

ASIC SOLUTIONS

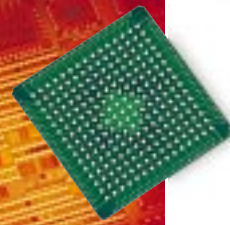
ATMEL

DELIVERS

SYSTEM

LEVEL

INTEGRATION



Atmel Corporation is a leading manufacturer of nonvolatile memory, microcontrollers, logic programmable ICs and application specific circuits. Our strategy is to develop products - which leverage our patented position in nonvolatile memory - that can provide customers a competitive edge.

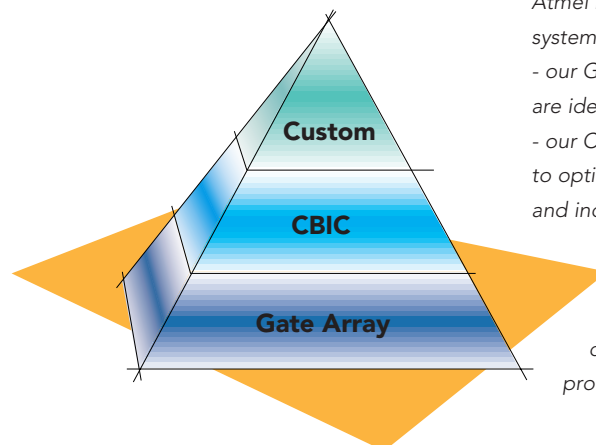
Headquartered in San Jose, California, Atmel operates fabs in Colorado Springs, USA, Nantes and Rousset, France and Heilbronn, Germany.

You want system level integration? Atmel has the building blocks you need.

Start with the brains of the system. It's waiting for you in our wide range of microcontroller and DSP cores. Next, the memory. No one knows nonvolatile memory like Atmel. We can easily integrate EEPROM or Flash Memory blocks on a chip for you. Must connect? We have all the standard interfaces you need. Need to mix analog with digital modes? Our experts are tops at helping you find the solution.

It all adds up to an optimized production in silicon area, cost, operating speed, power consumption and time-to-market. The bottom line for you is low unit prices in volume production.

To create this sophisticated mix of system-on-silicon solutions, Atmel supports design flows on leading industry-standard EDA tools. For production, choose from a wide range of screening flows, including automotive and military, and packaging from simple DILs to the latest ball grid array and chip scale packages.



Atmel has ASIC products for every system level integration requirement:

- our Gate Arrays or Embedded Arrays are ideal for fast time-to-market
- our Cell Based ICs (CBICs) allow you to optimize silicon area and speed, and incorporate our patented analog technology
- if you require the ultimate in customization, or BiCMOS or SiGE technology, we can provide a full custom solution.

Digital Input/Output Pads

a wide choice of CMOS and TTL-compatible input, output, tri-state and bi-directional cells.

Memory Blocks

EEPROM and Flash Memory, SRAM (single-port, dual-port and FIFO) and ROM.

