BEIJING LINE 10

AUTOMATIC FARE COLLECTION PROJECT

User Guide for PTCM(Portable Card Checking Machine)

(Model Name : SA-74PS01, SA-74PB01, SA-74PC01)

REVISION NUMBER: 1.00

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SAMSUNG SDS

1.   Outline

This Device is portable smart card reader and you can use this Device as electronic cash or token Marker, Device for purchase, Device for load according to service provider. And this one is communicated with PC or other upper device using USB. There are 4 SAM in this device, so this one can support several kinds of electronic payment system. And It is easy to make program for service provider, because this device use WINDOWS CE for OS. Basic data in this device is as following.

Item	Specification	note
CPU	ARM9, S3C2410	32bit RISC
SIZE	215mm(w) x 86mm(l) x 37mm(h)	
Weight	Under 300g	Not include Battery
Battery Capacity	3.7V / 2200mAh	Over 4 hours to use
Program memory1	32MBYTE NAND FLASH	WIN-CE part
Program memory2	32MBYTE NAND FLASH	USER APP, DATA part
Data memory	64MBYTE SDRAM	Execute program
HOST Communication	USB1.1, RS-232	Basic
RF Card that can be used	ISO 14443 A/B, Mifare	
Contact Card that can be used	ISO 7816 T=0	
Security Module	4 SIM SOCKET	
Electronic Specification of Battery charger	Over DC12V, 700mA	Adapter

2.   Configuration

2.1   Device Configuration

- Portable Card Checker

    (Main PCB, Contact Card/ RF Card/ SAM Control PCB, Keypad PCB, LCD)
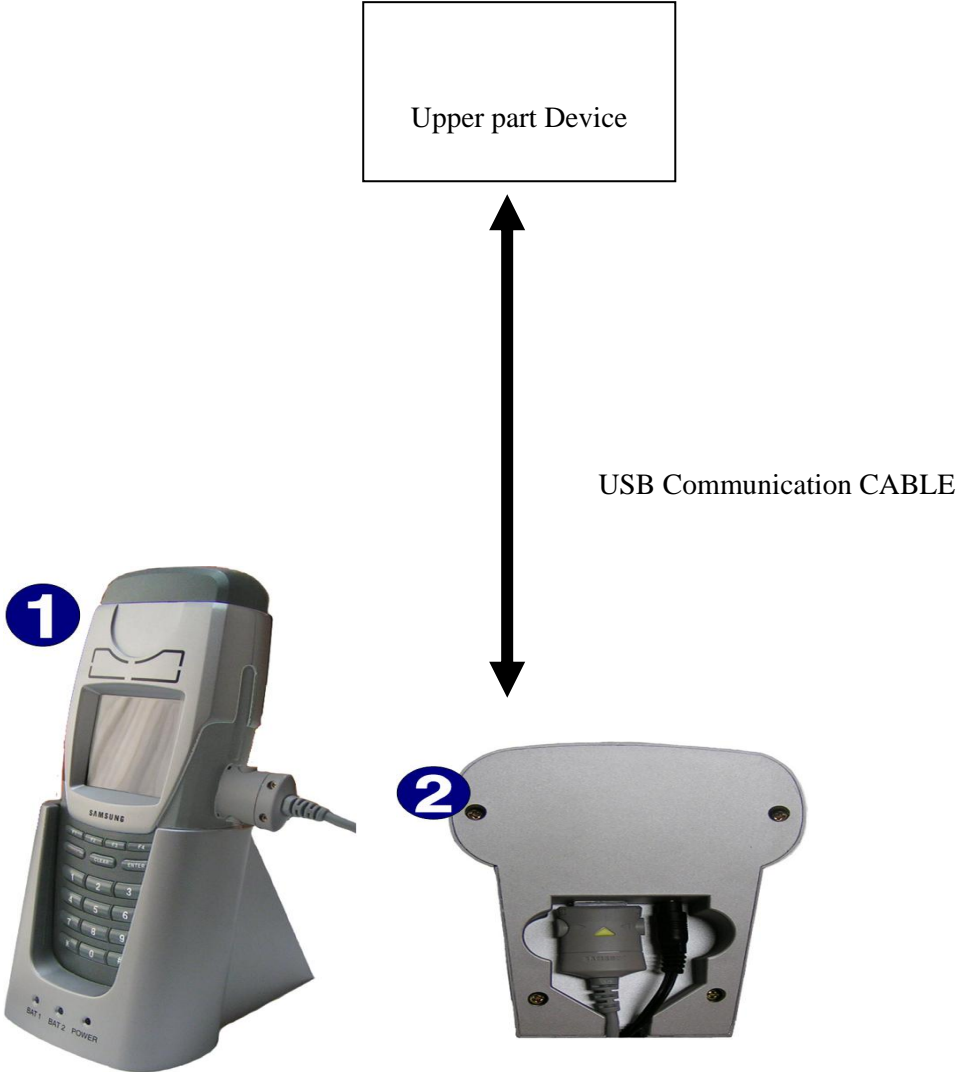
    - Battery Charger

