



# Mifare Card Commands

Version 0.1

September 2009

<http://www.castech.com.tw>

*CASTLES TECHNOLOGY*

Doc.#

Confidential Level:

HIGH

# Table of Contents

TABLE OF CONTENTS ..... 1

REVISION HISTORY ..... 2

1 INTRODUCTION..... 3

2 COMMANDS..... 3

2.1 GET DATA..... 3

2.2 LOAD KEY ..... 4

2.3 AUTHENTICATION ..... 4

2.4 READ BINARY ..... 5

2.5 UPDATE BINARY..... 6

2.6 INCREASE..... 7

2.7 DECREASE ..... 7

2.8 TRANSFER..... 8

2.9 RESTORE ..... 9

## ***Revision History***

<b>Version</b>	<b>Date</b>	<b>Editor</b>	<b>Description</b>
V0.1	2009.09.01	Arthur	Created

# 1 Introduction

This document is the reference manual to access Mifare card for Castles PC/SC contactless reader.

## 2 Commands

### 2.1 Get Data

#### Request Format:

CLA	INS	P1	P2	Le
FFh	CAh	Rt	00	RI

#### Parameter Contents:

Rt : read UID = 0x00  
      : Read historical bytes of ATS (Type A only) =0x01  
RI : number of bytes to read  
      0x00 : Return full length of the data

#### Response Format:

Data	Status Word	
UID / historical bytes of ATS	SW1	SW2

#### Response Code:

SW1SW2	Description
9000h	Normal processing
6282h	End of data reached before Le bytes (Le is greater than data length)
6Cxxh	Wrong length (wrong number Le; 'XX' encodes the exact number) if Le is less than the available UID length

#### Example:

1. FF CA 00 00 00 => read UID
2. FF CA 01 00 00 => read historical bytes of ATS (Type A only)

## 2.2 Load Key

### Request Format:

CLA	INS	P1	P2	Lc	Data
FFh	82h	Ks	Kn	Kl	K

### Parameter Contents:

- Ks : key structure = 0x00  
 ※ Currently we only support
1. card key (Mifare key)
  2. plain transmission
  3. load to volatile memory (data will lost when power off)
- Kn : key number = 0x00  
 Kl : key length  
 K : key

### Response Format:

Status Word	
SW1	SW2

### Response Code:

SW1SW2	Description
9000h	Normal processing
6983h	Reader key not supported
6985h	Secured transmission not supported
6987h	Non volatile memory is not available
6988h	Key number not valid
6889h	Key length is not correct

### Example:

FF 82 00 00 06 FF FF FF FF FF FF => load default key of Mifare

## 2.3 Authentication

### Request Format:

CLA	INS	P1	P2	Lc	Data				
FFh	86h	00	00	05	Ver	Adr1	Adr2	Kt	Kn

**Parameter Contents:**

Ver : version = 0x01  
 Adr1: address MSB = authen block number  
 Adr2: address LSB  
 Kt : key type = 0x60 (KEY\_A)  
       = 0x61 (KEY\_B)  
 Kn : key number

**Response Format:**

Status Word	
SW1	SW2

**Response Code:**

SW1SW2	Description
9000h	Normal processing
6986h	Key type not known

**Example:**

FF 86 00 00 05 01 00 01 60 00 => authen with the KEY\_A of sector containing the block 1

## 2.4 Read Binary

**Request Format:**

CLA	INS	P1	P2	Lc
FFh	B0h	Adr1	Adr2	RI

**Parameter Contents:**

Adr1: address MSB  
 Adr2: address LSB  
 RI : number of bytes to read

**Response Format:**

Data	Status Word	
Response Data	SW1	SW2

**Response Code:**

SW1SW2	Description
9000h	Normal processing
6Cxxh	Wrong length (wrong number Le; 'xx' is the exact number)

**Example:**

1. FF B0 00 01 10 > read the content of block 1  
 ※ for Mifare Ultralight card , Response data contains Pages 1,2,3,4

## 2.5 Update Binary

**Request Format:**

CLA	INS	P1	P2	Lc	Data
FFh	D6h	Adr1	Adr2	Wl	D

**Parameter Contents:**

Adr1: address MSB  
 Adr2: address LSB  
 Wl : number of bytes to write  
 D : data to write

**Response Format:**

Status Word	
SW1	SW2

**Response Code:**

SW1SW2	Description
9000h	Normal processing

**Example:**

FF D6 00 01 10 00 00 00 00 FF FF FF FF 00 00 00 00 55 AA 55 AA  
 => write block 1 to a value block with value 0

## 2.6 Increase

Value blocks operation function , increment the block value.

**Please note that this command will not change the value on card if not follow by Transfer command immediately**

### Request Format:

CLA	INS	P1	P2	Lc	Data
CCh	10h	Adr1	Adr2	4	V

### Parameter Contents:

Adr1: MSB block number

Adr2: LSB block number

V : Value

### Response Format:

Status Word	
SW1	SW2

### Response Code:

SW1SW2	Description
9000h	Normal processing
6982h	Security status not satisfied

### Example:

CC 10 00 01 04 01 00 00 00

=> Load the value of block 1, add 1 and put the result to internal register

## 2.7 Decrease

Value blocks operation function, decrement the block value

**Please note that this command will not change the value on card if not follow by Transfer command immediately**

### Request Format:

CLA	INS	P1	P2	Lc	Data
CCh	12h	Adr1	Adr2	04	V



**Parameter Contents:**

Adr1: MSB block number

Adr2: LSB block number

V : Value

**Response Format:**

Status Word	
SW1	SW2

**Response Code:**

SW1SW2	Description
9000h	Normal processing
6982h	Security status not satisfied

**Example:**

CC 12 00 01 04 01 00 00 00

=&gt; load the value of block 1, minus 1 and put the result to internal register

## 2.8 Transfer

Value blocks operation function, transfer the value of internal register to block number

**Request Format:**

CLA	INS	P1	P2
CCh	14h	Adr1	Adr2

**Parameter Contents:**

Adr1: MSB block number

Adr2: LSB block number

**Response Format:**

Status Word	
SW1	SW2

**Response Code:**

SW1SW2	Description
--------	-------------

9000h	Normal processing
6982h	Security status not satisfied

**Example:**

CC 14 00 02

=&gt; transfer the value of internal register to block 2

## 2.9 Restore

Value blocks operation function, restore the value of internal register from block number

**Request Format:**

CLA	INS	P1	P2
CCh	16h	Adr1	Adr2

**Parameter Contents:**

Adr1: MSB block number

Adr2: LSB block number

**Response Format:**

Status Word	
SW1	SW2

**Response Code:**

SW1SW2	Description
9000h	Normal processing
6982h	Security status not satisfied

**Example:**

CC 16 00 01

=&gt; restore the value of internal register from block 1