SRIX512

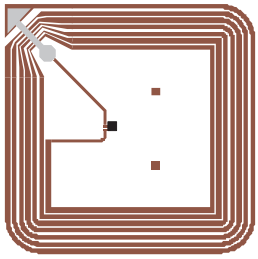
13.56MHz Short Range Contactless Memory Chip With 512-bit EEPROM, Anti-Collision and Anti-Clone Functions

DATA BRIEFING

FEATURES SUMMARY

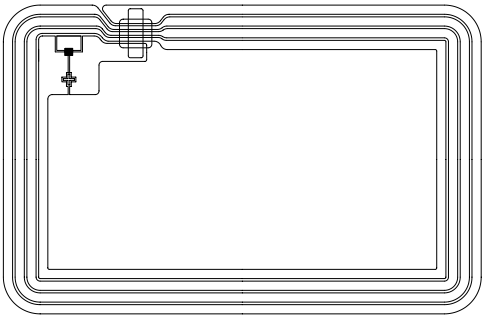
- ISO 14443 - 2 Type B Air Interface Compliant
- ISO 14443 - 3 Type B Frame Format Compliant
- 13.56MHz Carrier Frequency
- 847kHz Sub-carrier Frequency
- 106 Kbit/s Data Transfer
- France Telecom Proprietary Anti-Clone Function
- 8 bits Chip_ID based anticollision system
- 2 Count-Down Binary Counters
  - 32 bits each
  - 2^{32} units to be counted down
- 64-bit Unique Identifier
- 512-bit EEPROM with Write Protect Feature
- READ BLOCK & WRITE BLOCK (32 Bits)
- Internal Tuning Capacitor
- 1million ERASE/WRITE Cycles
- 10-Year Data Retention
- Self-Timed Programming Cycle
- 5ms Typical Programming Time

Figure 1. Delivery Forms

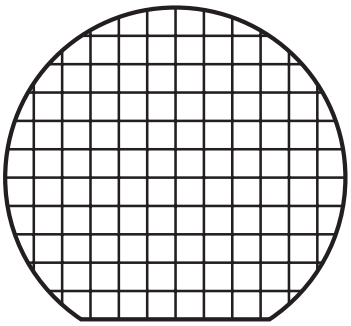


Antenna (A3)

Antenna (A4)



Antenna (A5)



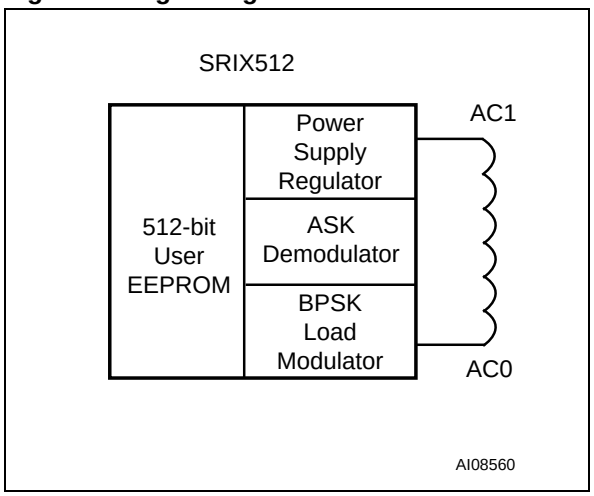
Wafer

SUMMARY DESCRIPTION

The SRIX512 is a contactless memory, powered by an externally transmitted radio wave. It contains a 512-bit user EEPROM fabricated with STMicroelectronics CMOS technology. The memory is organised as 16 blocks of 32 bits. The SRIX512 is accessed via the 13.56MHz carrier. Incoming data are demodulated and decoded from the received Amplitude Shift Keying (ASK) modulation signal and outgoing data are generated by load variation using Bit Phase Shift Keying (BPSK) coding of a 847kHz sub-carrier. The received ASK wave is 10% modulated. The Data transfer rate between the SRIX512 and the reader is 106Kbit/s in both reception and emission modes.

The SRIX512 follows the ISO 14443 part 2 type B recommendation for the radio-frequency power and signal interface.

Figure 2. Logic Diagram



The SRIX512 targets short range applications which need secure and re-usable products. The SRIX512 includes an anti-collision mechanism that allows it to detect and select tags present at the same time within range of the reader. The anti-collision is based on a probabilistic scanning method using slot markers. The SRIX512 provides an anti-clone function which allows its authentication. Using the STMicroelectronics single chip coupler, CRX14, it is easy to design a reader with the authentication capability and to build a system with a high level of security.

Table 1. Signal Names

AC1	Antenna Coil
AC0	Antenna Coil

The SRIX512 contactless EEPROM can be randomly read and written in block mode. Each block is composed of 32 bits. It offers a set of 10 commands:

- READ_BLOCK
- WRITE_BLOCK
- INITIATE
- PCALL16
- SLOT_MARKER
- SELECT
- COMPLETION
- RESET_TO_INVENTORY
- AUTHENTICATE
- GET_UID

The SRIX512 memory array is divided in three, as described in Figure 3. The first area is a resettable OTP (one time programmable) area in which bits can only be switched from 1 to 0. Using a special command, it is possible to erase all the bits of this area to 1. The second area provides two 32-bit binary counters that can only be decremented from FFFFFFFFh to 00000000h, and gives a capacity of 4,294,967,296 units per counter. The last area is the EEPROM area. It is accessible in blocks of 32 bits, and automatically invokes an auto-erase cycle during each WRITE_BLOCK command.

MEMORY MAPPING

The SRIX512 is organised as 16 blocks of 32 bits as shown in Figure 3. All blocks are accessible by the READ_BLOCK command. Depending on the write access, they can be updated by the WRITE_BLOCK command. A WRITE_BLOCK updates all the 32 bits of the block.

Figure 3. SRIX512 Memory Mapping

Block Addr	Msb b_{31}	b_{24} b_{23}	32 bits Block b_{16} b_{15}	b_8 b_7	Lsb b_0	Description
0	32-bit Boolean Area					Resettable OTP bits
1	32-bit Boolean Area					
2	32-bit Boolean Area					
3	32-bit Boolean Area					
4	32-bit Boolean Area					
5	32-bit Binary Counter					Count down Counter
6	32-bit Binary Counter					
7	User Area					Lockable EEPROM
8	User Area					
9	User Area					
10	User Area					
11	User Area					
12	User Area					
13	User Area					
14	User Area					
15	User Area					

255	OTP_Lock_Reg	ST Reserved	Fixed Chip_ID (Option)	System OTP bits

UID0	64-bit UID Area	ROM
UID1		

PART NUMBERING

For a list of available options (speed, package, etc.) or for further information on any aspect of this device, please contact your nearest ST Sales Office.

Table 2. Ordering Information Scheme

Example: SRIX512 – W4 / XXX

Device Type

SRIX512

Package

W4 =180 µm ± 15 µm unsawn wafer
SBN18= 180µm ± 15 µm Bumped & sawn wafer on 8inches frame
A3T= 38mm x 38mm Copper Antenna on continuous tape
A3S= 38mm x 38mm Copper Singulated adhesive Antenna on tape
A4T= 15mm x 15mm Copper Antenna on continuous tape
A4S= 15mm x 15mm Copper Singulated adhesive Antenna on tape
A5T= 42mm x 65mm Copper Antenna on continuous tape
A5S= 42mm x 65mm Copper Singulated adhesive Antenna on tape

Customer Code

XXX = Given by STMicroelectronics

REVISION HISTORY

Table 3. Document Revision History

Date	Version	Revision Details
11-Jul-2003	1.0	First Issue