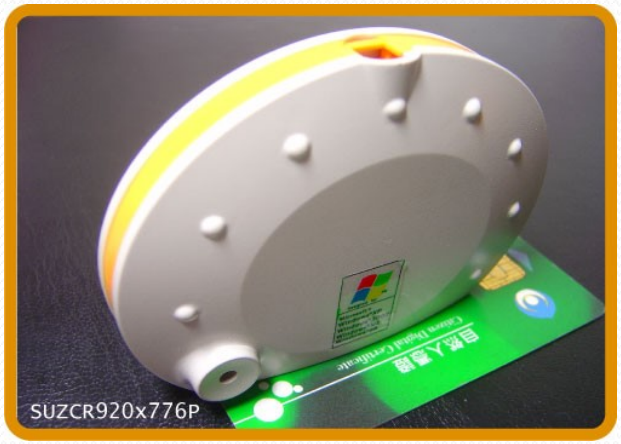
Combo Reader ISO7816 / NFC ISO15693

USB 2.0/TTL

(COMBOM smartcard with NFC reader)

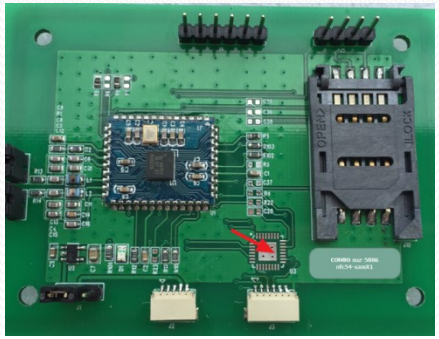
NXP PN74XX/PN51XX/PN544xx

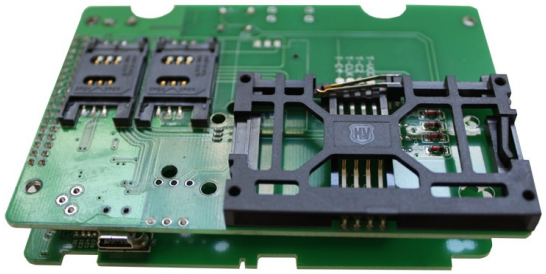
上航科技
SUNZone TEK



Rev. 0.1

Agenda





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Feature

- USB 2.0 Full Speed Interface/(RS232/TTL option)
- CCID Compliance
- Support Smart card and Contactless Smart Card
- Contactless Smart Card Reader PN 544

(1) Built-in antenna for contactless tag access, with card reading distance of up to 80 mm (depending on tag type)

(2) Supports：

- ISO/IEC 14443 Type A card,T=CL
- MIFARE 1K/4K
- MIFARE Ultra light C
- NTAG203
- FeliCa (Sony)
- Topaz

(3) ISO/IEC 15693, ICODE reader

Feature

- Contact Smart Card Reader

  (1) Supports ISO 7816 Class A, B and C (5 V, 3V and 1.8 V)
  (2) Supports CAC (Common Access Card)
  (3) Supports PIV (Personal Identity Verification Card)
  (4) Supports microprocessor cards with T=0 or T=1 protocol
  (5) Supports memory cards
  (6) ISO 7816 compliant SAM slot x 1 Up to 4 slot

- Application Programming Interface

  (1) Supports PC/SC standard
  (2) Supports CT-API (through wrapper on top of PC/SC)
  (3) Android OS ,Linux OS

