

FUDAN MICROELECTRONICS



复旦微电子

# ***FM1208 Contactless CPU Card***

**Datasheet**

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**May. 2008**

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# 1. Product Overview

## 1.1. Description

FM1208 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 CPU card based on PBOC2.0 Standard.

## 1.2. Feature

- Contactless RF interface according to ISO/IEC14443 TypeA
- 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

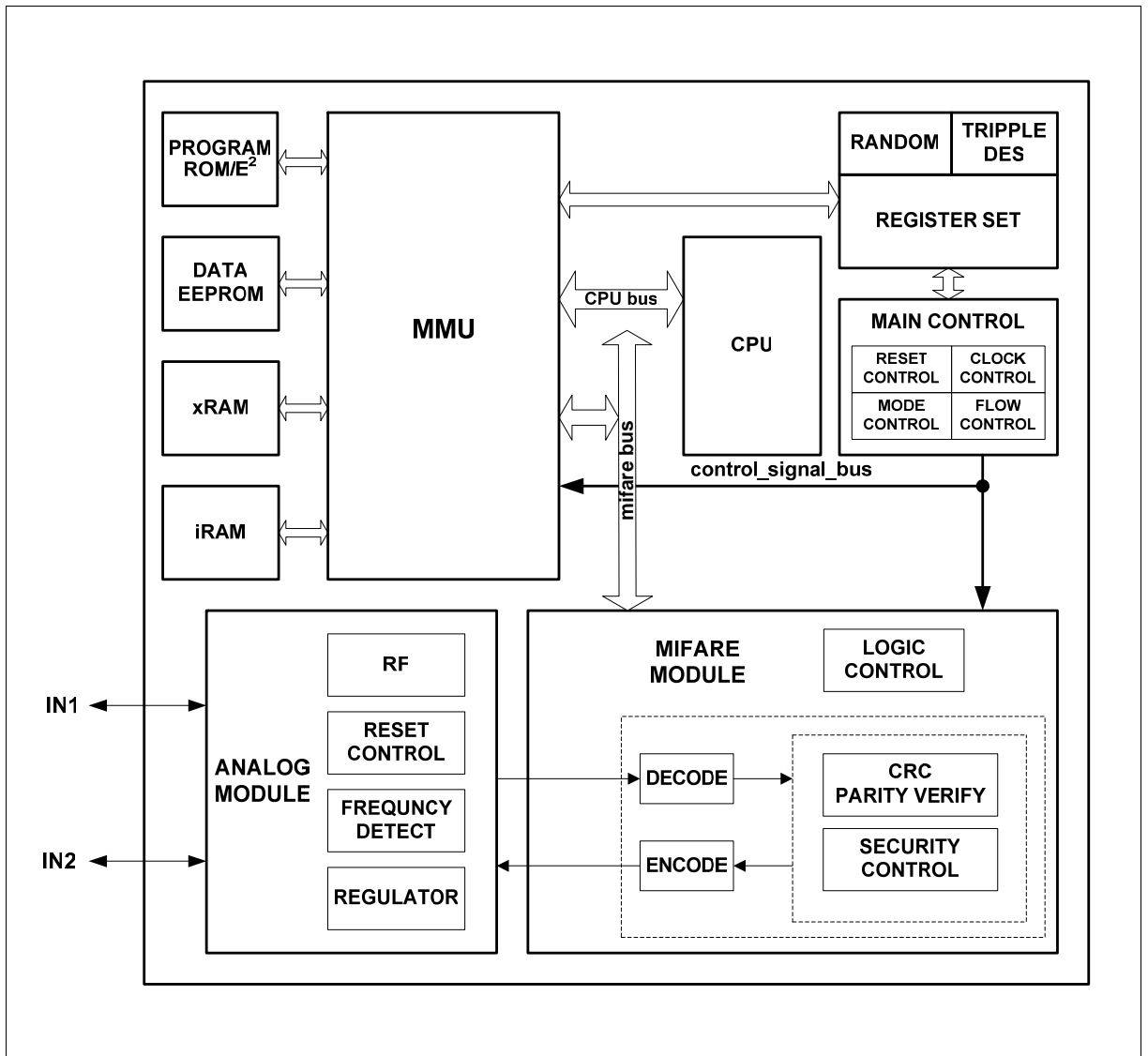


Figure 1-1 FM1208 Block diagram

## 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 FM1208 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 FM1208 Card Maximum Ratings

