



复旦微电子

FM1208M01 Contactless CPU Card

Datasheet

May. 2008

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1. Product Overview

1.1. Description

FM1208M01 is an Contactless CPU card designed by Fudan Microelectronics Co.,Ltd. It is designed to support both Electronics Wallet and existing Pulic Traffic RF Card based on ISO14443-A contactless interface platform. Furth more, it support both existing contactless M1 card and CPU card based on PBOC2.0 Standard.

1.2. Feature

- Contactless RF interface according to ISO/IEC14443 TypeA
- Compatible with FM11RF08(Support M1)、FM11RF08SH、FM11RF32M、FM11RF32SH series contactless card
- MCU command set compatible with Turbo 8051
- Support 106Kbps data transmission
- Triple-DES/Single-DES processor
- Program memory: 32K x 8bit ROM
- Data memory: 8K x 8bit EEPROM
- iRAM: 256 x 8bit
- xRAM: 384 x 8bit
- SPA、DPA resistant controller
- Reset controller of low voltage detection
- Reset controller of High/Low frequency detection
- Memory data encryption (ROM、EEPROM、RAM)
- ROM code reverse resistant
- EEPROM endurance: minimum 100,000
- EEPROM data retention: 10 years minimum

Typical Dealing Time:

- | | |
|---------------------------------|---|
| ◆ Identifying Card | 3ms (include REQA/ANTI-COLLISION/SELECTION) |
| ◆ EEPROM Erase and Write time | 2.4ms |
| ◆ Typical ticketing transaction | <350ms |

Security Features:

