

AT91 ARM THUMB MICROCONTROLLERS

The best combination of low-power consumption, 32-bit performance and 16-bit system cost.



Image: Studio Cadraghe/Postscriptum

The AT91 Product Family

- **System level integration on a standard product:**
 - Market-leading ARM7TDMI™ 32-bit RISC processor core
 - Optimal combination of large SRAM, ROM and Flash memories
 - Wide choice of on-chip peripherals
 - Analog functions: 10-bit ADC/DAC
 - Low risk, low cost, rapid time-to-market
- **High performance for compute-intensive applications:**
 - On-chip 32-bit architecture
 - 3-stage instruction pipeline for high instruction throughput
 - Single-cycle memory access via EBI
 - Hardware multiplier-plus-barrel shifter gives DSP capability
 - PDC channels (on-chip DMA) free the processor for the application
- **Low power for hand-held applications:**
 - ARM7TDMI processor is industry leader in MIPS/Watt
 - Advanced power management provides idle mode and disables clocks on unused peripherals
- **Optimized for real-time applications:**
 - Low-latency Advanced Vectored Interrupt Controller
 - Banked registers for separate stacks and call/returns in interrupt modes
 - Wide choice of Real Time Operating Systems
- **Extensive application development tools and support for rapid, low-risk software development**
- **Widely used in:**
 - Mobile phone accessories
 - Networking (Ethernet, Bluetooth™ systems, etc.)
 - GPS, PDA and MP3 players
 - Internet appliances
 - Fingerprint recognition
 - Telecom linecards, base stations and modems
 - Medical applications



Corporate Headquarters

2325 Orchard Parkway
San Jose, CA 95131
USA
Tel: (+1) (408) 441-0311
Fax: (+1) (408) 436 4200

Europe

Atmel SarL
Route des Arsenaux 41
Casa Postale 80
CH-1705 Fribourg
Switzerland
Tel: (+41) 26-426-5555
Fax: (+41) 26-426-5500

Asia

Atmel Asia Ltd
Room 1219
Chinachem Golden Plaza
77 Mody Road
Tsimshatsui East, Kowloon
Hong Kong
Tel : (+852) 272 19 778
Fax : (+852) 272 21 369

Japan

Atmel Japan KK
Tonetsu Shinkawa Bldg, 9F
1-24-8 Shinkawa
Chuo-Ku, Tokyo 104-0033
Japan
Tel : (+81) 3 3523 3551
Fax : (+81) 3 3523 7581

E-mail

literature@atmel.com

Web Site

<http://www.atmel.com>



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Atmel's AT91 series provides the optimal combination of processing power, on-chip peripherals and memory blocks for demanding real-time applications that require high performance on a tight power budget. Its wide range of Real Time Operating Systems and sophisticated application development tools minimize the risk and time taken to bring new applications to the market. As a standard product it eliminates the cost and risks of custom IC development. However its modular design means that application-specific variants can be rapidly developed.

Part Number	FLASH (Bytes)	Mask ROM (Bytes)	SRAM (Bytes)	Multi-Processor I/F	16-bit Timers	SPI + PDC	USART + PDC	10-bit ADC	10-bit DAC	RTC	I/O Pins	Vcc (V)	Max Clock Speed (MHz)	Package(s)
AT91M40800	-	-	8K	-	3	-	2	-	-	-	81	1.8-3.6	40	TQFP100
AT91F40816	2M	-	8K	-	3	-	2	-	-	-	85	2.7-3.6	40	BGA120
AT91R40807	-	-	136K	-	3	-	2	-	-	-	81	1.8-3.6	40	TQFP100
AT91FR4081	1M	-	136K	-	3	-	2	-	-	-	85	2.7-3.6	40	BGA120
AT91R40008	-	-	256K	-	3	-	2	-	-	-	81	1.65-3.6	66	TQFP100
AT91M40807	-	128K	8K	-	3	-	2	-	-	-	81	1.8-3.6	40	TQFP100
AT91M43300	-	-	3K	-	6	1	3	-	-	-	115	2.7-3.6	25	BGA144
AT91M63200	-	-	2K	y	6	1	3	-	-	-	144	2.7-3.6	25	TQFP176
AT91M42800A	-	-	8K	-	6	2	2	-	-	y	108	2.7-3.6	33	TQFP144 BGA144
AT91M55800A	-	-	8K	-	6	1	3	8	2	y	137	2.7-3.6	33	TQFP176 BGA176
AT91RM3400	-	256K	96K	-	6	1	4	-	-	y	100	1.65-3.6	66	TQFP100

AT91 Architecture

The AT91 series is built around the industry-leading ARM7TDMI 32-bit RISC processor core. Variants in the product range provide the optimal combination of memory - SRAM, ROM or Flash - for each application. The External Bus Interface provides a rapid, flexible means of connecting additional memory and application-specific peripheral devices.

Two key features significantly enhance the AT91's real-time performance. The **Advanced Interrupt Controller** substantially reduces the processor overhead in handling internal and external interrupts.

The multiple **Peripheral Data Controller** channels allow blocks of data to be transferred directly between memory and serial peripherals without processor intervention.

The peripherals are configurable, and easily programmable. The extensive range includes a full-duplex USART, an SPI operating in master or slave mode, and a Timer/Counter providing frequency measurement, event counting, interval measurement, PWM, etc.

Power Management

The Advanced Power Management system ensures that power consumption is kept to a minimum under all conditions of operation. The processor can be put in idle mode, and individual peripherals can be disabled if they are not used. The fully static design means that the clock can be run extremely slowly, down to zero Hertz if necessary, to reduce power consumption to an absolute minimum.

AT91 Development Tools

Atmel's AT91 series microcontrollers are fully supported by state-of-the-art development tools including C-compilers, Assemblers, Real Time Operating Systems and software debug tools. These are provided by accredited third-party suppliers. Low-cost evaluation kits are available for the entire AT91 range. These kits provide convenient entry points for application developers.

