Features

General

- High-performance, Low-power secureAVR® Core Enhanced RISC Architecture
  - 135 Powerful Instructions (Most Executed in a Single Clock Cycle)
- Low-power IDLE and LPW Modes
- Bond Pad Locations Conforming to ISO 7816-2
- ESD Protection to ± 6000V on ISO pins, ± 4000V on RF pins
- Operating Ranges: from 2.70V to 5.50V
- Compliant with EMV 2000 Specifications
- Compliant with ICAO ePassport Specifications (BAC, AA) and new European ePassport Specification (EAC)
- Available in Wafers, Modules, Contactless Modules or Inlays, and Industry-standard Packages
- Compatible with Printed Antennas (losses from 10 to 20 Ohms)

Memory

- 288K Bytes of ROM Program Memory Including 32K Bytes with Specific Access
- 80K Bytes of EEPROM, Including 128 OTP Bytes and 384 Bit-addressable Bytes
  - 1 to 128-byte Program/Erase
  - 1.5ms Program, 1.5ms Erase
  - Fast Personalization Mode (1.5ms)
  - Endurance: 500,000 Write/Erase Cycles at 25°C (Please refer to “Atmel SMS Reliability Manual”)
  - 10 Years Data Retention
- 8K Bytes of RAM Memory

Peripherals

- One I/O Port
- One ISO 7816 Controller
  - Up to 625 kbps at 5 MHz
  - Compliant with T = 0 and T = 1 Protocols
- Programmable Internal Oscillator
  (Up to 30 MHz for AdvX™ and internal CPU Clock)
- Three 16-bit Timers
  (One in contact, One in contactless, One shared for contact/contactless)
- Random Number Generator (RNG)
- 2-level Interrupt Controller
- Hardware DES and Triple DES, 4 Keys, DPA/DEMA Resistant
- Hardware AES

Secure Microcontroller for Smart Cards

AT90SC28880RCFV

NOTE: This is a summary document. The complete document is available under NDA. For more information, please contact your local Atmel sales office.

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- Checksum Accelerator
- Code Signature Module
- CRC16 & 32 Engine (Compliant with ISO/IEC 3309)
- 32-Bit Cryptographic Accelerator (AdvX for Public Key Operations): RSA, DSA, ECC, Diffie-Hellman

Contactless

- Contactless Interface Controller (CIC) with Full Support for ISO/IEC 14443 Type B Protocol
- Extended Specifications for Strong Interoperability Features
- On-chip Tuning Capacitance: 76pF
- 13.56 MHz Clock Extraction - 6.78 MHz Internal Bus Frequency
- Baud Rates:106Kbps, 212Kbps, 424Kbps and 848Kbps
- DMA capability

Security

- Dedicated Hardware for Protection Against SPA/DPA/DEMA/SEMA Attacks
- Advanced Protection Against Physical Attack, Including Active Shield
- Environmental Protection Systems
- Voltage Monitor
- Frequency Monitor
- Temperature Monitor
- Light Protection
- Secure Memory Management/Access Protection (Supervisor Mode)
- Start on Internal Oscillator
- No External Clock for Contactless Mode

Targeted Certifications

- Common Criteria EAL5+
- ZKA
- EMVCo
- FIPS 140-2

Development Tools

- Voyager Emulation Platform (ATV4Plus) to Support Software Development
- IAR Embedded Workbench® V4.30 Debugger or Atmel’s AVR Studio® Version 4.07 or Above
- Software Libraries and Application Notes

Description

The AT90SC28880RCFV is a low-power, high-performance, 8/16-bit microcontroller with ROM program memory, EEPROM data memory and a crypto-accelerator, based on the secureAVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the AT90SC28880RCFV 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.

In addition to the 288K bytes of embedded ROM, the AT90SC28880RCFV includes 80K of Atmel's high density EEPROM. 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 versitile 8/16-bit CPU on a monolithic chip provides a highly flexible and cost-effective solution to many smart card applications.

