



Sistema de Recaudo Control e Información y Servicio al Usuario Project

Maintenance and Repair Manual (Heavy)

Equipment Name

CB-EDR-HM-00-V1.0



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Maintenance and Repair Manual (Heavy)						

Document History

Previous Version	Present Document	Date	Numeral	Changes	Type

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1. Attended recharger structure

1.1 Outline

Attended recharger is the device that recharges passenger's card and managed by the crews.

1.2 External/Internal structure and main module

1.2.1 External structure



[Attended Recharger]



[Customer Display]

Division	Contents
Size	320mm(D) x 185mm(H) x 132mm(W)
Material	PC+ABS

1.2.2 Main module structure I



Name	Explanation
1) Printer	Print card recharging details
2) 4.3' LCD	Display attended recharger operation
3) RFID Antenna	ISO14443 Type A/B, 13.56Mhz recognition and charging
4) KEYPAD	Input the amount of recharge and information

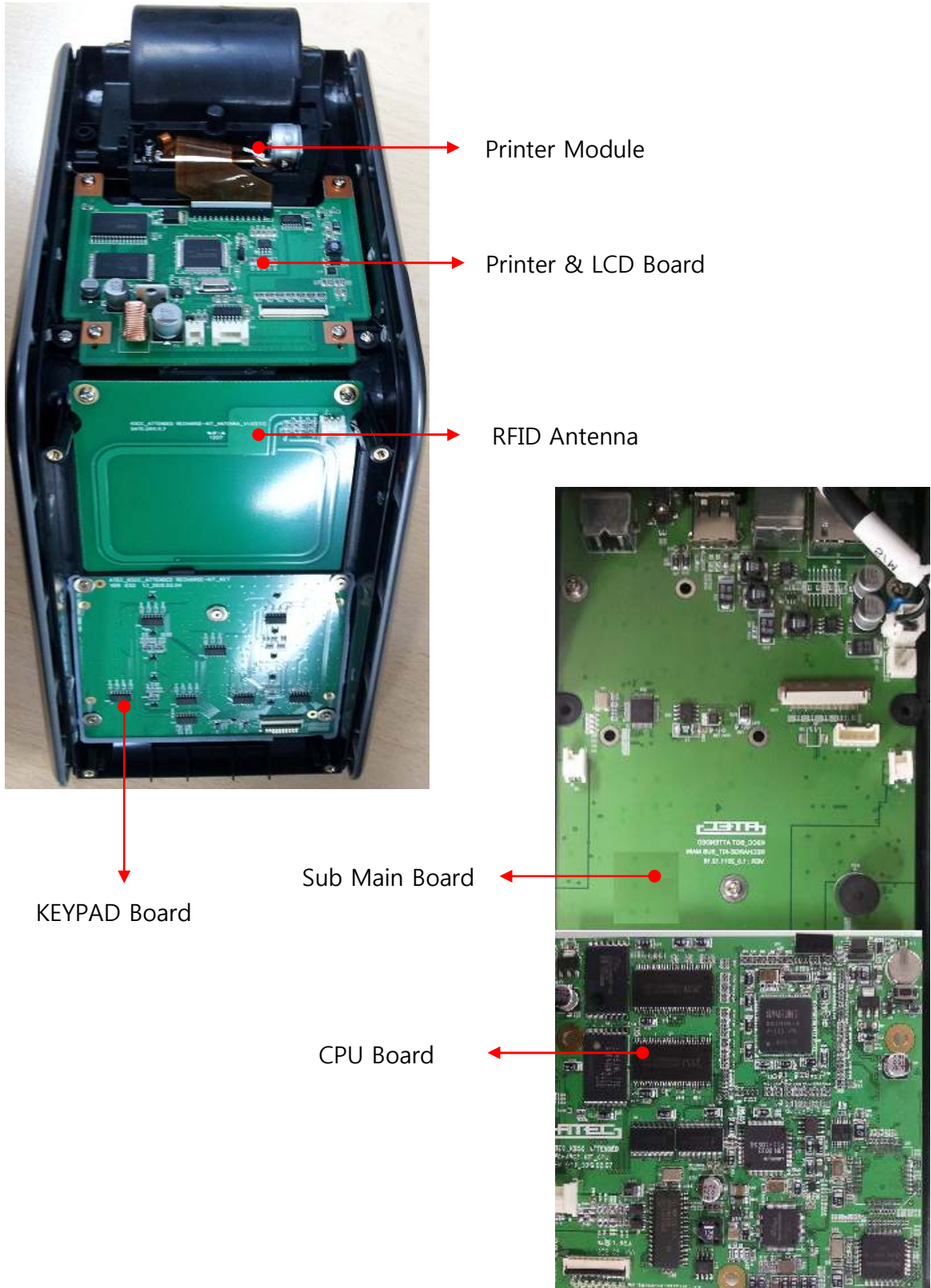
Division	Contents
Size	35.6mm(D) x 96mm(H1) x 342.6mm(H2) x 200mm(W)
Material	PC+ABS



Customer Display

Name	Explanation
1) The amount before charging	Display the amount before charging
2) The amount of charging	Display the amount of charging
3) The amount after charging	Display the amount after charging

1.2.3 Internal structure



1.2.4 Main module structure II

1) 4.3' LCD

Display attended recharger operation

2) Printer

Print various finishes, accounting journals and data etc.

3) RFID Antenna

RF interface that be able to read 13.56MHz RF Card
Available card : ISO 14443 Type A, B

4) CPU Board

Control all part of the attended recharger and transfer processed information to the main server.

- CPU
 - S3C2440(ARM9 Core) : 400MHz
- Memory
 - SDRAM : 128MByte
 - Nor : 8MByte
 - Nand : 512Myte
- RF module
 - RC531(Type A,B)

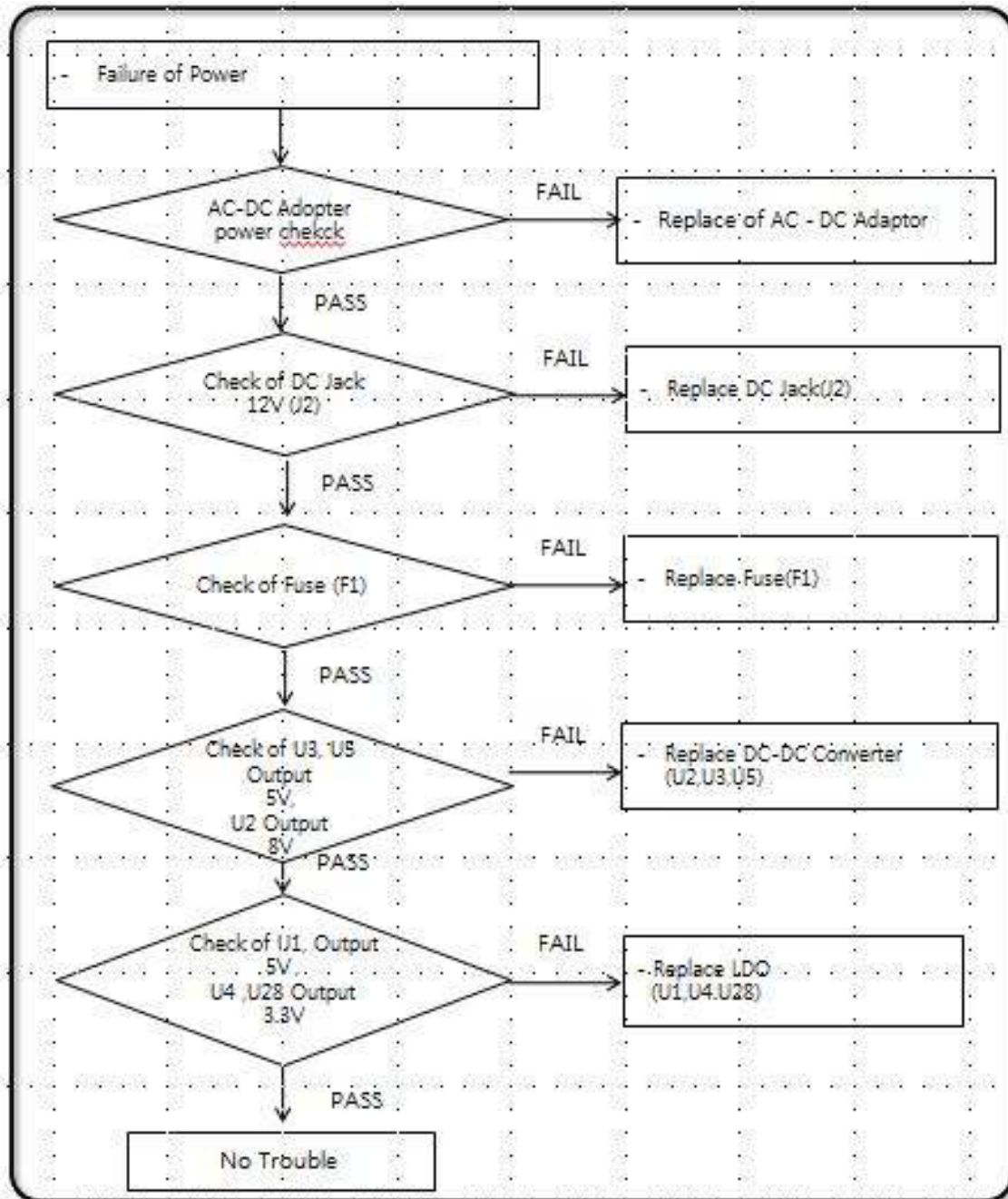
5) Sub Board

Communicate with CPU Board and control I/O devices.

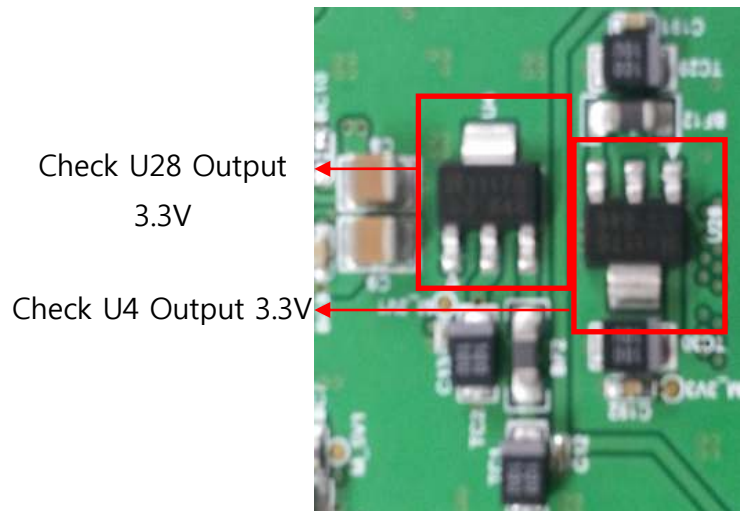
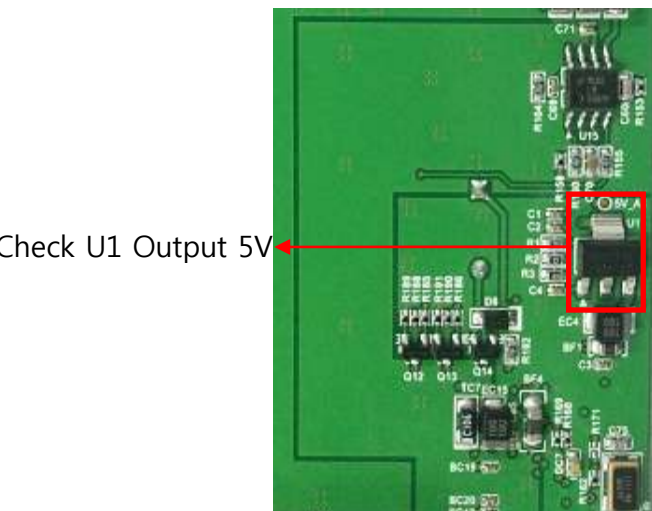
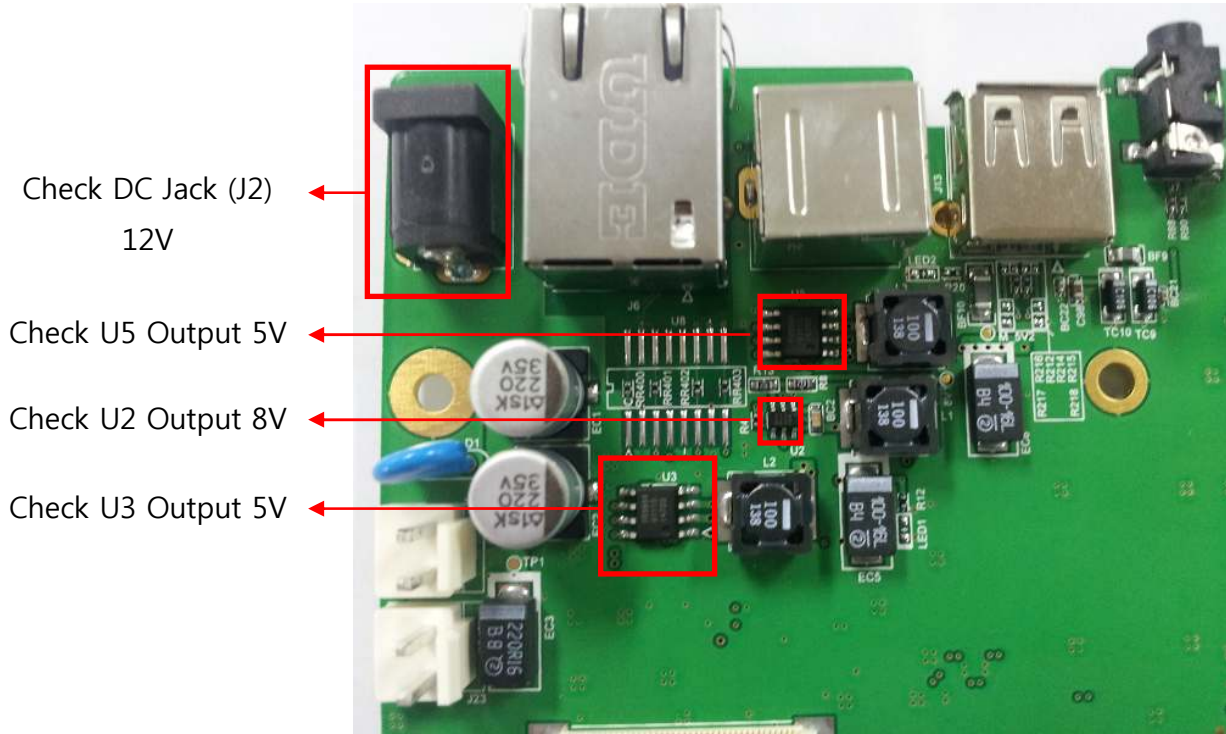
- External PORT
 - Ethernet : 1EA
 - USB 2.0 : 1EA
 - External 3G Modem : 1EA
 - RS -232 : 3EA
- SAM
 - Socket 6EA(SIM Type)
- Sound
 - SW Codec control
 - Speaker : 1W * 2 EA