1. DPA resistant
2. Frequency sensors
3. ROM code not visible due to implantation, encrytion of memory data

1.3. Block Diagram

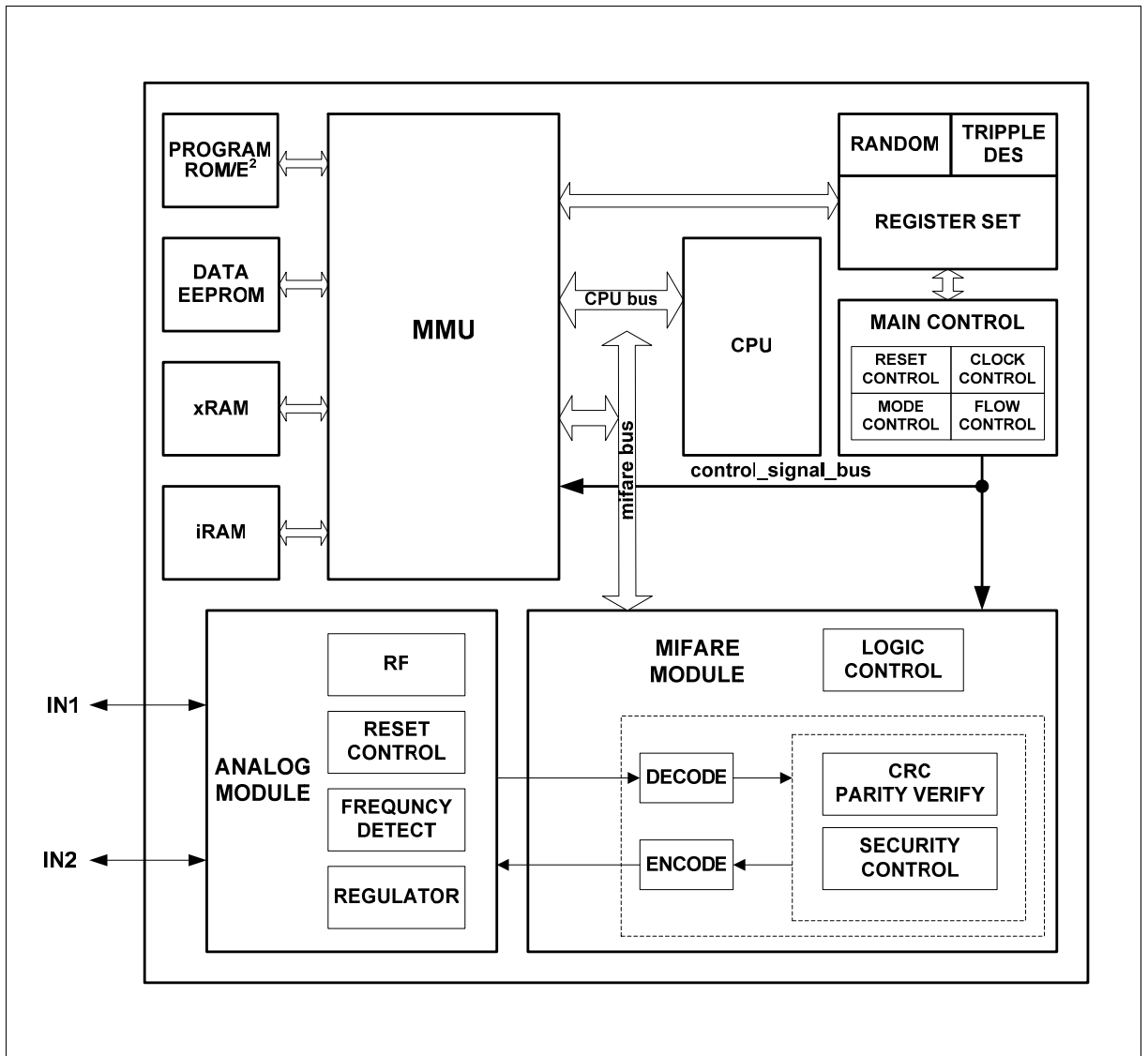


Figure 1-1 FM1208M01 Block diagram

1.4. Absolute Maximum Ratings

1.4.1. Module Maximum Ratings

Parameter	Symbol	Range	Unit
Operating Temperature	Topr	-25 - +70	°C
Storage Temperature	Tstr	-25 - +85	°C
ESD*	Vesd	4000 (minimum)	V

Table 1-1 FM1208M01 Module Maximum Ratings

1.4.2. Card Maximum Ratings

Parameter	Symbol	Range	Unit
Operating Temperature	Topr	0 - +70	°C
Storage Temperature	Tstr	-20 - +70	°C
ESD*	Vesd	6000 (最小)	V

Table 1-2 FM1208M01 Card Maximum Ratings

1.5. Package

FM1208M01 module: XOA2

FM1208M01 card: according to ISO7810 5.1.1

1.6. Pin Description

Number	Symbol	Type	Function
1	IN1	inout	Coil connection pin 1
2	IN2	Inout	Coil connection pin 2