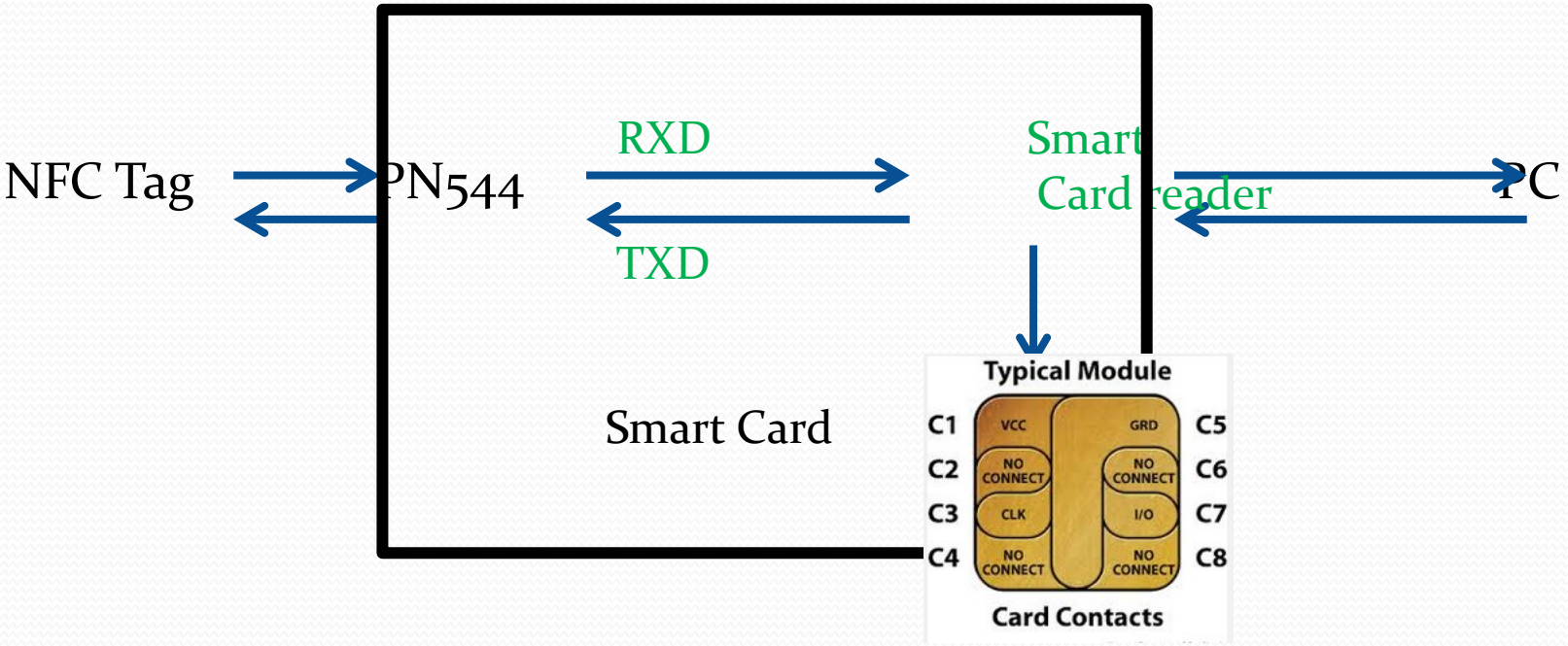
- Built-in Peripherals

  (1) Two LEDs
  (2) Buzzer
  (3) Flexible /PCB inlay Antenna option

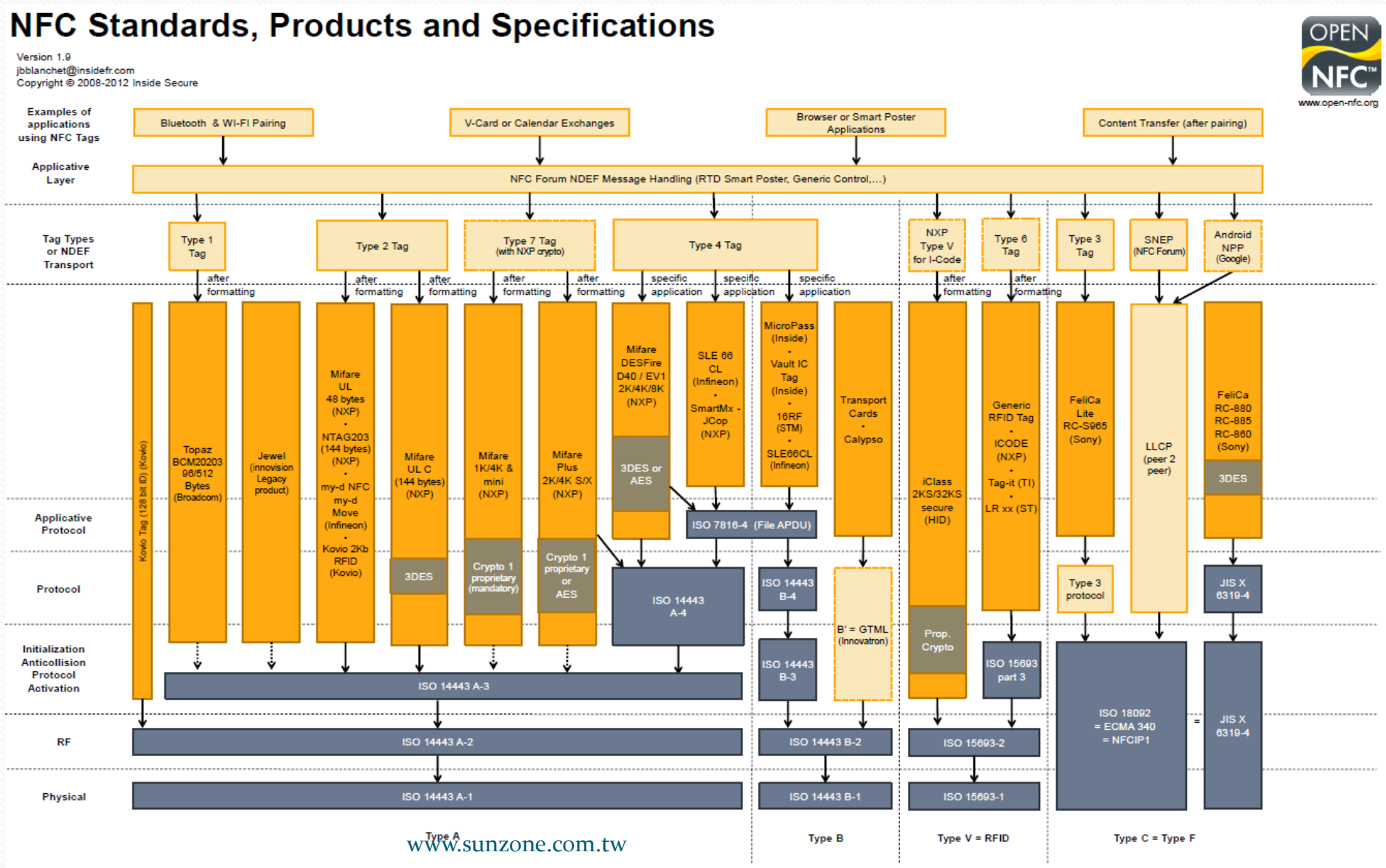
Combo Reader NFC Solution

- Comb09563 is a dual interface reader that can access any contact and contactless smart cards following the ISO 7816 and ISO 14443 standards.

- Transfer path of smartcard controller access cards as follows:



