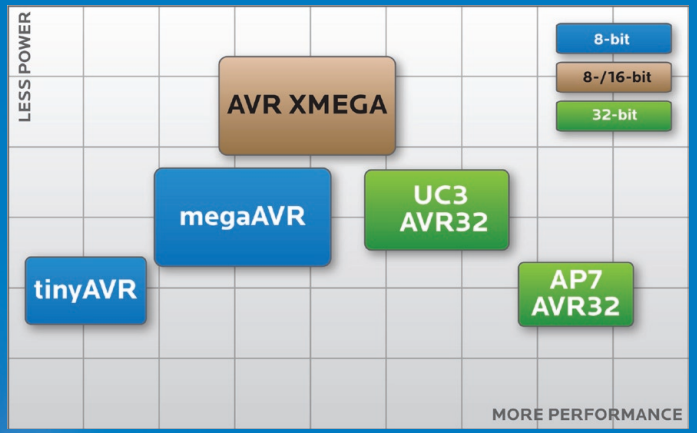
Product Range

Atmel microcontrollers - success through innovation

Atmel offers both 8-bit and 32-bit AVR's, and since day one the AVR philosophy has always been clear: Highest performance with no power penalty.



- tinyAVR
  - 1-16 KBytes Flash, 8-32 pin packages
- megaAVR
  - 4-256 KBytes Flash, 28-100 pin packages
- AVR XMEGA
  - 16-384 KBytes Flash, 44-100 pin packages
- AVR32 UC3
  - 16-512 KBytes Flash, 48-144 pin packages
- AVR32 AP7
  - Up to 32 KBytes On-chip SRAM, 196-256 pin packages

Product Families

- **tinyAVR®**

  General purpose microcontrollers with up to 16K Bytes Flash program memory, 512 Bytes SRAM and EEPROM.

- **megaAVR®**

  High performance microcontrollers with Hardware Multiplier. Up to 256 KBytes Flash, 4K Bytes EEPROM and 8K Bytes SRAM.

- **XMEGA™**

  The new XMEGA 8/16-bit AVR microcontrollers have new and advanced peripherals with increased performance, DMA and Event system, and extends the AVR family in low power/high performance markets.

- **AVR32 UC3**

  High performance, low power 32-bit AVR32 ash microcontrollers. Up to 512 KBytes Flash, 128 KBytes SRAM.

- **AVR32 AP7**

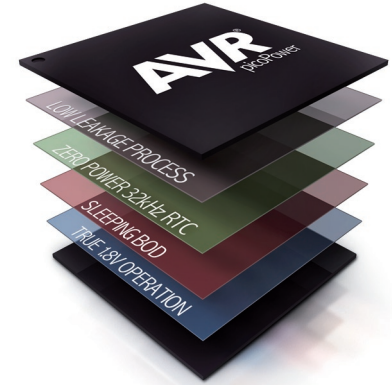
  High performance, low power 32-bit AVR32 application processors. Up to 32 KBytes SRAM.

- **Application Oriented**

  AVR-based devices covering speci ed areas such as such as automotive, LCD drivers, CAN networking, USB connectivity, motor control, lighting applications, battery management single-chip, IEEE 802.15.4/ZigBee™ and Remote Access Control.

Low Power

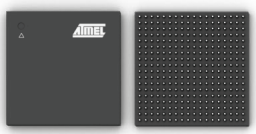
To meet the tough requirements of modern microcontrollers Atmel has combined years of low power research and developed picoPower technology. picoPower enables AVR microcontrollers to reduce power consumption in both sleep and active mode, and achieve the indu
with 500 nA @ 1.8V with RTC running and 100 nA in power-down sleep



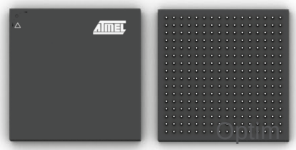
- True 1.8 Volt operation
- Low leakage process
- Sleeping Brown-out detector
- Ultra low power 32 kHz crystal oscillator
- Power Reduction Register
- Flash sampling

Web resources: www.atmel.com/products/avr/picopower/

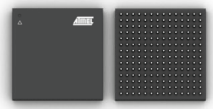
Packaging Range



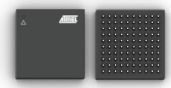
TFBGA-324
15x15 mm



CTBGA-256
17x17 mm



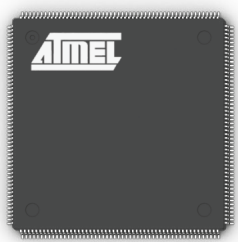
CTBGA-196
12x12 mm



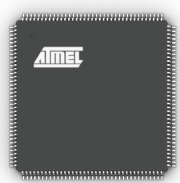
CBGA-100
9x9 mm

VFBGA-49
5x5 mm

LGA-32
3.5x6.5 mm



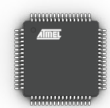
QFP-208
28x28 mm



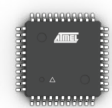
LQFP-144
20x20 mm

TQFP-100
14x14 mm

TQFP-64
14x14 mm



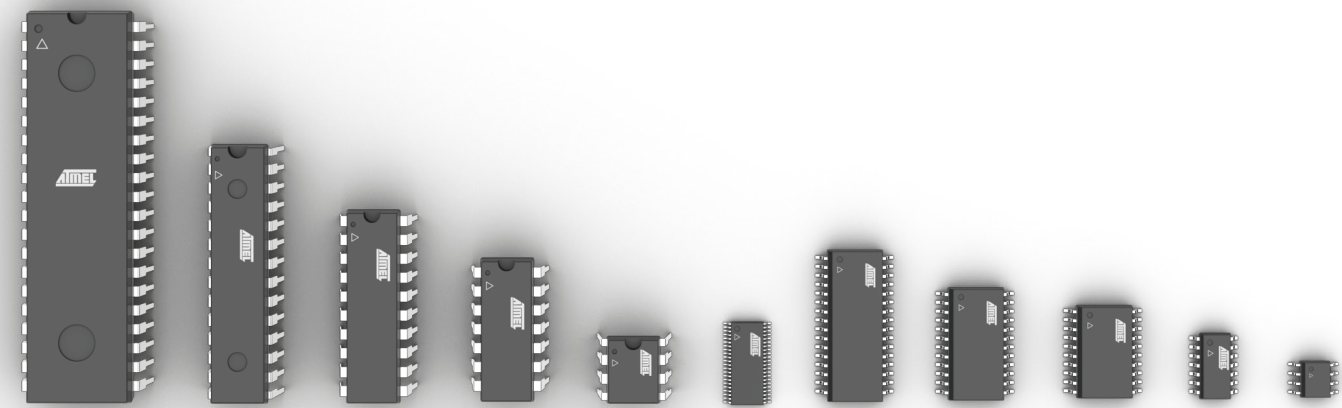
TQFP-64
10x10 mm



TQFP-44
10x10 mm

LQFP-48
7x7 mm

TQFP-32
7x7 mm



PDIP-40
13.72x52.32 mm

PDIP-28
7.3x34.69 mm

PDIP-20
6.6x25.74 mm

PDIP-14
6.6x19.17 mm

PDIP-8
6.35x9.3 mm

TSSOP-44
4.5x11.1 mm

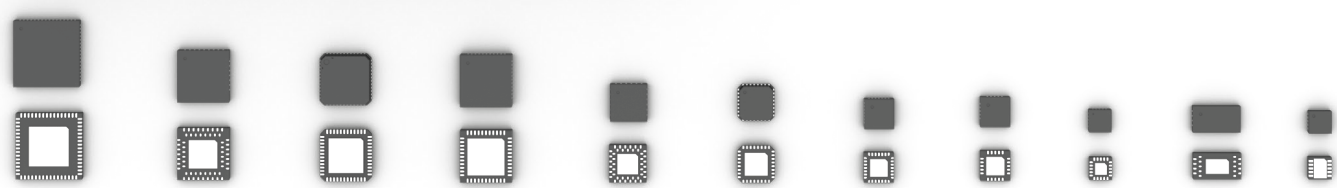
SOIC-32
7.51x20.73 mm

SOIC-24
7.5x15.4 mm

SOIC-20
7.52x12.83 mm

SOIC-14
4x8.7 mm

SOIC-8
4x5 mm



QFN-64
9x9 mm

DRQFN-64
7x7 mm

QFN-48
7x7 mm

QFN-44
7x7 mm

DRQFN-44
5x5 mm

QFN-32
5x5 mm

QFN-28
4x4 mm

QFN-20
4x4 mm

QFN-20
3x3 mm

DRDFN-18
3.5x6.5 mm

DFN-10
3x3 mm

tinyAVR

Don’t let the name fool you... tinyAVR delivers huge capability. Optimized for a wide range of applications that require a small but powerful MCU solution, tinyAVR requires no external glue logic, and is available with integrated A/D converter and EEPROM memory.

By delivering Flash exibility at Mask ROM prices, tinyAVR signi cantly cuts your time to market, while boosting your bottom line. And there’s nothing tiny about that.

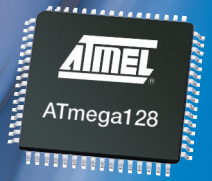
tinyAVR Key Benefits

- Optimized for simple applications requiring a small microcontroller.
- Great performance for cost effective devices.
- Fully featured with 10-bit ADCs and high speed PWMs onboard.
- Self-Programming Flash memory for maximum exibility.
- debugWIRE On-Chip Debug and In-System Programming.

Product	Status (f)	Flash (KB)	EEPROM (Bytes)	RAM (Bytes)	picoPower	I/O pins	UART/USART	SPI/TWI by USI	TWI	8-bit Timers	16-bit Timers	PWM (Channel)	10-bit A/D (channels)	Analog Gain Stage	DebugWIRE/OCD	Vcc Range (V)	Clock Speed (MHz)	Package	Pb-free, Green(a)	Temp. Range
ATtiny13A	P	1	64	64	Y	6				1		2	4		Y	1.8 - 5.5	20	PDIP8, SOIC8, QFN20, QFN10	Y	-40°C to +85°C
ATtiny2313	P	2	128	128		18	1	1		1	1	4			Y	1.8 - 5.5	10	PDIP20, SOIC20, QFN20	Y	-40°C to +85°C
	P	2	128	128		18	1	1		1	1	4			Y	2.7 - 5.5	20	PDIP20, SOIC20, QFN20	Y	-40°C to +85°C
ATtiny24	P	2	128	128		12		1		1	1	4	8	Y	Y	1.8 - 5.5	10	PDIP14, SOIC14, QFN20	Y	-40°C to +85°C
	P	2	128	128		12		1		1	1	4	8	Y	Y	2.7 - 5.5	20	PDIP14, SOIC14, QFN20	Y	-40°C to +85°C
ATtiny25	P	2	128	128		6		1		2 (c)		4 (d)	4	Y	Y	1.8 - 5.5	10	PDIP8, SOIC8, QFN20	Y	-40°C to +85°C
	P	2	128	128		6		1		2 (c)		4 (d)	4	Y	Y	2.7 - 5.5	20	PDIP8, SOIC8, QFN20	Y	-40°C to +85°C
ATtiny26	P	2	128	128		16		1		2		2	11	Y		2.7 - 5.5	8	PDIP20, SOIC20, QFN32	Y	-40°C to +85°C
	P	2	128	128		16		1		2		2	11	Y		4.5 - 5.5	16	PDIP20, SOIC20, QFN32	Y	-40°C to +85°C
ATtiny261	P	2	128	128		16		1		1 (c)	1	5 (e)	11	Y	Y	1.8 - 5.5	10	PDIP20, SOIC20, QFN32	Y	-40°C to +85°C
	P	2	128	128		16		1		1 (c)	1	5 (e)	11	Y	Y	2.7 - 5.5	20	PDIP20, SOIC20, QFN32	Y	-40°C to +85°C
ATtiny28L	P	2		(b)		11				1						1.8 - 5.5	1.2	PDIP28, QFN32, TQFP32	Y	-40°C to +85°C
	P	2		(b)		11				1						2.7 - 5.5	4	PDIP28, QFN32, TQFP32	Y	-40°C to +85°C
ATtiny44A	P	4	256	256	Y	12		1		1	1	4	8	Y	Y	1.8 - 5.5	10	PDIP14, SOIC14, QFN20 , VQFN20	Y	-40°C to +85°C
ATtiny45	P	4	256	256		6		1		2 (c)		4 (d)	4	Y	Y	1.8 - 5.5	10	PDIP8, SOIC8, QFN20	Y	-40°C to +85°C
	P	4	256	256		6		1		2 (c)		4 (d)	4	Y	Y	2.7 - 5.5	20	PDIP8, SOIC8, QFN20	Y	-40°C to +85°C
ATtiny461	P	4	256	256		16		1		1 (c)	1	5 (e)	11	Y	Y	1.8 - 5.5	10	PDIP20, SOIC20, QFN32	Y	-40°C to +85°C
	P	4	256	256		16		1		1 (c)	1	5 (e)	11	Y	Y	2.7 - 5.5	20	PDIP20, SOIC20, QFN32	Y	-40°C to +85°C
ATtiny48	P	4	64	256	Y	28 (g)			1	1	1	2	8		Y	1.8 - 5.5	12	PDIP28, QFN32/28, TQFP32	Y	-40°C to +85°C
ATtiny84	P	8	512	512		12		1		1	1	4	8	Y	Y	1.8 - 5.5	10	PDIP14, QFN20	Y	-40°C to +85°C
	P	8	512	512		12		1		1	1	4	8	Y	Y	2.7 - 5.5	20	PDIP14, QFN20	Y	-40°C to +85°C
ATtiny85	P	8	512	512		6		1		2 (c)		4 (d)	4	Y	Y	1.8 - 5.5	10	PDIP8, SOIC8, QFN20	Y	-40°C to +85°C
	P	8	512	512		6		1		2 (c)		4 (d)	4	Y	Y	2.7 - 5.5	20	PDIP8, SOIC8, QFN20	Y	-40°C to +85°C

