real 12-bit ADC and DAC

For high analog accuracy the XMEGA features high-speed 12-bit analog peripherals. Capable of up to 2 Msps, XMEGA's ADCs deliver the fastest sample rate and most accurate result compared to conventional MCUs. Since XMEGA also features two 12-bit digital-to-analog converters (DAC) with up to 1 Msps and four advanced analog comparators, XMEGA microcontrollers have leading analog integration.

### DMA Controller

A 4-channel DMA Controller enables fast, CPU independent data transfer that significantly boosts performance. The DMA Controller in XMEGA handles transfers between all combinations of data memories and peripherals. The AVR CPU register file and multiple bus layers ensures that the data bus is always accessible for the XMEGA DMA Controller.



### Programmable Multilevel Interrupt Controller

All peripherals have software selectable interrupt levels and different interrupt vectors. Important interrupts are executed immediately and tasks are prioritized with minimum latency.

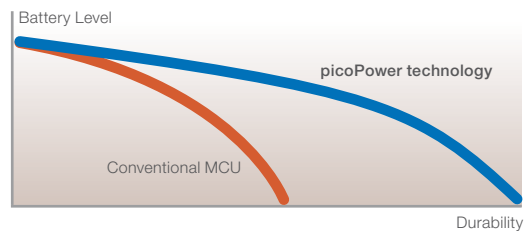
### Performance Peripherals

XMEGA is packed with new, improved peripherals including:

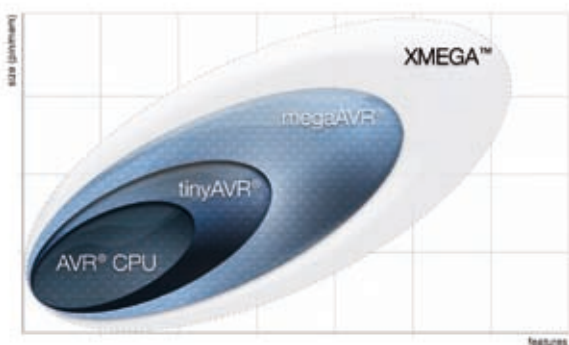
- multiple analog comparators
- several 16-bit Timer/Counters with 8 unique time bases
- multiple USARTs, TWIs and SPIs
- IrDA®
- Fast AES and DES crypto engine.

## Second Generation picoPower

Atmel's picoPower technology have proven to be the industry leader in low power designs. With the 2<sup>nd</sup> generation picoPower technology, XMEGA MCUs run a Real-Time Counter, Watchdog Timer and Brown-out Detector with only 2  $\mu$ A current consumption. The XMEGA also incorporates true 1.6 volt operation and elements like dynamic clock switching, and frequency scaling for optimal power management.



## XMEGA – Extreme Compatibility



XMEGA uses the same instruction set as existing AVR products, and code can easily be reused. Compilers and development tools platforms are the same for all AVR microcontrollers.

All XMEGA family members are pin and 100% code compatible. Designers can easily reuse both source and binary code in all projects when different XMEGA devices are used. This significantly reduces development effort and time to market.

## The XMEGA Product Range

All XMEGA devices operate from 1.6 to 3.6 volts and up to 32 MHz. The first XMEGA devices range from 44 to 100 pins and from 16 to 384 KB of Flash memory.