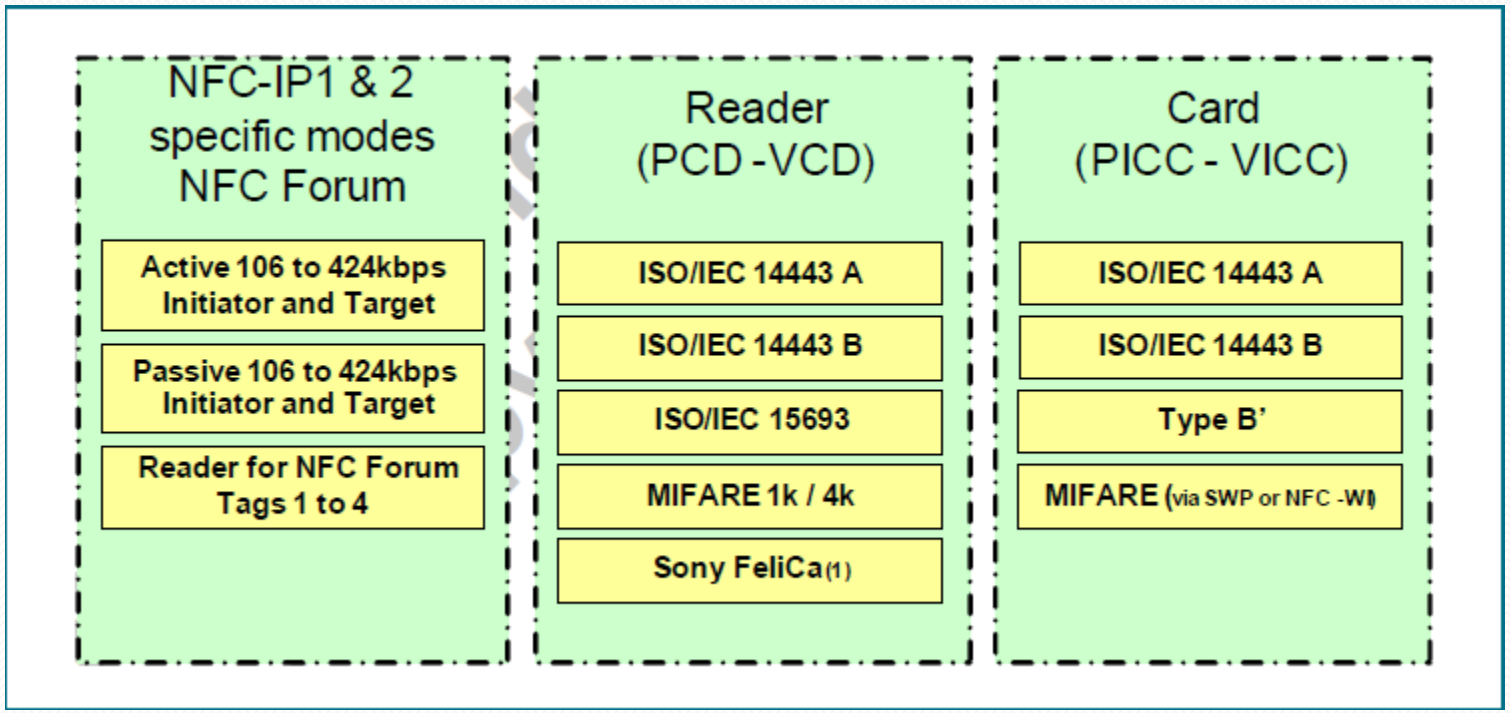
NFC Standard



PN544 introduction

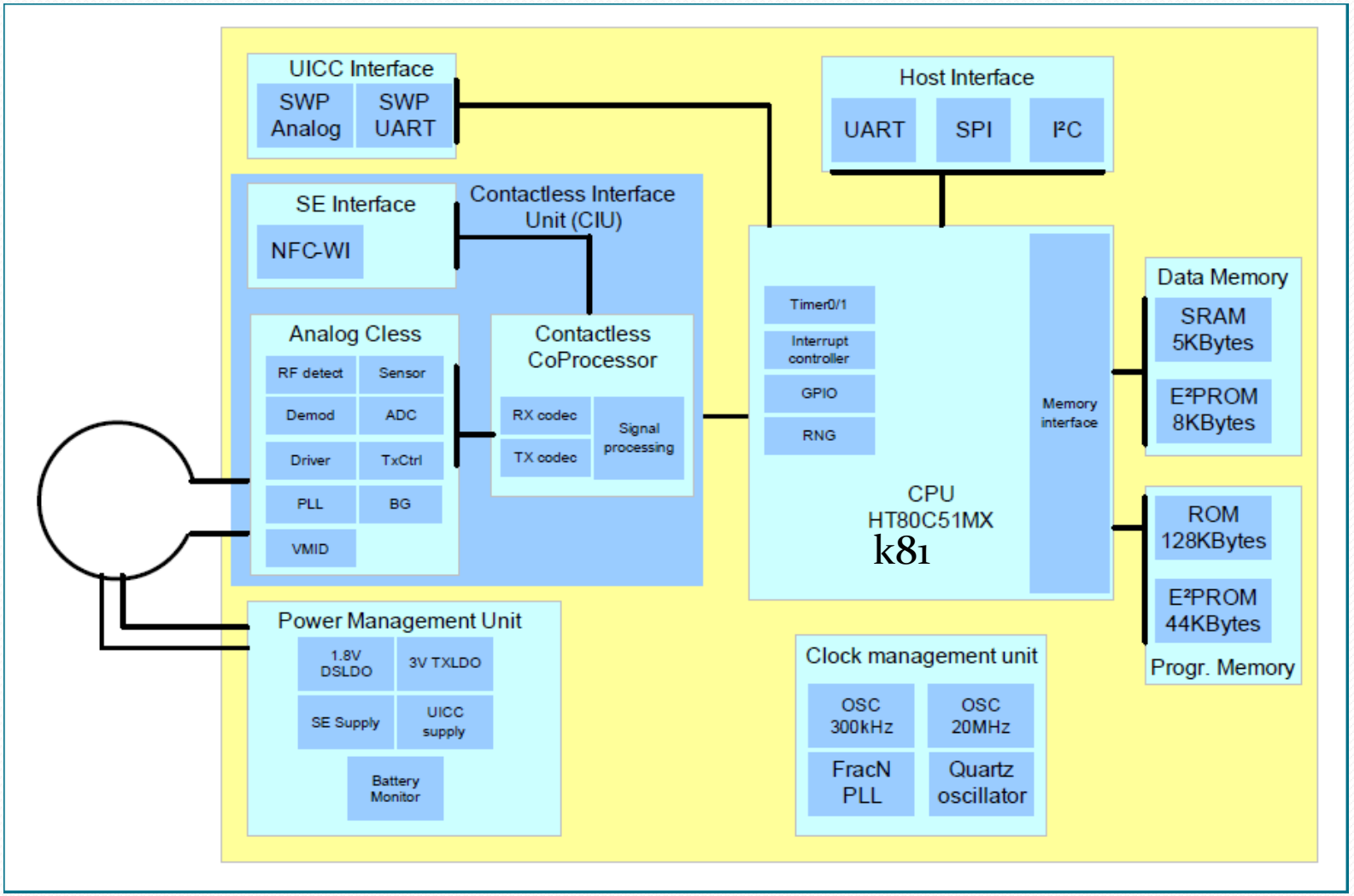
- PN544 transmission modes

  According to ISO/IEC 18092 (ECMA 340) standard



PN544 introduction

- PN544 block diagram



How to access Tags

Auto Detection and Send ATR as Smart Card Reader

(1) Combo 9563 loop detecting Tag when Contactless enable

(2) If the reader detects a Tag, an ATR will be sent to the PC/SC driver for identifying the Tag.

(3) AP identify Tag by ATR data then send the different command to access Tag.

How to access Tags

ATR Data for different Tag

- Example：

ATR for MIFARE 1K =

{3B 8F 80 01 80 4F 0C A0 00 00 03 06 03 00 01 00 00 00 00 6Ah}

ATR											
Initial Header	To	TD1	TD2	T1	Tk	Length	RID	Standard	Card Name	RFU	TCK
3Bh	8Fh	80h	01h	80h	4Fh	0Ch	A0 00 00 03 06h	03h	00 01h	00 00 00 00h	6Ah

- Where, Card Name：

00 01h = MIFARE 1K

00 02h = MIFARE 4K

00 03h = MIFARE Ultralight

F0 04h = Topaz

F0 11h = FeliCa

00 14h = ICODESLI

00 26h = MIFARE Mini

00 30h = Topaz NFC Tag = Generic RFID Tag (ISO/IEC 1569

00 3Ah = MIFARE Ultralight C

00 3Bh = FeliCa

Card Name(Vendor define)：

F0 13h

How to access Tags

How to access MIFARE

- Read MIFARE UID

  APDU → Reader：FF CA 00 00 00

  Reader → APDU：xx xx xx xx 90 00

  UID (4 bytes)

- Read MIFARE Block