2. Error handling

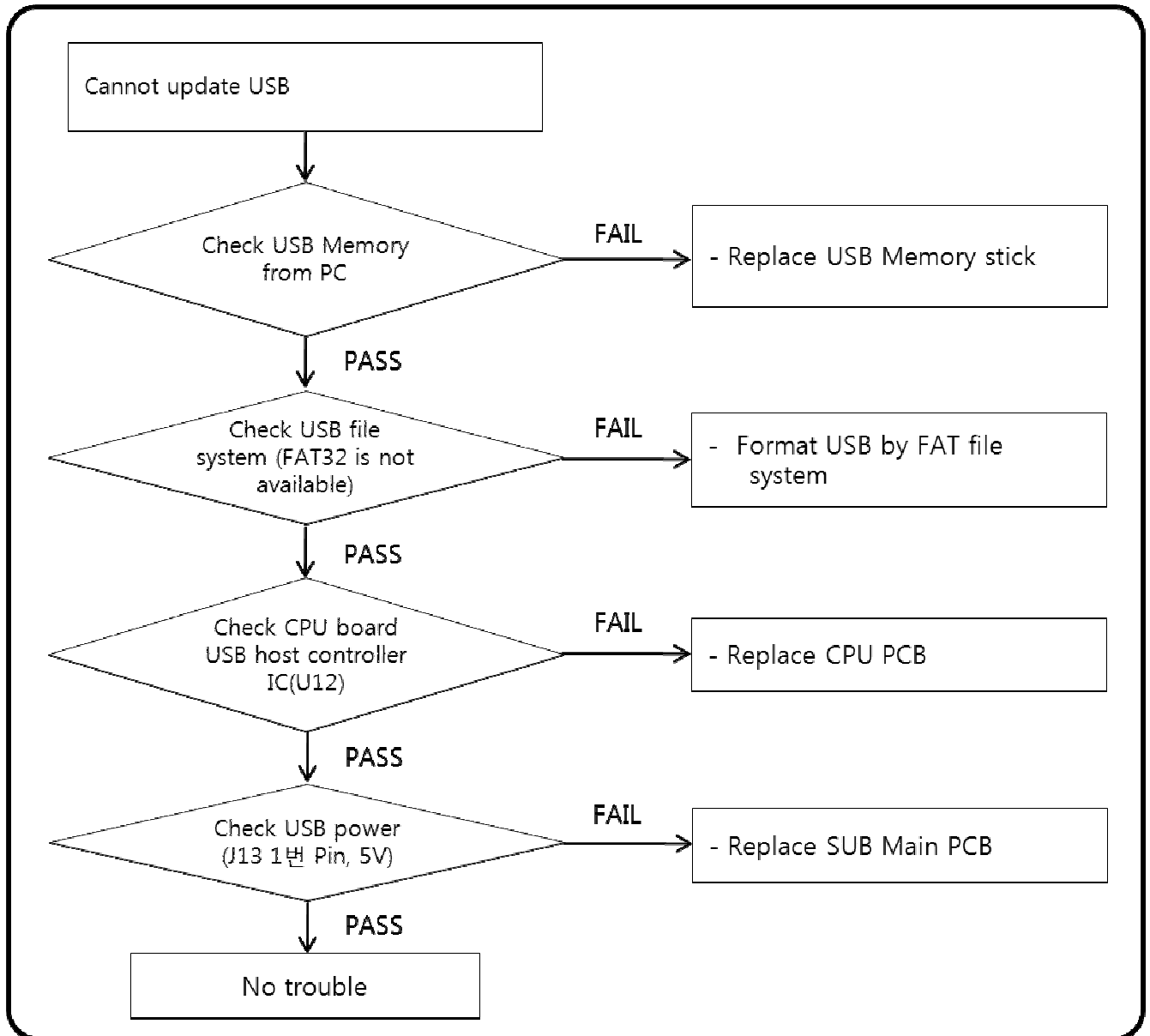
2.1.1 Supply the power (1/2)



2.1.2 Supply the power (2/2)



2.1.3 USB Trouble (1/2)

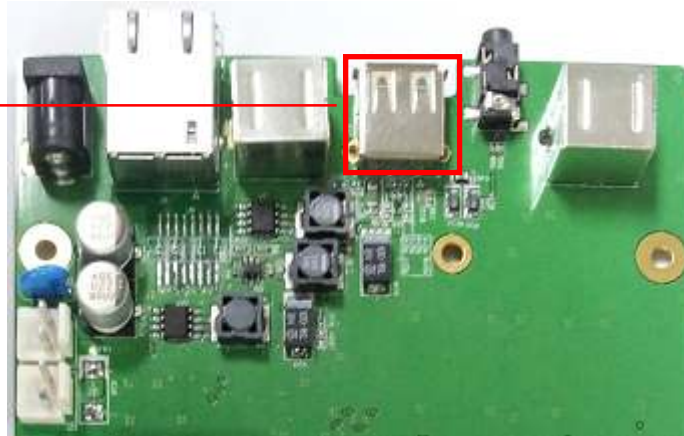


2.1.4 USB Trouble (2/2)

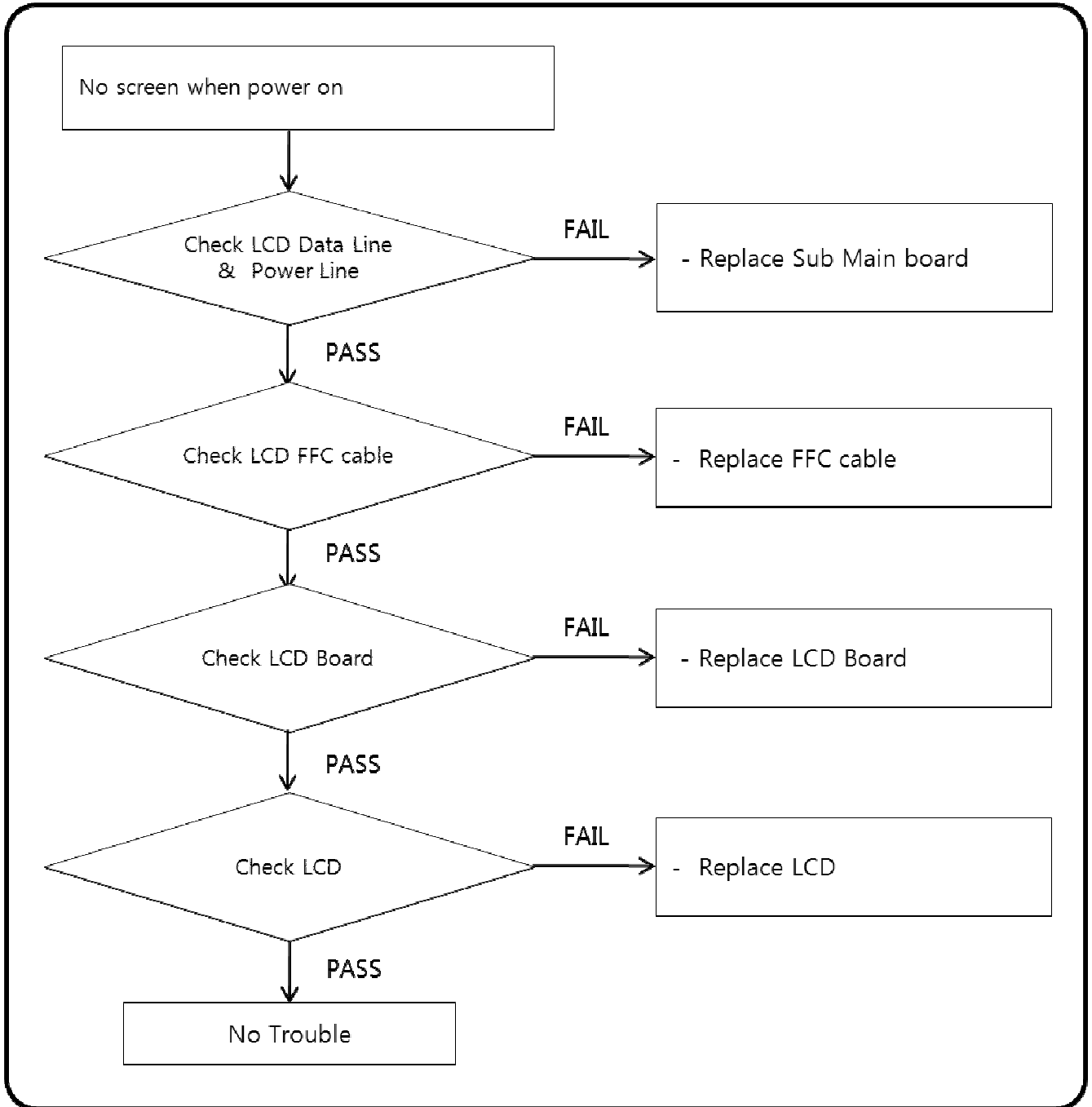
Check U21 USB HOST
Controller



Check USB Power
Pin No.1 and 5V

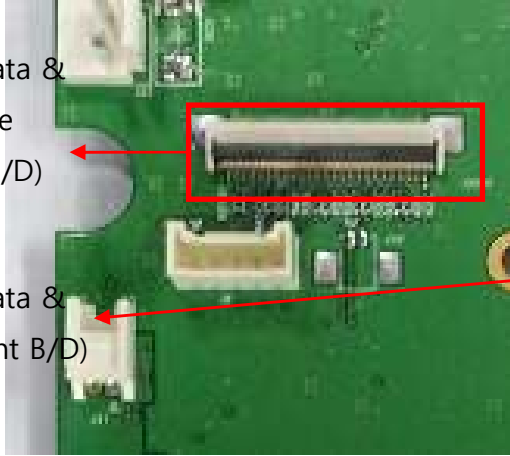


2.1.5 LCD Screen Trouble (1/2)

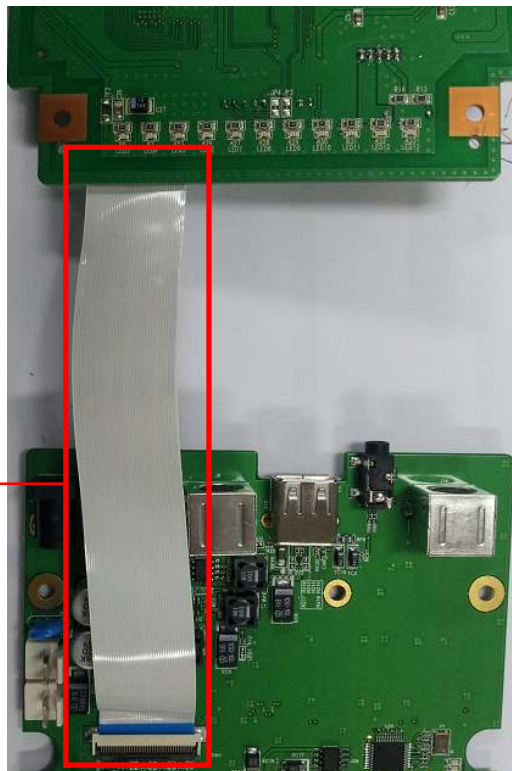
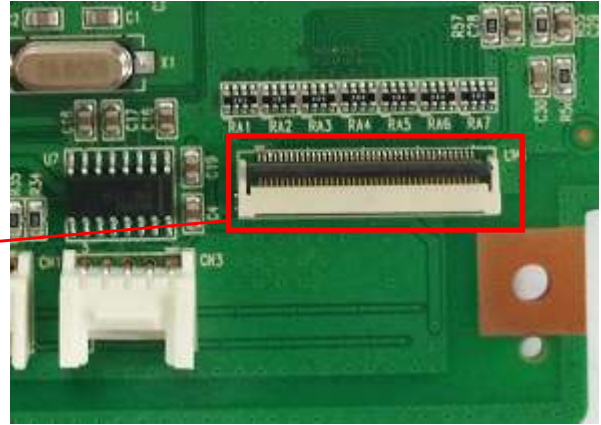


