

CPU experiments

Experiment 11: Based on the ISO/IEC 7816 standard protocol, the CPU card RATS, PPS request instruction operation

Purpose of the experiment

1. Learn and understand the ISO/IEC 7816 standard.
2. Learn and understand the specific definition of each byte of ATS.
3. Learn and understand the implementation of PPS settings.

Experimental equipment:

1. 1 RFID reader module
2. 1 laptop or desktop computer
3. PC software and MINI USB cable

Experiment:

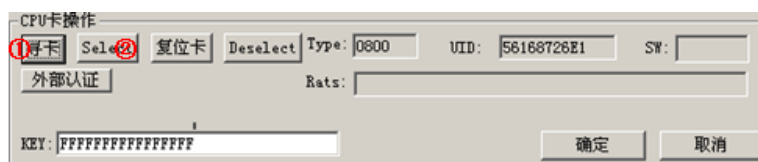
1. Use the provided underlying program and the host computer software based on the WINDOS environment.
2. Turn on the USB communication function of the reader, open the host computer software to send RATS commands, and the host computer can obtain the real-time response of the CPU card through the USB, and analyze the response data according to the ISO7816 protocol to determine its correctness.
3. Turn on the USB communication function of the reader, open the host computer software to send PPS commands, and the host computer can obtain the real-time response of the sending command to the CPU card through USB, and set the response number judgment parameter successfully.

Procedure:

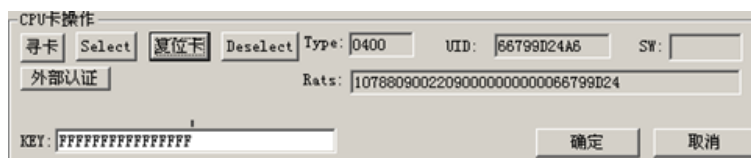
First, the RFID read-write module is used to activate the CPU card, and the process is operated according to Figure 1.

Place the CPU card in the card reading area of the card reading module;

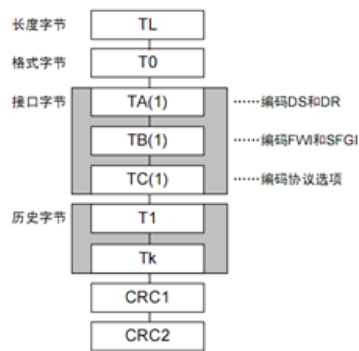
Select the CPU card according to the orange dotted box in Figure 1, and click the button "Search" -> "Select" as shown in the following figure.



Click the button "Reset Card" to reset the CPU, so that the CPU card enters FMCOS mode, and returns the ATS code



Perform field analysis on the returned ATS to understand its meaning



Example 1:

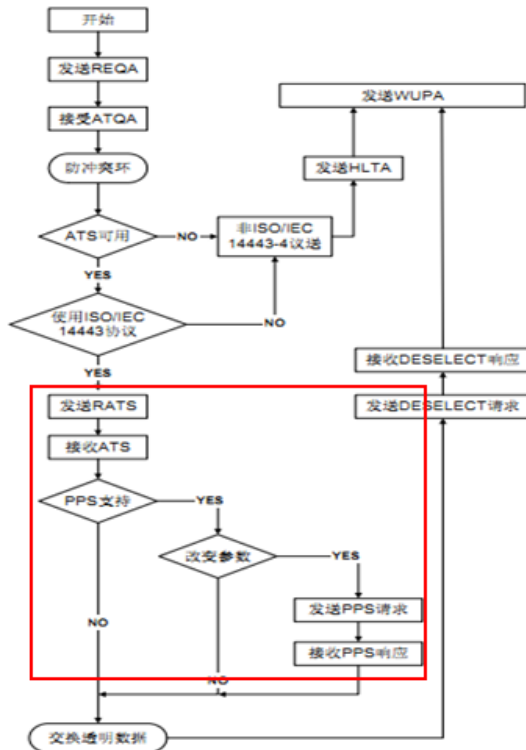
If the ATS of a CPU card is 1078809002209000000000066799D24, the following table describes the ATS of the CPU card:

symbol	Byte content	Content Explanation
TL	0x10	Length bytes
T0	0x78	TA1, TB1, and TC1 present, FSCI=8 (FSC=256 bytes)
TA1	0x80	Both directions can support the same D, support DR=1, DS=1
TB1	0x90	FWI=0x9 (FWT=155ms) SFGI=0(SFGT=302us)
TC1	0x02	NAD is not supported, CID is supported
T1	0x20	COS version 2.0
T2	0x09	COS Manufacturer Code (Multiplier Microelectronics)
T3	0x00	Reserved bytes
T4-T11	0000000066799D24	Card serial number

Use the PPS command to set the communication rate between the CPU card and the card reader module.