## 1.5. Package

FM1208 module: XOA2

FM1208 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 FM1208 Pin Description

## 1.7. ATQA and SAK Description

Type	ATQA	SAK
FM1208	0x0008	0x20

Table 1-4 FM1208 ATQA and SAK Description

## 2. Operating Flow

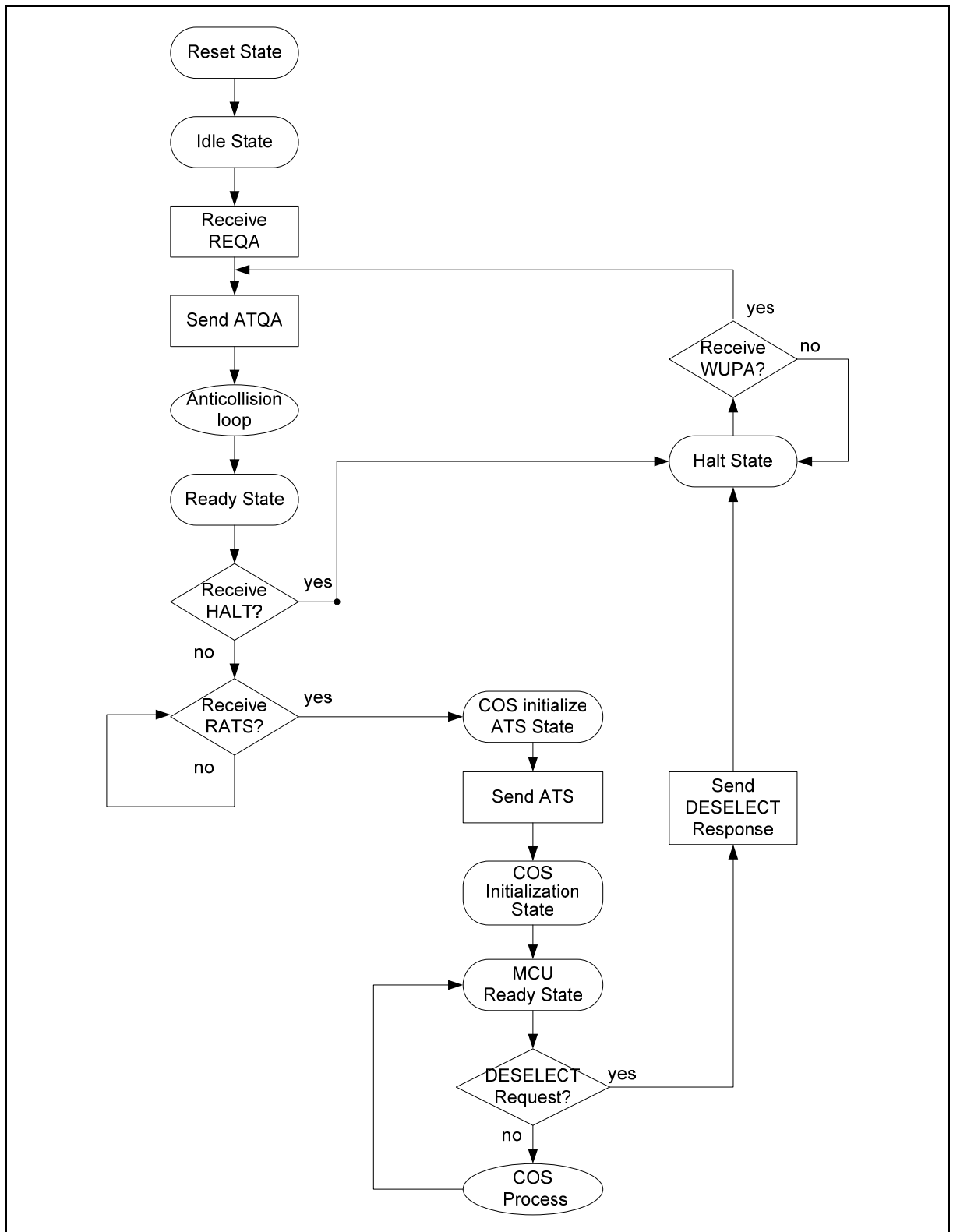


Figure 2-1 FM1208 Operating Flow

### 3. Memory Organisation

FM1208 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.

