ST19WR02

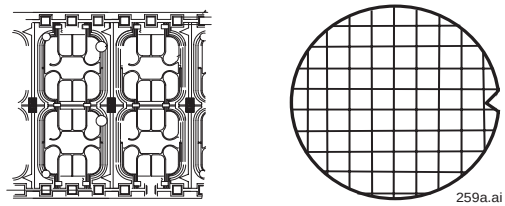
Dual Contactless Smartcard MCU With 2 Kbytes EEPROM

DATA BRIEF

PRODUCT FEATURES

- ENHANCED 8 BIT CPU WITH EXTENDED ADDRESSING MODES
- 64 KBYTES USER ROM WITH PARTITIONING
- 1 KBYTES USER RAM WITH PARTITIONING
- 2 KBYTES USER EEPROM WITH PARTITIONING plus 128 BYTES USER and ST OTP AREA:
  - 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 DES ACCELERATOR.
- VERY HIGH SECURITY FEATURES INCLUDING EEPROM FLASH PROGRAMMING AND CLOCK MANAGEMENT.
- 2x8 BIT TIMERS WITH INTERRUPT CAPABILITY
- HARDWARE DES ACCELERATOR WITH LIBRARY SUPPORT FOR SYMMETRICAL ALGORITHMS:
  - DES, triple DES, DESX computations and CBC chaining mode...
- ISO 3309 CRC CALCULATION BLOCK
- FIPS 140-2 COMPLIANT RANDOM NUMBER GENERATOR WITH TWO GUN REGISTERS (Generators of Unpredictable Number)
- 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
- ESD PROTECTION GREATER THAN 5000 V

Figure 1. Delivery Form



Micromodule Wafer

Function	Speed(1)
Triple DES (with keys loaded)	24 µs
Single DES (with keys loaded)	15 µs

1. Typical values, independent from external clock frequency and supply voltage.

CONTACTLESS SPECIFIC FEATURES

- BASED UPON ISO 14443 TYPE B
- 13.56 MHz CARRIER FREQUENCY
- HIGH SPEED DATA TRANSFER CAPABILITY UP TO 424 KBAUDS
- 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 3000 V

For further information contact your local ST sales office.

HARDWARE DESCRIPTION

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.

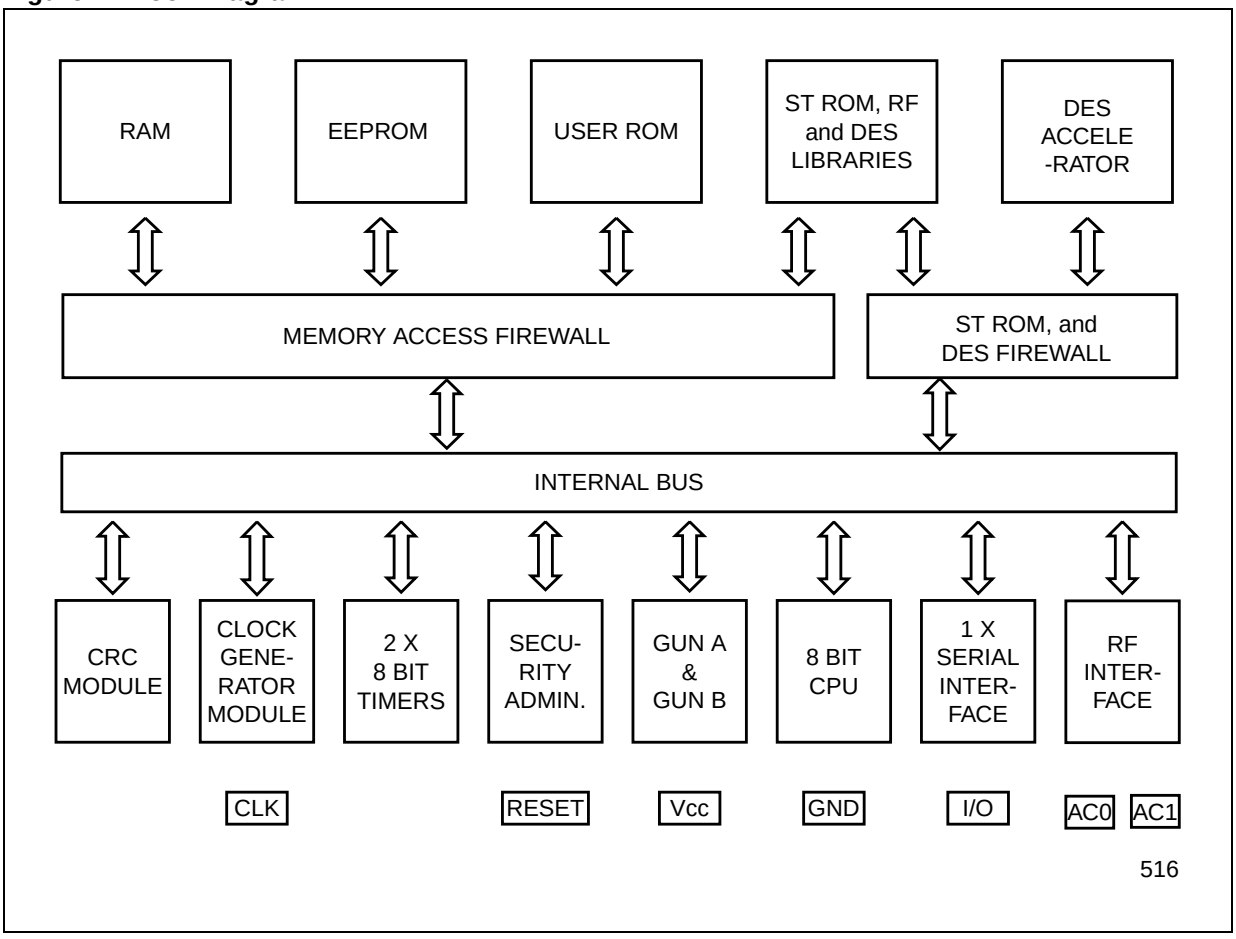
Access from any memory area to another are protected by hardware FIREWALLS. Access rules are User defined and can be selected by mask options.

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

As with all the other ST19W products, a serial interface fully compatible with the ISO7816 standard for Smartcard applications is available.

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

Figure 2. Block Diagram



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 softwares:

- Smartcard ICs Emulator,
- ST19X simulation package,
- ScDevTools pack environment for all Windows™ based stations,
- Powerful C/C++ compiler and debugger are also available (third party tools).
- RF contactless demokit based upon ISO 14443 type B standard.

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