Product	Status (f)	Flash (KB)	EEPROM (Bytes)	RAM (Bytes)	picoPower	I/O pins	UART/USART	SPI/TWI by USI	TWI	8-bit Timers	16-bit Timers	PWM (Channel)	10-bit A/D (Channel)	Analog Gain Stage	DebugWIRE/OCD	Vcc Range (V)	Clock Speed (MHz)	Package	Pb-free, Green(a)	Temp. Range
ATtiny861	P	8	512	512		16		1		1 (c)	1	5 (e)	11	Y	Y	1.8 - 5.5	10	PDIP20, SOIC20, QFN/32	Y	-40°C to +85°C
	P	8	512	512		16		1		1 (c)	1	5 (e)	11	Y	Y	2.7 - 5.5	20	PDIP20, SOIC20, QFN32	Y	-40°C to +85°C
ATtiny88	P	8	64	512	Y	28 (g)			1	1	1	2	8		Y	1.8 - 5.5	12	PDIP28, QFN32/28, TQFP32	Y	-40°C to +85°C

a) Pb-free packaging complies to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green.
b) The AVR core has 32 internal registers that can be used as RAM storage.
c) One high speed 8-bit timer/counter.
d) Two High Frequency, 250kHz, PWM Outputs.
e) Three High Frequency PWM Outputs for BLDC motor control.
f) P: Product in Full Production, I: Device under Introduction
g) 28 Programmable I/O Lines in 32-lead TQFP and 32-pad QFN/MLF package, 24 Programmable I/O Lines in 28-pin PDIP and 28-pad QFN/MLF package



megaAVR

When your designs call for a bit of extra muscle, you need megaAVR. Developed for applications that need to store a large amount of program code, megaAVR offers substantial program and data memories, and performance approaching 1 MIPS per MHz. Better yet, megaAVR delivers the power of self-programmability for fast, secure, cost-effective remote upgrades.

megaAVR Key Benefits

- Self-Programming Flash memory with boot block.
- High accuracy 10-bit A/D converters with up to x200 analog gain stage.
- USART, SPI and TWI(1) compliant serial interfaces.
- IEEE 1149.1 compliant JTAG interface on megaAVRs with 44 pins or more.
- On-Chip Debug through JTAG or debugWIRE interface.

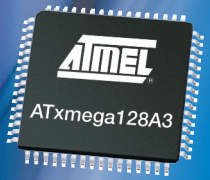
(1): Two Wire Interface (TWI) is a I2C compliant interface.

Product	Status (b)	Flash (KB)	EEPROM (Bytes)	RAM (Bytes)	picoPower	I/O pins	UART/USART	SPI/TWI by USI	SPI	TWI (I2C compliant)	8-bit Timers	16-bit Timers	PWM (Channel)	10-bit A/D (Channel)	Analog Gain Stage	DebugWIRE/OCD	JTAG/OCD	Vcc Range (V)	Clock Speed (MHz)	Package	Pb-free, Green(a)	Temp. Range
ATmega48PA	P	4	256	512	Y	23	1		1+USART	Y	2	1	6	8		Y		1.8-5.5V	20	TQFP32, QFN32, PDIP28	Y	-40°C to +85°C
ATmega88PA	P	8	512	1K	Y	23	1		1+USART	Y	2	1	6	8		Y		1.8-5.5V	20	TQFP32, QFN32, PDIP28	Y	-40°C to +85°C
ATmega8515	P	8	512	512		35	1		1		1	1	3					2.7-5.5V	8	TQFP44, PLCC44, QFN44, PDIP40	Y	-40°C to +85°C
	P	8	512	512		35	1		1		1	1	3					4.5-5.5V	16	TQFP44, PLCC44, QFN44, PDIP40	Y	-40°C to +85°C
ATmega8535	P	8	512	512		32	1		1	Y	2	1	4	8	Y			2.7-5.5V	8	TQFP44, PLCC44, QFN44, PDIP40	Y	-40°C to +85°C
	P	8	512	512		32	1		1	Y	2	1	4	8	Y			4.5-5.5V	16	TQFP44, PLCC44, QFN44, PDIP40	Y	-40°C to +85°C
ATmega16A	P	16	512	1K		32	1		1	Y	2	1	4	8	Y		Y	2.7-5.5V	16	TQFP44, QFN44, PDIP40	Y	-40°C to +85°C
ATmega162	P	16	512	1K		35	2		1		2	2	6				Y	1.8-5.5V	8	TQFP44, QFN44, PDIP40	Y	-40°C to +85°C
	P	16	512	1K		35	2		1		2	2	6				Y	2.7-5.5V	16	TQFP44, QFN44, PDIP40	Y	-40°C to +85°C
ATmega164P	P	16	512	1K	Y	32	2		1+USART	Y	2	1	6	8	Y		Y	1.8-5.5V	10	TQFP44, QFN44, PDIP40	Y	-40°C to +85°C
	P	16	512	1K	Y	32	2		1+USART	Y	2	1	6	8	Y		Y	2.7-5.5V	20	TQFP44, QFN44, PDIP40	Y	-40°C to +85°C
ATmega165P	P	16	512	1K	Y	54	1	1	1+USI	USI	2	1	4	8			Y	1.8-5.5V	8	TQFP64, QFN64	Y	-40°C to +85°C
	P	16	512	1K	Y	54	1	1	1+USI	USI	2	1	4	8			Y	2.7-5.5V	16	TQFP64, QFN64	Y	-40°C to +85°C
ATmega168	P	16	512	1K		23	1		1+USART	Y	2	1	6	8 c)		Y		1.8-5.5V	10	TQFP32, QFN32, PDIP28	Y	-40°C to +85°C
	P	16	512	1K		23	1		1+USART	Y	2	1	6	8 c)		Y		2.7-5.5V	20	TQFP32, QFN32, PDIP28	Y	-40°C to +85°C
ATmega168P	P	16	512	1K	Y	23	1		1+USART	Y	2	1	6	8		Y		1.8-5.5V	10	TQFP32, QFN32, PDIP28	Y	-40°C to +85°C
	P	16	512	1K	Y	23	1		1+USART	Y	2	1	6	8		Y		2.7-5.5V	20	TQFP32, QFN32, PDIP28	Y	-40°C to +85°C

Product	Status (b)	Flash (KB)	EEPROM (Bytes)	RAM (Bytes)	picoPower	I/O pins	UART/USART	SPI/TWI by USI	SPI	TWI(I2C compliant)	8-bit Timers	16-bit Timers	PWM (Channel)	10-bit A/D (Channel)	Analog Gain Stage	DebugWIRE/OCD	JTAG/OCD	Vcc Range (V)	Clock Speed(MHz)	Package	Pb-free, Green(a)	Temp. Range
ATmega32A	P	32	1K	2K		32	1		1	Y	2	1	4	8	Y		Y	2.7-5.5V	16	TQFP44, QFN44, PDIP40	Y	-40°C to +85°C
ATmega324PA	P	32	1K	2K	Y	32	2		1+USART	Y	2	1	6	8	Y		Y	1.8-5.5V	20	TQFP44, QFN44, PDIP40	Y	-40°C to +85°C
ATmega325	P	32	1K	2K		54	1	1	1+USI	USI	2	1	4	8			Y	1.8-5.5V	8	TQFP64, QFN64	Y	-40°C to +85°C
	P	32	1K	2K		54	1	1	1+USI	USI	2	1	4	8			Y	2.7-5.5V	16	TQFP64, QFN64	Y	-40°C to +85°C
ATmega325P	I	32	1K	2K	Y	54	1	1	1+USI	USI	2	1	4	8			Y	1.8-5.5V	10	TQFP64, QFN64	Y	-40°C to +85°C
	I	32	1K	2K	Y	54	1	1	1+USI	USI	2	1	4	8			Y	2.7-5.5V	20	TQFP64, QFN64	Y	-40°C to +85°C
ATmega3250	I	32	1K	2K		69	1	1	1+USI	USI	2	1	4	8			Y	1.8-5.5V	8	TQFP100	Y	-40°C to +85°C
	I	32	1K	2K		69	1	1	1+USI	USI	2	1	4	8			Y	2.7-5.5V	16	TQFP100	Y	-40°C to +85°C
ATmega3250P	I	32	1K	2K	Y	69	1	1	1+USI	USI	2	1	4	8			Y	1.8-5.5V	10	TQFP100	Y	-40°C to +85°C
	I	32	1K	2K	Y	69	1	1	1+USI	USI	2	1	4	8			Y	2.7-5.5V	20	TQFP100	Y	-40°C to +85°C
ATmega328P	I	32	1K	2K	Y	23	1		1+USART	Y	2	1	6	8		Y		1.8-5.5V	10	TQFP32, QFN32, PDIP28	Y	-40°C to +85°C
	I	32	1K	2K	Y	23	1		1+USART	Y	2	1	6	8		Y		2.7-5.5V	20	TQFP32, QFN32, PDIP28	Y	-40°C to +85°C
ATmega64	P	64	2K	4K		54	2		1	Y	2	2	6+2	8	Y		Y	2.7-5.5V	8	TQFP64, QFN64	Y	-40°C to +85°C
	P	64	2K	4K		54	2		1	Y	2	2	6+2	8	Y		Y	4.5-5.5V	16	TQFP64, QFN64	Y	-40°C to +85°C
ATmega640	P	64	4K	8K		86	4		1+USART	Y	2	4	12+4	16	Y		Y	1.8-5.5V	8	TQFP100, CBGA100	Y	-40°C to +85°C
	P	64	4K	8K		86	4		1+USART	Y	2	4	12+4	16	Y		Y	2.7-5.5V	16	TQFP100, CBGA100	Y	-40°C to +85°C
ATmega644	P	64	2K	4K		32	1		1+USART	Y	2	1	6	8	Y		Y	1.8-5.5V	10	TQFP44, QFN44, PDIP40	Y	-40°C to +85°C
	P	64	2K	4K		32	1		1+USART	Y	2	1	6	8	Y		Y	2.7-5.5V	20	TQFP44, QFN44, PDIP40	Y	-40°C to +85°C
ATmega644P	P	64	2K	4K	Y	32	2		1+USART	Y	2	1	6	8	Y		Y	1.8-5.5V	10	TQFP44, QFN44, PDIP40	Y	-40°C to +85°C
	P	64	2K	4K	Y	32	2		1+USART	Y	2	1	6	8	Y		Y	2.7-5.5V	20	TQFP44, QFN44, PDIP40	Y	-40°C to +85°C
ATmega645	P	64	2K	4K		54	1	1	1+USI	USI	2	1	4	8			Y	1.8-5.5V	8	TQFP64, QFN64	Y	-40°C to +85°C
	P	64	2K	4K		54	1	1	1+USI	USI	2	1	4	8			Y	2.7-5.5V	16	TQFP64, QFN64	Y	-40°C to +85°C

