FUDAN MICROELECTRONICS

复旦微电子

# *FM1208 Contactless CPU Card*

**Datasheet**

**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：**

- Identifing 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

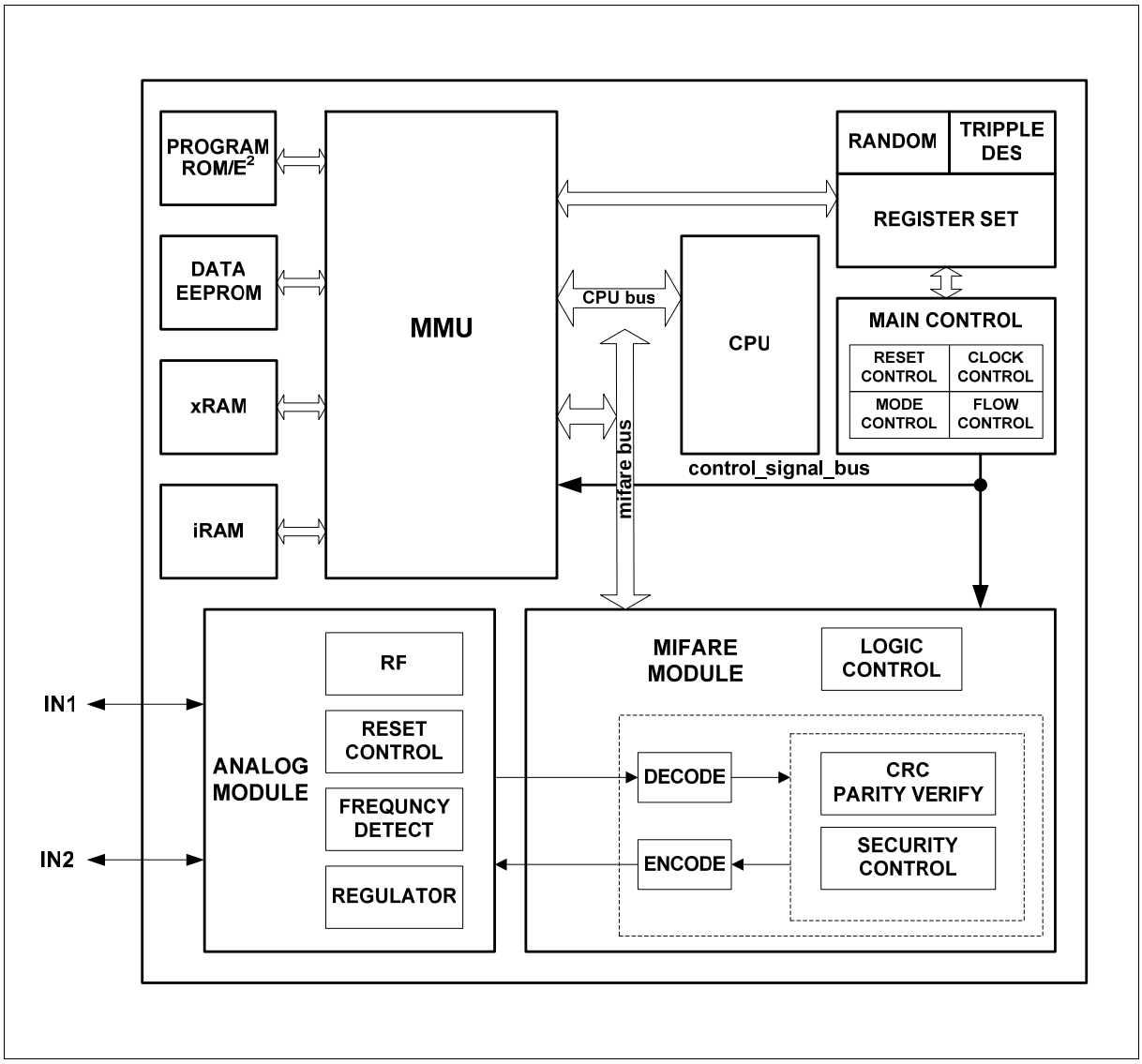


**Figure 1-1 FM1208 Block diagram**

## 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 SAKDescription

| Type | ATQA | SAK |