2.1.6 LCD Screen Trouble (2/2)

Check LCD Data & Power Line (Sub Main B/D)



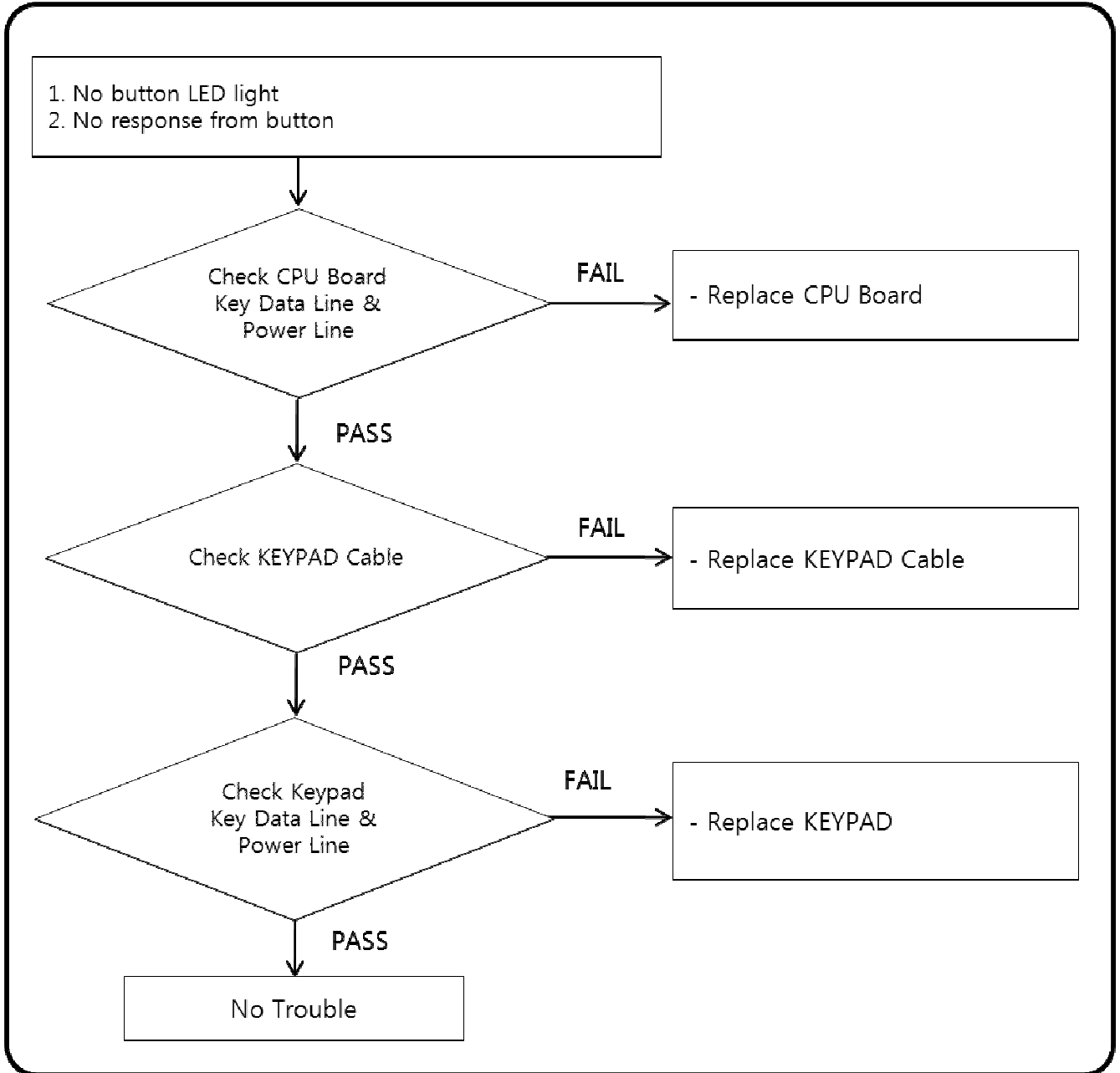
Check LCD Data & Power Line (Print B/D)



Check LCD Board

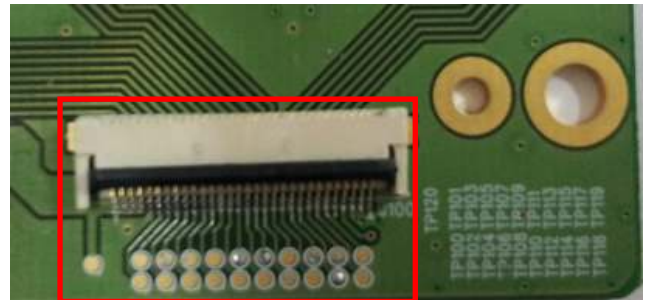
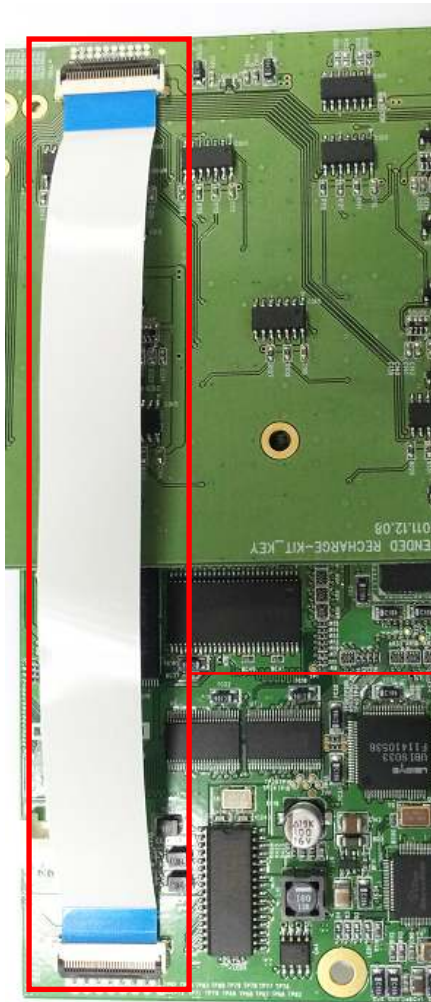
Check LCD

2.1.7 Keypad Trouble (1/2)



2.1.8 Keypad Trouble (2/2)

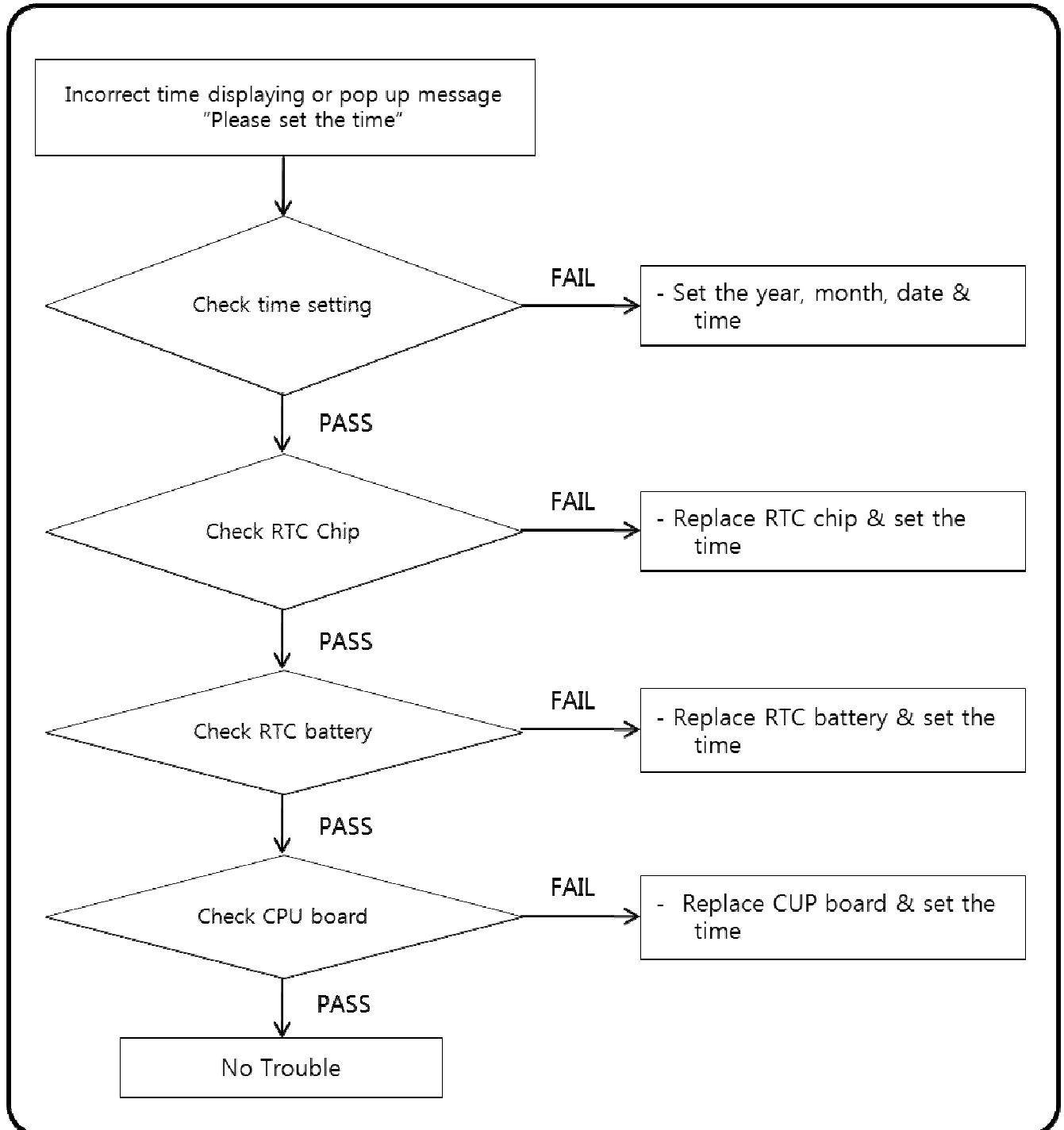
Check CPU Board
Key Data Line
& Power Line



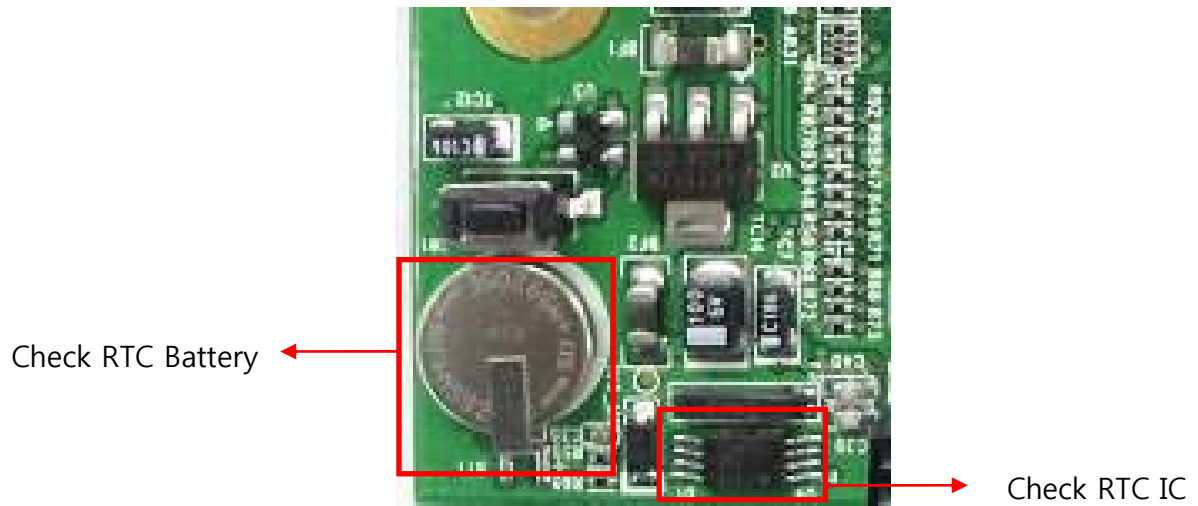
Check Key Board
Key Data Line
& Power Line