APPLICATION SPECIFIC SYSTEMS

Embedded Microcontroller and DSP Cores

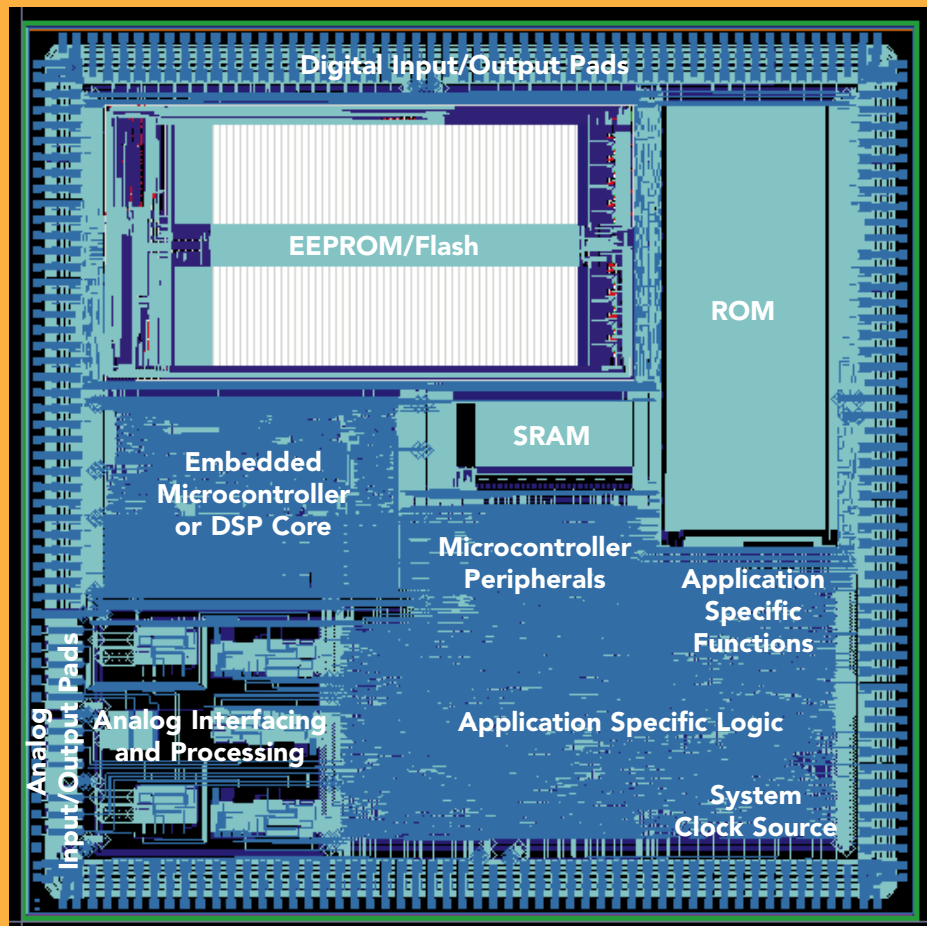
Atmel offers many choices including the OakDSPCore™, Lode™ DSP Core, FC16 DSP Core, ARM7TDMI™ (ARM Thumb), AVR®, and 8032- and 8051-compatible devices as well as an RSA encryption co-processor.

Microcontroller Peripherals

a wide range of standard microcontroller peripherals as on-chip macrocells, including an AVR and an ARM7 bus-compatible series.

Application Specific Functions

these include the USB, PCI, CAN, Ethernet MAC, PCMCIA, I²C, JPEG, MPEG2 and a range of industry-standard interfaces.



Analog Interfacing and Processing

some of the highest specification cells in the industry, including application-specific cells custom-designed for your system (e.g: voice and multimedia codec, IQ modem...).

Analog Input/Output Pads

linking your system to the real world.

Application Specific Logic

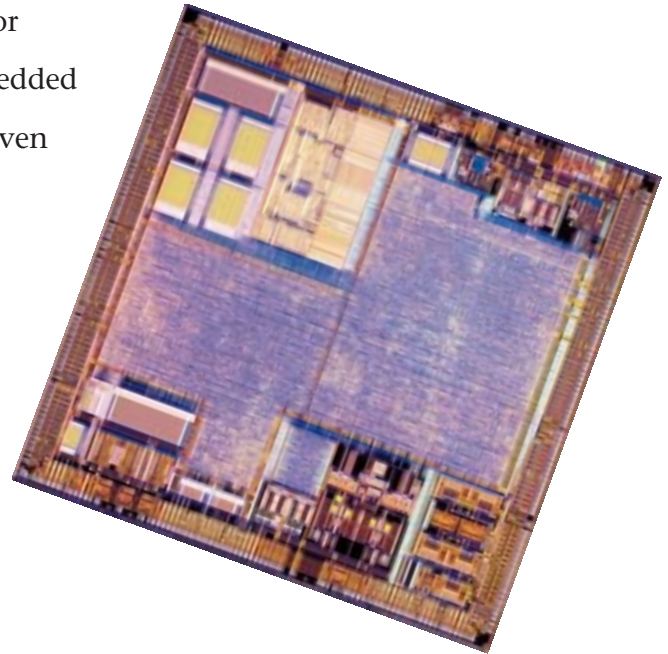
an extensive range of standard logic cells.

System Clock Source

high-performance oscillators, PLL and power-on-reset cells.

An embedded microcontroller or DSP core gives your system-on-chip power and flexibility. Power from advanced processor architectures. Flexibility from in-system programming. For your application choose an embedded microcontroller, a DSP core, or even a combination of each.

Atmel's extensive choice runs from the powerful 8-bit AVR® to the high-performance 32-bit ARM7TDMI™. All feature minimal power consumption and reduced silicon area to keep costs down.