图 1 CPU 卡激活流程图



Experiment 12: The operation of the card issuance instruction of the FMCOS user card of the CPU card system

Objectives:

1. Understand the structure of the FMCOS file system
2. Understand the CPU card issuance process
3. Master the use of CPU card issuance instructions and understand the meaning of each instruction.
4. Understand the user card e-wallet format.

Experimental equipment:

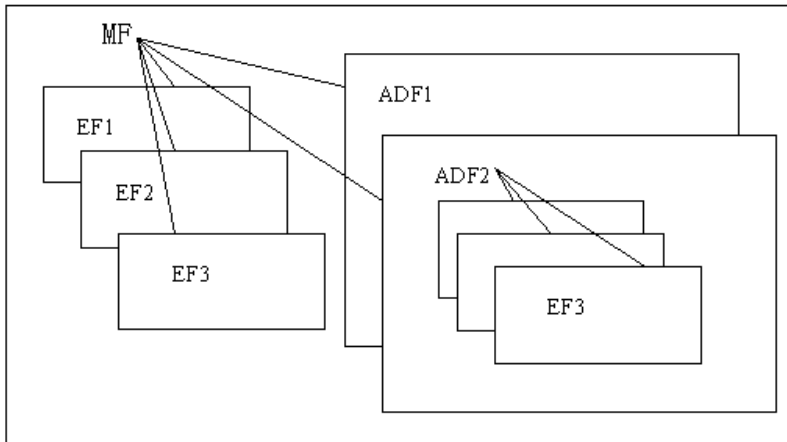
1. 1 RFID reader module
2. 1 laptop or desktop computer
3. PC software and MINI USB cable

Experiment:

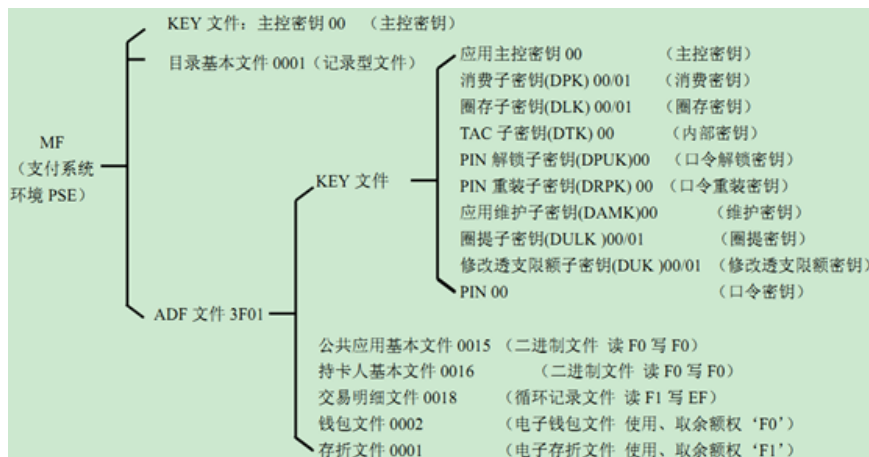
1. Use the provided underlying program and the host computer software based on the WINDOS environment.
2. Turn on the USB communication function of the reader, open the host computer software to send the relevant card issuance instructions of the CPU card, and establish a file system on FMCOS.
3. Understand the meaning of the card issuance instruction, and be able to judge whether the CPU card is successfully operated according to the returned response code.

Procedure:

Refer to the FMCOS General Technical Manual to understand the relationship between the various levels of documents (MF, ADF, EF) under FMCOS.



According to the file structure of the user card in the figure below, the card issuance operation is carried out, and the card issuance instruction can refer to the following blue text part.