Product	Status (b)	Flash (KB)	EEPROM (Bytes)	RAM (Bytes)	picoPower	I/O pins	UART/USART	SPI/TWI by USI	SPI	TWI (I2C compliant)	8-bit Timers	16-bit Timers	PWM (Channel)	10-bit A/D (Channel)	Analog Gain Stage	DebugWIRE/OCD	JTAG/OCD	Vcc Range (V)	Clock Speed (MHz)	Package	Pb-free, Green (a)	Temp. Range
ATmega6450	I	64	2K	4K		69	1	1	1+USI	USI	2	1	4	8			Y	1.8-5.5V	8	TQFP100	Y	-40°C to +85°C
	I	64	2K	4K		69	1	1	1+USI	USI	2	1	4	8			Y	2.7-5.5V	16	TQFP100	Y	-40°C to +85°C
ATmega1284P	I	128	4K	16K	Y	32	2		1+USART	Y	1	2	6	8	Y		Y	1.8-5.5V	20	TQFP44, QFN44, PDIP40	Y	-40°C to +85°C
ATmega128	P	128	4K	4K		53	2		1	Y	2	2	6+2	8	Y		Y	2.7-5.5V	8	TQFP64, QFN64	Y	-40°C to +85°C
	P	128	4K	4K		53	2		1	Y	2	2	6+2	8	Y		Y	4.5-5.5V	16	TQFP64, QFN64	Y	-40°C to +85°C
ATmega1280	P	128	4K	8K		86	4		1+USART	Y	2	4	12+4	16	Y		Y	1.8-5.5V	8	TQFP100, CBGA100	Y	-40°C to +85°C
	P	128	4K	8K		86	4		1+USART	Y	2	4	12+4	16	Y		Y	2.7-5.5V	16	TQFP100, CBGA100	Y	-40°C to +85°C
ATmega1281	P	128	4K	8K		54	2		1+USART	Y	2	4	6+4	8	Y		Y	1.8-5.5V	8	TQFP64, QFN64	Y	-40°C to +85°C
	P	128	4K	8K		54	2		1+USART	Y	2	4	6+4	8	Y		Y	2.7-5.5V	16	TQFP64, QFN64	Y	-40°C to +85°C
ATmega2560	P	256	4K	8K		86	4		1+USART	Y	2	4	12+4	16	Y		Y	1.8-5.5V	8	TQFP100, CBGA100	Y	-40°C to +85°C
	P	256	4K	8K		86	4		1+USART	Y	2	4	12+4	16	Y		Y	4.5-5.5V	16	TQFP100, CBGA100	Y	-40°C to +85°C
ATmega2561	P	256	4K	8K		54	2		1+USART	Y	2	4	6+4	8	Y		Y	1.8-5.5V	8	TQFP64, QFN64	Y	-40°C to +85°C
	P	256	4K	8K		54	2		1+USART	Y	2	4	6+4	8	Y		Y	4.5-5.5V	16	TQFP64, QFN64	Y	-40°C to +85°C

a) Pb-free packaging complies to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green.
b) P: Product in Full Production, I: Device under Introduction.
c) Only 6 ADC in PDIP packages.



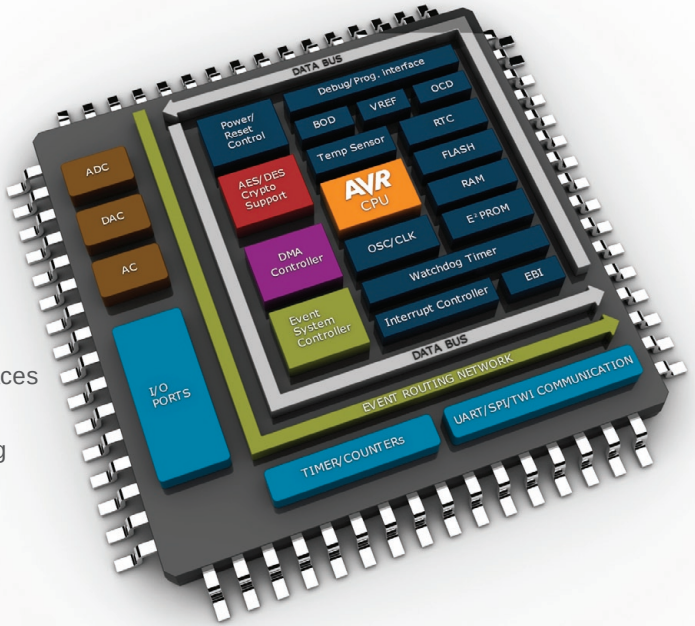
AVR XMEGA

AVR XMEGA extends the AVR product family to reach new markets and improve existing applications. With a DMA Controller, an Innovative Event System, Multi-level Interrupt Controller, Crypto engine, and high speed ADC and DAC, AVR XMEGA pushes the boundries for high performance 8/16-bit MCUs while still remaining highly compatible with tinyAVR and megaAVR

AVR XMEGA is the MCU for the next generation of 8- and 16-bit applications!

AVR XMEGA Key Benefits

- picoPower technology for ultra low power consumption
- True 1.6 volt operation and CPU speed up to 32 MHz
- Event System and DMA Controller
- High speed, high resolution 12-bit ADC and DAC
- Crypto engine, Timers/Counters and fast communication interfaces
- Accurate and exible Clock System with dynamic clock switching



Product (a)	Status (b)	Flash (KB)	Boot code (Bytes)	EEPROM (Bytes)	SRAM (Bytes)	picoPower	DMA (Channels)	Event (Channels)	I/O	16-bit Timers	PWM (Channel)	RTC 16-bit	RTC 32-bit (c)	SPI	TWI (I2C)	USART	12-bit A/D (Channel)	12-bit DAC (Channel)	Analog Comp.	Interrupts	Interrupts Ext.	JTAG	PDI	Vcc (V) Range	Clock Speed(MHz)	Package	Temp. Range
ATxmega64A1	P	64	4	2	4	Y	4	8	78	8	24	Y		4	4	8	2x8	2x2	4	122	78	Y	Y	1.6 - 3.6	32	TQFP100, BGA100	-40°C to +85°C
ATxmega128A1	P	128	8	2	8	Y	4	8	78	8	24	Y		4	4	8	2x8	2x2	4	122	78	Y	Y	1.6 - 3.6	32	TQFP100, BGA100	-40°C to +85°C
ATxmega192A1	F	192	8	4	16	Y	4	8	78	8	24	Y		4	4	8	2x8	2x2	4	122	78	Y	Y	1.6 - 3.6	32	TQFP100, BGA100	-40°C to +85°C
ATxmega256A1	F	256	8	4	16	Y	4	8	78	8	24	Y		4	4	8	2x8	2x2	4	122	78	Y	Y	1.6 - 3.6	32	TQFP100, BGA100	-40°C to +85°C
ATxmega384A1	F	384	8	4	32	Y	4	8	78	8	24	Y		4	4	8	2x8	2x2	4	122	78	Y	Y	1.6 - 3.6	32	TQFP100, BGA100	-40°C to +85°C
ATxmega64A3	I	64	4	2	4	Y	4	8	50	7	22	Y		3	2	7	2x8	1x2	4	102	50	Y	Y	1.6 - 3.6	32	TQFP64, QFN64	-40°C to +85°C
ATxmega128A3	I	128	8	2	8	Y	4	8	50	7	22	Y		3	2	7	2x8	1x2	4	102	50	Y	Y	1.6 - 3.6	32	TQFP64, QFN64	-40°C to +85°C
ATxmega192A3	I	192	8	4	16	Y	4	8	50	7	22	Y		3	2	7	2x8	1x2	4	102	50	Y	Y	1.6 - 3.6	32	TQFP64, QFN64	-40°C to +85°C
ATxmega256A3B	I	256	8	4	16	Y	4	8	49	7	22		Y	2	2	6	2x8	1x2	4	102	49	Y	Y	1.6 - 3.6	32	TQFP64, QFN64	-40°C to +85°C
ATxmega256A3	I	256	8	4	16	Y	4	8	50	7	22	Y		3	2	7	2x8	1x2	4	102	50	Y	Y	1.6 - 3.6	32	TQFP64, QFN64	-40°C to +85°C
ATxmega16A4	I	16	4	1	2	Y	4	8	34	5	16	Y		2	2	5	1x12	1x2	2	77	34		Y	1.6 - 3.6	32	TQFP44, QFN44, VFBGA49	-40°C to +85°C
ATxmega32A4	I	32	4	1	4	Y	4	8	34	5	16	Y		2	2	5	1x12	1x2	2	77	34		Y	1.6 - 3.6	32	TQFP44, QFN44, VFBGA49	-40°C to +85°C
ATxmega64A4	F	64	4	2	4	Y	4	8	34	5	16	Y		2	2	5	1x12	1x2	2	77	34		Y	1.6 - 3.6	32	TQFP44, QFN44	-40°C to +85°C
ATxmega128A4	F	128	4	2	8	Y	4	8	34	5	16	Y		2	2	5	1x12	1x2	2	77	34		Y	1.6 - 3.6	32	TQFP44, QFN44	-40°C to +85°C
ATxmega64D3	I	64	4	2	4	Y		4	50	5	18	Y		2	1	3	1x16		2	67	50		Y	1.6 - 3.6	32	TQFP64, QFN4	-40°C to +85°C
ATxmega128D3	I	128	8	2	8	Y		4	50	5	18	Y		2	1	3	1x16		2	67	50		Y	1.6 - 3.6	32	TQFP64, QFN64	-40°C to +85°C
ATxmega192D3	I	192	8	2	16	Y		4	50	5	18	Y		2	1	3	1x16		2	67	50		Y	1.6 - 3.6	32	TQFP64, QFN64	-40°C to +85°C
ATxmega256D3	I	256	8	4	16	Y		4	50	5	18	Y		2	1	3	1x16		2	67	50		Y	1.6 - 3.6	32	TQFP64, QFN64	-40°C to +85°C
ATxmega16D4	I	16	4	1	2	Y		4	34	4	14	Y		2	1	2	1x12		2	55	34		Y	1.6 - 3.6	32	TQFP44, QFN44, VFBGA49	-40°C to +85°C
ATxmega32D4	I	32	4	1	4	Y		4	34	4	14	Y		2	1	2	1x12		2	55	34		Y	1.6 - 3.6	32	TQFP44, QFN44, VFBGA49	-40°C to +85°C

a) Pb-free packaging complies to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green. All products have 32 MHz, 2 MHz and 32 kHz calibrated oscillators and Event System channels.