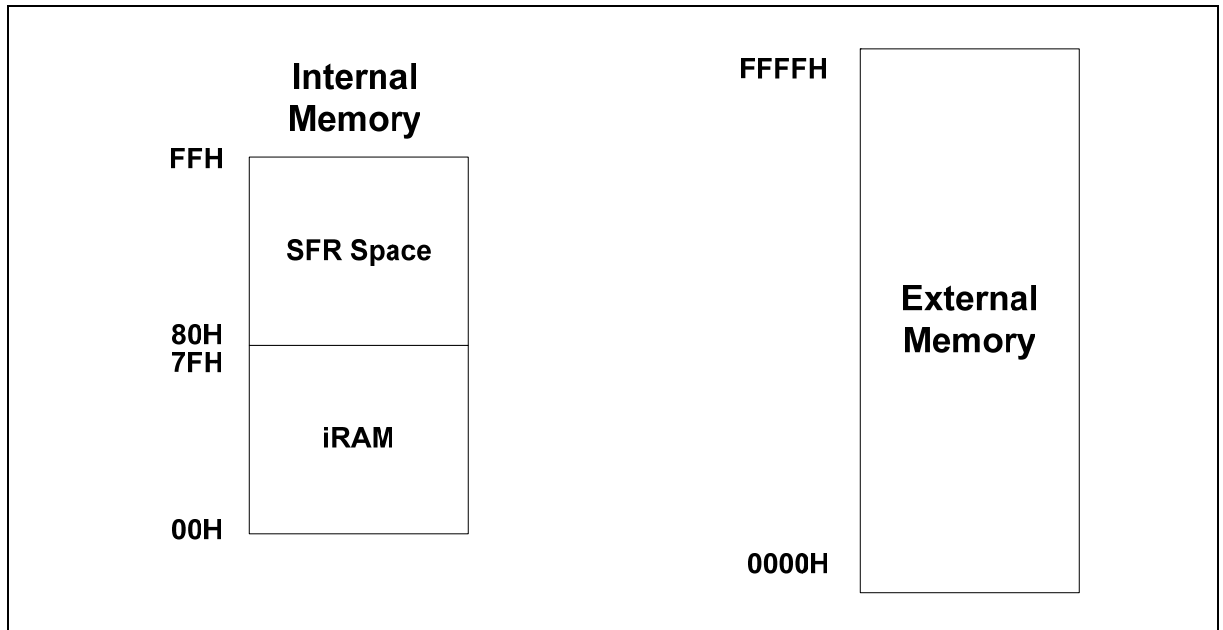


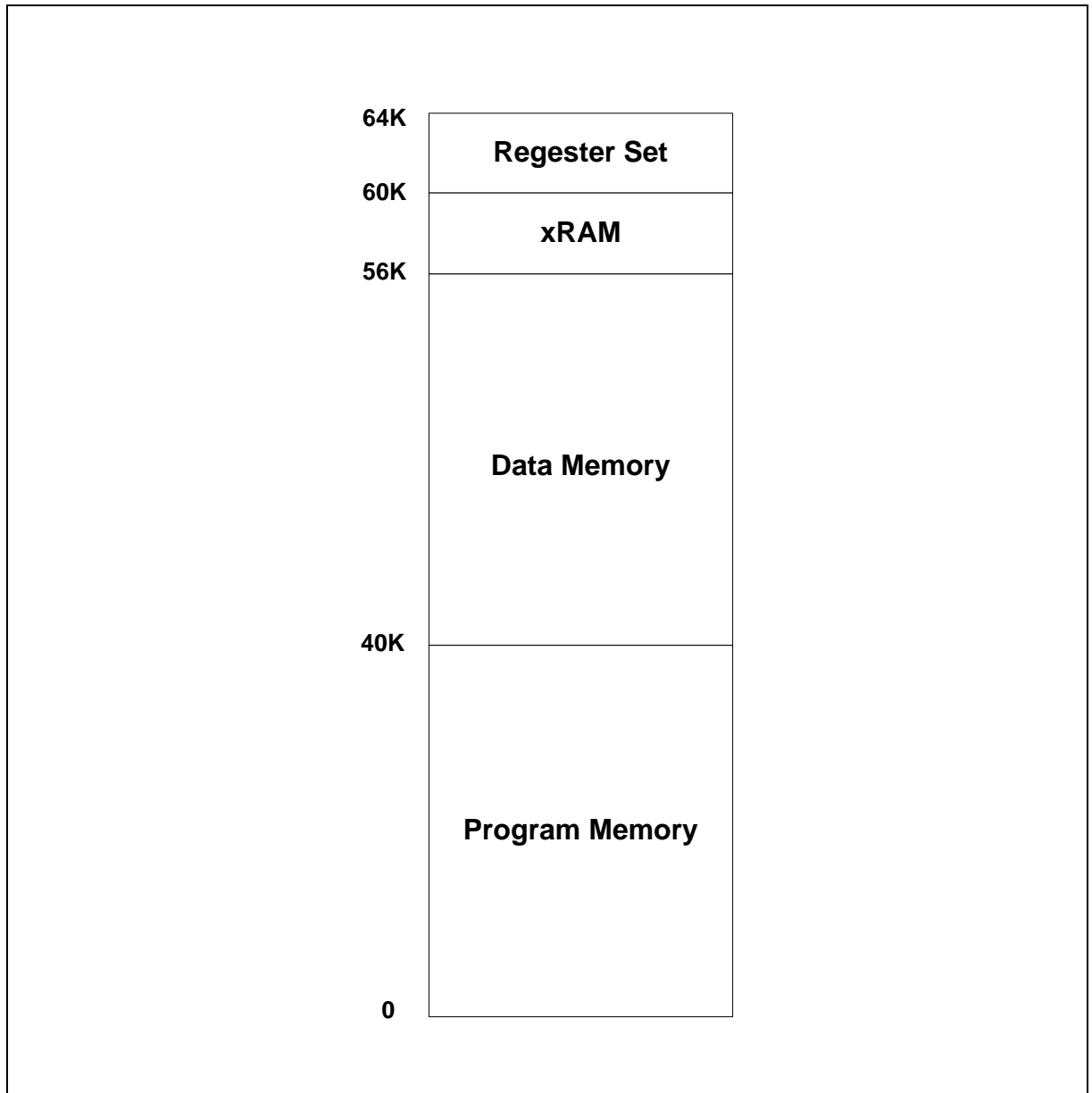
Figure 3-1 FM1208 Memory Organisation

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 FM1208 External Memory Organisation



**External Memory Organisation:****Figure 3-2 FM1208 External Memory Organisation**

## 4. Command Set

CPU command compatible to Turbo51 command set.

Common command set:

Command	Code (HEX)	Description
request std	26	<b>Answer to Request</b> Look for card in operating area. 'Request Std' means looking for card which is not set to halt
request all	52	<b>Answer to Request</b> Look for card in operating area. 'Request All' means looking for all cards which are in operating area
Anti-collision	93	<b>Anti-collision</b> It means selecting only one card if there is one card or several cards in operating area.
Select Card	93	<b>Select Card</b> It means setting up the communication with the selected card after the anti-collision command.
Halt	50	<b>Halt</b> Card is set to halt.

Table 4-1 FM1208 Command Set

## 5. Ordering Information

Ordering Code	Package	Operation Temperature
FM1208-X0A2	X0A2 module	-25°C ~ +70°C

## 6. Revision History

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

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