User card file structure

/***** issuance/

00a4000000

For external authentication, the initial password is FFFFFFFFFFFFFFFF

80d40100153cf0020101bbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbb

Overdraft Limit Subkey DUK 01

80d40101153cf0020101cccccccccccccccccccccccccccc

//PIN 00

80d401000b3af0ef0133123456FFFFFF

Create a basic file for the public application: 0015 (binary, read F0, write F0).

80e0001507a8001ef0f0ffff

WRITE A PUBLIC APPLICATION BASE FILE (MAC).

04d6950022112233445566778899aabbccddeeff00112233445566778899aabbccdee6f22aa45

Create cardholder profile 0016 (binary, read, F0, write, F0).

80e0001607a80027f0f0ffff

Write basic cardholder documents

04d6960022112233445566778899aabbccddeeff00112233445566778899aabbccdee0817284e

Create transaction detail file 0018 (circular record file, read F1, write EF).

80e00018072e0A17f1effff

Create an electronic passbook file 0001 (use and withdraw balance rights "F1").

80e00001072f0208f10f1f18

Create e-wallet file 0002 (use, withdraw balance right "F0").

80e00002072f0208f0f0ff18

Deselct

Experiment 13: Consumption instruction operation of FMCOS user card in CPU card system

Purpose of the experiment

1. Understand the structure of the FMCOS file system
2. Understand the process of CPU card consumption
3. Master the use of CPU card consumption instructions and understand the meaning of each instruction.
4. Understand the calculation principle of DES and MAC codes.

Experimental equipment:

1. 1 RFID reader module
2. 1 laptop or desktop computer
3. PC software and MINI USB cable

Experiment:

1. Use the provided underlying program and the host computer software based on the WINDOS environment.
2. Turn on the USB communication function of the reader, open the host computer software to send the consumption instructions related to the CPU card, and pay attention to the data interaction process (MAC code calculation) between the card reader module and the user card.
3. Understand the meaning of the card consumption instruction, and judge whether the CPU card operation is successful according to the returned

response code.

Procedure:

1、

/****** consumption/

00a4040009a00000000386980701

805c000204//Read balance

0020000003123456

Captivity

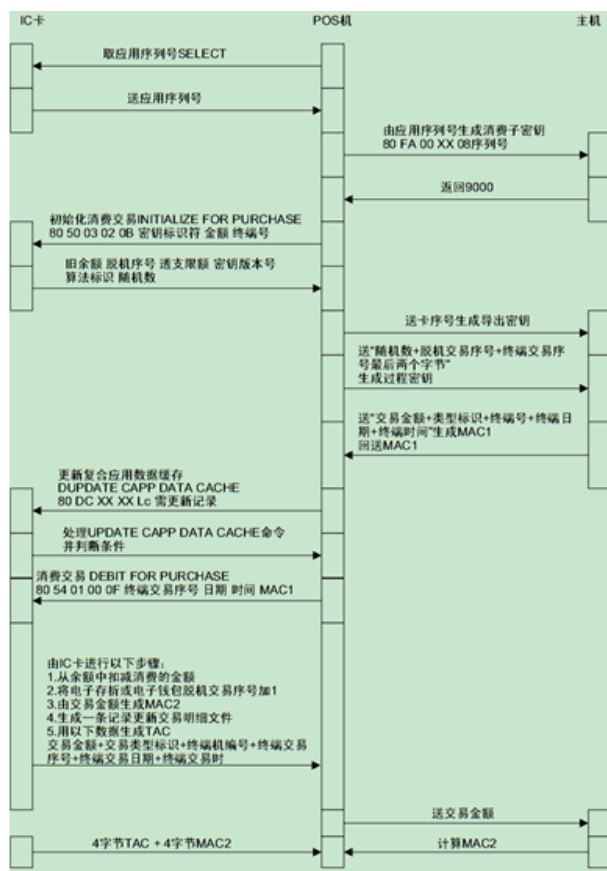
805000020b000000000F11223344556610

805200000b11223344332211+MAC2

consume

805001020b02000000011122334455660f

805401000f0000000011223344332211+MAC1



Comprehensive consumption process of CPU card