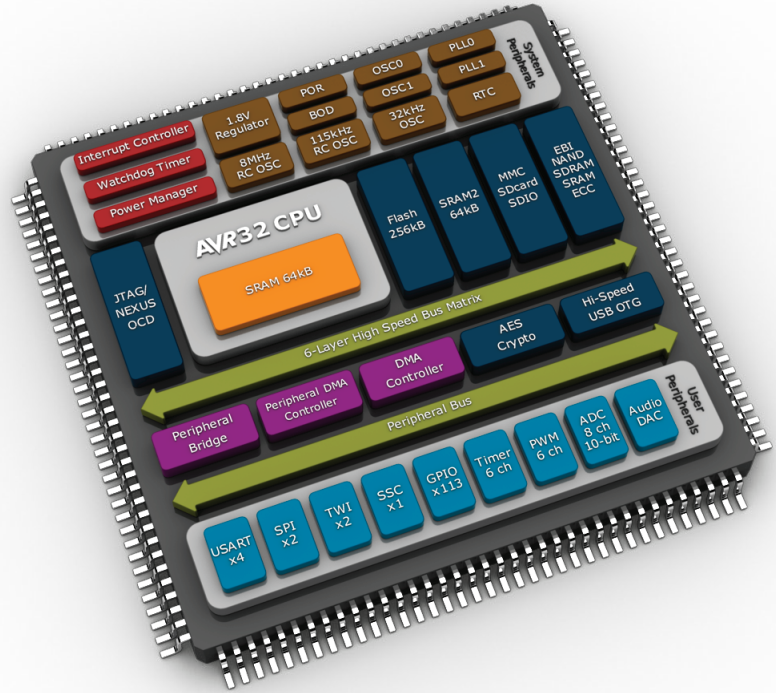
b) P: Production, F: Future product, I: Device under Introduction. c) Include Battery backup function

AVR32 UC3

The Atmel AVR32 UC3 product family is built on the new AVR32 UC architecture optimized for highly integrated embedded applications requiring microcontrollers with on-chip Flash program memory. UC3 microcontrollers achieve high computation throughput, real-time behavior and low power consumption.

AVR32 UC3 Key Benefits

- High CPU performance
- Low power consumption
- High data throughput
- Low system cost
- High reliability
- Easy to use



Products	Status(b)	Flash (KBytes)	SRAM (Bytes)	SD/MMC	Ethernet MAC	USB High Speed	USB Full Speed	USB Host / OTG	USART	PWM (Channels)	I/O	System Bus Layer	PDC (Channels)	16-bit Timers	RTC	SPI	SSC (I2C audio)	TWI (I2C)	Crystal Oscillator	MPU	10-bit A/D (Channel)	12-bit TSADC (Channel)	Crypto (AES)	Vcc (V) max	Clock Speed (MHz)	Package (a)	Temp. Range
AT32UC3A0128	P	128	32K		1		Y	Y	4	13	109	6	7	3	Y	2	1	Y	2	Y	8			3.3V	66	LQFP144	-40°C to +85°C
AT32UC3A0256	P	256	64K		1		Y	Y	4	13	109	6	7	3	Y	2	1	Y	2	Y	8			3.3V	66	LQFP144	-40°C to +85°C
AT32UC3A0512	P	512	64K		1		Y	Y	4	13	109	6	7	3	Y	2	1	Y	2	Y	8			3.3V	66	LQFP144	-40°C to +85°C
AT32UC3A1128	P	128	32K		1		Y	Y	4	13	69	6	7	3	Y	2	1	Y	2	Y	8			3.3V	66	TQFP100	-40°C to +85°C
AT32UC3A1256	P	256	64K		1		Y	Y	4	13	69	6	7	3	Y	2	1	Y	2	Y	8			3.3V	66	TQFP100	-40°C to +85°C
AT32UC3A1512	P	512	64K		1		Y	Y	4	13	69	6	7	3	Y	2	1	Y	2	Y	8			3.3V	66	TQFP100	-40°C to +85°C
AT32UC3A364	I	64	128K	Y		Y	Y	Y	4	13	110	6	8	3	Y	2	1	Y	2	Y	8			3.3V	66	LQFP144, TBGA144	-40°C to +85°C
AT32UC3A3128	I	128	128K	Y		Y	Y	Y	4	13	110	6	8	3	Y	2	1	Y	2	Y	8			3.3V	66	LQFP144, TBGA144	-40°C to +85°C
AT32UC3A3256	I	256	128K	Y		Y	Y	Y	4	13	110	6	8	3	Y	2	1	Y	2	Y	8			3.3V	66	LQFP144, TBGA144	-40°C to +85°C
AT32UC3A364S	I	64	128K	Y		Y	Y	Y	4	13	110	6	8	3	Y	2	1	Y	2	Y	8		Y	3.3V	66	LQFP144, TBGA144	-40°C to +85°C
AT32UC3A3128S	I	128	128K	Y		Y	Y	Y	4	13	110	6	8	3	Y	2	1	Y	2	Y	8		Y	3.3V	66	LQFP144, TBGA144	-40°C to +85°C
AT32UC3A3256S	I	256	128K	Y		Y	Y	Y	4	13	110	6	8	3	Y	2	1	Y	2	Y	8		Y	3.3V	66	LQFP144, TBGA144	-40°C to +85°C
AT32UC3B064	P	64	16K				Y	Y	3	13	44	5	7	3	Y	1	1	Y	2	Y	8			3.3V	60	TQFP64, QFN64	-40°C to +85°C
AT32UC3B0128	P	128	32K				Y	Y	3	13	44	5	7	3	Y	1	1	Y	2	Y	8			3.3V	60	TQFP64, QFN64	-40°C to +85°C
AT32UC3B0256	P	256	32K				Y	Y	3	13	44	5	7	3	Y	1	1	Y	2	Y	8			3.3V	60	TQFP64, QFN64	-40°C to +85°C
AT32UC3B0512	P	512	96K				Y	Y	3	13	44	5	7	3	Y	1	1	Y	2	Y	8			3.3V	60	TQFP64, QFN64	-40°C to +85°C
AT32UC3B164	P	64	16K				Y		2	13	28	5	7	3	Y	1		Y	1	Y	6			3.3V	60	TQFP48, QFN48	-40°C to +85°C
AT32UC3B1128	P	128	32K				Y		2	13	28	5	7	3	Y	1		Y	1	Y	6			3.3V	60	TQFP48, QFN48	-40°C to +85°C
AT32UC3B1256	P	256	32K				Y		2	13	28	5	7	3	Y	1		Y	1	Y	6			3.3V	60	TQFP48, QFN48	-40°C to +85°C
AT32UC3B1512	P	512	96K				Y		2	13	28	5	7	3	Y	1		Y	1	Y	6			3.3V	60	TQFP48, QFN48	-40°C to +85°C
AT32UC3L016	I	16	8K						4	36	36	5	12	6	Y	1		Y	3	Y		6		3.6V	50	TQFP48, QFN48	-40°C to +85°C
AT32UC3L032	I	32	16K						4	36	36	5	12	6	Y	1		Y	3	Y		6		3.6V	50	TQFP48, QFN48	-40°C to +85°C
AT32UC3L064	I	64	16K						4	36	36	5	12	6	Y	Y	1x12	Y	3	Y		6		3.6V	50	TQFP48, QFN48	-40°C to +85°C

a) Pb-free packaging complies to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green.
b) P: Product in Full Production, I: Device under Introduction, F: Future device.

AVR32 AP7

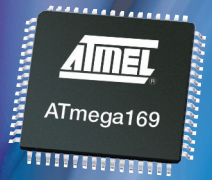
The Atmel AVR32 AP7 product family is built on the high performance AVR32 AP architecture optimized for embedded Linux applications. All AP7 devices are designed to deliver the highest possible CPU performance at the lowest possible power consumption, and a rich set of high-speed peripherals in combination with the innovative DMA controllers and multi-layer data busses offer the highest possible data throughput rates.

AVR32 AP7 Key Benefits

- High CPU perfromance
- Low power consumption
- SIMD / DSP instructions
- Instruction & data caches
- Memory management unit
- Built for embedded Linux

Products(a)	Status(b)	SRAM (Bytes)	SDRAM	NAND Flash	DSP instr.	Vector mult.	Ethernet MAC	USB high Speed	LCD	USART	PWM (Channels)	I/O	PDC (Channels)	16-bit Timers	RTC	SPI	16-bit Audio DAC	Audio	ISI	PS/2 Interface	SSC (I2S Audio)	TWI (I2C)	Crystal oscillator	PLL	MMU	JTAG	Nexus	10-bit TSADC (Channels)	Vcc (V) Range	Package(a)
AT32AP7000	P	32K	Y	Y	Y	Y	2	Y	2048x2048 24-bit	4	4	160	15	6	Y	2	Stereo	AC97, 3xI2S	CMOS	Y	3	Y	2	2	Y	Y	Class 3		1.8+3.3V	CTBGA256
AT32AP7001	P	32K	Y	Y	Y	Y		Y		4	4	90	15	6	Y	2	Stereo	AC97, 3xI2S	CMOS	Y	3	Y	2	2	Y	Y	Class 3		1.8+3.3V	QFP208
AT32AP7002	P	32K	Y	Y	Y	Y		Y	2048x2048 18-bit	4	4	85	15	6	Y	2	Stereo	AC97, 3xI2S	CMOS	Y	3	Y	2	2	Y	Y	Class 3		1.8+3.3V	CTBGA196

a) Pb-free packaging complies to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green.
b) P: Product in Full Production, I: Device under Introduction, F: Future device.
c) Industrial temperature range, -40°C to +85°C.



Application Oriented

The range of standard AVRs is complemented by an increasing number of derivatives speci ed to deliver precise characteristics and capabilities. Available devices cover domains such as automotive, LCD drivers, CAN networking, USB connectivity, motor control, lighting applications, battery management single-chip, IEEE 802.15.4, ZigBee and Remote Access Control.

AVR for LCD Control

Designed for maximum exibility and the highest possible integration, the LCD AVR family of high performance, low-power microeon trollers includes everything you need for human interface. The feature set includes keyboard interrupts, visual LCD driver with contrast control and interrupts for input switches.

Product	Status (b)	Flash (KB)	EEPROM (Bytes)	RAM (Bytes)	picoPower	I/O pins	LCD Segments	UART/USART	SPI/TWI by USI	SPI	8-bit Timers	16-bit Timers	PWM (Channel)	10-bit A/D (Channel)	JTAG/OCD	Vcc Range (V)	Clock Speed (MHz)	Package	Pb-free, Green(a)	Temp. Range
ATmega169P	P	16	512	1K	Y	54	4x25	1	1	1+USI	2	1	4	8	Y	1.8 - 5.5	8	TQFP64, QFN64	Y	-40°C to +85°C
	P	16	512	1K		54	4x25	1	1	1+USI	2	1	4	8	Y	2.7 - 5.5	16	TQFP64, QFN64	Y	-40°C to +85°C
ATmega329P	P	32	1K	2K	Y	54	4x25	1	1	1+USI	2	1	4	8	Y	1.8 - 5.5	10	TQFP64, QFN64	Y	-40°C to +85°C
	P	32	1K	2K		54	4x25	1	1	1+USI	2	1	4	8	Y	2.7 - 5.5	20	TQFP64, QFN64	Y	-40°C to +85°C
ATmega329	P	32	1K	2K		54	4x25	1	1	1+USI	2	1	4	8	Y	1.8 - 5.5	8	TQFP64, QFN64	Y	-40°C to +85°C
	P	32	1K	2K		54	4x25	1	1	1+USI	2	1	4	8	Y	2.7 - 5.5	16	TQFP64, QFN64	Y	-40°C to +85°C
ATmega3290P	I	32	1K	2K	Y	69	4x40	1	1	1+USI	2	1	4	8	Y	1.8 - 5.5	10	TQFP100	Y	-40°C to +85°C
	I	32	1K	2K		69	4x40	1	1	1+USI	2	1	4	8	Y	2.7 - 5.5	20	TQFP100	Y	-40°C to +85°C
ATmega3290	P	32	1K	2K		69	4x40	1	1	1+USI	2	1	4	8	Y	1.8 - 5.5	8	TQFP100	Y	-40°C to +85°C
	P	32	1K	2K		69	4x40	1	1	1+USI	2	1	4	8	Y	2.7 - 5.5	16	TQFP100	Y	-40°C to +85°C
ATmega649	P	64	2K	4K		54	4x25	1	1	1+USI	2	1	4	8	Y	1.8 - 5.5	8	TQFP64, QFN64	Y	-40°C to +85°C
	P	64	2K	4K		54	4x25	1	1	1+USI	2	1	4	8	Y	2.7 - 5.5	16	TQFP64, QFN64	Y	-40°C to +85°C
ATmega6490	I	64	2K	4K		69	4x40	1	1	1+USI	2	1	4	8	Y	1.8 - 5.5	8	TQFP100	Y	-40°C to +85°C
	I	64	2K	4K		69	4x40	1	1	1+USI	2	1	4	8	Y	2.7 - 5.5	16	TQFP100	Y	-40°C to +85°C

a) Pb-free packaging to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green.
b) P: Product in Full Production, I: Device under Introduction.

