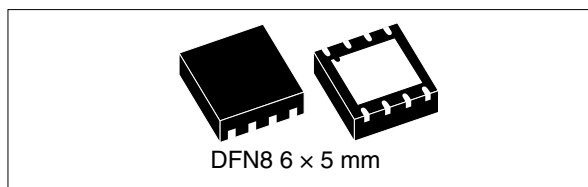


M2M automotive-grade secure MCU with 32-bit ARM® Cortex®-M3 CPU and up to 512 Kbytes of high density Flash memory

Data brief



Features

Hardware features

- ARM® Cortex® -M3 32-bit RISC core
- 12 Kbytes of user RAM
- 512 Kbytes of user Flash memory with OTP area:
 - 10-year data retention at 105 °C, or 17 years at 85 °C
 - 500 000 Erase/Write cycles per page
 - Page granularity of 128 Bytes
 - Block granularity: 1 Kbyte
 - 128 bytes of OTP for user
 - Page Erase time 4 ms
 - Block Erase 1 Kbyte in 20 ms
 - Programming performance up to 10 µs/byte
 - Flash Erase / Write Protection software programmable on 32 Kbyte sectors
- Asynchronous Receiver Transmitter supporting ISO/IEC 7816-3 T=0 and T=1 protocols
- Two 16-bit timers with interrupt capability
- 1.8 V, 3 V and 5 V supply voltage ranges
- External clock frequency from 1 up to 7.5 MHz
- High performance provided by:
 - Typical CPU clock frequency of 17.5 MHz
 - External clock multiplier (2x, 3x, and 4x)
- Current consumption compatible with ETSI specifications
- AECQ100 rev G automotive-grade compliance
- Power-saving Standby state
- Contact assignment compatible ISO 7816-2

- ESD protection greater than 4 kV (HBM)
- 8-pin DFN (6 × 5 mm) ECOPACK® package

Security features

- Monitoring of environmental parameters
- Protection against faults
- ISO 3309 CRC calculation block
- True random number generator
- Unique serial number on each die
- Hardware data encryption standard (DES) accelerator

Software features

- Flash memory loader
- Flash memory drivers

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

Major applications

- eCalls
- Connected car
- Java Card™ applications

Table 1. Device summary

Part number	Flash memory
ST32G512A	512 Kbytes
ST32G416A	416 Kbytes
ST32G320A	320 Kbytes
ST32G256A	256 Kbytes

1 Description

The ST32GxxxA (see [Table 1](#)) is a serial access microcontroller designed for machine-to-machine (M2M) applications in the car environment that incorporates the most recent generation of ARM[®] processors for embedded systems. Its Cortex[®]-M3 32-bit RISC core operating at a 15-MHz frequency brings great performance and excellent code compacity to the application thanks to the Thumb[®]-2 instruction set.

The 512-Kbyte high-speed embedded Flash memory introduces more flexibility to the system. This Flash memory has an improved cycling capability compared to the ST32F512-M.

