
Features

- General
- Industry-standard M68HC05 Instruction Set, Including: 8 x 8 bits Unsigned Multiply Instruction, True Bit Manipulation, Memory-mapped I/O
- Operating Voltage: 3.0V \pm 10% or 5.0V \pm 10%
- Meets GSM 11.11 & 11.12 Specifications and EMV 2000 Specification
- 5.0 MHz Maximum Internal Bus Frequency at 3.0V and 5.0V
- ESD Protection to \pm 4000V
- Bond Pad Layout Conforming to ISO Standard ISO/IEC 7816-2
- External Maskable Interrupt on ISO Standard I/O Port (PA0)
- Power-saving WAIT and Very Low-power STOP Modes
- Power-up Detection
- Available as Sawn Wafers or in Industry-standard Packages and Modules

EEPROM

- 4096 Bytes of EEPROM, Including 16 Control Bytes and 48 OTP Bytes
- 1 to 64-byte Write/Program/Erase
- 4 ms Program Time, 4 ms Erase Time
- 10 Years Data Retention
- Typically More than 1,000,000 Write/Erase Cycles
- On-chip Charge Pump for EEPROM Programming, Driven by an Internal Oscillator

RAM and ROM

- 16384 Bytes of ROM, including 16 Bytes Reserved for Vectors
- 1024 Bytes of RAM with Security Wipe on Selected Areas

Peripherals

- Single Bidirectional I/O Line (1-bit ISO/IEC 7816-3 Standard I/O Port) with Sample Bit
- Time Base Circuitry (with Preset and Maskable Interrupt Capabilities)
- Watchdog Capability
- CRC Module (Allowing Generation of Checksums (ISO/IEC 3309))
- Random Number Generator (RNG)

Security

- Dedicated Hardware to Resist Power Analysis Attacks
- Low and High Voltage Monitors
- Low and High Temperature Monitors
- Low Frequency Monitor
- High Frequency Filter/Monitor
- Advanced Physical Barrier to Enhance Tamper Resistance
- Illegal Access Reset
- Illegal Opcode Reset
- Memory Partitioning with Address Lockout Reset
- Scrambling Logic
- Tamper Monitor
- Physical Removal of Test Mode when Testing is Complete

Development Tools

- Hardware Emulation Module (for the Motorola MMDS05[®] Development System)
 - Emulation Module (AT05SC1604R-EM3)
- Software Simulator Based on Metrowerk's HI-WAVE[®] Product
 - Simulator Software (AT05SCRSIM)



Secure Microcontroller for Smart Cards

AT05SC1604R Summary

Rev. 1522DS-SMIC-05/02



Description

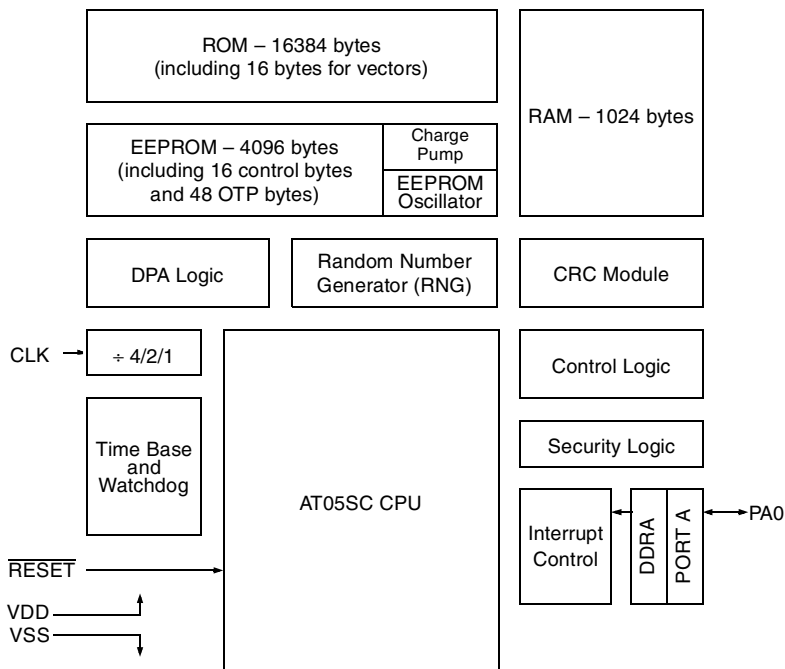
The AT05SC1604R is a member of Atmel's AT05SC family of single chip microcontrollers. Designed specifically for embedded conditional access systems and other security conscious systems, these devices are based on the industry-standard M68HC05 low-power core and its instruction set.

The AT05SC1604R is designed to give a high level of protection against physical and power analysis attacks, and includes hardware features to assist in protecting against SPA and DPA attacks. On-board CRC and RNG modules are provided to assist in the design of high-security applications.

On-board memory comprises 16K bytes of ROM, 1K bytes of RAM and 4K bytes of EEPROM. The EEPROM features 64-byte write, 4 ms program time, 4 ms erase time, typically more than 1,000,000 write/erase cycles, and greater than 10 years data retention.

Application areas for the AT05SC1604R include Health, Social Security and Benefit Cards, Finance and Payment Systems, Driving Licences and ID cards.

Figure 1. AT05SC1604R Block Diagram



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