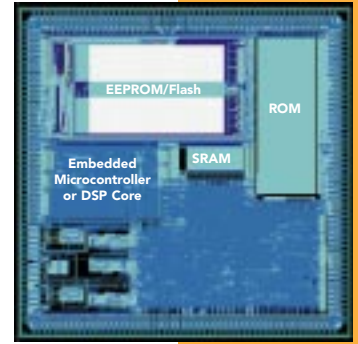


MICROCONTROLLER AND DSP CORES

Core	Description
OakDSPCore™	16-bit DSP core
Lode™ DSP Core	16-bit DSP core with dual MACs
FC16 DSP Core	16-bit DSP core
ARM7TDMI™	ARM7 Thumb 16/32-bit RISC microcontroller core
AVR®	8-bit RISC microcontroller core
AT8032	8-bit microcontroller core, compatible with industry-standard 8032 device
AT8051	8-bit microcontroller core, compatible with industry-standard 8051 device
RSA	RSA encryption co-processor

MICROCONTROLLER AND DSP CORES

MEMORY BLOCKS



No one anywhere sells more EEPROMs than Atmel and we're one of the world's top three Flash manufacturers. Our EEPROM and Flash memories offer fast access times and low current consumption during programming, erase and read cycles. And we're experts at integrating EEPROM and Flash into single-chip solutions.

Want to reprogram? It's simply done with these single-voltage devices. Eliminate time consuming and costly respins for mask ROM changes or the inflexibility of OTP.

Atmel offers ROM as well as single-port, dual-port RAM or FIFOs. All are easily integrated on-chip.

The Atmel Memory compilers eliminate redundant address space yielding optimum memory capacity. All Atmel SRAM and ROM blocks can be constructed with an associated built-in self-test (BIST) circuit.

We have the know-how to design memory blocks for your exact specifications.

Only Atmel can take the same blocks of Flash and EEPROM used in standard products and incorporate them into ASICs. As embedded memory blocks, they can be programmed, written and read identically to the discrete memories.

MEMORY BLOCKS

EEPROM and Flash

Cell	Size
EEPROM Blocks	up to 2 Mbit
Flash Memory Blocks	up to 16 Mbit
Combined EEPROM / Flash Memory Blocks	e.g: 512 Kbit EEPROM + 1 Mbit Flash

RAM and ROM

Cell	Size
SRAM	up to 1 Mbit
ROM	up to 8 Mbit
Dual-port RAM	up to 512 Kbit
FIFO	up to 512 Kbit

Atmel has everything you need to complete your ASIC. Our clock source, clock buffer and system reset cells keep your system synchronous.

Our wide range of industry-standard microcontroller peripherals and interface modules take care of all your system's communication requirements.

Our extensive libraries of standard logic cells allow you to construct your own application-specific blocks. Atmel also offers a multiplier generator to quickly and precisely adjust to your system data bus width. Atmel input/output cells include CMOS and TTL-compatible input, output, bi-directional and tri state cells. A low slew-rate option minimizes noise.

MICROCONTROLLER PERIPHERALS

Core	Description
ARM7-Compatible Peripherals	DMA Controller, Interrupt Controller, Watchdog Timer, Timer Counter, USART...
AVR Peripherals	Interrupt Controller, Watchdog Timer, Timer Counter, UART...
Programmable USART	8251-compatible and 16450-compatible devices
Real Time Clock	146818-compatible
Programmable Interrupt Controller	8259-compatible
Programmable Peripheral Interface	8255 standard with three 8-bit ports
Extended Programmable Interval Timer	8254-compatible with three independent 16-bit counters
Serial Communication Controller	82530-compatible
DMA Controller	8237-compatible with four independent Direct Memory Access (DMA) channels



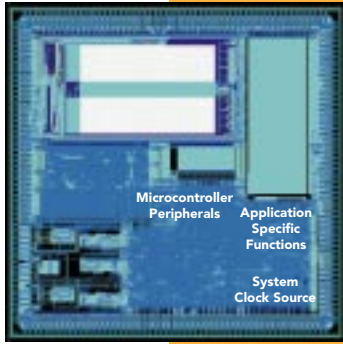
SYSTEM CLOCK SOURCES

Cell	Description
Oscillators	Crystal Oscillators
PLLs	Phase-Locked Loop cells
POR	Power-On-Reset cells