AVR for USB Connectivity

The USB microcontrollers are designed to address the varied requirements of embedded applications needing USB connectivity. Devices have either a USB interface for applications needing to communicate with USB host or comply with the USB On-The-Go (OTG) standard for use as Dual Role Devices (DRD) in applications operating as either host or function on the USB.

Atmel offers a number of applications notes with implementation examples, and a set of development tools. An extensive soft ware library is offered to support the most-relevant USB classes for the embedded market: Mass Storage Device (MSD), Human Interface Device (HID), Device Firmware Upgrade (DFU), Communication Device Class (CDC), Audio Class, etc.

Web resources: www.atmel.com/products/avr/usb/

Product	Status (b)	Flash (KB)	EEPROM (Bytes)	RAM (Bytes)	I/O pins	UART/USART	SPI	TWI (I2C compliant)	USB 2.0 Host/OTG	USB Full Speed	USB Low Speed	USB DPRAM (bytes)	USB endpoints	8-bit Timers	10-bit HS Timers	16-bit Timers	PWM (channel)	10-bit A/D (channel)	Analog Gain Stage	DebugWIRE/OCD	JTAG/OCD	Vcc Range (V)	Clock Speed (MHz)	Package	Pb-free, Green (a)	Temp. Range
AT90USB82	P	8	512	512	22	1	1			Y		176	4+1	1		1	5					2.7 - 5.5	16	QFN32	Y	-40°C to +85°C
AT90USB162	P	16	512	512	22	1	1			Y		176	4+1	1		1	5					2.7 - 5.5	16	TQFP32, QFN32	Y	-40°C to +85°C
ATmega8U2	I	8	256	128	22	1	1			Y		176	4+1	1		1	2+3		Y	Y		2.7 - 5.5	16	TQFP32, QFN32	Y	-40°C to +85°C
AT mega16U2	I	16	512	512	22	1	1			Y		176	4+1	1		1	2+3		Y	Y		2.7 - 5.5	16	TQFP32, QFN32	Y	-40°C to +85°C
AT mega32U2	I	32	1K	1K	22	1	1			Y		176	4+1	1		1	2+3		Y	Y		2.7 - 5.5	16	TQFP32, QFN32	Y	-40°C to +85°C
ATmega16U4	I	16	1K	1.25K	26	1	1	1		Y	Y	835	6+1	1	1	2	5+3+1	12	Y		Y	2.7 - 5.5	16	QFN44	Y	-40°C to +85°C
ATmega32U4	I	32	1K	2.5K	26	1	1	1		Y	Y	835	6+1	1	1	2	5+3+1	12	Y		Y	2.7 - 5.5	16	TQFP44, QFN44	Y	-40°C to +85°C
ATmega32U6	I	32	1K	2.5K	26	1	1	1		Y	Y	835	6+1	2		2	6+2	8	Y		Y	2.7 - 5.5	16	TQFP64, QFN64	Y	-40°C to +85°C
AT90USB646	P	64	2K	4K	48	1	1	1		Y	Y	832	6+1	2		2	6+2	8	Y		Y	2.7 - 5.5	16	QFN64	Y	-40°C to +85°C
AT90USB647	P	64	2K	4K	48	1	1	1	Y	Y	Y	832	6+1	2		2	6+2	8	Y		Y	2.7 - 5.5	16	TQFP64, QFN64	Y	-40°C to +85°C
AT90USB1286	P	128	4K	8K	48	1	1	1		Y	Y	832	6+1	2		2	6+2	8	Y		Y	2.7 - 5.5	16	QFN64	Y	-40°C to +85°C
AT90USB1287	P	128	4K	8K	48	1	1	1	Y	Y	Y	832	6+1	2		2	6+2	8	Y		Y	2.7 - 5.5	16	TQFP64, QFN64	Y	-40°C to +85°C

a) Pb-free packaging complies to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green.
b) F: Future product I: Device under Introduction, P: Product in Full Production.

AVR for CAN Networking

AVRs with extended CAN (Controller Area Network) capabilities are perfectly suited for industrial applications. They feature a large amount of Flash memory to operate higher level protocol stack (CANopen, DeviceNet™ or J1939) and offer up to 16 MIPS throughput. Designers can take bene ts of the highly exible In-Application Programming capability via CAN, UART or SPI interface, as well as the V2.0A/V2.0B CAN controller with 15 independent message objects programmable on-the- y.

Product	Status[b]	Flash (KB)	EEPROM (Bytes)	RAM (Bytes)	I/O pins	CAN Mess. Obj.	UART/USART	TWI (I2C compliant)	SPI	8-bit Timers	16-bit Timers	PWM (Channel)	10-bit A/D (Channel)	debugWire/OCD	JTAG/OCD	Vcc Range (V)	Clock Speed (MHz)	Package	Pb-free, Green[a]	Temp. Range
ATmega32M1	I	32	2K	2K	27	6	1		1	1	1	6+4	11	Y		2.7 - 5.5	16	TQFP32, QFN32	Y	-40°C to +85°C
AT90CAN32	P	32	1K	2K	53	15	2	1	1	2	2	6+2	8		Y	2.7 - 5.5	16	TQFP64, QFN64	Y	-40°C to +85°C
AT90CAN64	P	64	2K	4K	53	15	2	1	1	2	2	6+2	8		Y	2.7 - 5.5	16	TQFP64, QFN64	Y	-40°C to +85°C
AT90CAN128	P	128	4K	4K	53	15	2	1	1	2	2	6+2	8		Y	2.7 - 5.5	16	TQFP64, QFN64	Y	-40°C to +85°C

a) Pb-free packaging alternative, complies to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green.
b) b) P: Product in Full Production, I: Device under Introduction.

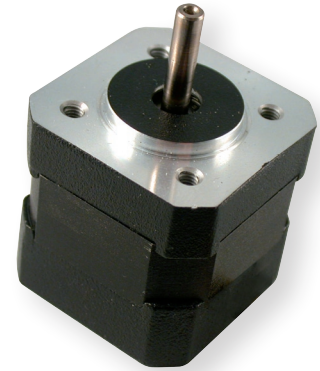
AVR for Motor Control

Microcontrollers are more and more used for motor control instead of Application Speci c Standard Products (ASSP). Incorporating the necessary functions, they provide more exibility and offer a better cost solution in most of the cases. Ranging from 8- to 100-pin devices, AVR Flash microcontrollers are well suited for applications such as PC fans up to highly advanced motor control applications.

From ATtiny13A to AT90PWM3B, designer can nd a cost-effective solution for a variety of motor type and application complexity. Atmel is providing support to developers using AVR for motor control designs, with a number of applications notes with implementation examples, and a set of development tools.
This covers:

– Sensor-based or sensorless 2-phase BLDC Motors
– Sensor-based or sensorless 3-phase BLDC Motors
– AC motors

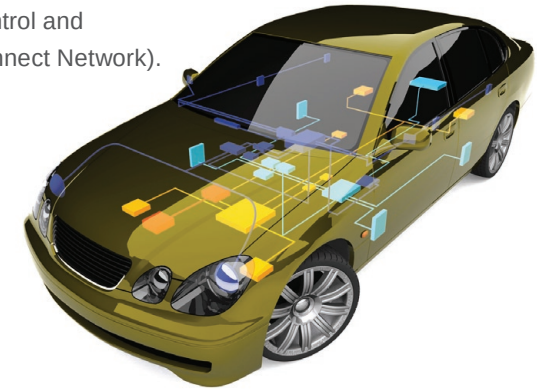
Web resources: www.atmel.com/products/avr/mc/



AVR for Automotive

AVR 8-bit architecture has reached a high level of acceptance in many market segments for its performance, high code density and ef cient development tool set. It is perfectly suited for many automotive applications. The range of devices made available to automotive already covers a variety of needs and will expand rapidly in the future. AVR devices incorporate all the basic peripherals as well as powerful analog functions.

Typical applications cover Brushless DC Motor Control, sensors and actuators control and in-vehicle networking with CAN (Controller Area Network) and LIN (Local Interconnect Network).



In addition to usual manufacturing and development plant quali cations (ISO-TS-16949 and QS-9000) automotive products are being quali ed according to the AEC Q100 (Automotive Electronic Council) requirements, and a PPAP (Production Part Approval Process) document is made available for each product.