Check KEYPAD
Cable

2.1.9 RTC Trouble (1/2)



2.1.1 RTC Trouble (2/2)



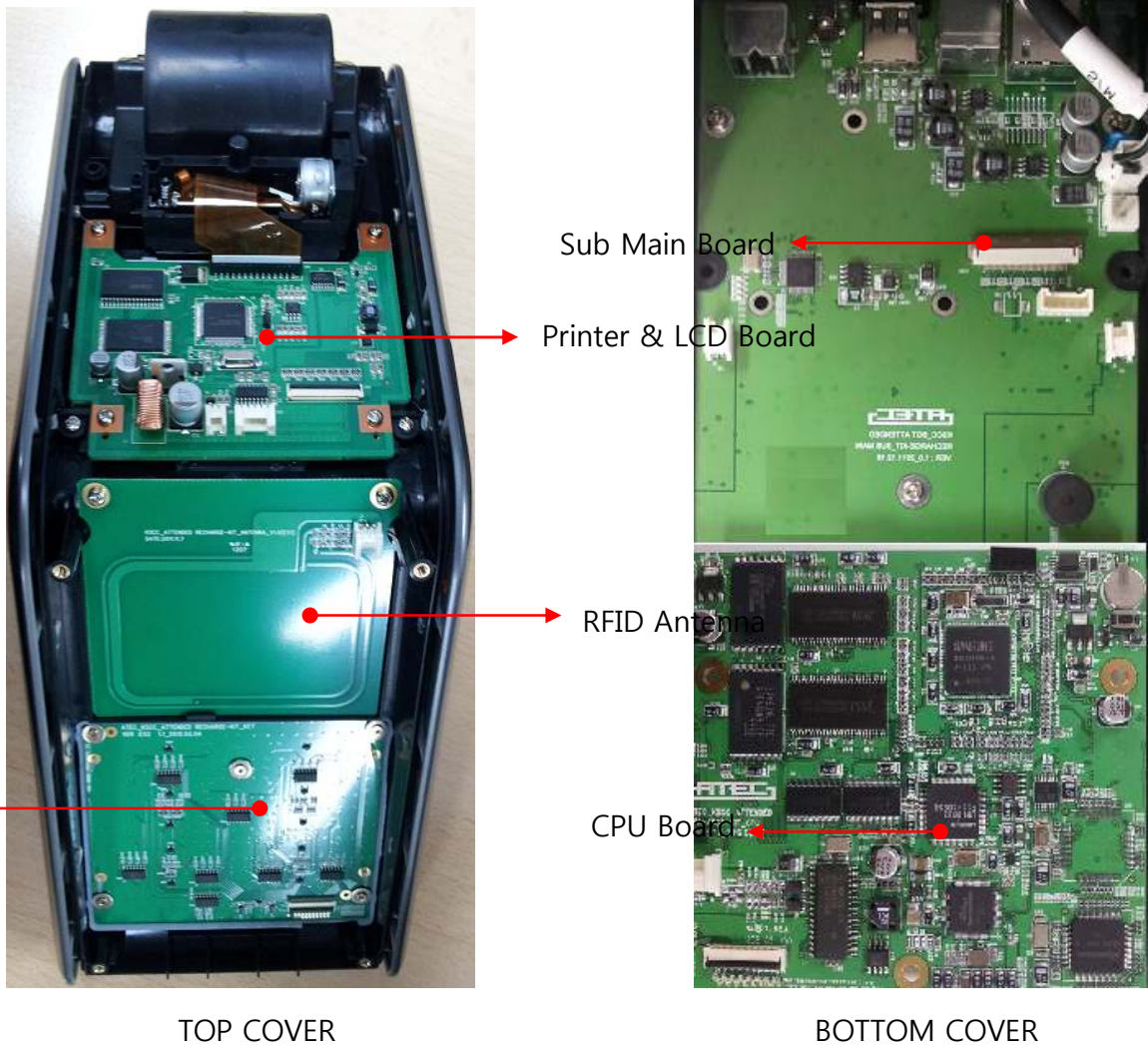
3. Device maintenance

3.1 CPU Board

3.1.1 Outline

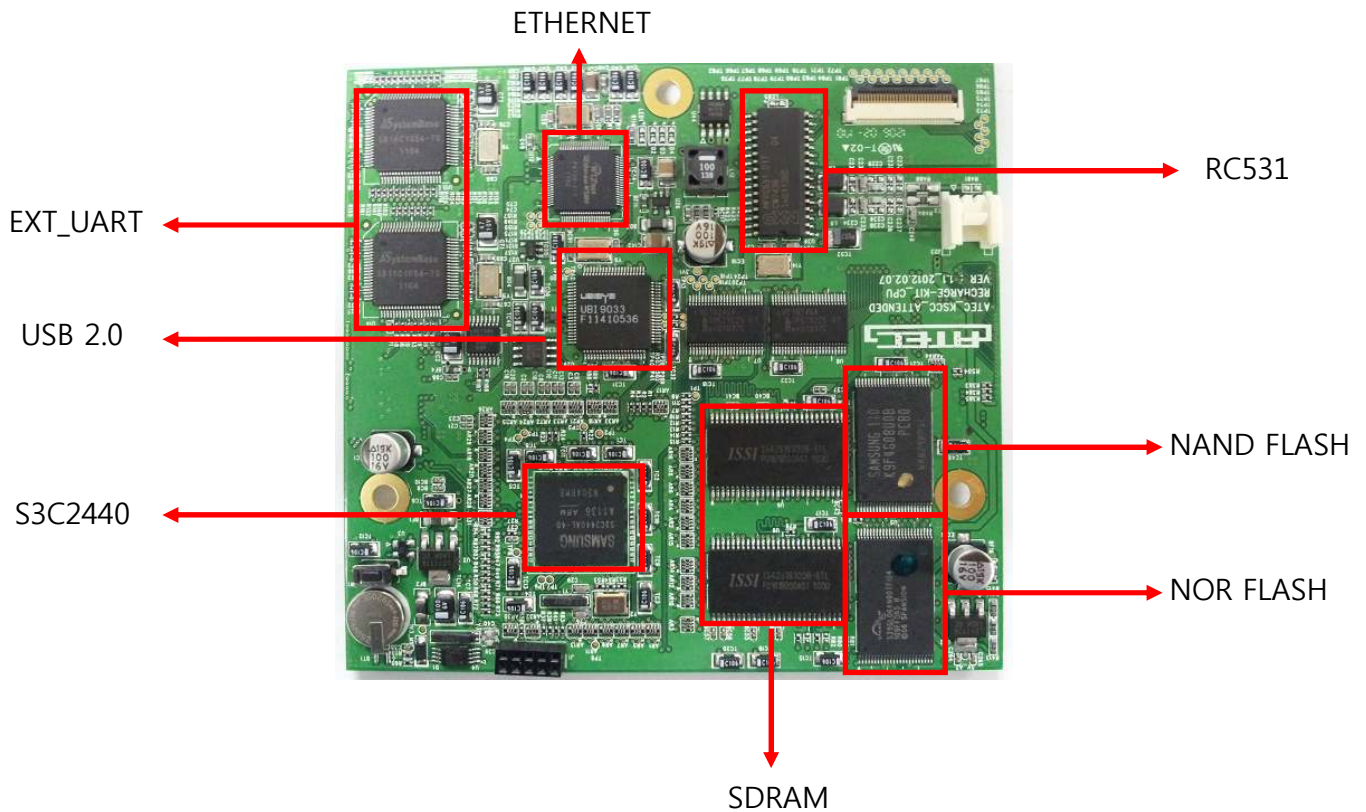
Control all part of the attended recharger and transfer processed information to the main server.

3.1.2 Structure



3.1.3 Spec

1) CPU Spec

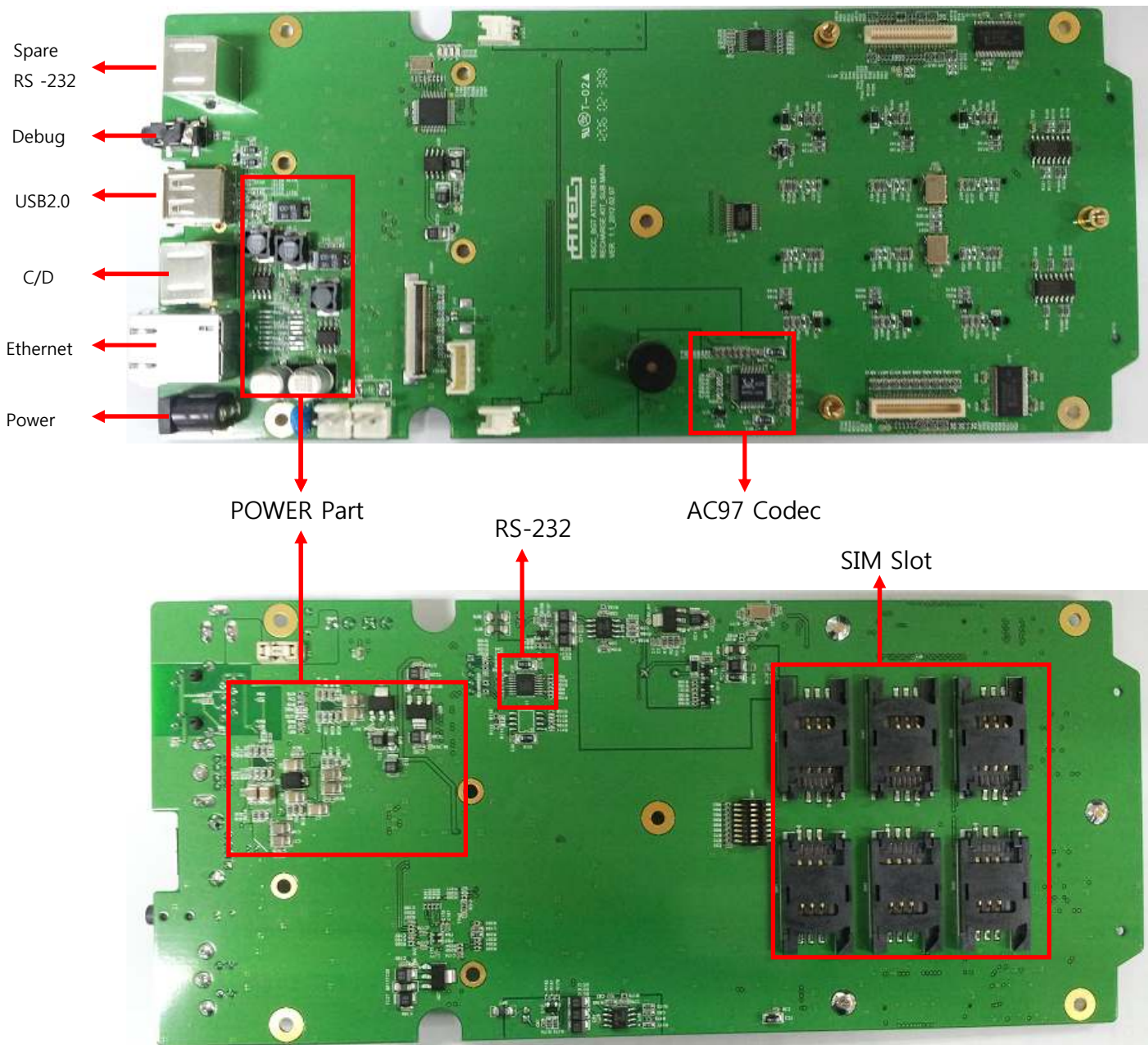


CPU Board: The core board of attended recharger and drive main program so that manage all of communication and configuration modules.

- CPU
 - S3C2440(ARM9 Core) : 400MHz
- Memory
 - SDRAM : 128MByte
 - Nor : 8MByte
 - Nand : 512Myte
- RF module
 - RC531(Type A,B)
- EXT_UART
 - SB16C1054A (SYSTEMBASE)
- USB 2.0
 - UBI9033 (UBISYS)
- ETHERNET

- W5100 (WIZNET)

2) SUB Board Spec



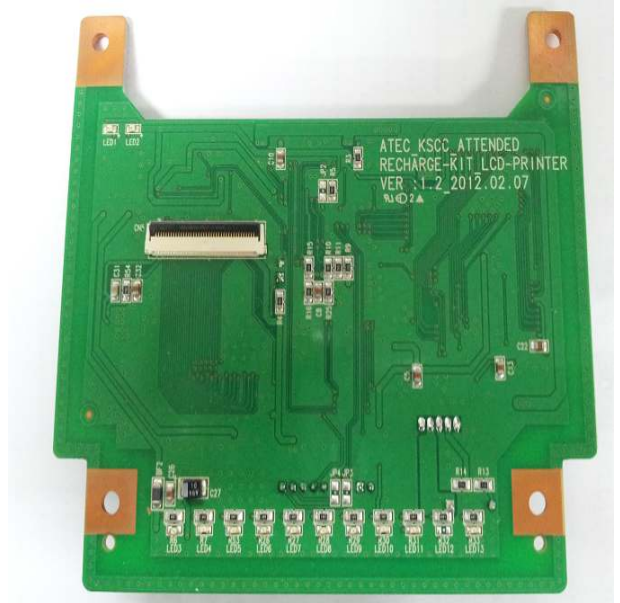
Communicate with CPU Board and control various I/O device.

- External PORT
 - Ethernet : 1EA
 - USB2.0 : 1EA
 - External 3G Modem : 1EA
 - RS -232 : 3EA
 - : C/D(Customer Display) 1, Debug 1, Spare Port 1

- SAM
 - Socket 6EA(SIM Type)
 -

- Sound
 - SW Codec control
 - Speaker : 1W * 2ea
- Input power
 - DC 12V/5A, use adopter

3) Printer & LCD Board Spec



Communicate with Sub Main Board and control Printer & LCD.