MICROCONTROLLER PERIPHERALS

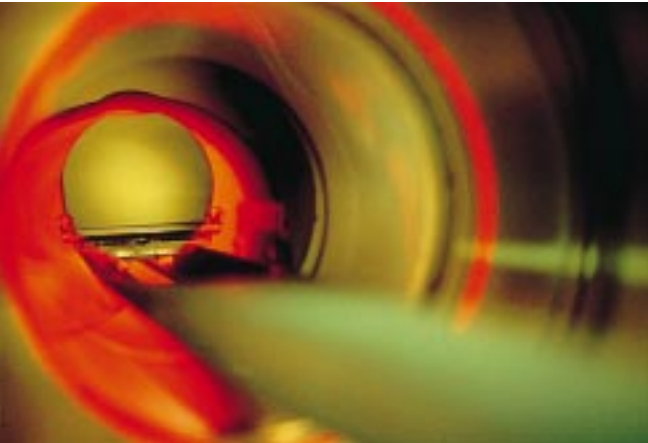
APPLICATION SPECIFIC FUNCTIONS

SYSTEM CLOCK SOURCE



Atmel's compact, highly functional cells are all characterized on silicon before release. Datasheet parameters and simulation model timings are verified against actual silicon

performance. Thanks to migration through silicon process evolutions, your designs take advantage of process developments without extensive re-engineering.



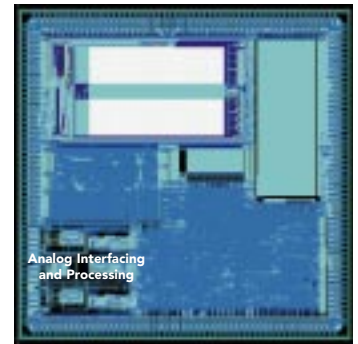
APPLICATION SPECIFIC FUNCTIONS

Core	Description
USB	Universal Serial Bus
Ethernet MAC	Ethernet Media Access Controller
PC Card Bus (PCMCIA)	Personal Computer Memory Card Industry Association
PCI	Peripheral Component Interconnect
I ² C	Inter-Integrated Circuit Bus
JPEG	Joint Picture Expert Group
MPEG2	Moving Picture Expert Group
CAN	Controller Area Network

Atmel's lead in mixed-mode analog/digital CBIC technology provides a key competitive edge for system level integration. Many of our advanced analog cells carry patents. We offer current mode operation for very high frequencies. Our switched current mode makes it possible to use standard CMOS processes for fabrication.

You may well find just the cells you need in our basic analog library. A range of the most-required cells is available on quick turnaround times. Atmel's Basic Analog Library includes analog-to-digital and digital-to-analog

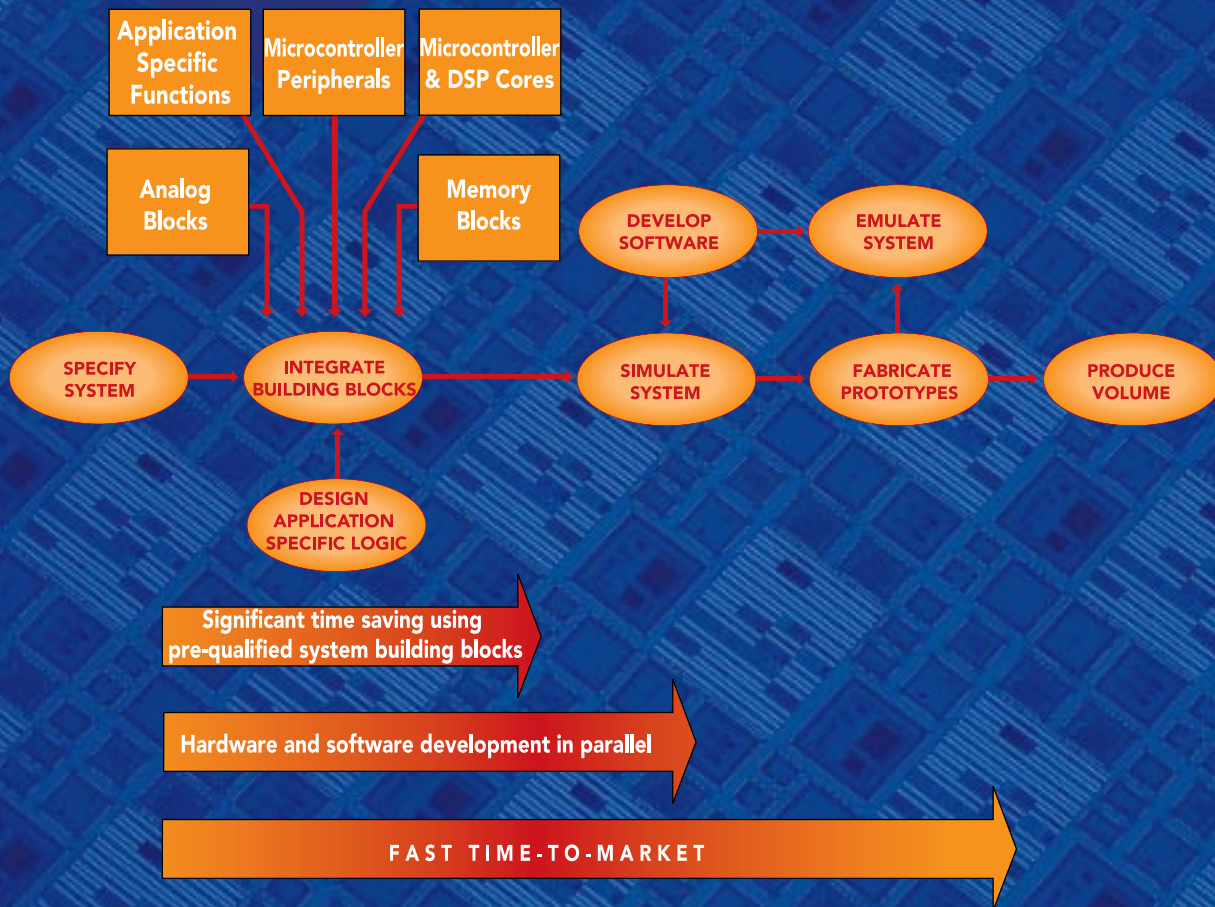
converters, multiplexers, operational amplifiers, comparators and voltage references.