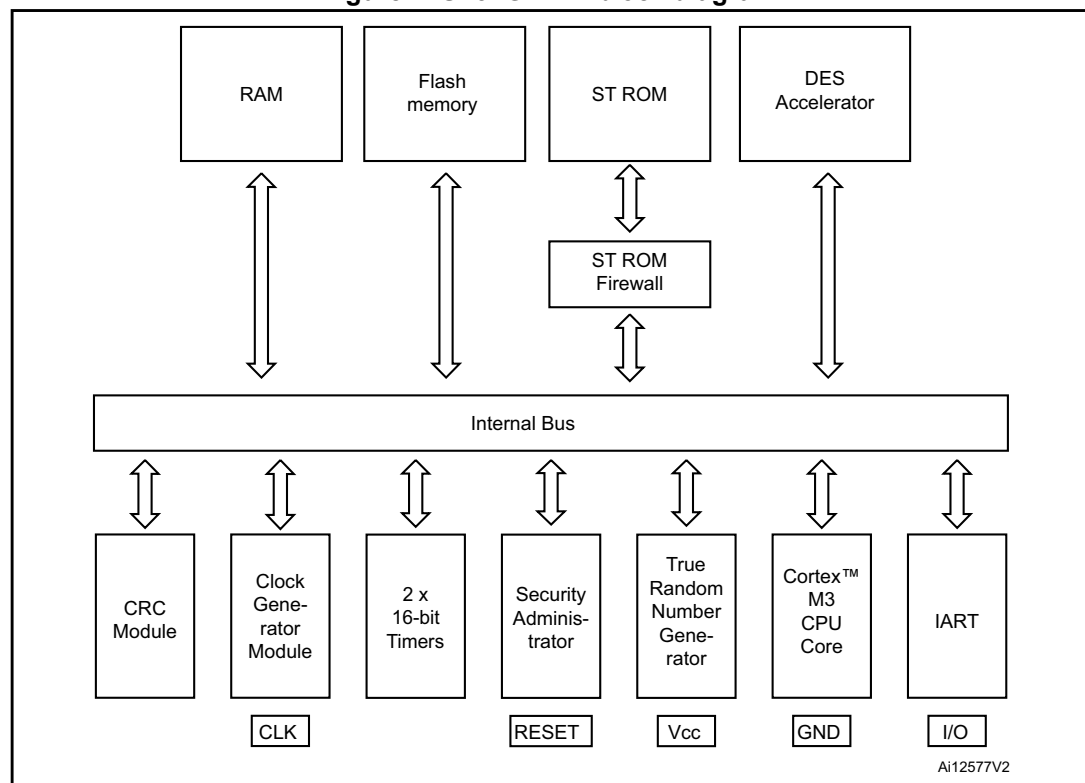
The ST32GxxxA also offers a serial communication interface fully compatible with the ISO/IEC 7816-3 standard (T=0, T=1).

Two general-purpose 16-bit timers are available.

A hardware Data Encryption Standard (DES) accelerator can be used to the user to optimize the application performance. A software library is provided for Advanced Encryption Standard (AES) implementation.

The ST32GxxxA operates in the -40 to +105 °C temperature range and 1.8 V, 3 V and 5 V supply voltage ranges. A comprehensive range of power-saving modes enables the design of efficient low-power applications.

Figure 1. ST32GxxxA block diagram



1.1 Package features

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. ECOPACK[®] is an ST trademark.

1.1.1 DFN8 package qualification for M2M automotive applications

Package qualification for M2M automotive applications, according to AEC Q100 standard:

- Moisture Sensitivity Level test according to IPC/JEDEC J-STD-20: MSL1 with 260 °C peak temperature.
- Temperature Humidity Bias test according to JEDEC JESD22-A101: 85 °C, 85% RH, 1000 hours.
- Autoclave test according to JEDEC JESD22-A102: 121°C, 100% RH, 205 kPa, 96 hours.
- Vibration test according to JEDEC JESD22-B103 service condition 1: 20 / 2000 Hz, 20 g peak acceleration.
- Mechanical Shock test according to JEDEC JESD22-B104 service condition B: 1500 g acceleration for 0.5 ms pulse duration.
- Temperature cycling test according to JEDEC JESD22-A104: –65 / +150 °C, 500 cycles.

1.1.2 Package information

For a complete description of available packages and micromodules, refer to the ST32GxxxA package mechanical data - package information.

1.2 Software development tool description

Dedicated Cortex[™]-M3 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 websites.

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 Cortex[™]-M3 CPU.
- A ROMed Flash memory loader with very high-speed software downloading capabilities.

2 Revision history

Table 2. Document revision history

Date	Revision	Changes
22-Apr-2015	0.1	Initial release.
27-Jan-2016	1	Document confidentiality changed from ST Restricted to unclassified. Updated document reference. Small text changes.

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