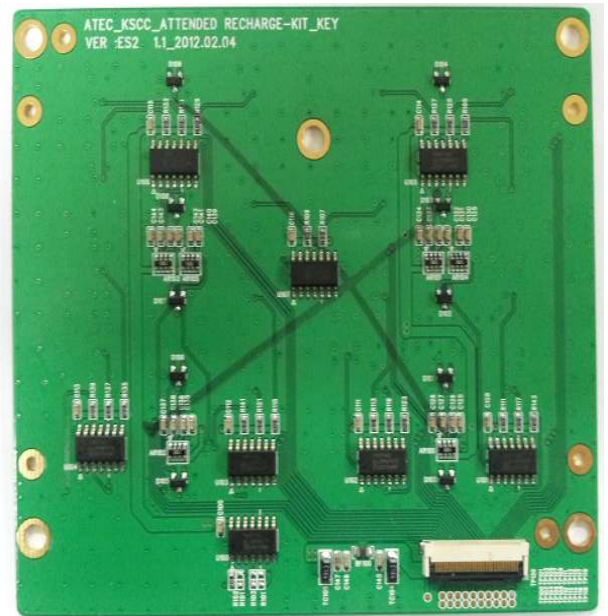
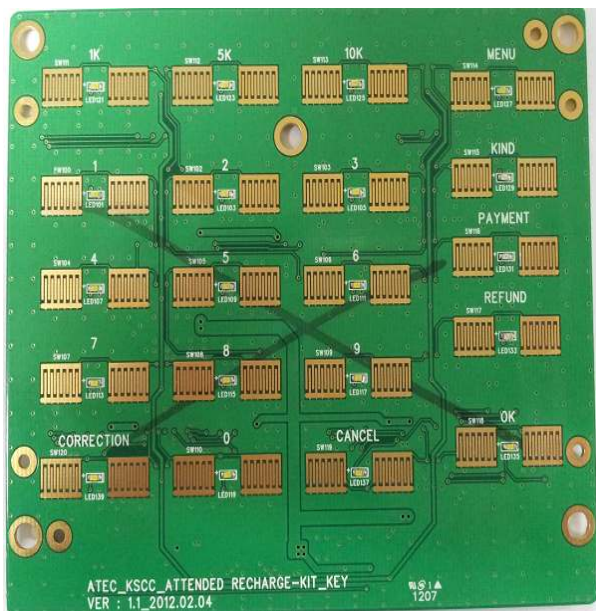
- LCD
 - DC 3.3V input, GPIO communication
- Printer
 - DC 12V input, RS-232 communication

4) Antenna Board Spec



Connected at CPU Board RC531, recognize the card.

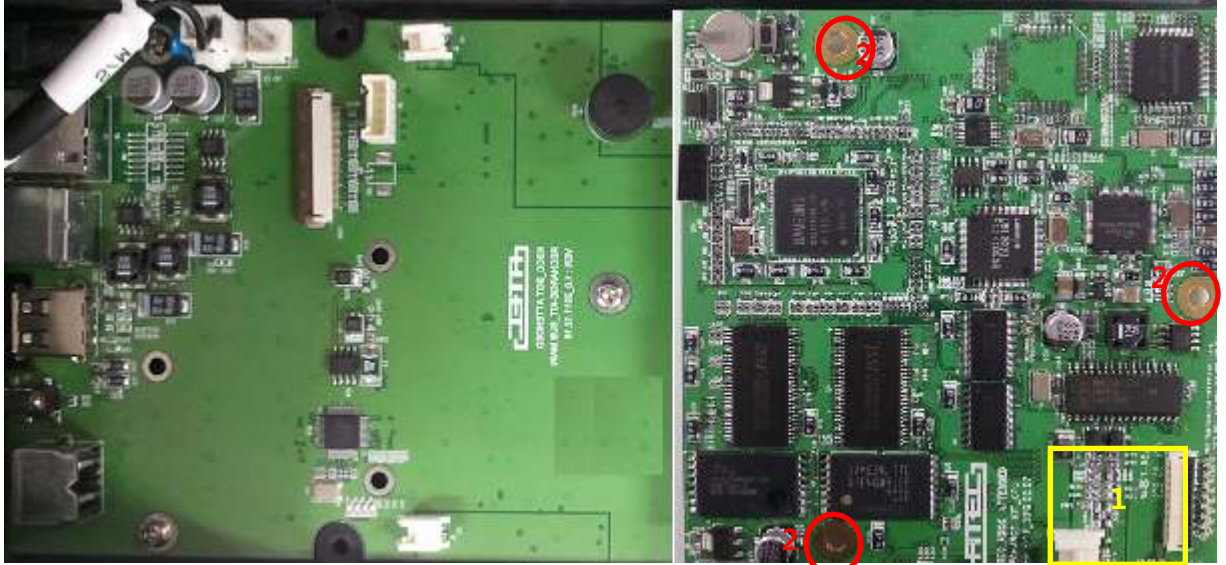
5) Keypad Spec



Transfer input key information to CPU Board.

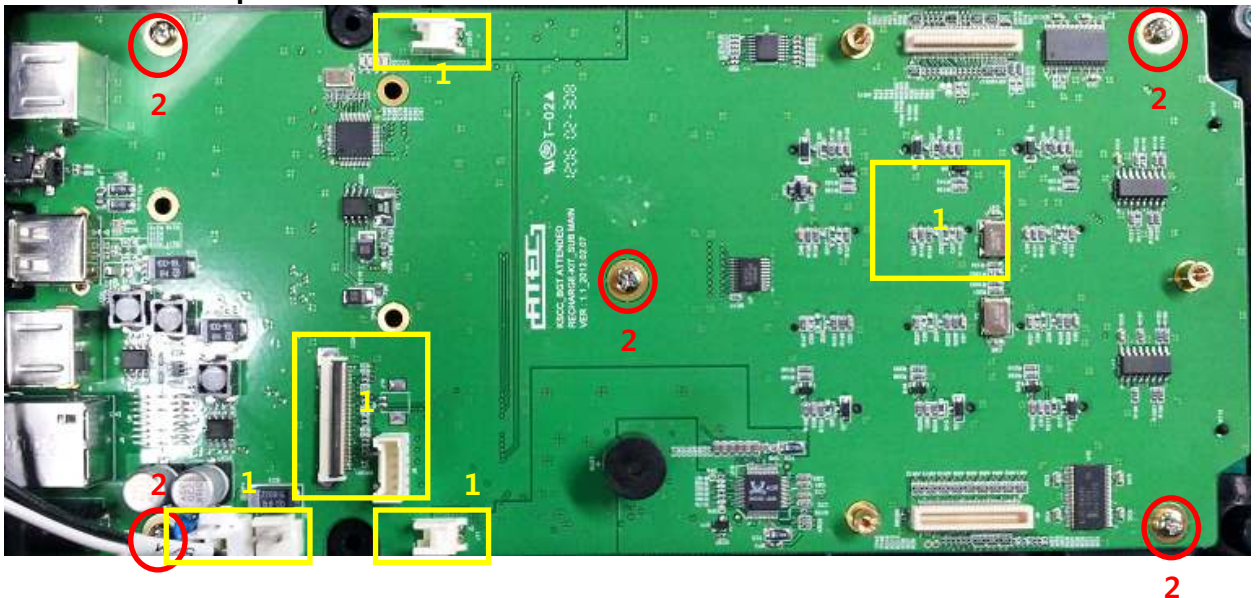
3.1.4 Replacement method

1) CPU board desorption



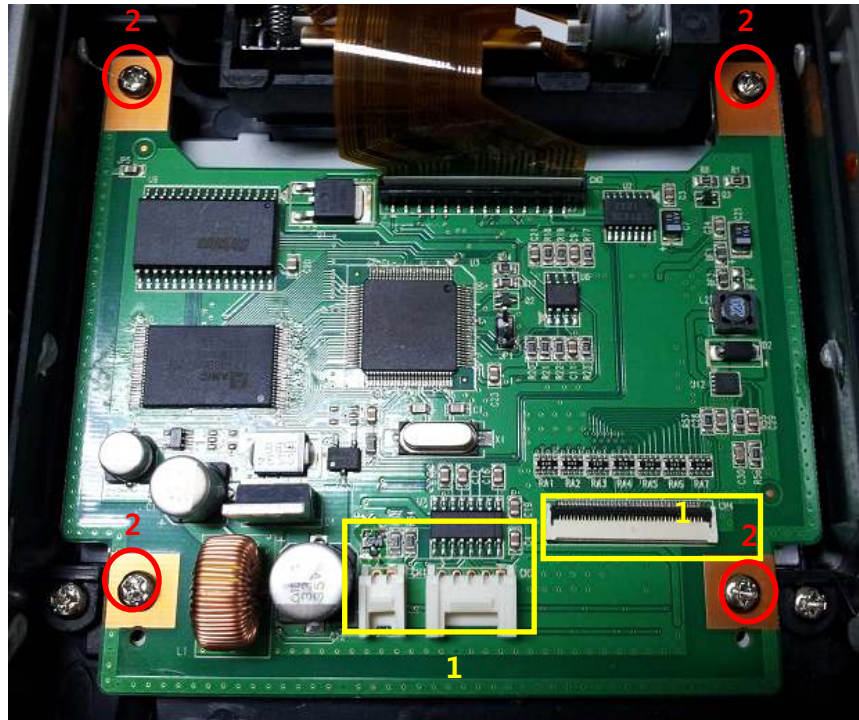
- ① Separate FFC Cable that associated with Keypad and 3Pin Connector the associated with antenna board.
- ② Loosen the fixed bolts with Sub Board and separate Sub Board.

2) Sub Board desorption



- ① Remove the cable the connected to Sub Board.
- ② Loosen fixed five bolts with Bottom Cover and separate Bottom Cover.

3) Printer & LCD Board desorption



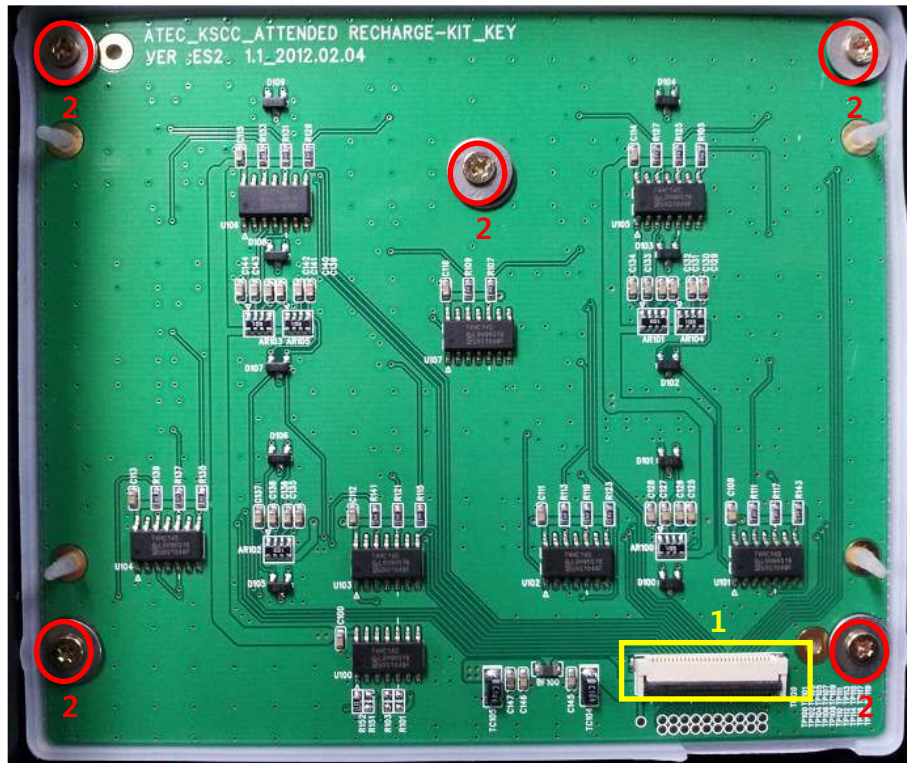
- ① Remove cable that connected to Printer & LCD Board.
- ② Loosen fixed four bolts with TOP Cover and separate TOP Cover.

4) Antenna Board desorption



- ① Remove cable that connected to Antenna Board.
- ② Loosen fixed two bolts TOP Cover and separate TOP Cover.

5) KEYPAD desorption



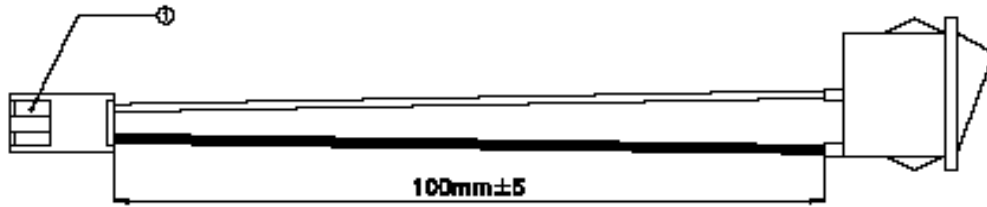
- ① Remove cable that connected to KETPAD.
- ② Loosen fixed five bolts with TOP Cover and separate TOP Cover.

