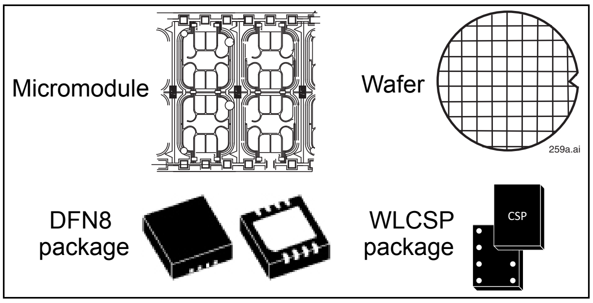
ST33F1M, ST33F1M0, ST33F896, ST33F768, ST33F640, ST33F512

Secure MCU with 32-bit ARM SC300 CPU, SWP interface, NESCRYPT cryptoprocessor and high-density Flash memory

Data brief



Features

ST33F1M[a] major applications include:

- Mobile communications (GSM, 3G and CDMA)
- Java Card™ applications
- NFC applications (Banking, Transportation, etc.)
- Optional MIFARE Classic & DESFire® EV1
- Secure Element (UICC or embedded)

Hardware features

- ARM® SecurCore® SC300™ 32-bit RISC core
- Up to 30 Kbytes of User RAM
- Up to 1280 Kbytes of User Flash memory with OTP area
- Asynchronous receiver transmitter supporting ISO/IEC 7816-3 T=0 and T=1 protocols (Slave mode supported)
- Single Wire Protocol (SWP) Interface for communications with NFC router
- Serial peripheral interface (SPI) slave interface
- Three 16-bit timers with interrupt capability including one 16-bit timer with watchdog capability
- 1.8 V, 3 V and 5 V supply voltage ranges
- External clock frequency from 1 up to 10 MHz
- Current consumption compatible with GSM and ETSI specifications
- High performance provided by:
  - CPU clock frequency up to 22.5 MHz
  - External clock multiplier (2x, 3x, and 4x)
- Power-saving standby state
- Contact assignment compatible with ISO/IEC 7816-2
- ESD protection greater than 4 kV (HBM)

Software features

- Secure Flash Loader
- Flash drivers

Security features

- Active shield
- Memory protection unit (MPU)
- Monitoring of environmental parameters
- Protection against faults
- ISO 3309 CRC calculation block
- True random number generator
- Unique serial number on each die
- Hardware security-enhanced DES accelerator
- NESCRYPT coprocessor for public key cryptography algorithms (RSA, ECC, etc.)
- Code/data signature

Development environment

- Software development and firmware generation are supported by a comprehensive set of development tools dedicated to software design and validation: C compiler, simulator and emulator.

Table 1. Device summary

Part numbers	Flash (Kbytes)
ST33F1M	1280
ST33F1M0	1024
ST33F896	896
ST33F768	768
ST33F640	640
ST33F512	512

[a] ST33F1M* is a generic term that refers to all devices summarized in *Table 1*.

1 Description

The ST33F1M is a serial access microcontroller designed for secure mobile applications that incorporates the most recent generation of ARM® processors for embedded secure systems. Its SecurCore® SC300™ 32-bit RISC core is built on the Cortex™ M3 core with additional security features to help to protect against advanced forms of attacks.

Cadenced at 22.5 MHz, the SC300™ core brings great performance and excellent code density thanks to the Thumb®-2 instruction set.

The high-speed embedded Flash with up to 1280 Kbytes of memory introduces more flexibility to the system.

The ST33F1M also offers a serial communication interface fully compatible with the ISO/IEC 7816-3 standard (T=0, T=1) and a single-wire protocol (SWP) interface for communication with a near field communication (NFC) router in SIM/NFC applications.

An SPI Slave interface is also available for communication in non-SIM applications. Note that this interface is not available when ISO/IEC 7816 communications are required.

Three general purpose 16-bit timers are available; one configurable as a watchdog.

The ST33F1M features hardware accelerators for advanced cryptographic functions. The EDES peripheral provides a secure DES (Data Encryption Standard) algorithm implementation, while the NESCRYPT crypto-processor efficiently supports the public key algorithm.

The ST33F family operates in the –25 to +85°C temperature range and 1.8V, 3V and 5V supply voltage ranges. A comprehensive range of power-saving modes enables the design of efficient low-power applications.