|---|---|---|
| FM1208 | 0x0008 | 0x20 |

**Table 1-4 FM1208 ATQA and SAK Description**

# 2. Operating Flow

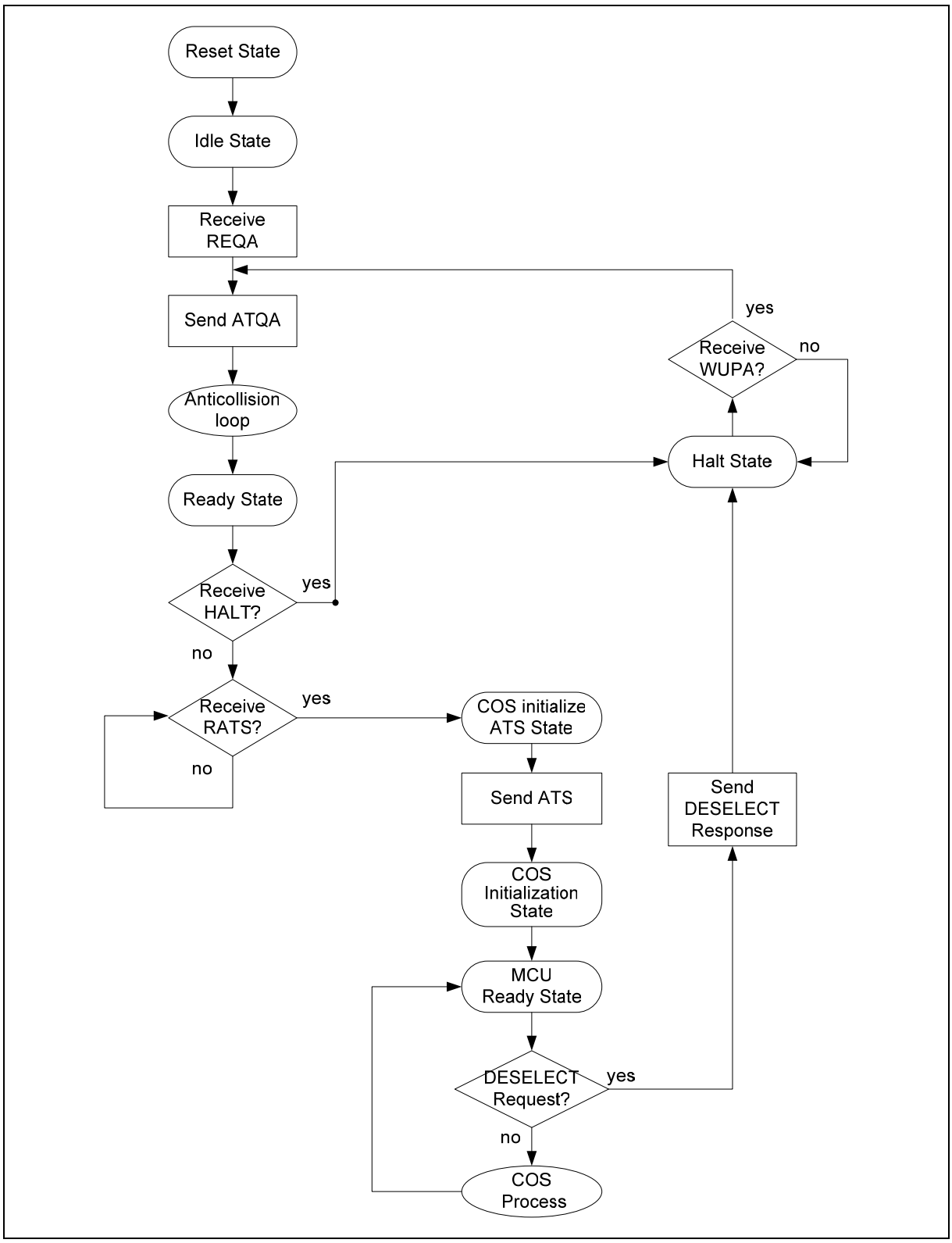


**Figure 2-1 FM1208 Operating Flow**

# 3. Memory Organisation

FM1208 include internal memory and external memory (according to MCU). Externlal memory includes program memory and data memory. The size of data memory is 8K byte.