3.1.5 Connector Spec

A. POWER Cable

CON 'A'

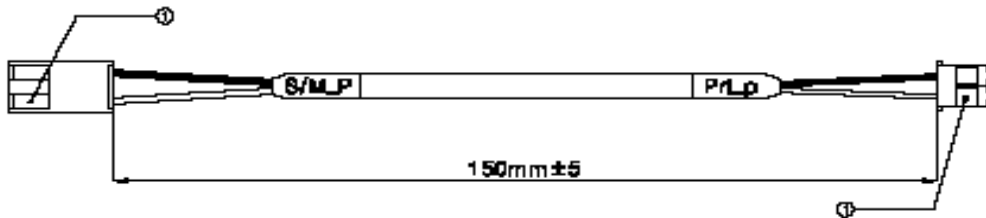
CON 'B'



CON 'A' '(SUB B/D J1)		CON 'B' '(SWITCH)
1	WHITE	1
1	BLACK	1A

CON 'A'

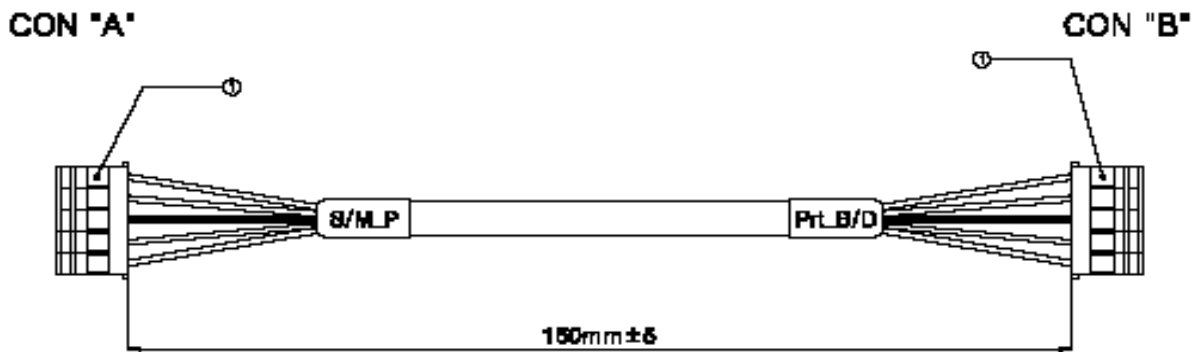
CON 'B'



B. PRINTER POWER Cable

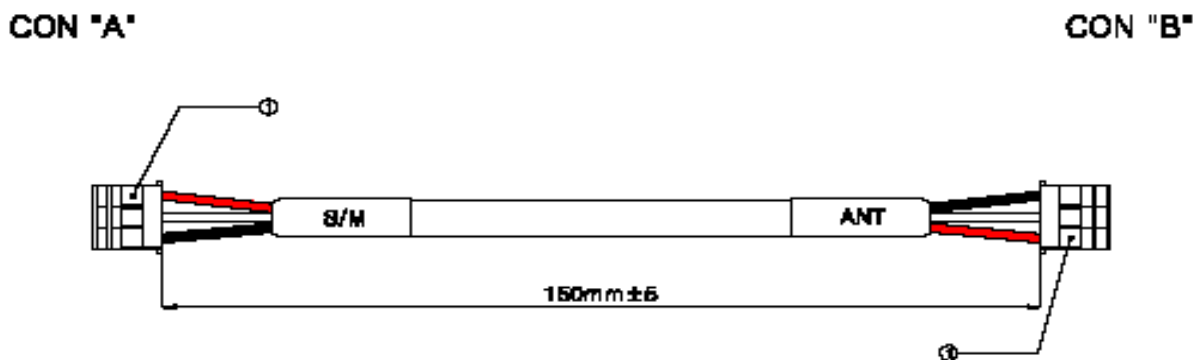
CON 'A' '(SUB B/D J23)		CON 'B' (PRINTER B/D CN1)
1	WHITE	1
2	BLACK	2

C. PRINTER DATA Cable



CON 'A' (SUB B/D J9)		CON 'B' (PRINTER B/D CN3)
1	TX	2
2	RX	1
3	GND	3
4	DTR	4
5	DECO	5

D. Antenna Cable

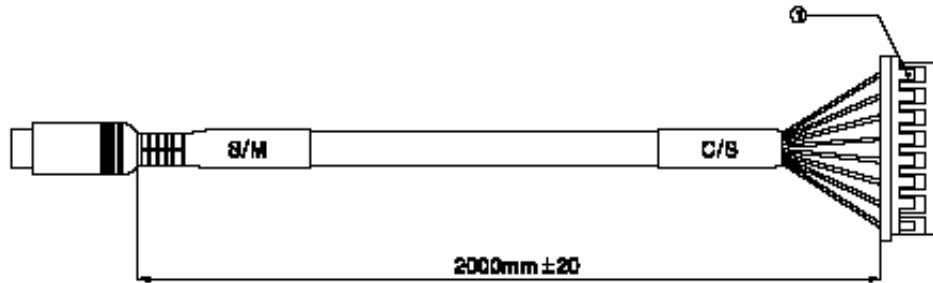


CON 'A' (CPU B/D J23)	MATCH	CON 'B' (ANTENNA B/D CN1)
1	RED	1
2	WHITE	2
3	GND	3

E. Customer Display

CON 'A'

CON 'B'



CON 'A' (SUB B/D J8)		CON 'B' (CUSTOM DISPALY B/D J103)
1	VCC	1
2	VCC	2
3	TX	5
4	GND	6
5	VCC	3
6	GND	7
7	RX	4
8	GND	8

3.2 Customer Display

3.2.1 Outline

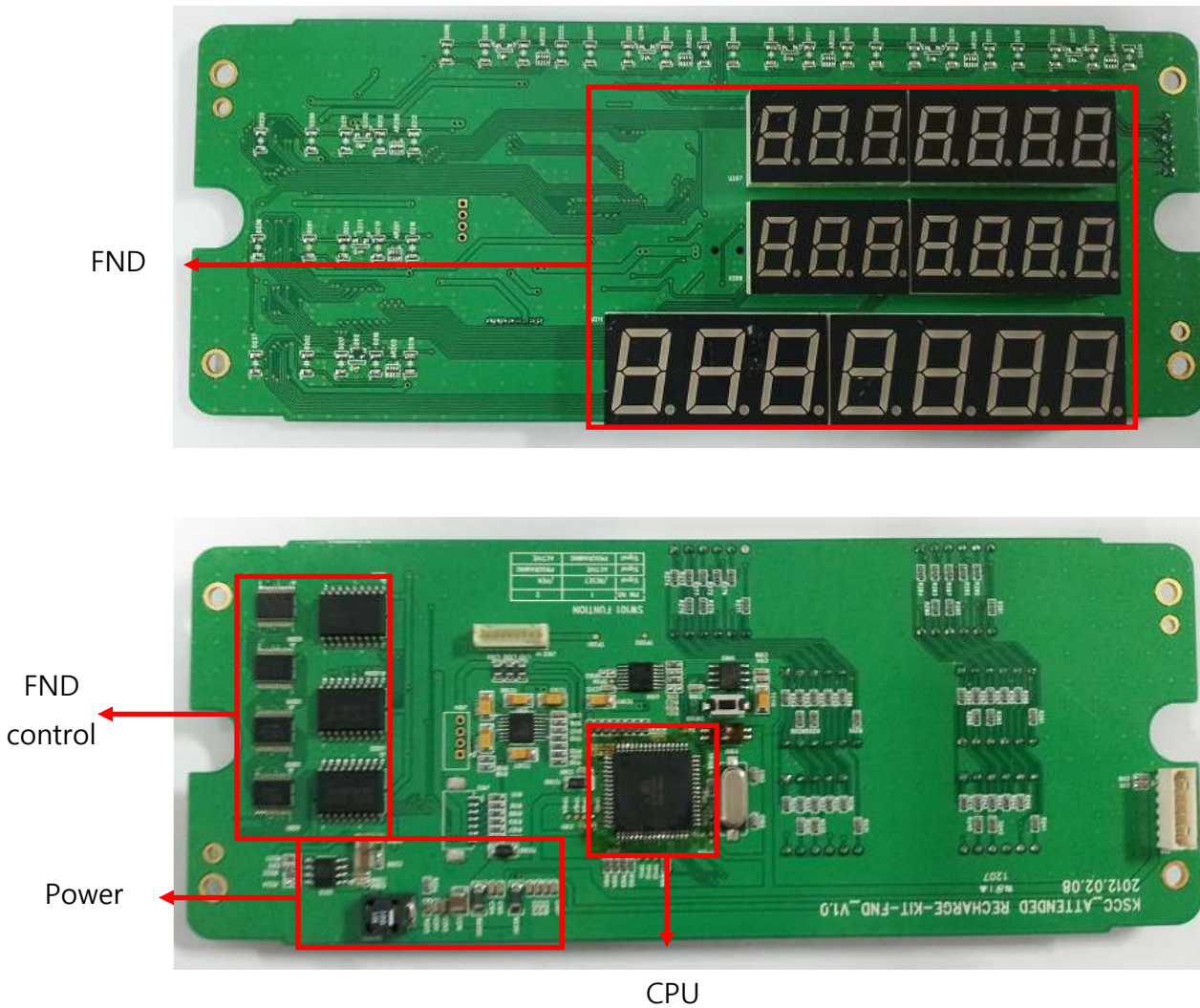
Communicate with the attended recharger, display the amount before recharging, the amounting of recharging, the amount after recharging.

3.2.2 Structure



3.2.3 Spec

1) Customer Display Spec



Customer Display communicate with Attended Recharger, display the amount before recharging, the amount of recharging, the amount after recharging.

- CPU
 - ATMEGA64A
- Power
 - Attended Recharger supply DC 12V
- Communication
 - RS – 232

3.2.4 Replacement method

1) Customer Display

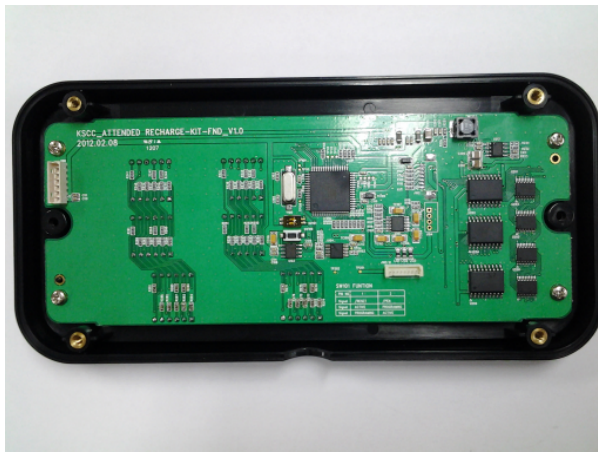


<Picture 1>



<Picture 2>

- A. Picture 1: Loosen 4 fixed bolts, separate back cover.
- B. Picture 2: The process of separating back cover, disconnect cable that connected to connector and separate back cover completely.



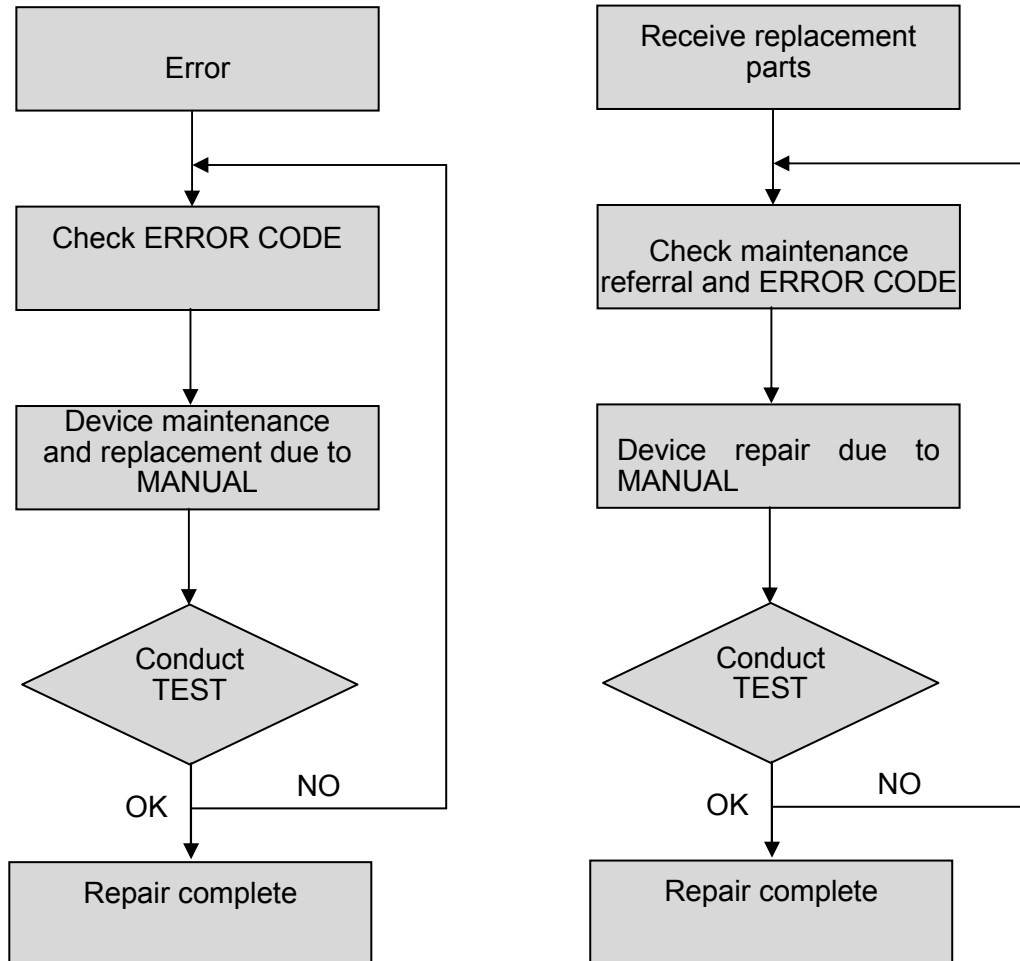
<Picture 3>



<Picture 4>

- A. Picture 3: Loosen 4 fixed bolts and separate PCB completely.
- B. Picture 4: When separate completely, PCB and front cover of balance inquiry are separated completely as shown in the Picture 4 .
- C. Assemble is in reverse order.