  APDU → Reader：FF b0 00 04 10

  Reader → APDU：xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx 90 00

  Data Block (16 bytes)

- Update MIFARE Block

  APDU → Reader：FF d6 00 04 10 xx xx xx xx xx xx xx xx xx xx xx xx

  xx xx xx xx

  Reader → APDU：90 00

How to access Tags

How to access FeliCa

- Read FeliCa Block

  APDU → Reader：FF b0 00 04 10

  Reader → APDU：xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx 90 00

  Data Block (16 bytes)

- Update FeliCa Block

  APDU → Reader：FF d6 00 04 10 xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx

  Reader → APDU：90 00

How to access Tags

How to access ISO/IEC 15693 Tag

- Read ISO/IEC 15693 Tag Block

  APDU → Reader：FF b0 00 04 04

  Reader → APDU：xx xx xx xx 90 00

  Data Block (4 bytes)

- Update ISO 15693 Tag Block

  APDU → Reader：FF d6 00 04 04 xx xx xx xx

  Reader → APDU：90 00

Real User Application

- Get EasyCard's consumer records

Compare to Current Solution

- USB Smart Card reader chip
  + Hub Controller
  + USB NFC Chip PN 533

- USB Smart Card reader chip
  + Hub Controller
  + USB MCU
  + NFC IC PN 544

- More Components
- Higher cost
- More Power Consumption
- Firmware coding effort
- Driver Maintain in different OS
- Verification Cost high

Thank you.

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SUNZONE TEK