Web resources: www.atmel.com/automcu/

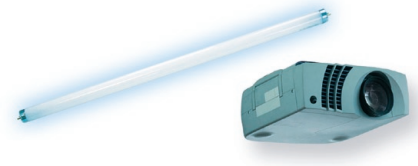
Product	Status (b)	Flash (KB)	EEPROM (Bytes)	RAM (Bytes)	I/O pins	CAN Mess. Obj.	LIN (g)	UART	USART	USI	SPI	8-bit Timers	12-bit Timers	16-bit Timers	PWM (Channel)	10-bit A/D (channel)	Analog Gain Stage	DebugWIRE/OCD	JTAG/OCD	2.7-5.5V @ 16 MHz	1.8-3.6V @ 8 MHz	Package	Pb-free, Green(a)	Temp. Range(c)
ATtiny24	P	2	128	128	12					1	1+USI	1		1	4	8	Y	Y		Y		SOIC14, QFN20	Y	Z
ATtiny25	P	2	128	128	6					1	1+USI	2			4(d)	4	Y	Y		Y	Y	SOIC8, QFN20	Y	Z
ATtiny261	I	2	128	128	16					1	1+USI	1		1	5	11	Y	Y		Y		SOIC8, QFN20	Y	Z, T2
ATtiny44	P	4	256	256	12					1	1+USI	1		1	4	8	Y	Y		Y	Y	SOIC20, QFN32, TSSOP20	Y	D
ATtiny45	P	4	256	256	6					1	1+USI	2			4(d)	4	Y	Y		Y	Y	SOIC8, QFN20	Y	Z, T2
ATtiny461	I	4	256	256	16					1	1+USI	1		1	5	11	Y	Y		Y		SOIC20, QFN32, TSSOP20	Y	Z, D
ATtiny84	P	8	512	512	12					1	1+USI	1		1	4	8	Y	Y		Y		QFN20	Y	Z
ATtiny85	P	8	512	512	6					1	1+USI	2			4(d)	4	Y	Y		Y	Y	SOIC8, QFN20	Y	Z
ATtiny87	I	8	512	512	16		H		1	1	1+USI	1		1	4	11	Y	Y		Y		SOIC20, QFN32, TSSOP20	Y	Z, D
ATtiny861	I	8	512	512	16					1	1+USI	1		1	5	11	Y	Y		Y		SOIC20, QFN32 TSSOP20	Y	Z
ATtiny167	I	16	512	512	16		H		1	1	1+USI	1		1	4	11	Y	Y		Y		SOIC20, QFN32, TSSOP20	Y	Z, D
ATtiny327	I	32	1024	2048	16		H		1	1	1+USI	1		1	4	11	Y	Y		Y		SOIC20, QFN32, TSSOP20	Y	Z, D
ATmega48	P	4	256	512	23		S	1			1+USART	2		1	6	8		Y		Y		TQFP32, QFN32	Y	T, T1, Z
ATmega88	P	8	512	1K	23		S	1			1+ USART	2		1	6	8		Y		Y	Y	TQFP32, QFN32	Y	T, T1, Z ,T2
ATmega164P	P	16	512	1K	32		S	2			1+ USART	2		1	6	8	Y		Y	Y		TQFP44, QFN44	Y	Z
ATmega168	P	16	512	1K	23		S	1			1+ USART	2		1	6	8		Y		Y		TQFP32, QFN32	Y	T, T1, Z, D
ATmega169P	P	16	512	1K	54		S	1		1	1+USI	2		1	4	8			Y	Y		TQFP64, QFN64	Y	T
ATmega16M1	I	16	1K	2K	27	6	H		1		1	1	1	1	6+4(d)	11	Y	Y		Y		TQFP32, QFN32	Y	Z, D
ATmega324P	P	32	1K	2K	32		S	2			1+ USART	2		1	6	8	Y		Y	Y		TQFP44, QFN44	Y	Z
ATmega328P	I	32	1K	2K	23		S	1			1+ USART	2		1	6	8		Y		Y		TQFP32, QFN32	Y	Z
ATmega32M1	I	32	2K	2K	27	6	H		1		1	1	1	1	6+4(d)	11	Y	Y		Y		TQFP32, QFN32	Y	Z, D
ATmega32C1	I	32	2K	2K	27	6	H		1		1	1		1	4	11	Y	Y		Y		TQFP32, QFN32	Y	Z, D
ATmega64M1	I	64	1K	4K	27	6	H		1		1	1	1	1	6+4(d)	11	Y	Y		Y		TQFP32, QFN32	Y	Z, D
ATmega64C1	I	64	1K	4K	27	6	H		1		1	1		1	4	11	Y	Y		Y		TQFP32, QFN32	Y	Z, D
ATmega644P	P	64	2K	4K	32		S	2			1+ USART	2		1	6	8	Y		Y	Y		TQFP44, QFN44	Y	Z
AT90CAN32	P	32	1K	2K	53	15	S	2		1	1	2		2	6+2	8	Y		Y	Y		TQFP64, QFN64	Y	T, T1, Z
AT90CAN64	P	64	2K	4K	53	15	S	2		1	1	2		2	6+2	8	Y		Y	Y		TQFP64, QFN64	Y	T, T1, Z
AT90CAN128	P	128	4K	4K	53	15	S	2		1	1	2		2	6+2	8	Y		Y	Y		TQFP64, QFN64	Y	T, T1, Z

a) Pb-free packaging complies to the European directive for Restriction of Ha zardous Substances (RoHS directive). Also Halide free and fully Green.
b) P: Product in Full Production, I: Device under Introduction
c) T: -40°C; +85°C — T1: -40°C; +105°C — Z: -40°C; +125°C D or T2: -40°C; +150°C.
d) One high speed 8-bit timer/counter.
e) Two High Frequency, 250kHz, PWM Outputs.
f) Only 6 ADC in PDIP packages.
g) S: software, H: hardware.

AVR for Lighting

AT90PWM devices have been specially developed to handle ballasts for High Intensity Discha
(HID) and dimmable uorescent lamps.

They feature enhanced 12-bit PWM to realize the Power Factor Correction and control the balla
With an embedded EEPROM allowing to save con guration parameters and necessary analog
functions, the microcontrollers help to reduce ballast component count and system cost.
The Digital Addressable Lighting Interface (DALI) protocol is also supported, allowing highly
exible user control.



Product	Status (a)	Flash (KB)	EEPROM (Bytes)	RAM (Bytes)	I/O pins	UART/USART	DALI	SPI	8-bit Timers	12-bit Timers	16-bit Timers	PWM (Channel)	10-bit A/D (channel)	10-bit D/A	DebugWIRE/OCD	Vcc Range (V)	Clock Speed (MHz)	Package	Pb-free, Green (b)	Temp. Range
AT90PWM1	P	8	512	512	19	1		1	1	2	1	7	8		Y	2.7 - 5.5	16	SO24	Y	-40°C to +105°C
AT90PWM2B	P	8	512	512	19	1	Y	1	1	2	1	7	8		Y	2.7 - 5.5	16	SO24	Y	-40°C to +105°C
AT90PWM3B	P	8	512	512	27	1	Y	1	1	3	1	10	11	Y	Y	2.7 - 5.5	16	SO32, QFN32	Y	-40°C to +105°C
AT90PWM81	I	8	512	256	16/20			1			1	4	11	Y	Y	2.7 - 5.5	16	SO20, QFN32	Y	-40°C to +105°C
AT90PWM216	P	16	512	1024	19	1	Y	1	1	2	1	7	8		Y	2.7 - 5.5	16	SO24	Y	-40°C to +105°C
AT90PWM316	P	16	512	1024	27	1	Y	1	1	3	1	10	11	Y	Y	2.7 - 5.5	16	QFN32, SO32	Y	-40°C to +105°C

a) Pb-free packaging complies to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green.
b) F: Future product I: Device under Introduction, P: Product in Full Production.

AVR for Battery Management

The single-chip AVR battery management products cover the 1 to 4 Li-ion cells market. They feature dedicated analog-to-digital converters tailored for battery fuel gauging and voltage monitoring. Other MCU features include independent battery protection circuitry, voltage regulators, integrated cell balancing FETs, and special high voltage I/O controlling charge and discharge.

Product	Status (a)	Li-ion cells	Flash (KB)	EEPROM (Bytes)	SRAM (Bytes)	I/O pins	FET Drive (Channel)	Vgs typ (V)	Battery Protection	12-bit A/D (Channel)	Voltage Measurement Accuracy (mV)(a)	Coulomb Counter	JTAG/OCD	Vcc Range (V)	Clock Speed (MHz)	Package	Pb-free, Green (b)	Temp. Range
ATmega8HVA	F	1-2	8	256	512	6	N	4.5	Y	5	12.5	18-bit	Y	1.8 - 9.0	4	LGA36, TSOP28	Y	-10°C to +85°C
ATmega16HVA	I	1-2	16	256	512	6	N	4.5	Y	5	12.5	18-bit	Y	1.8 - 9.0	4	LGA36, TSOP28	Y	-10°C to +85°C
ATmega406	P	2-4	40	512	2048	18	P	1		10	12.5	18-bit	Y	4.0 - 25	1	LQFP48	Y	-40°C to +85°C
ATmega4HVD	I	1	4	256	512	5	N	4.5	Y	2 (10-bit)	50		Y	2.0 - 5.5	4	DFN18	Y	-40°C to +85°C
ATmega8HVD	I	1	8	256	512	5	N	4.5	Y	2 (10-bit)	50		Y	2.0 - 5.5	4	DFN18	Y	-40°C to +85°C
ATmega16HVB	I	2-4	16	512	1024	18	N	12	Y	10	12.5	18-bit	Y	4.0 - 25	8	TSSOP44	Y	-40°C to +85°C
ATmega32HVB	I	2-4	32	1024	2048	18	N	12	Y	10	12.5	18-bit	Y	4.0 - 25	8	TSSOP44	Y	-40°C to +85°C

a) F: Future product I: Device under Introduction, P: Product in Full Production.
b) Pb-free packaging complies to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green.

MCU Wireless Solutions for IEEE 802.15.4 and ZigBee Applications

Atmel's wireless MCUs provide a complete single source for IEEE 802.15.4 and ZigBee wireless applications with its own RF tranceiver chips, AVR microcontrollers and speci c kits & tools. The radio chips feature the best link budget in the industry today and are available for the 2.4 GHz and 700/800/900 MHz ISM bands.

A rich selection of FREE software for complete system solutions supporting the Atmel chipsets is available:

– Low level drivers/ Transceiver Access Toolbox
– IEEE 802.15.4 MAC
– Wireless IPv6/ 6LoWPAN
– ZigBee and ZigBee PRO stack

Web resources: www.atmel.com/wireless

Product	Status (a)	MCU	RF Device	Flash (KB)	EEPROM (Bytes)	RAM (Bytes)	ISM Band	Bitrate	Sensitivity (dBm)	Output Power (dBm)	Vcc Range (V)	Clock Speed (MHz)	MCU Package
AT86RF230	P		AT86RF230				2,4 GHz	250 kbps	-101	-17 to +3	1.8-3.6V		QFN32
ATmega64RZA	P	ATmega644	AT86RF230	64	2K	4K	2,4 GHz	250 kbps	-101	-17 to +3	1.8-3.6V	10	TQFP44, QFN44, PDIP40
ATmega64RZAP	P	ATmega644P	AT86RF230	64	2K	4K	2,4 GHz	250 kbps	-101	-17 to +3	1.8-3.6V	10	TQFP44, QFN44
ATmega1284RZAP	I	ATmega1284P	AT86RF230	128	4K	16K	2,4 GHz	250 kbps	-101	-17 to +3	1.8-3.6V	20	TQFP44, QFN44
ATmega128RZA	P	ATmega1281	AT86RF230	128	4K	8K	2,4 GHz	250 kbps	-101	-17 to +3	1.8-3.6V	8	TQFP64, QFN64
ATmega128RZB	P	ATmega1280	AT86RF230	128	4K	8K	2,4 GHz	250 kbps	-101	-17 to +3	1.8-3.6V	8	TQFP100, CBGA100
ATmega256RZA	P	ATmega2561	AT86RF230	256	4K	8K	2,4 GHz	250 kbps	-101	-17 to +3	1.8-3.6V	8	TQFP64, QFN64
ATmega256RZB	P	ATmega2560	AT86RF230	256	4K	8K	2,4 GHz	250 kbps	-101	-17 to +3	1.8-3.6V	8	TQFP100, CBGA100

a) I: Device under Introduction, P: Product in Full Production. All products available Pb-free packaging alternative, compling to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green.