3.3 Maintenance Flow chart



2) Required tool: Driver, tester, etc.

2) Precautions

- Check each part of the adjustment value for every 12months or in a timely manner.

3) Detail check items

No	Items	Inspection cycle				Note
		1month	3months	6months	12months	
1	Power/ Voltage check					
2	Printer operation check					
3	Keypad operation check					
4	LCD operation check					
5	Customer display operation check					

4. Attended recharger installation and update

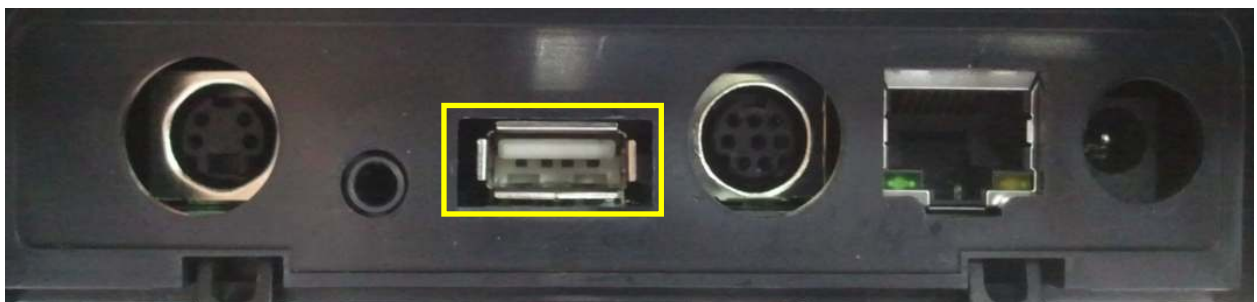
4.1 Attended recharger installation

4.1.1 Process

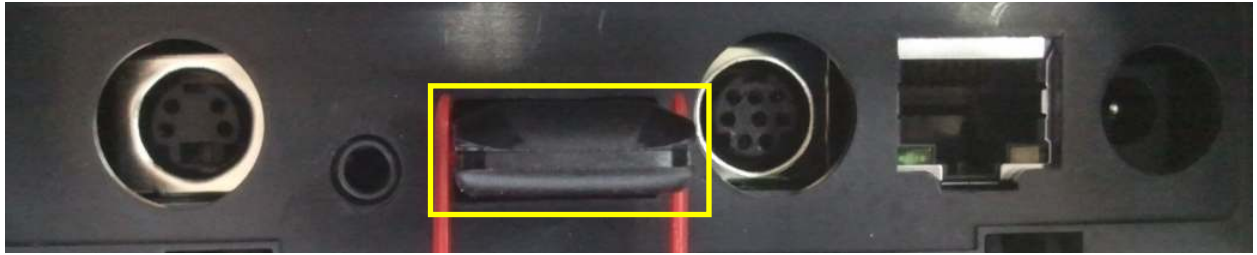
No	Division	Contents	Note
1	Device registration	1) USB mounting method 2) SAM mounting 3) Power on	
...

4.1.2 Device registration

4.1.2.1 USB mounting method



- ① Turn OFF the terminal.



- ② Insert USB TO USB PORT and turn on.
- ③ After update, reboot the theminal.

4.1.2.2 SAM Card mounting

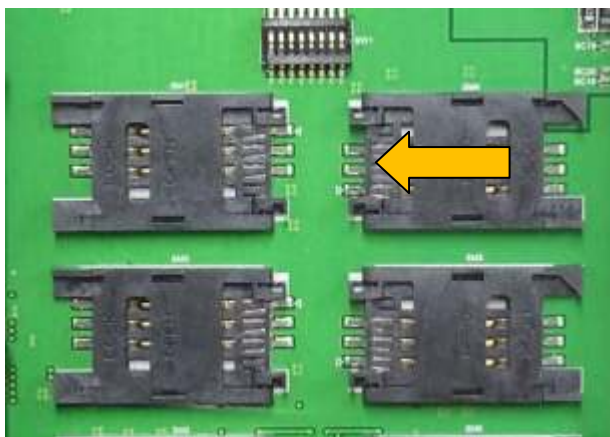


< Picture 1 >

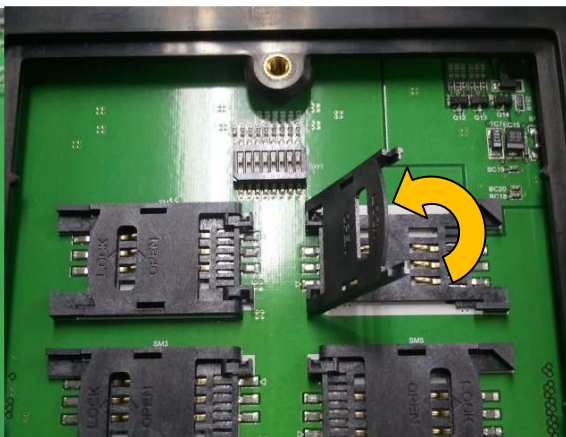


< Picture 2 >

- ① Picture 1: Loosen fixed bolts.
- ② Picture 2: Push in the direction of the arrow and separate completely.

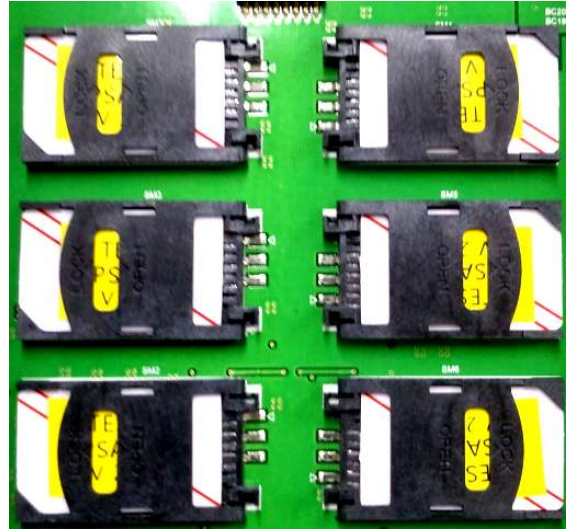
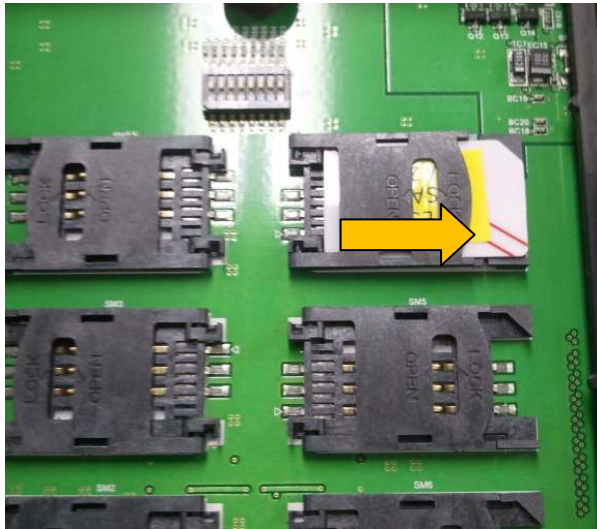


< Picture 3 >



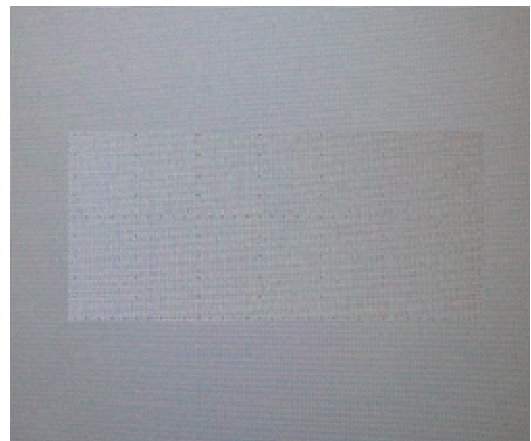
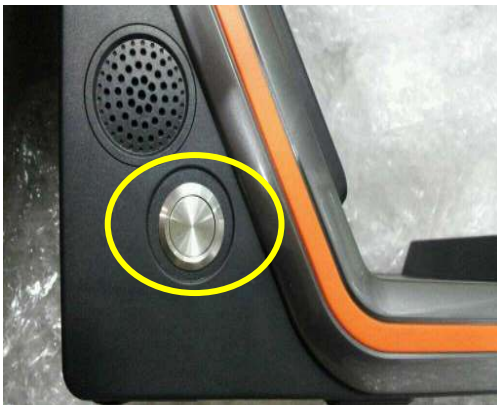
< Picture 4 >

- ③ As shown in the Picture 3, push SAM slot in the direction of the arrow and lift SAM slot like as shown in the Picture 4!

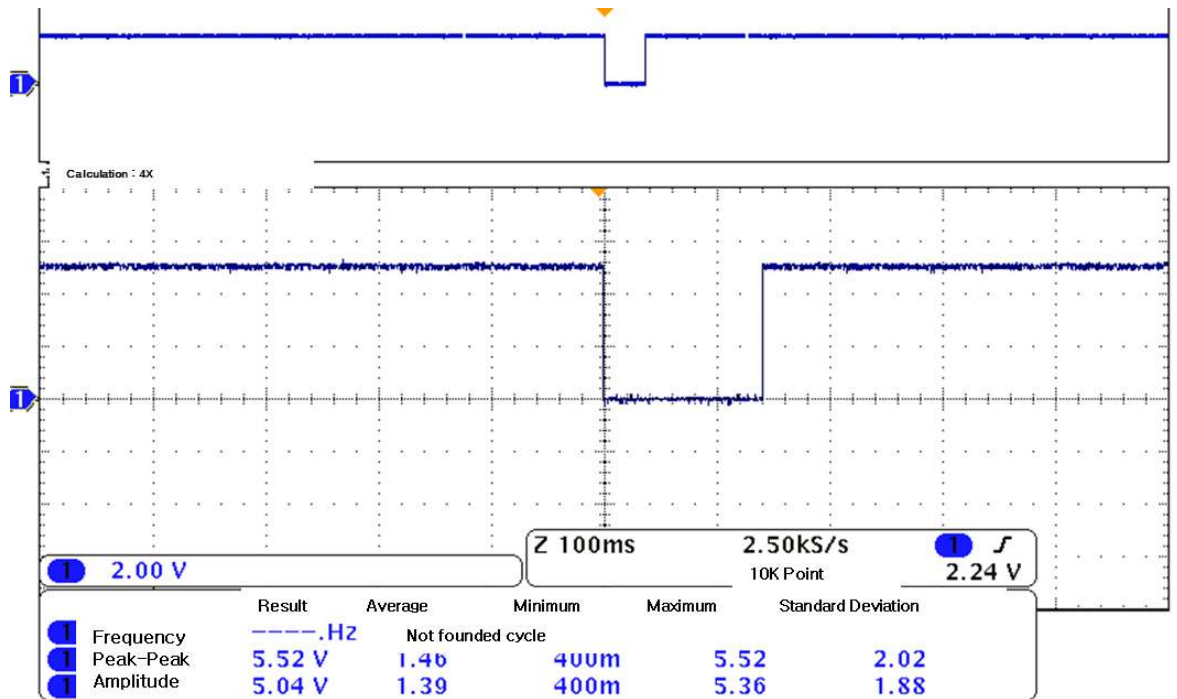


- ④ After combine the SAM Card, push SAM slot in the direction of the arrow and secure
- ⑤ After SAM Card combined, assemble the back case.

4.1.2.3 Power ON



- ① Turn on power switch.
- ② Check T money logo on the screen after booting.