For CBIC and custom ASIC, the Atmel Application Specific Cell Service stands ready to design cells to your precise requirements. We can customize library cells or start from scratch. Our aim is to ensure that you get the cells you need when you need them. We qualify customized cells on the same basis as library cells and integrate them into your EDA tools.

KEY ANALOG CELLS

Cell	Function
VC01	Voice-band linear audio codec
MC01	Multimedia codec
IQDAC	Low-power I/Q digital-to-analog interface
Data Codec	Data Codec for Modem applications
A/D Converters	High accuracy (up to 18 bits), high speed (up to 54 MHz), low power ...
D/A Converters	High accuracy (up to 18 bits), high speed (up to 160 MHz), low power ...
COMP, MUX, OPAMP	A wide range of comparators, multiplexers and operational amplifiers
VREF	Bandgap voltage reference, voltage regulator, trimming voltage reference
LCD Drivers	Liquid Crystal Display Drivers



Time-to-market can make the difference between a trail-blazing product, where the sky's the limit, and a me-too substitute.

Atmel's system building blocks save you time where it counts: between system specification and production roll-out.

The blocks are pre-qualified for rapid integration. You can develop system hardware and software concurrently. This brings product revenue on-stream fast, and maybe first.

Atmel employs a broad range of silicon process technologies to manufacture your ASIC.

We have a decade of experience in high volume production of ASICs incorporating EEPROM and/or Flash memory.

Atmel ASICs are manufactured using one of these leading-edge wafer process technologies:

Description	Gate Array	CBIC	Full Custom Availability
0.8µm 3-layer metal BiCMOS, 1.8V-5.0V			✓
0.8µm 3-layer metal Bipolar, 12V			✓
0.8µm 2-layer metal SiGe, 50V			✓
0.8µm 2-layer metal SiGe, 30/50 GHz			✓
0.6µm 3-layer metal CMOS, 2.0V-5.0V	ATL60		
0.6µm 2-layer metal CMOS with embedded EEPROM, 2.0V-5.0V	ATL60/E ²		
0.5µm 3-layer metal CMOS, 3.3V	ATL50	ATC50	✓
0.5µm 3-layer metal CMOS with embedded EEPROM, 3.3V	ATL50/E ²	ATC50/E ²	✓
0.35µm 3/5-layer metal CMOS, 3.3V	ATL35	ATC35	✓
0.35µm 3/5-layer metal CMOS with embedded EEPROM, 3.3V	ATL35/E ²	ATC35/E ²	✓
0.35µm 3/5-layer metal CMOS with embedded Flash, 3.3V	ATL35/Flash	ATC35/Flash	✓
0.25µm 3/5-layer metal CMOS, 2.5V	ATL25	ATC25	✓
0.25µm 3/5-layer metal CMOS with embedded EEPROM, 2.5V	ATL25/E ²	ATC25/E ²	✓
0.25µm 3/5-layer metal CMOS with embedded Flash, 2.5V	ATL25/Flash	ATC25/Flash	✓

What do you need in an application specific system? The best microcontroller? We've got it. EEPROM and/or Flash memory? We're world leaders. High-performance analog? We deliver. And we're experts at building all the elements you need onto one chip. Let us show you for your next product...