Table 1-3 FM1208M01 Pin Description

1.7. ATQA and SAK Description

Type	ATQA	SAK
FM1208M01	0x0004	0x08

Table 1-4 FM1208M01 ATQA and SAK Description

2. Operating Flow

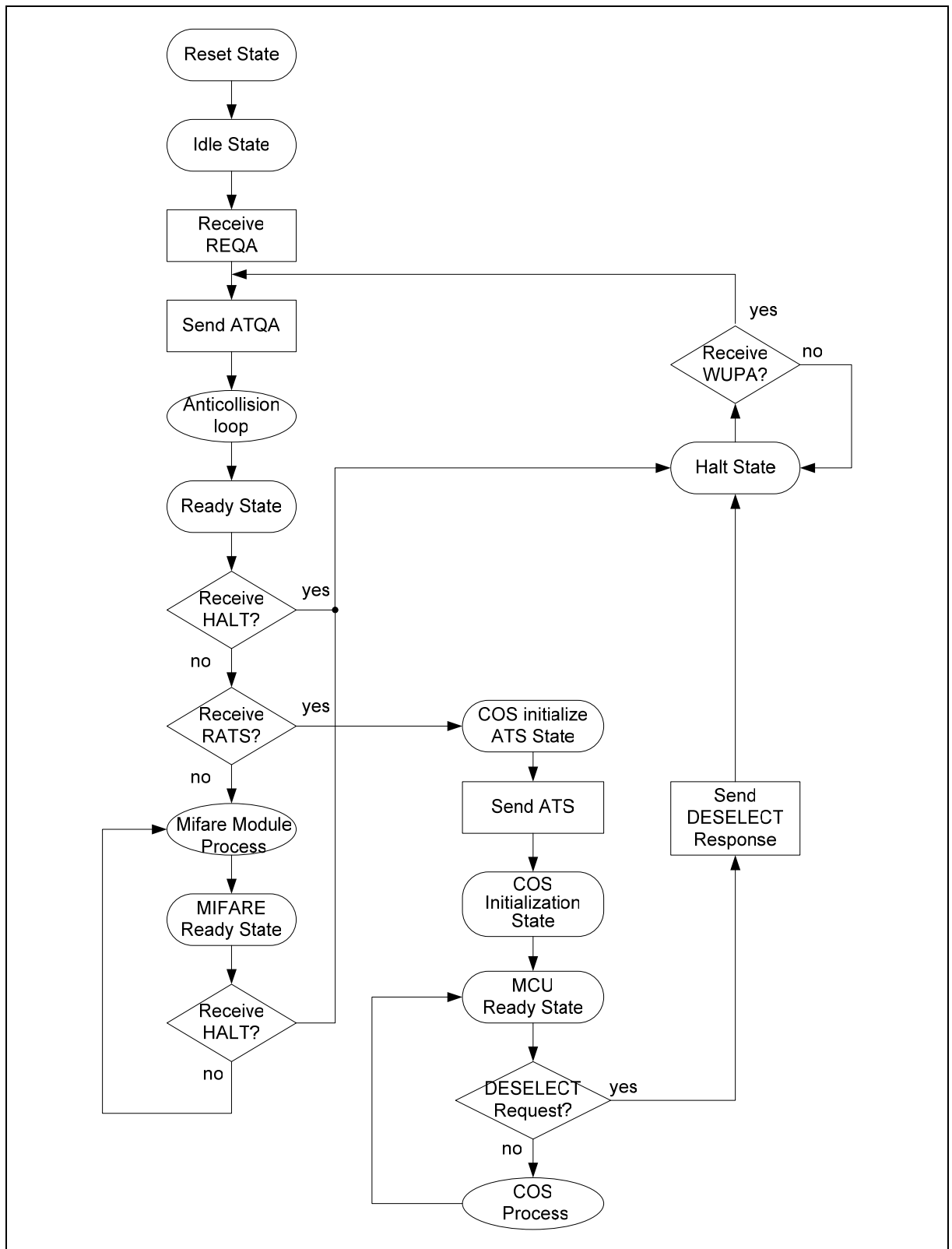


Figure 2-1 FM1208M01 Operating Flow

3. Memory Organisation

FM1208M01 include internal memory and external memory (according to MCU). External memory includes program memory and data memory. The size of data memory is 8K byte.

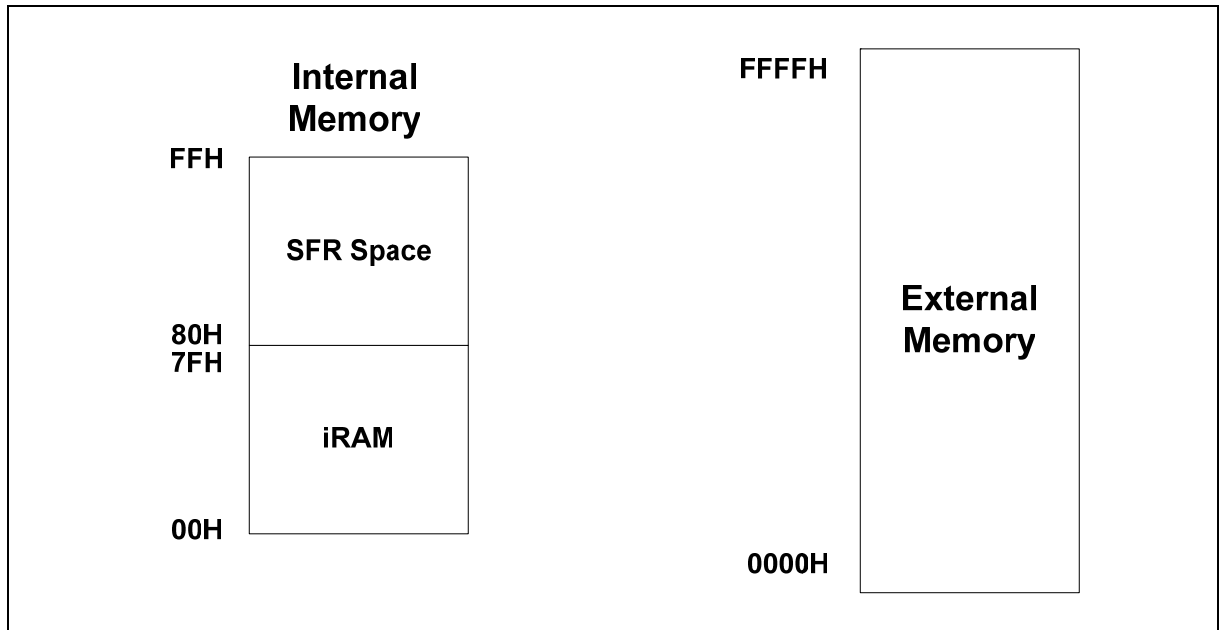
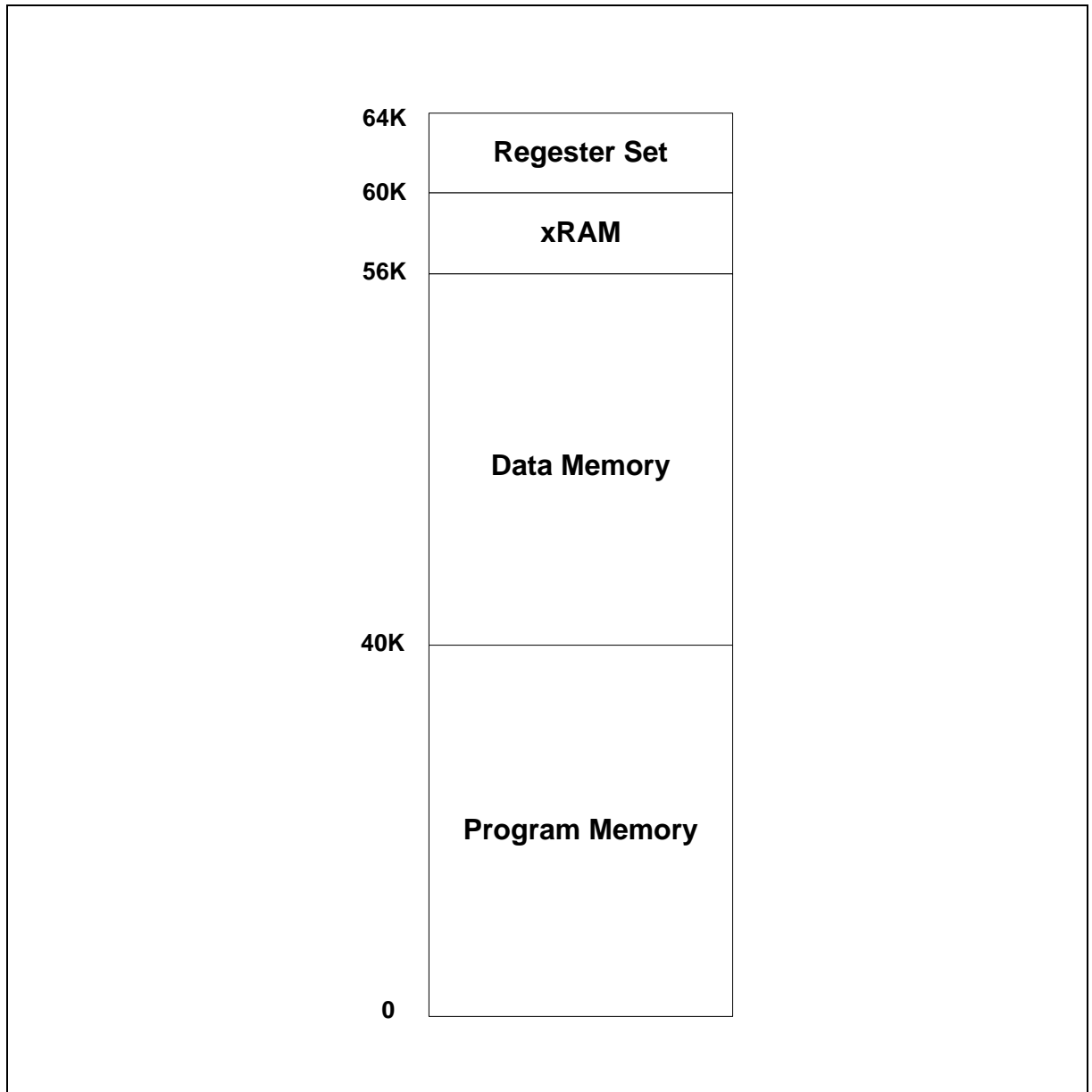