< Normal key input waveform >

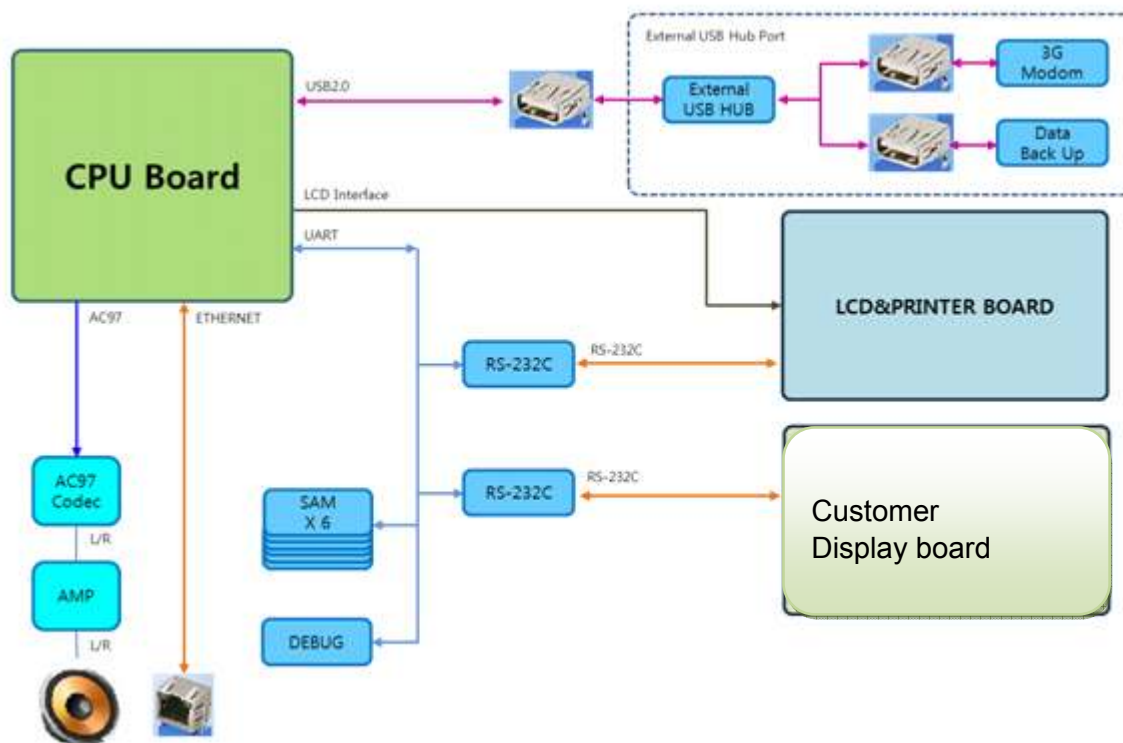
4.1.3 Sub BOARD spec

4.1.3.1 Sub Main Board spec

Communicate with CPU Board and control I/O device.

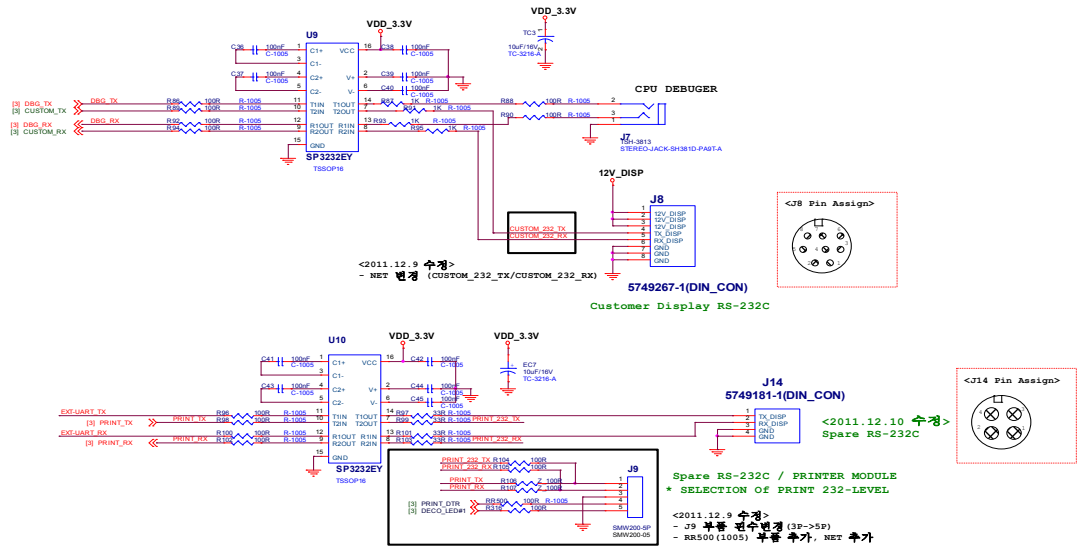
Division	Standard	Note
CPU	S3C24440	
Memory	SDRAM : 128MByte Nor Flash : 8MByte Nand Flash : 512 MByte	
RF Module	ISO 14443 Type A,B	

4.1.3.2 Sub Main Board block diagram

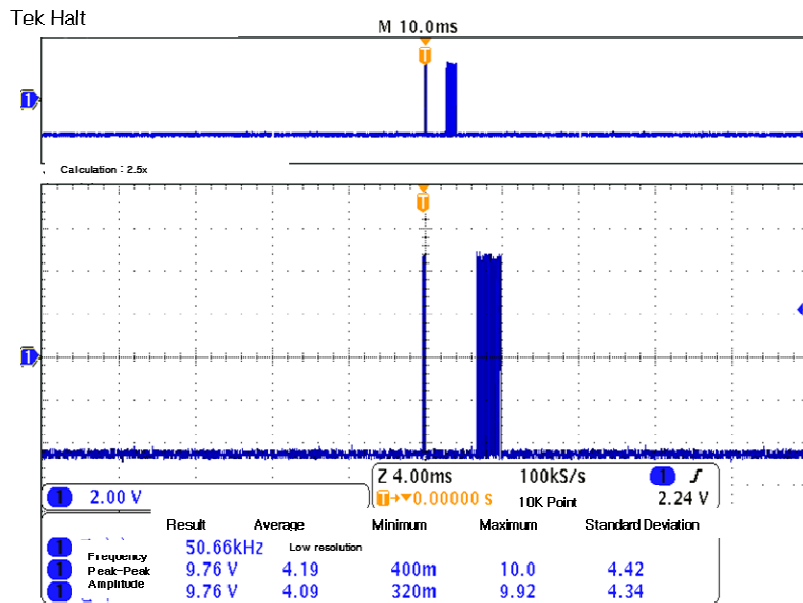


4.1.3.3 Sub Main I/O

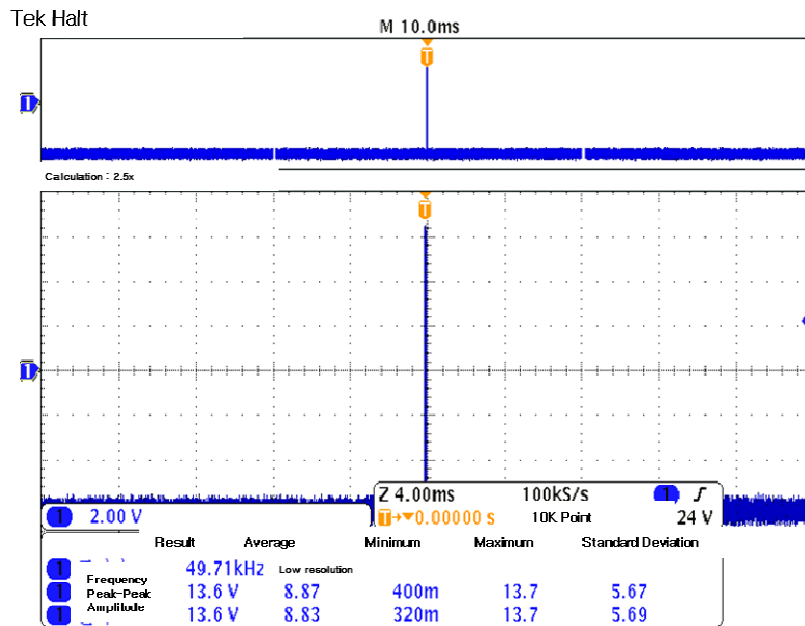
- RS-232



- ① Circuit description
: Circuits that change UART signal into RS-232 signal
- ② Waveform measurements

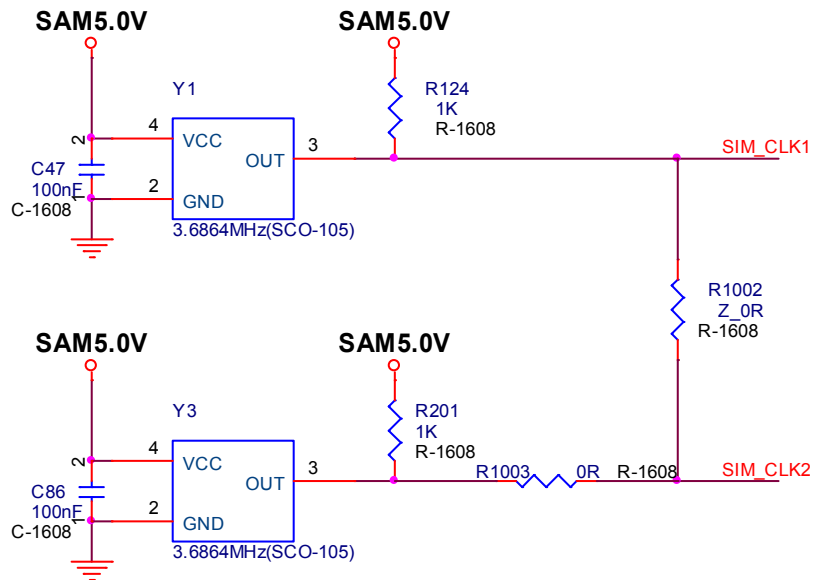


<Normal TX waveforms>



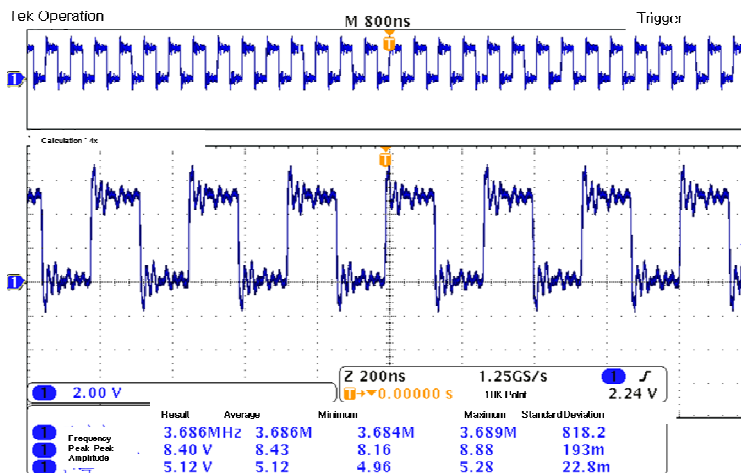
<Normal RX waveforms>

- SIM Part (Clock)



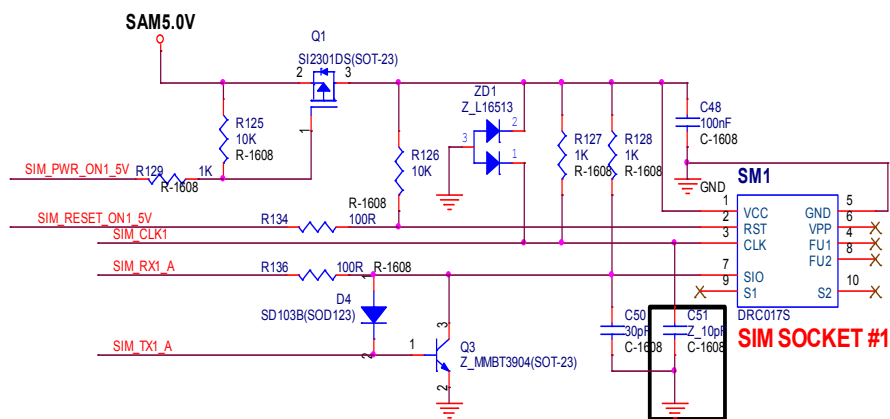
- ① Circuit description : Circuit that supply the stable Clock to allow SIM Card to operate.

② Waveform measurements



<Normal Clock waveform>

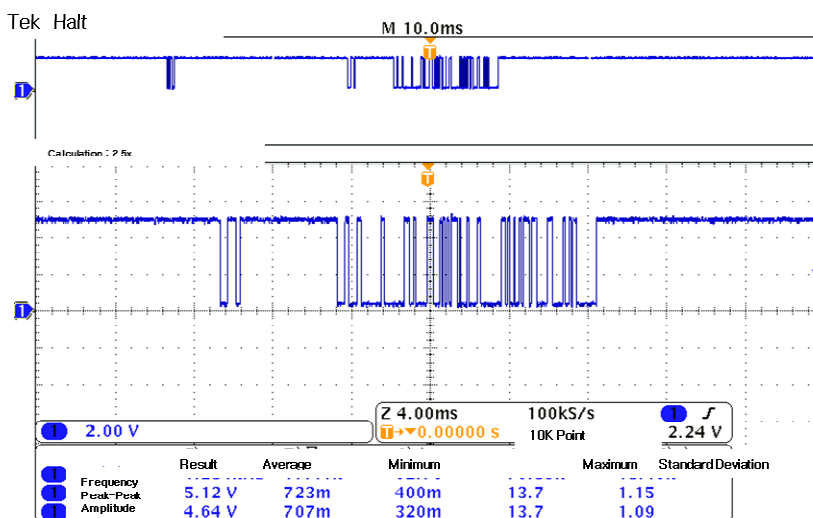
- SIM Part (Signal)



① Circuit description

: Circuit that realize to recognize SIM CARD .

② Waveform measurements



<Waveform when normally recognize SIM CARD>

FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference. and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

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

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.