Product (a)	Status (b)	Flash (KB)	Boot code (Bytes)	EEPROM (KB)	SRAM (KB)	DMA Channel	Event Channel	Crypto	I/O	16-bit Timers	PWM Channel	RTC 16-bit	SPI	TWI (I2C and SMBus)	USART	12-bit A/D Channel	DAC 12-bit Channel	Ana. Comp.	BOD/WDT/Int. RC (c)	Pb-free Packages (d)
ATxmega64A1	I	64	4	2	4	4	8	Y	78	8	24	Y	4	4	8	2x8	2x2	4	Y	TQFP100, BGA100
ATxmega128A1	I	128	8	2	8	4	8	Y	78	8	24	Y	4	4	8	2x8	2x2	4	Y	TQFP100, BGA100
ATxmega192A1	F	192	8	2	4	4	8	Y	78	8	24	Y	4	4	8	2x8	2x2	4	Y	TQFP100, BGA100
ATxmega256A1	F	256	8	4	16	4	8	Y	78	8	24	Y	4	4	8	2x8	2x2	4	Y	TQFP100, BGA100
ATxmega384A1	F	384	8	4	32	4	8	Y	78	8	24	Y	4	4	8	2x8	2x2	4	Y	TQFP100, BGA100
ATxmega64A3	F	64	4	2	4	4	8	Y	50	7	22	Y	4	2	7	2x8	1x2	4	Y	TQFP64, QFN/MLF64
ATxmega128A3	F	128	8	2	8	4	8	Y	50	7	22	Y	4	2	7	2x8	1x2	4	Y	TQFP64, QFN/MLF64
ATxmega192A3	F	192	8	4	16	4	8	Y	50	7	22	Y	4	2	7	2x8	1x2	4	Y	TQFP64, QFN/MLF64
ATxmega256A3	F	256	8	4	16	4	8	Y	50	7	22	Y	4	2	7	2x8	1x2	4	Y	TQFP64, QFN/MLF64
ATxmega16A4	F	16	4	1	2	4	8	Y	36	5	16	Y	2	2	5	1x12	1x2	2	Y	TQFP44, QFN/MLF44
ATxmega32A4	F	32	4	2	4	4	8	Y	36	5	16	Y	2	2	5	1x12	1x2	2	Y	TQFP44, QFN/MLF44
ATxmega64A4	F	64	4	2	4	4	8	Y	36	5	16	Y	2	2	5	1x12	1x2	2	Y	TQFP44, QFN/MLF44
ATxmega128A4	F	128	8	2	8	4	8	Y	36	5	16	Y	2	2	5	1x12	1x2	2	Y	TQFP44, QFN/MLF44

a) All XMEGA devices have Event System channels, and temperature range from -40°C to +85°C.

b) F: Future product, I: Device under Introduction.

c) 32MHz, 2MHz and 32kHz calibrated RC oscillators.

d) Pb-free packaging alternative, complies to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green.

Samples can be ordered from Atmel sales or distribution channels



EXTREME PERIPHERALS

EXTENDED PICOPOWER



EXCEPTIONAL PERFORMANCE

XMEGA

## XMEGA tools

XMEGA is supported by the easy-to-use tool chain already existing for AVR devices.

### AVR Studio

Download the free AVR Studio® and start writing and debugging code instantly! The Integrated Development Environment provides an easy-to-use human interface for XMEGA development. AVR Studio includes a free simulator and assembler as well as the user front-end for all Atmel AVR tools.

### JTAGICE mkII

The JTAGICE mkII is a powerful development tool for On-Chip Debugging of all AVR micro-controllers with PDI, JTAG or debugWire interface.

### STK®600

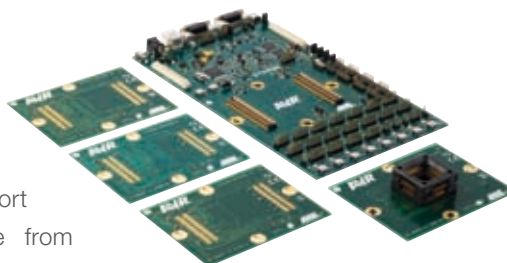
Together with AVR Studio the STK600 starter kit provides a complete programming and development system. All AVRs and future XMEGA parts are supported.

### XMEGA Third Party Products

IAR Embedded workbench for AVR also supports XMEGA. A free evaluation version is available from [www.iar.com](http://www.iar.com).

The Micrium uC OS-II real time kernel port for XMEGA and ATxmega128A1 is available from [www.micrium.com](http://www.micrium.com).

XMEGA is also supported by the free WinAVR GCC compiler.



### XMEGA Documentation

Complete device and module documentation is available from the XMEGA homepage. A comprehensive collection of free application examples and source code for all XMEGA peripherals facilitates development and reduce time to market.

Support center: <http://support.atmel.no>

Get all about XMEGA here: [www.atmel.com/xmega](http://www.atmel.com/xmega)

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### Literature Requests

[www.atmel.com/literature](http://www.atmel.com/literature)

### Website

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