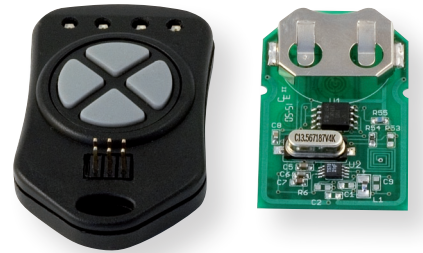
Product	Status (a)	MCU	RF Device	Flash (KB)	EEPROM (Bytes)	RAM (Bytes)	ISM Band	Bitrate (bps)	Sensitivity (dBm)	Output Power (dBm)	Vcc Range (V)	Clock Speed (MHz)	MCU Package
AT86RF231	I		AT86RF231				2,4 GHz	2 Mbps	-101	-17 to +3	1.8-3.6V		QFN32
ATmega644PR231	I	ATmega644P	AT86RF231	64	2K	4K	2,4 GHz	2 Mbps	-101	-17 to +3	1.8-3.6V	10	TQFP44, QFN44
ATmega1280R231	I	ATmega1280	AT86RF231	128	4K	8K	2,4 GHz	2 Mbps	-101	-17 to +3	1.8-3.6V	8	TQFP100, CBGA100
ATmega1281R231	I	ATmega1281	AT86RF231	128	4K	8K	2,4 GHz	2 Mbps	-101	-17 to +3	1.8-3.6V	8	TQFP64, QFN64
ATmega1284PR231	I	ATmega1284P	AT86RF231	128	4K	16K	2,4 GHz	2 Mbps	-101	-17 to +3	1.8-3.6V	20	TQFP44, QFN44
ATmega2560R231	I	ATmega2560	AT86RF231	256	4K	8K	2,4 GHz	2 Mbps	-101	-17 to +3	1.8-3.6V	8	TQFP100, CBGA100
ATmega2561R231	I	ATmega2561	AT86RF231	256	4K	8K	2,4 GHz	2 Mbps	-101	-17 to +3	1.8-3.6V	8	TQFP64, QFN64
AT86RF212	I		AT86RF212				700/800/900 MHz	1 Mbps	-110	-10 to +10	1.8-3.6V		QFN32
ATmega644PR212	I	ATmega644P	AT86RF212	64	2K	4K	700/800/900 MHz	1 Mbps	-110	-10 to +10	1.8-3.6V	10	TQFP44, QFN44
ATmega1280R212	I	ATmega1280	AT86RF212	128	4K	8K	700/800/900 MHz	1 Mbps	-110	-10 to +10	1.8-3.6V	8	TQFP100, CBGA100
ATmega1281R212	I	ATmega1281	AT86RF212	128	4K	8K	7007800/900 MHz	1 Mbps	-110	-10 to +10	1.8-3.6V	8	TQFP64, QFN64
ATmega1284PR212	I	ATmega1284P	AT86RF212	128	4K	16K	700/800/900 MHz	1 Mbps	-110	-10 to +10	1.8-3.6V	20	TQFP44, QFN44
ATmega2560R212	I	ATmega2560	AT86RF212	256	4K	8K	700/800/900 MHz	1 Mbps	-110	-10 to +10	1.8-3.6V	8	TQFP100, CBGA100
ATmega2561R212	I	ATmega2561	AT86RF212	256	4K	8K	700/800/900 MHz	1 Mbps	-110	-10 to +10	1.8-3.6V	8	TQFP64, QFN64

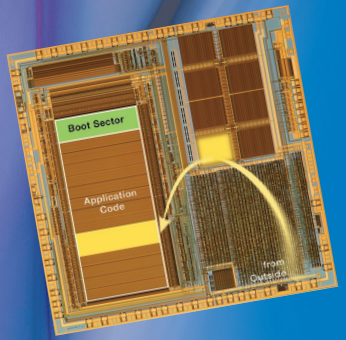
a) I: Device under Introduction, P: Product in Full Production. All products available Pb-free packaging alternative, compling to the European Directive for Restriction of Hazardous Substances (RoHS directive). Also Halide free and fully Green.

AVR for Remote Access Control

Remote Access Control (also referred to as Remote Keyless Entry and Remote Wireless Entry) is remote control of applications like doors, alarms, blinds etc. The communication is usually done via radio and the transmission uses IDs and encryption to provide authentication and prevent unauthorized users from accessing the system.
Atmel provides a complete secure solution using AVR microcontrollers, Smart RF radios, application notes and development tools.

Web resources: www.atmel.com/products/avr/rac/





AVR MCUs Are Designed to Program Themselves at Your Command

By eliminating the expensive and time-consuming steps inherent in Mask ROM-based microcontrollers, AVR slashes months from your development and production schedule. You get to market rst. Then, you get back to thinking up your next great idea.

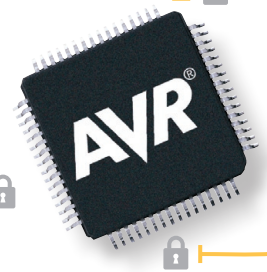
Self-Programming Flash – Key Benefits

- Reprogram without external components
- Flash sector size optimized for programming speed
- Separate protection of Boot block sector
- Application allowed to run while Self-Programming
- True 1.6 – 5.5V operation
- Easy-to-Use
- Reduced programming time
- Hardware controlled programming

Flexible Programming Implementation

Self-Program using any physical link!
– Program through any interface (e.g. SPI, TWI)
– 100% secure encrypted remote updates

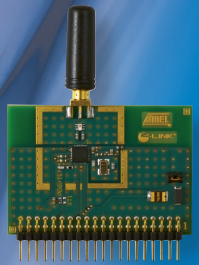
In-System Programming
– Native 2-wire PDI or 3-wire SPI interface
– Quick updates in the eld
– Easy-to-use



Parallel
– One of the fastest ways to download
– Compatible with major programmers

JTAG
– IEEE 1149.1 compliant interface
– Can program Flash, EEPROM, Fuses and Lock Bits
– On-Chip Debugging
– Boundary-scan PCB test

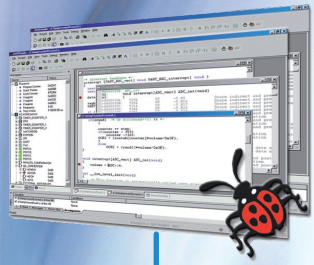
The programming channels can be disabled to avoid any further download !



Complete Tool Chain

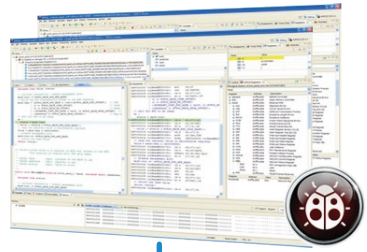
Atmel offers a high quality, easy-to-use toolchain for the whole range of AVR and AVR32 families
The completely free AVR Studio and AVR32 Studio front-end assembler and simulator integrate seam - lessly with the starter kits, programmers, debuggers, evaluation kits, and reference designs.
All created to deliver more functionality... for less.

Integrated Development Environment for AVR and AVR32



AVR Studio

- Front end for all AVR tools
- C and assembly source level debugging
- Includes Atmel macro assembler
- Supports third party compilers
- Free GCC-AVR C-compiler included
- Freely available from http://www.atmel.com



AVR32 Studio

- Front end for all AVR32 tools
- Source code editor with syntax highlighting
- Debugging and Disassembler views
- Target Control
- AVR32 GNU toolchain including GCC
- Support for writing and debugging Linux applications
- Freely available from http://www.atmel.com

Compilers

IAR Systems®
CodeVision
ImageCraft®
GCC-AVR
Rowley

Starter kits

STK500
- expansion cards
STK600
- expansion cards
STK1000
- expansion cards

Programmers

AVR Dragon
AVRISP mkII
JTAGICE mkII
AVR ONE!

Debuggers

AVR Dragon
JTAGICE mkII
AVR ONE!

Evaluation kits & Reference designs

A variety of Evaluation and Reference kits are available on www.atmel.com

Low Cost Development Tool

AVR DRAGON

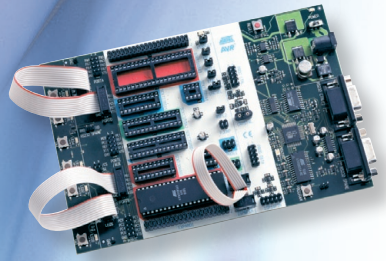
For less than $50, the AVR Dragon (ATAVRDRAGON) sets a new standard for low cost development tools.
AVR Dragon supports all programming modes for the AVR device family.
Programming Interfaces:
– In-System Programming
– High Voltage Serial Programming
– Parallel Programming
– JTAG Programming.

It also includes complete emulation support for devices with 32 KB or less Flash memory.
Emulation Interfaces
– JTAG
– debugWIRE

The AVR Dragon is USB powered and is capable of sourcing an external target.
A prototype area allows simple programming and debugging.

Starter Kits

Atmel offers a modular platform based on the STK500, providing designers an easy way to start with any AVR device and engage development activity.



STK500

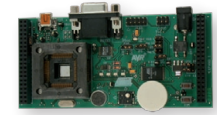
STK500 handles most tinyAVR and megaAVR microcontrollers.

- In-system and parallel programming support
- Software programmable clock sources
- LEDs and switches
- Sockets for 8- to 40-pin AVRs
- Expansion connectors for custom boards or expansion modules
- Expansion modules available from Atmel for AVRs with more than 40 pins

STK501 (For 64-pin devices)

STK503 (For 100-pin devices)

STK505 (For 14-pin devices)



STK525 (For USB devices)

STK502 (For 64-pin devices with LCD display)

STK504 (For 100-pin devices with LCD display)

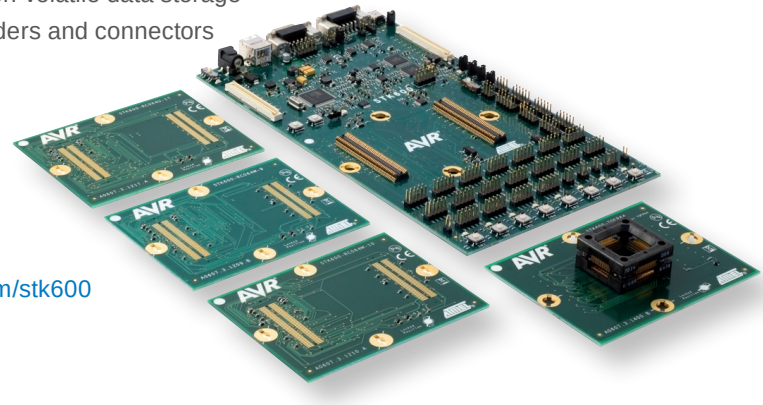
STK520 (For 24-pin and 32-pin AT90PWM devices with DALI interface)

STK524 (For 32-pin automotive devices with motor control LIN and CAN)

STK600

The STK600 is a complete starter kit and development system for the 8-bit AVR and 32-bit AVR32 Flash microcontrollers.

– AVR Studio 4 and AVR32 Studio compatible
– Flexible routing and socket card system for all supported devices
– Parallel and Serial High-Voltage Programming of AVR devices
– JTAG and Serial In-System Programming (ISP) of AVR devices
– 8 general purpose LEDs and switches
– On-board 2 Mbit Data ash for non-volatile data storage
– USB, RS232, CAN, and LIN headers and connectors
– USB or external power

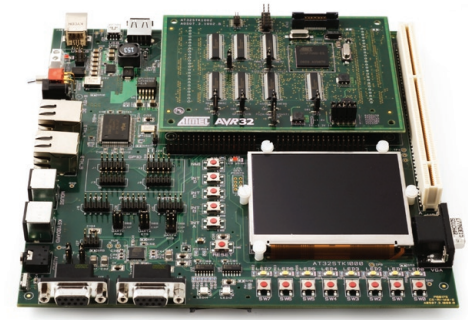


For a complete list of socket and routing cards, visit http://www.atmel.com/stk600

STK1000

STK1000 provides a complete AT32AP7000 development environment. A pre-installed Linux ensures that the user can boot and start program development directly after power up.

– AVR32 Studio compatible
– Two Ethernet Ports
– High Quality QVGA LCD
– Loadspeaker
– Connetors for USART, PS/2, VGA and USB
– SD Card Reader
– Expansion Header for Prototyping



STK1005

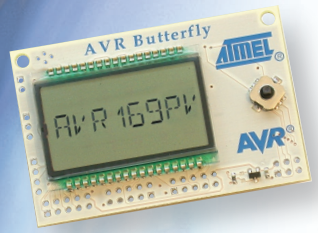
STK1005 is a CPU carrier and expansion module for the STK1000, containing the AT32AP7200 device, extra RAM and NAND Flash.

STK1006

STK1006 is a CPU carrier and expansion module for the STK1000, containing the AT32AP7000 device, extra RAM and NAND Flash.

Evaluation Kits and Reference designs

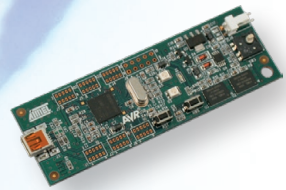
For more dedicated development needs, Atmel also offers speci c tools.



LCD Control

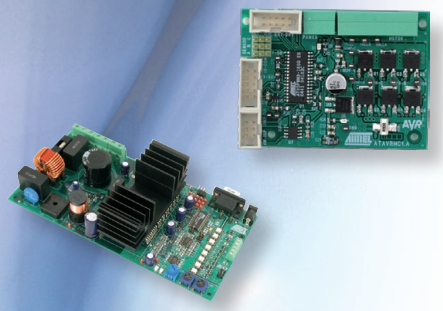
AVR Butter y (ATAVRBFLY) is an evaluation tool demonstrating the capabilities of the ATmega169.
The tool is shipped with preloaded rmware supporting temperature sensing, light measurement, voltage readings, music playback and nametag display.