    - Battery 2 EA

    - Adapter

    - Communication cable

2.2 System configuration Diagram

Upper part Device

USB Communication CABLE

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②

2.3　　　Main board Block Diagram And Explanation

Antenna

CAD (Card Acceptance Device)

ISO 14443A/B, Mifare

Color TFT LCD

LED BACKLIGHT

BUZZER

DC/DC
CONVERTER

KEYPAD
19Keys(0~9#,F1,F2,F3,F4
,PWR,ENT,CLR)

SIM SLOT x4
for SAM

MAIN CPU

ARM920T Core

32bit RISC Processor

RTC 내장

USB I/F to SC

RS232

Boot ROM

Flash Memory
32MB (WIN-CE)

Flash Memory
32MB (B/L 200000)

SDRAM Memory
64MB

AC/DC
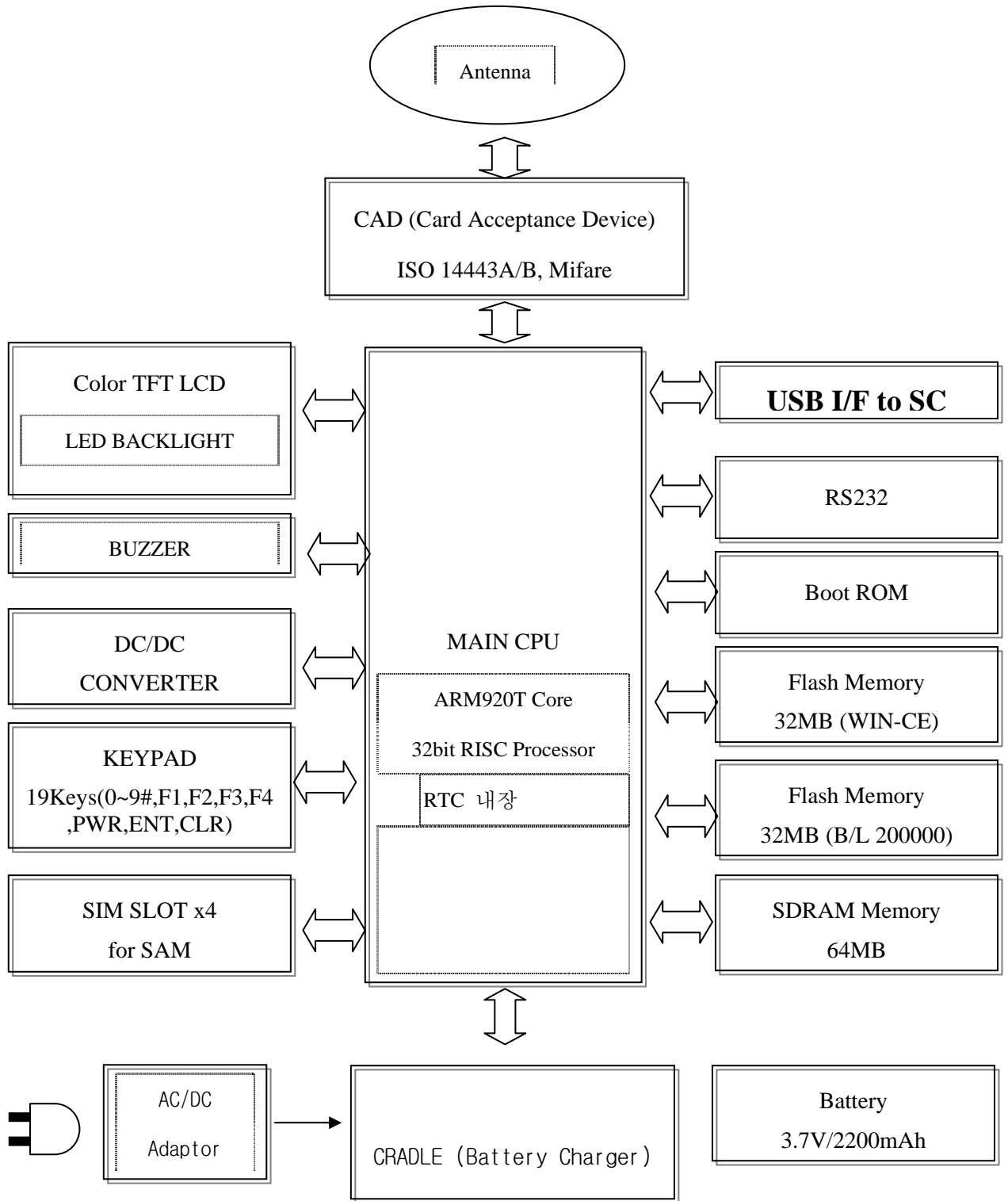Adaptor

CRADLE (Battery Charger)