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com.

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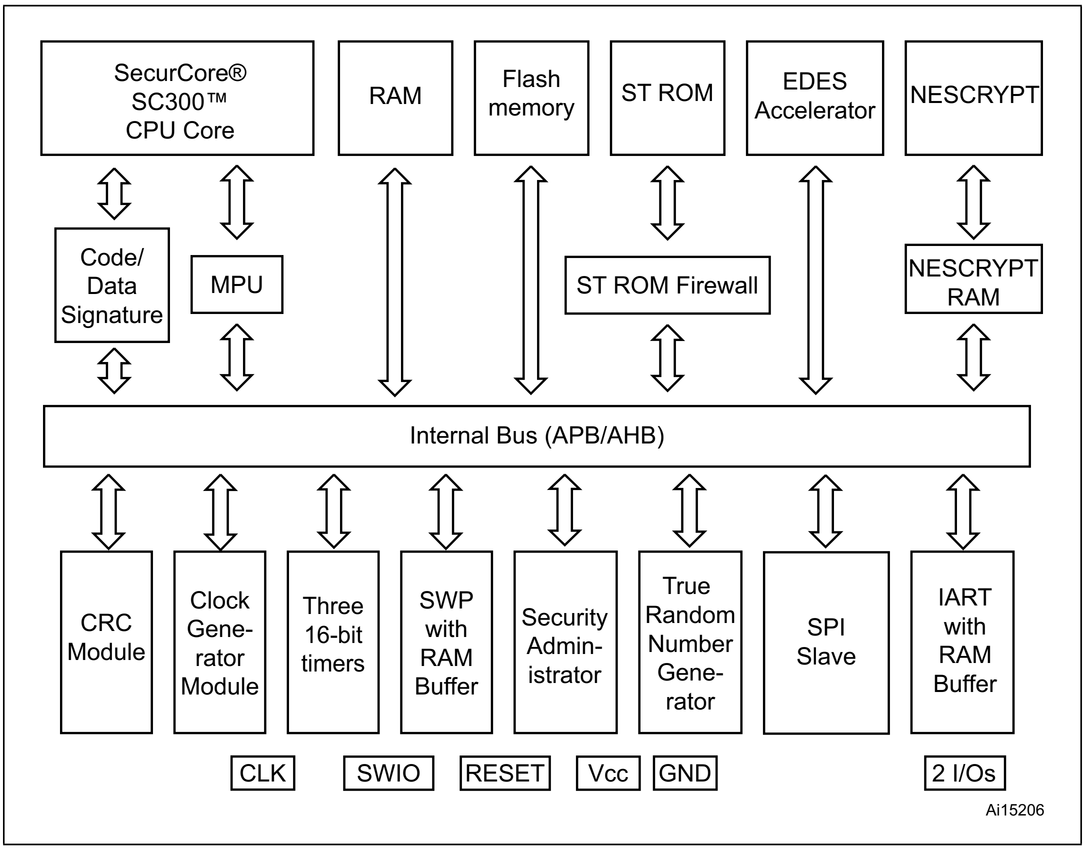
Figure 1. ST33F1M block diagram



1.1 Software development tools

Dedicated SecurCore® SC300™ software development tools are provided by ARM and Keil. This includes the Instruction Set Simulator (ISS) and C compiler. The documentation is available on the ARM and Keil web sites.

Moreover, STMicroelectronics provides:

- A time-accurate hardware emulator controlled by the Keil debugger and the ST development environment.
- A complete product simulator based on Keil's ISS simulator for the SecurCore® SC300™ CPU.
- A secured ROMed Flash Loader with very high-speed software downloading capabilities.

2 Revision history

Table 2. Document revision history

Date	Revision	Changes
24-Jan-2011	1	Initial release.
28-Nov-2012	2	Updated *Features* and *Description*.
18-Sep-2012	3	Modified title, *Features* and added *Table 1: Device summary*.
26-Mar-2013	4	Updated document header to cover all part numbers. Added part numbers in *Table 1: Device summary*. Removed “optional” before SWP interface in *Features* and *Section 1: Description*. Added MIFARE in *Features*. Added WLCSP package.
07-Nov-2013	5	Updated logo information on page 2.

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