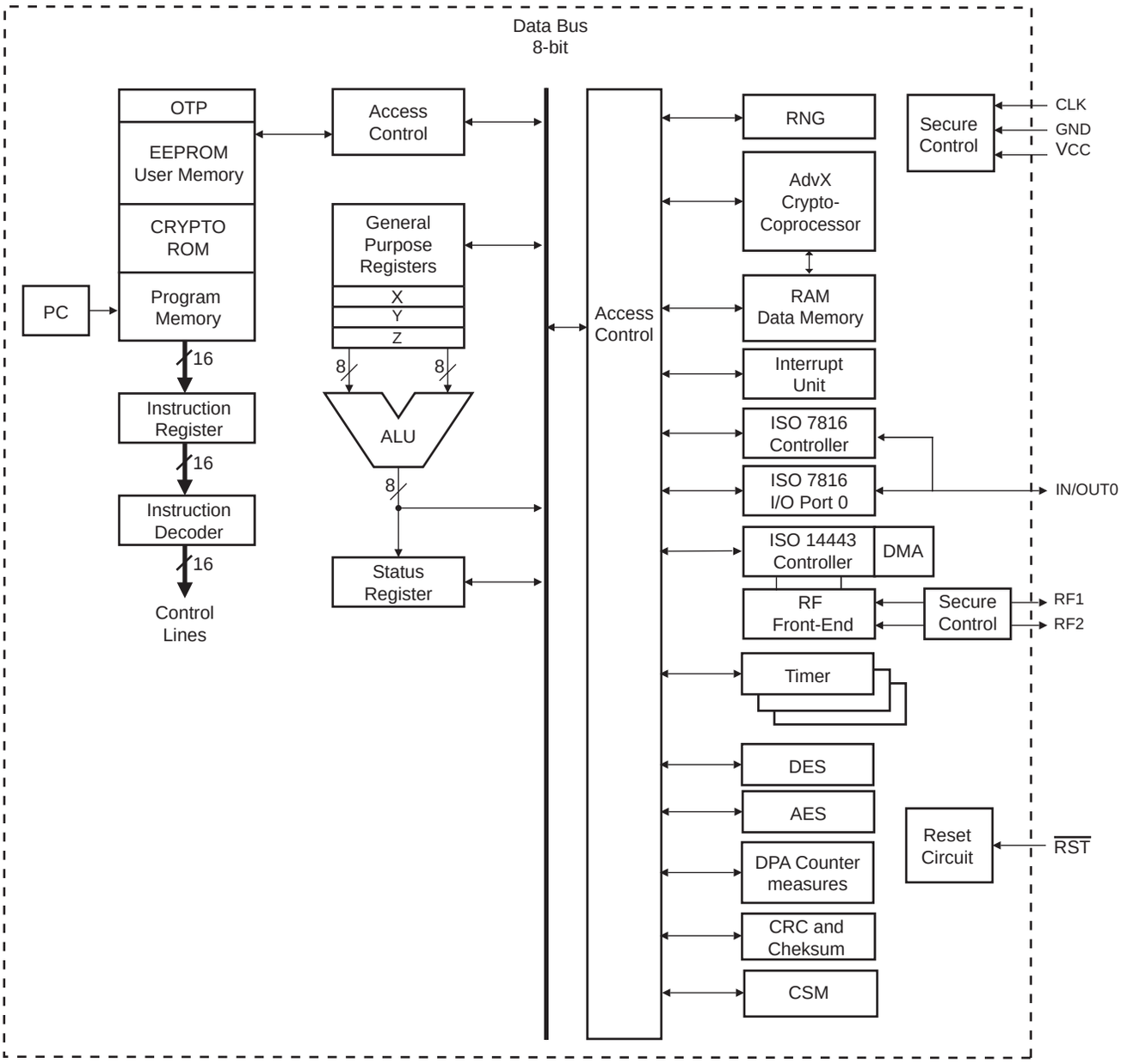
The AT90SC28880RCFV uses the secureAVR® that allows the linear addressing of code and data as well as a number of new functional and security features.

The crypto engine featured in the AT90SC series is the AdvX, a 32-bit accelerator dedicated to perform fast encryption or authentication functions.

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

Figure 1 on next page shows a block diagram of the AT90SC28880RCFV

Figure 1. The AT90SC28880RCFV secureAVR Enhanced RISC Architecture



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