



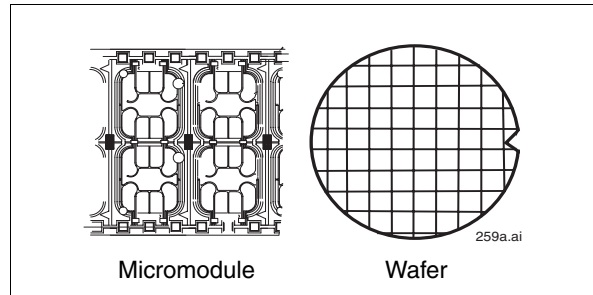
ST19WR08

Dual Contactless Smartcard MCU With RF UART, IART & 8 Kbytes EEPROM

Data Brief

Features

- Enhanced 8-bit CPU with extended addressing modes
- 112 KBytes user ROM with partitioning
- 2 KBytes user RAM with partitioning
- 8 kbytes user EEPROM with partitioning plus 128 Bytes user OTP and 64 Bytes ST OTP areas:
 - Highly reliable CMOS EEPROM submicron technology
 - Error Correction Code for single bit fail correction within a byte
 - 10 year data retention
 - 500,000 Erase/Write cycles endurance
 - 1 to 32 Bytes Erase or Program in 1 ms
- Security firewalls for memories, and Enhanced DES accelerator
- Very high security features including EEPROM Flash programming and clock management.
- 2x8-bit timers with interrupt capability
- Hardware Security Enhanced DES accelerator with library support for symmetrical algorithms:
 - DES, triple DES computations and CBC chaining mode
- AES-128 software library
- ISO 3309 CRC calculation block
- FIPS 140-2 and AIS31 compliant True Random Number Generator (TRNG)
- 2.7 V to 5.5 V supply voltage
- External clock frequency up to 10 MHz
- High performance provided using internal clock frequency
- Unique serial number on each die
- Power-saving standby mode
- Contact assignment compatible ISO 7816-2
- Serial access I/O, ISO 7816-3 compatible



- ISO asynchronous receiver transmitter for high speed serial data support
- ESD protection greater than 5000 V

Function	Speed ⁽¹⁾
Triple DES (with enhanced security)	58.0 µs
Single DES (with enhanced security)	43.0 µs

1. Best performance achieved using a 15-MHz clock frequency.

Contactless specific features

- Based on ISO 14443 type B
- 13.56 MHz carrier frequency
- RF UART (RF Universal Asynchronous Receiver Transmitter) for easy-to-manage high speed data transfer up to 848 Kbits/s
- RF frame up to 256 Bytes
- 10% amplitude modulation reception (reader to card)
- BPSK - NRZ load modulation (card to reader)
- Interface with RF readers supported through a library of embedded software functions compatible with ISO 14443 standard
- ESD protection on antenna pads greater than 5000 V

1 Summary description

1.1 Hardware overview

The product, member of the ST19W platform, is a serial access microcontroller specially designed for cost-effective secure portable applications.

It is manufactured using an advanced highly reliable ST CMOS EEPROM technology.

It is based on the STMicroelectronics 8-bit CPU already implemented on the ST19X product family and includes on-chip memories: User ROM, User RAM and EEPROM with state-of-the-art security features. ROM, RAM and EEPROM memories can be configured into partitions with customized access rules.

An additional ST ROM contains all ST provided functions and libraries.

Access from any memory area to another are protected by hardware firewalls. Access rules are user-defined and can be selected by mask options.