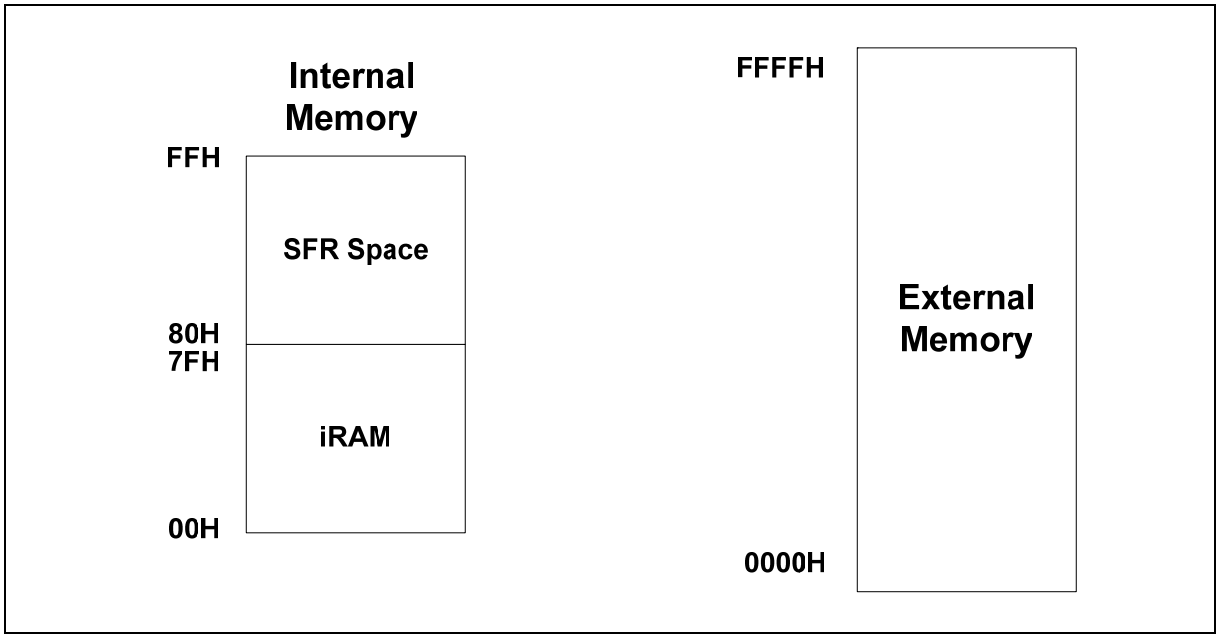


**Figure 3-1 FM1208 Memory Organisation**

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 | Regester set |

**Table 3-1 FM1208 External Memory Organisation**

**External Memory Organisation：**

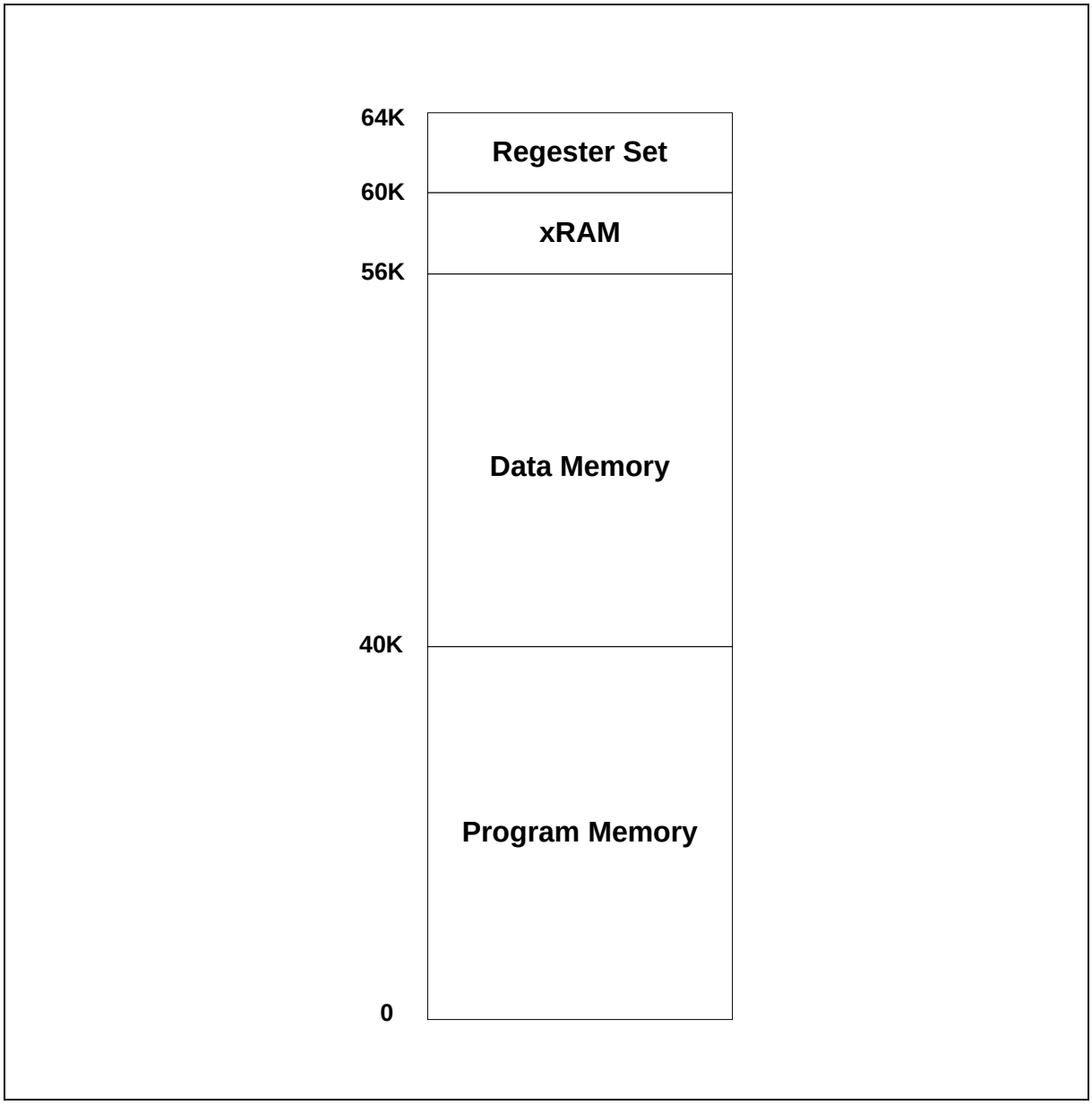


**Figure 3-2 FM1208 External Memory Organisation**

# 4. Command Set

CPU commandcompatible to Turbo51 command set.

Common command set:

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

**Table 4-1 FM1208 Command Set**

# 5. Ordering Information

| Ordering Code | Package | Operation Temprature |
|---|---|---|
| FM1208-X0A2 | XOA2 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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