

## Features

### General

- High-performance, Low-power secureAVR™ Enhanced RISC Architecture
  - 135 Powerful Instructions (Most Executed in a Single Clock Cycle)
- Low Power Idle and Power-down Modes
- Bond Pad Locations Conforming to ISO 7816-2
- ESD Protection to  $\pm 4000V$
- Operating Ranges: 1.62 to 5.5V
- Compliant with GSM, 3GPP and EMV 2000 Specifications; PC Industry Compatible
- Available in Wafers, Modules, and Industry-standard Packages

### Memory

- 288K Bytes of ROM Program Memory
- 144K Bytes of EEPROM, Including 128 OTP Bytes and 384-byte Bit-addressable Area
  - 1 to 128-byte Program / Erase
  - 1 ms Program / 1 ms Erase
  - Typically More than 500,000 Write/Erase Cycles at a Temperature of 25°C
  - 10 Years Data Retention
- EEPROM Erase Only Mode
- Write EEPROM With or Without Autoerase
  - Bit-write Mode (Optional)
  - Full or Partial Page Erase Mode (Optional)
  - Block Erase Mode (Optional)
- 6K Bytes of RAM

### Peripherals

- One ISO 7816 Controller
  - Up to 625kbps at 5 MHz
  - Compliant with T=0 and T=1 Protocols
- One I/O Port
- Programmable Internal Oscillator (Up to 20 MHz on ROM)
- Two 16-bit Timers
- Random Number Generator (RNG)
- 2-level, 7-vector Interrupt Controller
- Hardware DES and Triple DES (DPA Resistant)
- Checksum Accelerator
- CRC 16 Engine (Compliant with ISO/IEC 3309)

### Security

- Dedicated Hardware for Protection Against SPA/DPA Attacks
- Protection Against Physical Attack
- Environmental Protection Systems
- Voltage Monitor
- Frequency Monitor
- Light Protection
- Secure Memory Management/Access Protection (Supervisor Mode)

### Development Tools

- Voyager Emulation Platform (ATV2 Standard) to Support Software Development
- IAR Embedded Workbench® V3.20c Debugger or Atmel's AVR Studio® Version 4.07 or Above
- Software Libraries and Application Notes



## Secure Microcontroller for Smart Cards

## AT90SC 288144RT Summary

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Note: This is a summary document. A complete document will be available under NDA. For more information, please contact your local Atmel sales office.

## Description

The AT90SC288144RT is a low-power, high-performance, 8/16-bit microcontroller with flexible ROM program memory, EEPROM data memory, based on the secureAVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the AT90SC288144RT achieves throughputs close to 1 MIPS per MHz. Its Harvard architecture includes 32 general-purpose working registers directly connected to the ALU, allowing two independent registers to be accessed in one single instruction executed in one clock cycle.

The AT90SC288144RT uses the secureAVR that allows the linear addressing of up to 8M bytes of code and up to 16M bytes of data as well as a number of new functional security features.

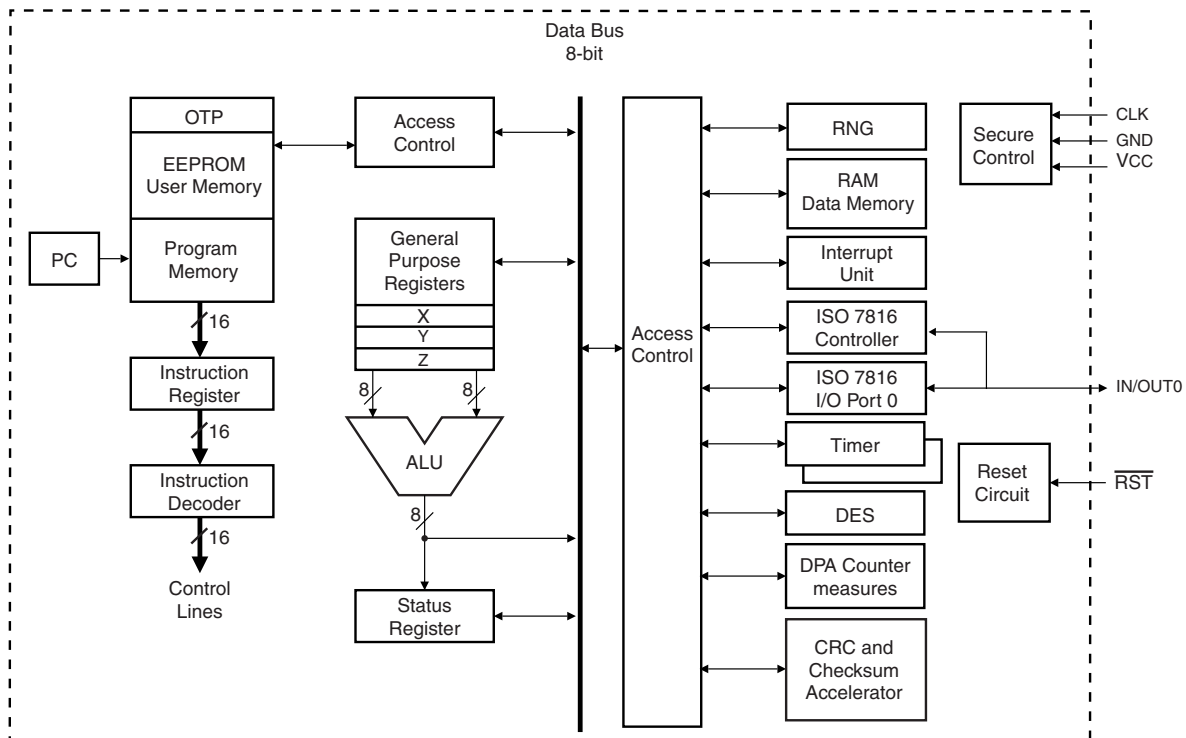
The ability to map the EEPROM in the code space allows parts of the program memory to be reprogrammed in-system. This technology combined with the versatile 8/16-bit CPU on a monolithic chip provides a highly flexible and cost-effective solution to many smart card applications.

The AT90SC288144RT benefits of advanced EEPROM functions (XP Mode), but can also be configured to offer compatibility with modes from previous product generations.

Additional security features include power and frequency protection logic, logical scrambling on program data and addresses, Power Analysis countermeasures and memory accesses controlled by a supervisor mode.

A block diagram of the AT90SC288144RT is shown in Figure 1.

**Figure 1.** AT90SC288144RT secureAVR Enhanced RISC Architecture





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### Literature Requests

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

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