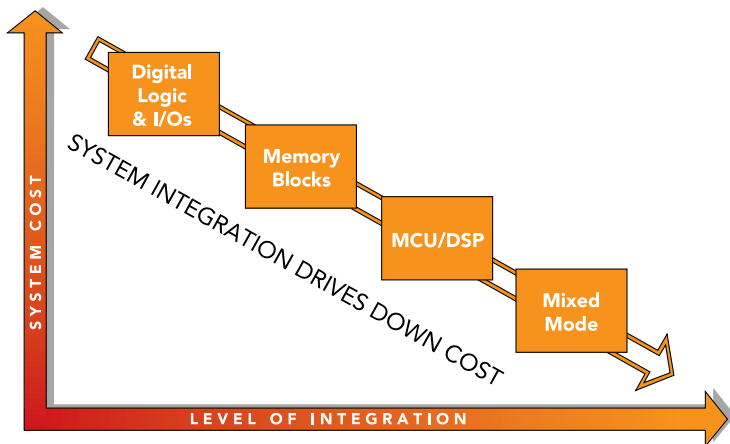
Modem



CD-ROM
Reader



Printer

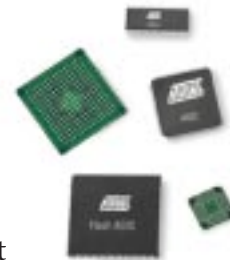


Atmel is committed to ASIC, and we're working to drive down your system cost.

Want to apply all this expertise in microcontrollers, memory and mixed-mode technology and manufacturing to your next product?

Just call your nearest Atmel Sales Office. You talk. We listen to your needs and fill them.

Be sure to visit our Web site at <http://www.atmel.com> for the latest information.



It all adds up to maximum integration at a minimum risk. Use Atmel's building blocks and experienced design teams to create highly-integrated systems on-chip.



Radio Handset



Pager



Personal Digital Assistant



Cellular Phone



Corporate Headquarters

2325 Orchard Parkway
San Jose, CA 95131
TEL (408) 441-0311
FAX (408) 487-2600

Europe

Atmel U.K., Ltd.
Coliseum Business Centre
Riverside Way
Camberley, Surrey GU15 3YL
England
TEL (44) 1276-686677
FAX (44) 1276-686697

Asia

Atmel Asia, Ltd.
Room 1219
Chinachem Golden Plaza
77 Mody Road
Tsimshatsui East
Kowloon, Hong Kong
TEL (852) 27219778
FAX (852) 27221369

Japan

Atmel Japan K.K.
Tonetsu Shinkawa Bldg., 9F
1-24-8 Shinkawa
Chuo-ku, Tokyo 104-0033
Japan
TEL (81) 3-3523-3551
FAX (81) 3-3523-7581

Atmel Operations

Atmel Colorado Springs
1150 E. Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906
TEL (719) 576-3300
FAX (719) 540-1759

Atmel Rousset

Zone Industrielle
13106 Rousset Cedex, France
TEL (33) 4 42 53 60 00
FAX (33) 4 42 53 60 01

Fax-on-Demand

North America: 1-(800) 292-8635
International: 1-(408) 441-0732

e-mail

literature@atmel.com

Web Site

<http://www.atmel.com>

Bulletin Board Service

1-(408) 436-4309

© Atmel Corporation 1999.

Atmel Corporation makes no warranty for the use of its products, other than those expressly contained in the Company's standard warranty which is detailed in Atmel's Terms and Conditions located on the Company's web site. The Company assumes no responsibility for any errors which may appear in this document, reserves the right to change devices or specifications detailed herein at any time without notice, and does not make any commitment to update the information contained herein. No licenses to patents or other intellectual property of Atmel are granted by the Company in connection with the sale of Atmel products, expressly or by implication. Atmel's products are not authorized for use as critical components in life support devices or systems.

1176B—3/99/12M