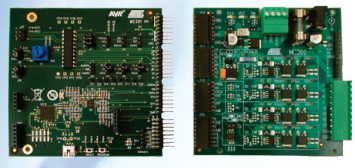
It can also be re-programmed and used as a hardware platform for code development.

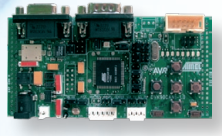


USB Connectivity

The AT90USBKey is a low-cost demonstration board based on the AT90USB1287 microcontroller.
It allows the quick evaluation of AVR microcontrollers and the AT90USB family.







Motor Control

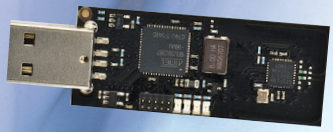
– The ATAVRMC100 kit includes an evaluation board, a 3-phase BLDC motor and a demonstration software. It allows users to quickly evaluate the capability of the AT90PWM3 to control high speed brushless DC motor applications.

– The ATAVRMC200 is an evaluation kit dedicated to asynchronous AC motor control, using various sensors for regulation. The kit includes an evaluation board and a demonstration rmware. Supporting 110-230V motors, the kit also allows evaluation of BLDC motors using the AT90PWM3 AVR microcontroller.

– The ATAVRMC320, ATAVRMC321 and ATAVRMC323 are complete hardware systems for demonstrating motor control. These kits includes the ATAVRMC300 power stage board, BLDC motor, and a processor board, ATAVRMC310 (with ATmega32M1, CAN and LIN interfaces), ATAVRMC301(with low cost ATtinyx61) and ATAVRMC303(with the high performance XMEGA) respectively.

CAN Networking

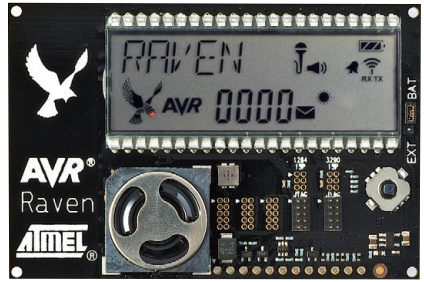
The ATDVK90CAN1 development kit is dedicated to the AT90CAN AVR microcontrollers. This stand alone board has numerous serial interfaces (dual RS232, CAN, LIN, SPI & TWI) and resources (keyboard, LEDs, voltage reading, light and temperature sensors and speaker) and comes with demonstration software.

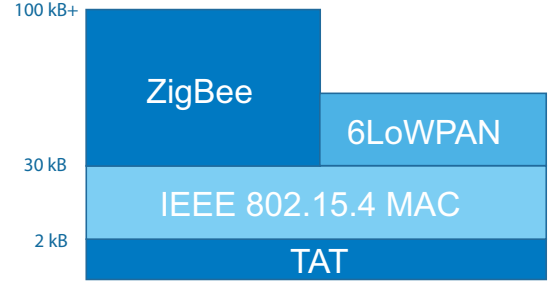


RAVEN: AVR Wireless 2.4 GHz solution

The RZ Raven kit enables development, debugging and demonstration of IEEE 802.15.4, 6LoWPAN, and ZigBee wireless networks. Raven is using Atmel's AT86RF230 2.4 GHz high performance RF tranceiver and AVR picoPower and USB microcontrollers. The ATAVRRZRAVEN kit comes with two Ravens and one RZ USB Stick.

Atmel MCU Wireless Solution offers exibility through the AVR family of 8-bit RISC microcontrollers, AVR32 32-bit microcontrollers, and the Smart ARM (SAM) devices. AVR MCUs have ash memory densities rang ing from 1 KB to 512 KB, and a suite of free and certi ed software is available for you, ranging from low level drivers (Transceiver Access Toolbox) to IEEE 802.15.4 MAC, 6LoWPAN, and ZigBee PRO stacks. Choosing Atmel and partners gives you a head start with ready to use wireless solutions and the shortest time to market!



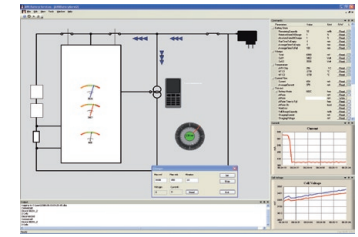


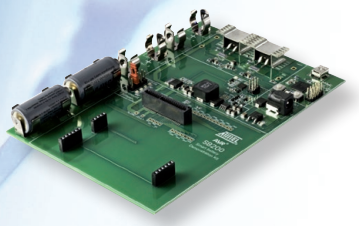
Battery Management Development Platform

Atmel's battery management reference designs show how to get the most out of the AVR battery management devices. The rmware provides all needed safety measures for a Lithium-ion battery design. This includes over- and undervoltage protection and protection against excessive charge and discharge currents. The reference designs also features:

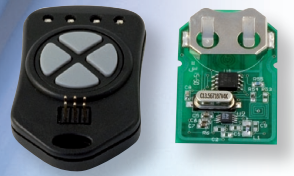
- High accuracy voltage and current measurements
- Gas gauging
- Temperature checks
- AES based authentication
- SHA2 based authentication
- Command set based on SMBus™ speci cation

Reference design	Device	#cells
ATAVRSB201	ATmega8HVA - ATmega16HVA	1-2
ATAVRSB202	ATmega16HVB - ATmega32HVB	2-4
ATAVRSB204	ATmega4HVD - ATmega8HVD	1
ATAVRSB206	ATmega406	2-4



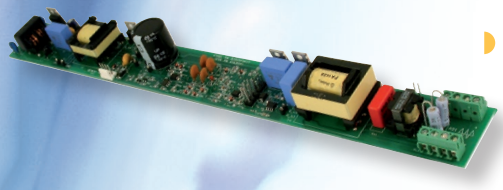


The ATAVRSB200 evaluation kit includes Lithium-ion batteries, a programmable charger and load, and a USB communication gateway. The SB200 connects to AVR Studio® by starting the AVR battery management services plug-in. Through this interface all battery parameters can be observed and modi ed, and the ATAVRSB200 functions are also controlled through this interface.



Remote Access Control

The ATAKSTK512 is an Remote Access Control kit for unidirectional communication.
The kit contains a functional standalone UHF radio system consisting of a transmitter (ATtiny45 + T575x) and receiver (ATA5743), and Interface Board.
The STK512 starter kit is available in 2 different versions covering 315 MHz or 434 MHz.



Lighting

The ATAVRFBKIT is a Dimmable Fluorescent Ballast kit which demonstrate the ability of the AT90PWM2 to control all the main functions of a DALI Fluorescent Ballast. C code is provided to speed-up development time.

EVK1100

The EVK1100 is an evaluation kit and development system for the AVR32 AT32UC3A microcontrollers. It is equipped with a rich set of peripherals, memory, and makes it easy to try the full potential of the AVR32 devices.

EVK1101

The EVK1101 is an evaluation kit and development system for the AVR32 AT32UC3B microcontroller. It is equipped with a rich set of peripherals, memory, and makes it easy to try the full potential of the AVR32 devices.

EVK1104

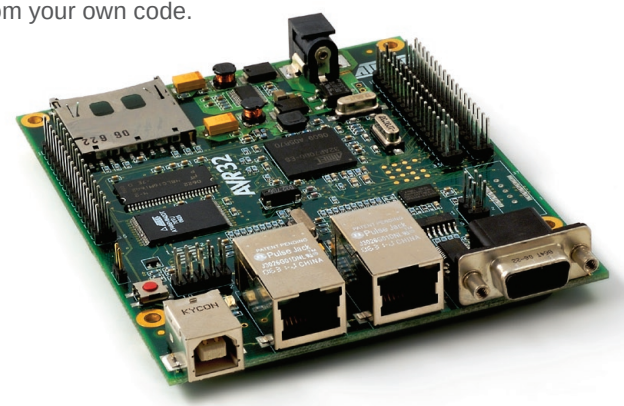
The EVK1104 is an evaluation kit for the AVR32 AT32UC3A3 which combines Atmel's state of art AVR32 microcontroller with an unrivalled selection of communication interface like USB device including On The-Go functionality, SDcard, NAND ash with ECC and stereo 16-bit DAC.

EVK1105

The EVK1105 is an evaluation kit for the AVR32 AT32UC3A0512 which demonstrates Atmel's state-of-the-art AVR32 microcontroller in Hi-Fi audio decoding and streaming applications. The kit contains refer ence hardware and software for generic MP3 player docking stations.

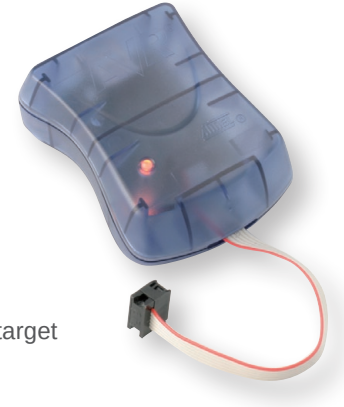
NGW100 Network Gateway

The NGW100 uses the AT32AP7000 which combines Atmel's state of the art AVR32 AP7000 Applica tion Processor with an unrivalled selection of communication interfaces. The NGW100 is also an ideal development board for the AT32AP7000. All reources are available , and it supports communication on any of the device's communication interfaces. The board is preloaded with Linux and shipped with I/O interface drivers that can be called from your own code.



In-System Programmers

- **AVRISP mkII**
  - – Supports In-System Programming on all 8-bit AVRs
  - – Interfaces with AVR Studio
  - – Improved level converters
  - – Supports all AVR target voltages
  - – Target interface protection
  - – Fast programming
  - – USB 1.1 interface to PC
  - – Powers directly from USB, does not draw current from target



- **JTAGICE mkII**
  - – This powerful AVR debug tool can also be used for In-System Programming.
  - – Supports programming via JTAG and ISP.

Debugging Solutions

JTAGICE mkII

– Real-Time emulation in actual silicon
  - Debug the real device at the target level
  - Communicates directly to the device through
    4-pin JTAG interface
    One-wire debugWIRE interface

– Supports
  Program breakpoints
  Data breakpoints
  Full I/O view and watches
  Full execution control

AVR ONE!

The AVR ONE! is a powerful development tool for on-chip debugging and programming of AVR devices.

Suppported debug interfaces are JTAG (IEEE 1149.1), debugWire, PDI and the Nexus (IEEE-ISTO 5001(TM)-2003) auxiliary interface for high-speed trace.

Supported programming interfaces are ISP, JTAG and PDI.

Support & Contact

Atmel provides extensive support to 8-bit AVR and 32-bit AVR32 MCUs/DSPs through its sales of ces and network of representatives and distributors.

Atmel's dedicated technical staff as well as certi ed AVR consultants are available to help and support customer projects.

Atmel.com web site and other web resources from AVR community provide a huge amount of product literature, application notes, tools information and other technical advises. FAQs and community forums also offer a dynamic knowledge resource for AVR and AVR32.

http://www.atmel.com/avr
http://www.atmel.com/avr32

Selection Guides, Data Sheets and Errata Sheets

Application Notes and Reference Library

Atmel and Third Party Tools

Software, User Guides

Consultants, Distributors and Atmel Representatives

http://support.atmel.no

Of cial Atmel MCU technical support center with FAQ and email noti cation service

http://www.avrtv.com

Of cial AVR podcasts

http://www.avrfreaks.net

AVR Experts Discussion Forum

Selection Guides for Tools and Products,

Third Party Tools Information, FAQs

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Fax: (81) 3 - 3523 - 7581

Literature Requests
www.atmel.com/literature

Website
www.atmel.com

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