Features

General

- High-performance, Low-power secureAVR™ Enhanced RISC Architecture
  - 137 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 ± 6000V
- Operating Range: from 1.62V to 5.5V
- Compliant with GSM, 3GPP and EMV 2000 Specifications; PC Industry Compatible
- Available in Wafers, Modules and Industry-standard Packages

Memory

- 144K Bytes of Flash Program Memory
- 144K Bytes of EEPROM, Including 128 OTP Bytes and 384-byte Bit-addressable Bytes
  - 1 to 128-byte Program/Erase
  - 1.25 ms Program, 1.25 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
- 8K Bytes of RAM
- 32K Bytes of ROM dedicated to Atmel's crypto-library

Peripherals

- Two I/O Ports
  - Configurable to Support Communication Protocols Including ISO 7816-3 and 2-wire Protocol
- ISO 7816 Controller compliant with T=0 and T=1 protocols
  - Up to 625 kbps at 5 MHz
- Serial Peripheral Interface (SPI) Controller (up to 12 MHz)
- Programmable Internal Oscillator
- Up to 20 MHz on ROM
- Up to 40MHz for Cryptographic Accelerator
- Two 16-bit Timers
- Random Number Generator (RNG)
- 2-level, 8-vector Interrupt Controller
- 32-bit AdvX™ Cryptographic Accelerator for Public Key Operations
  - RSA, DSA, GF(2n), Diffie-Hellman,... Cryptographic Library
- Hardware DES and Triple DES DPA, DEMA Resistant
- Checksum Accelerator
- CRC 16/32 Engine (Compliant with ISO/IEC 3309)

Security

- Dedicated Hardware for Protection Against SPA/DPA/SEMA/DEMA Attacks
- Advanced Protection Against Physical Attack including Active Shield
- Environmental Protection Systems
- Voltage Monitor, Frequency Monitor, Light Protection, Temperature monitor
- Secure Memory Management/Access Protection (Supervisor Mode)

Development Tools

- Voyager Emulation Platform (ATV4 Advanced) to Support Software Development
- IAR Systems EWAVR® Debugger or Atmel's AVR Studio Version 4.07 or Above
- Software Libraries and Application Notes

Secure Microcontroller for Smart Cards

AT90SC 144144CT Summary

6521AS–SMIC–05 Sep 05

Note: This is a summary document. A complete document will be

Description

The AT90SC144144CT is a low-power, high-performance, 8/16-bit microcontroller with Flash program memory, EEPROM data memory, based on the secureAVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the AT90SC144144CT 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.

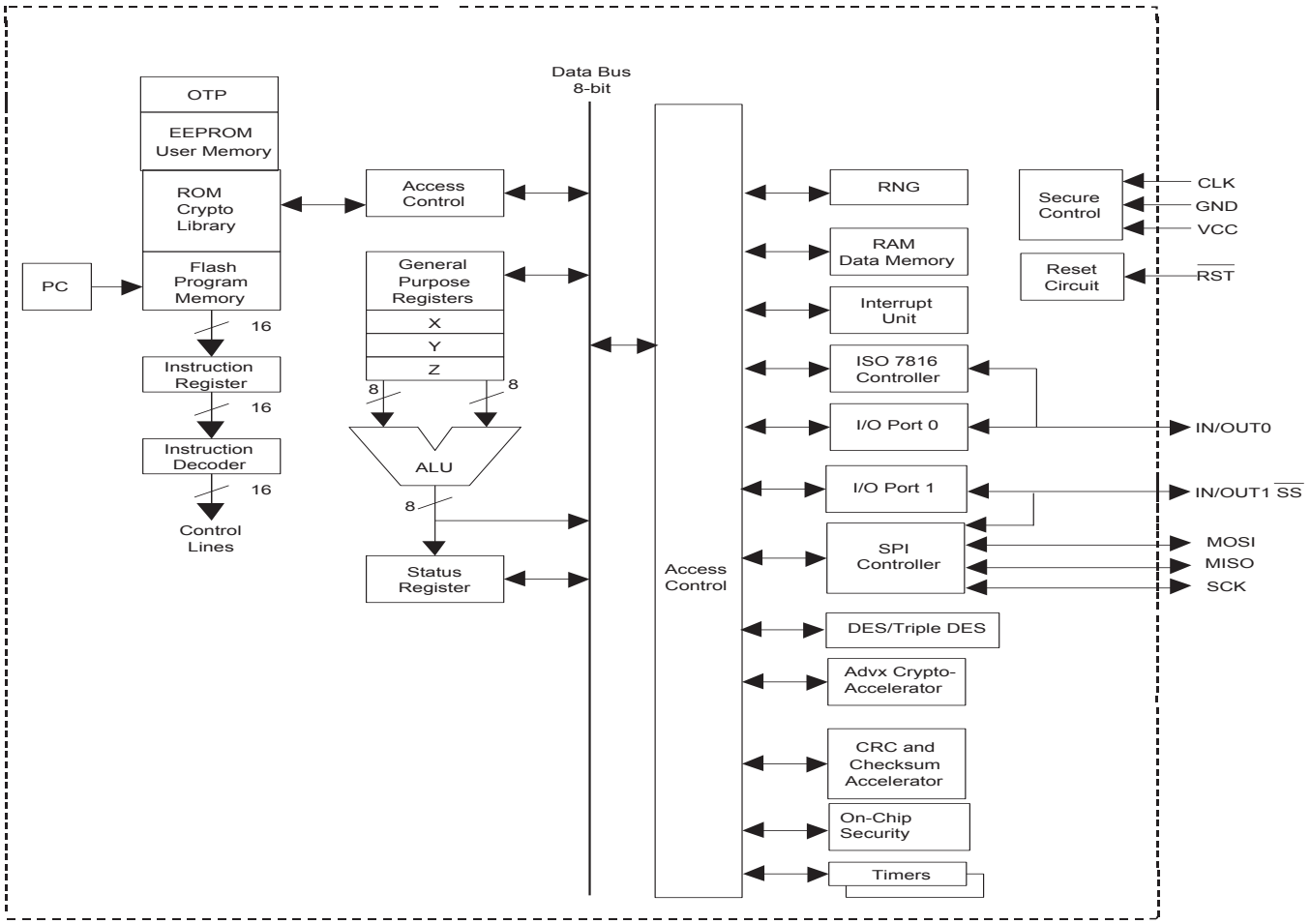
The ability to map the EEPROM in the code space allows parts of the program memory to be reprogrammed in-system. This technology combined with the versatile 8/16-bit CPU on a monolithic chip provides a highly flexible and cost-effective solution to many smart card applications. The AT90SC144144CT benefits from advanced EEPROM functions (XP Mode).

The cryptographic accelerator, featured in the AT90SC144144CT is the new AdvX®. It is based on a 32-bit multiplier-accumulator architecture which is designed to perform fast encryption and authentication functions. This enables fast computation and low-power operation. The controlling firmware is located either in the dedicated ROM memory (Atmel's crypto-library supports standard finite fields arithmetic functions including RSA, DSA, DH and ECC) or in the Flash program memory (customer specific).

Additional security features include power and environment 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 AT90SC144144CT is shown in Figure 1.

Figure 1. AT90SC144144CT secureAVR Enhanced RISC Architecture.



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