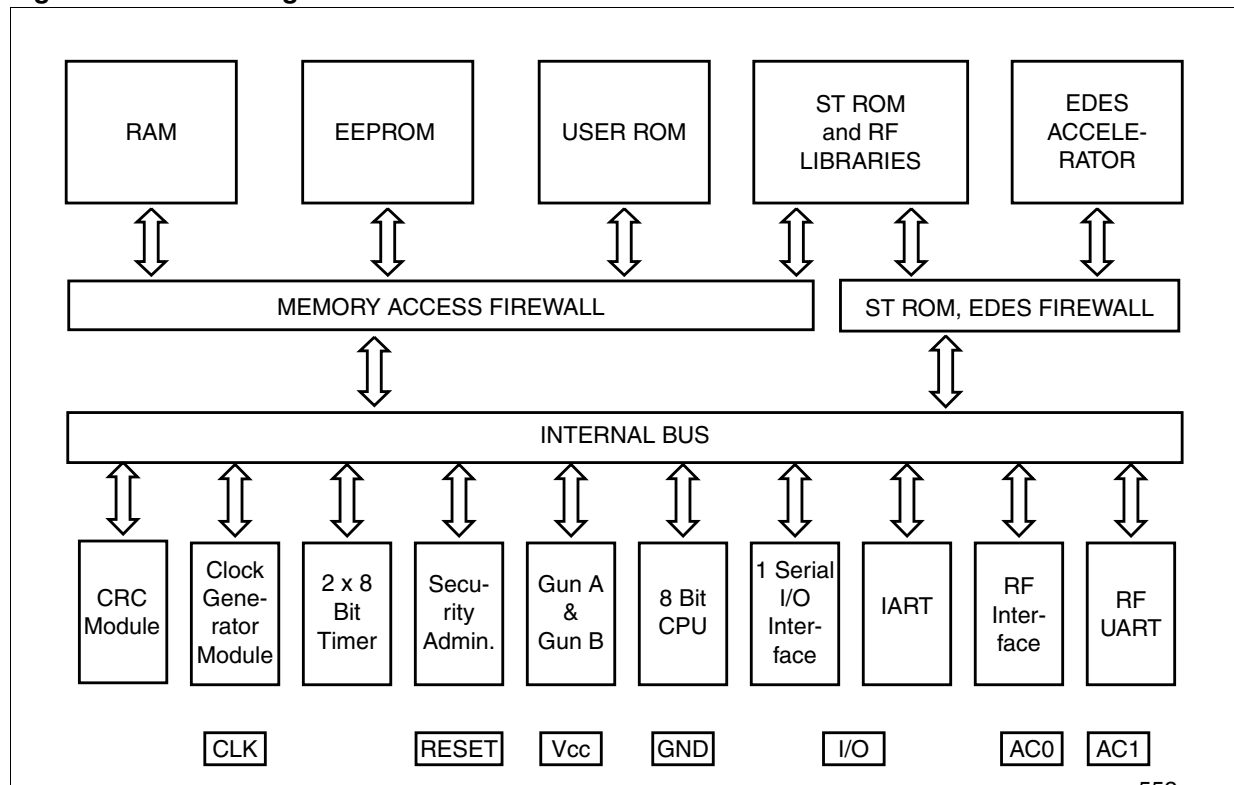
The chip includes an Enhanced DES accelerator which is accessible via cryptographic software libraries located in ST ROM.

An RF Interface including an RF Universal Asynchronous Receiver Transmitter (RF UART) enables contactless communication up to 848 Kbits/s compatible with the ISO 14443-B standard.

As with all the other ST19W products, a serial interface fully compatible with the ISO 7816 standard for Smartcard applications is available.

A CRC calculation block is also available and is directly accessible by the User.

Figure 1. Block Diagram



1.2 Software development

Software development and firmware generation (ROM and options) are supported by a comprehensive set of development tools, dedicated at development and validation of software:

- Smartcard ICs Emulator
- ST19X simulation package
- ScDevTools environment for Windows™ NT, 2000, and XP based stations
- Powerful C/C++ compiler and debugger are also available (third-party tools)
- RF contactless demokit based on ISO 14443 type B standards

2 Revision history

Table 1. Document revision history

Date	Revision	Changes
28-Apr-2005	1	Initial release.
16-Mar-2006	2	Document converted into new ST Corporate Template. AIS31 function added.

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