Figure 3-1 FM1208M01 Memory Organisation

External Memory Organisation:

Number	Address	Size	Description
1	0000H ~ 9FFFH	40K	Program Memory
2	A000H ~ DFFFH	16K	Data Memory
3	E000H ~ EFFFH	4K	xRAM
4	F000H ~ FFFFH	4K	Register set

Table 3-1 FM1208M01 External Memory Organisation

External Memory Organisation:**Figure 3-2 FM1208M01 External Memory Organisation**

4. Command Set

CPU command compatible to Turbo51 command set.

Common command set:

Command	Code (HEX)	Description
request std	26	Answer to Request Look for card in operating area. 'Request Std' means looking for card which is not set to halt
request all	52	Answer to Request Look for card in operating area. 'Request All' means looking for all cards which are in operating area
Anti-collision	93	Anti-collision It means selecting only one card if there is one card or several cards in operating area.
Select Card	93	Select Card It means setting up the communication with the selected card after the anti-collision command.
Authentication.1a Authentication.1b	60/61	Authentication Before visiting memory, the user must verify if the operation is legal by coherence of cipher in RWD and cipher in card.
Read	30	Read Read 16 bytes of one block.
Write	A0	Write Write data to one block.
Increment	C1	Increment Increment a certain value to numerical block, store the result in register.
Decrement	C0	Decrement Decrement a certain value to numerical block, store the result in register.
Restore	C2	Restore Read contents of numerical block to register.
Transfer	B0	Transfer Write contents of register to numerical block.
Halt	50	Halt Card is set to halt.

Table 4-1 FM1208M01 Command Set

5. Ordering Information

Ordering Code	Package	Operation Temperature
FM1208M01-X0A2	XOA2 module	-25°C ~ +70°C

6. Revision History

Version	Publication date	Pages	Paragraph or Illustration	Revise Description
0.1	Oct. 2007	13		Initial Release.
0.2	May. 2008	13	Sales and service	Updated the address of HK office.

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