Battery
3.7V/2200mAh

Figure 2-1 figure

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- MAIN CPU: Main CPU is Samsung ARM9 Core S3C2410. And this CPU is 32bit RISC CPU. This CPU has RTC, 2 UART, USB.

- CAD(Card Acceptance Device): The part for reading Contact Card, 4 SAM and Contact less Card.

   - Contactless Smart Card Standard: ISO14443 Type A, Type B, Mifare
   - Card communication Speed: 106Kbps
   - Range for reading: 50mm(Card), 30mm(Token)
   - Contact Smart Card Standard: ISO7816, T=0
   - Contact Smart Card Slot: User Card(1), SIM Type(4)

- LCD : 960 x 240 Color TFT LCD(LED Backlight)

Parameter	Specification
Screen Size	2.5 Inch
Display Format	960 * 240
Active Area	50.4mm(W) * 37.8mm(H)
Dot Pitch	0.525mm(W) * 0.1575mm(H)
Pixel Configuration	R.G.B Delta
Outline Dimension	60.73mm(W) * 47.07mm(H) * 2.54mm(T)
Weight	12g
Operation Temperature	0 ~ 60 ℃
Storage Temperature	-25 ~ 80 ℃

- Buzzer: Control Frequency using Buzzer connected with Timer Output Por.

- DC/DC Converter: All part that create 5V, 3.3V, 2.0V power for executing using Battery power.

- Keypad: There are 19 button such as 0~9,#,*,F1,F2,F3,F4,Power,Enter,Clear.

- SIM Slot: There are 4 SAM Slot in Main board and CAD part control this SAM slot.

- Data memory: 64MBytes SDRAM

- B/L Memory: 32MBytes NAND Flash

- Program memory: 32MBytes NAND Flash

- Boot ROM: 64Kbytes Flash

- RS-232: Communication port for Debug

- USB: USB is used as communication part when Device is connected with upper Device using USB.

- RTC Battery: RTC is on CPU. And when power is off, RTC is running using other battery.

- Battery: Lithium ion or Lithium polymer, 3.7V/2200mAh
    - Minimum waiting time is 6 hours.
    - Enable to detach and to check card over 1500 times.
    - Under voltage notification

- CRADDLE: Charger Module

    - Input power: Adapter power (DC 12V)
    - Lithium ion(or Lithium polymer) For Battery charger.
    - Charging time: Under 4 hours
    - Over charge protection
    - Detect decrease rate of power.
    - The number of charging and discharge: Over 500 times.

    - Battery weight: 66g

- Adapter: Over Power 12V, 700mA.

- Mast cell burst Factor(MCBF): Over 100,000 times

- Mean Time to Repair(MTTR) : Under 10 minutes and easy to maintenance.

3.   External Specification
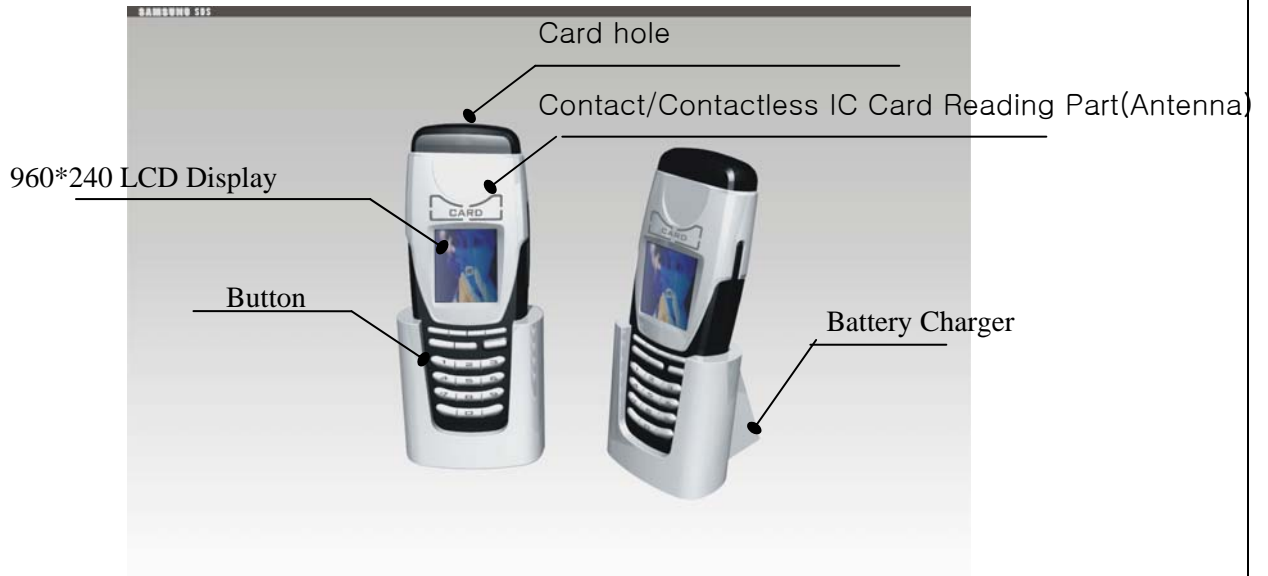
3.1   Device Visual Diagram

Figure 3-1 figure

3.2   External Size

- 215mm(w) x 86mm(l) x 37mm(h)

3.3   Weight

- Under 300g (Not include Battery)

4.   Electronic Specification

4.1   Power Specification

- Input Power: AC 220V / 50Hz

- Adapter output power: DC 12V

4.2   Current (3.7V As standard)

- Minimum use: Under 170 mA(Waiting status)

- Maximum use: Under 460 mA(Checking card, LCD Back Light ON)

4.3   Battery Specification

- Output power and capacity: 3.7V / 2200mAh

- Lithium ion or Lithium polymer

- Waiting time: Over 8 hours

- Over 4 hours to use

- Charging time: Under 4 hours.

4.4   RS-232 Specification

- Communicate port for Debug

- Communication Specification: 8 Data, 1 Stop bit, No Parity, 115200 bps

4.5   USB Communication Specification

- Support Over 10Mbps

5.   Function Specification

5.1   Host Communication Function

- Enable to Load and download data to upper Device using USB.

(You can download all parameter and data, upload data of checker using this function.)

- It is easy to make application program for service provider, because it uses Windows CE as OS.

- Card data execute time has to be shorter than 300ms.

- Support Function for test and setting and this function are as following.

　　　　* Setting time

　　　　* RF Test

　　　　* Contact IC Card and SAM test

　　　　* Select slot number that SAM Card is connected

　　　　* Battery test

　　　　* Check Residual Quantity of Battery

　　　　* Setting Sleep Mode time

　　　　* Setting use LED or not, setting time to use LED

　　　　* Dual Driver Test(RF ON/OFF, BUZZER ON/OFF)

　　　　* Download program of contactless module.

　　　　* Color test and the amount of memory used

5.2   RF Module Function

-　RC531 chip made by Philips is used for supporting Mifare protocol. And this module support the function of Mifare and ISO-14443 Type A/B using this chip.

- Detecting range in Reader: Card → 0~5cm. Token → 0~3cm.

- Detail function of RF Module is as following.

　　a) Basic function API

　　　　- Set RF Field as On/Off mode.

　　　　- Read RF Module Version Data

　　　　- Send/Receive host data

b) API function for supporting Mifare

- Detecting Card

- Read a card number among several cards

- Select card

- Authenticate Card

- Read/Write data in card

- Increase/Decrease sums of money in card

- Save Card Authentication key

- Convenient Batch function using upper function.

c) API function for supporting ISO14443 Type A/B Card

- Support Communication between ISO14443 Type A/B standard and data.

d) API function for supporting ISO7816 SAM Card

- Activating Selected SAM Card

- Deactivating Selected SAM Card

- Support Communicating with Selected Contact SAM card according to
ISO-7816 standard

6.　　Special Feature

6.1　Circumstance for using

- Temperature for Using: 0 ~ 50 ℃

- Humidity for Using: 30 ~ 90 % (Relative Humidity)

6.2　Circumstance for Keeping

- Temperature for Keeping: -25 ℃ ~ 55 ℃

- Humidify for Keeping: 10 ~ 95 % (Relative Humidify)

7.   Warning Factors(Warning and N.B.)

- This Device is made for using inside, so you should not set up this device at outside.

- This Device is affected by an ion around this one, so you should not set up this device on an iron plate.

- This Device is not waterproof one, so you should never setup this device at humid place.

-."Changes or modifications not expressly approved by the party responsible for compliance   could void the user's authority to operate the equipment."