



## **Sistema de Recaudo Control e Información y Servicio al Usuario Project**

# **Maintenance and Repair Manual (Heavy)**

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**Equipment Name**

**CB-EVA-HM-00-V1.0**



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Maintenance and Repair Manual (Heavy)						

**Document History**

<b>Previous Version</b>	<b>Present Document</b>	<b>Date</b>	<b>Numeral</b>	<b>Changes</b>	<b>Type</b>

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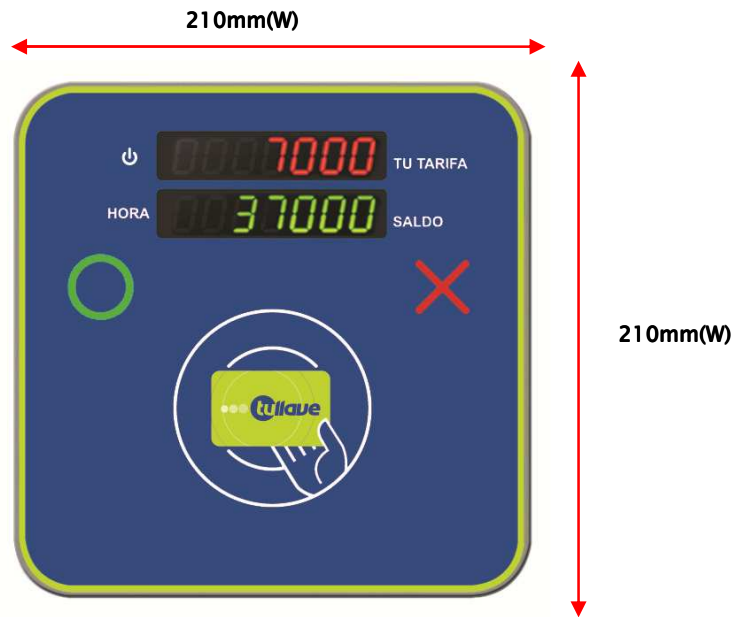
# 1. Validator structure

## 1.1 Outline

Validator is the device that recognize bus passenger's card.

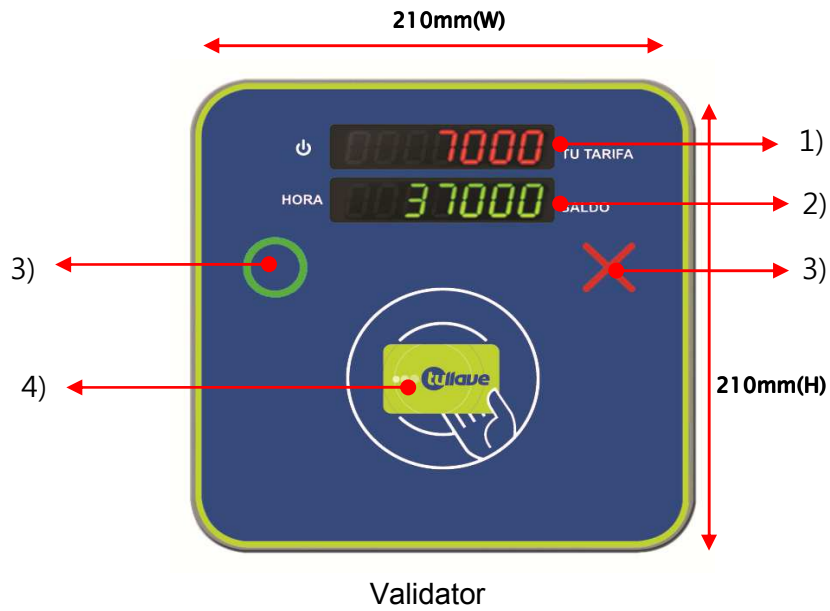
## 1.2 External/Internal structure and main module

### 1.2.1 External structure



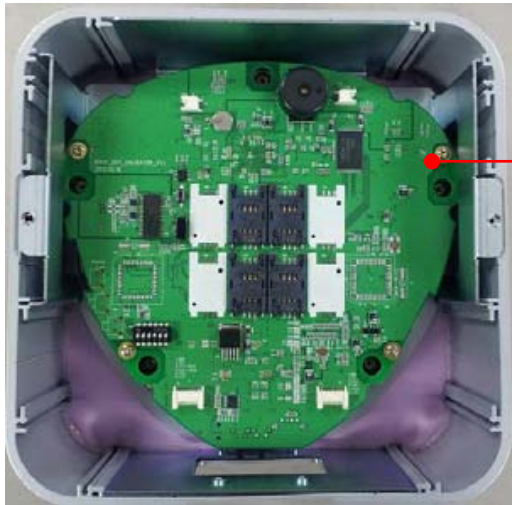
Division	Contents
Size	210mm(W) x 210m(H) x 65mm(D)
Material	Aluminum + SPCC

1.2.2 Main module structure I

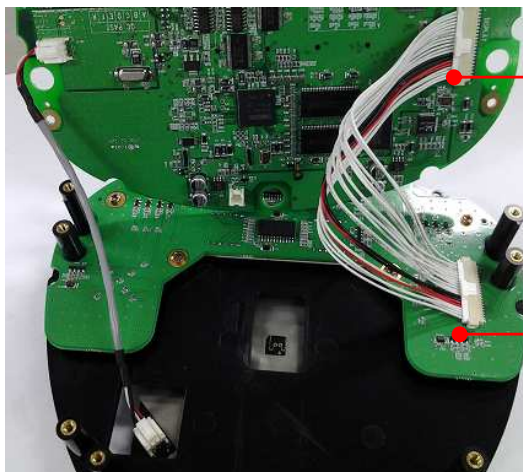


Name	Explanation
1) 7 Segment FND (3DIGIT + 4DIGIT)	Display the deducted amount of card
2) 7 Segment FND (3DIGIT + 4DIGIT)	Display the after deducted amount of card
3) O, X LED	Determine whether the card is recognized
4) RFID Antenna	ISO14443 Type A/B, 13.56MHz recognize the Card and recharge.

### 1.2.3 Internal structure

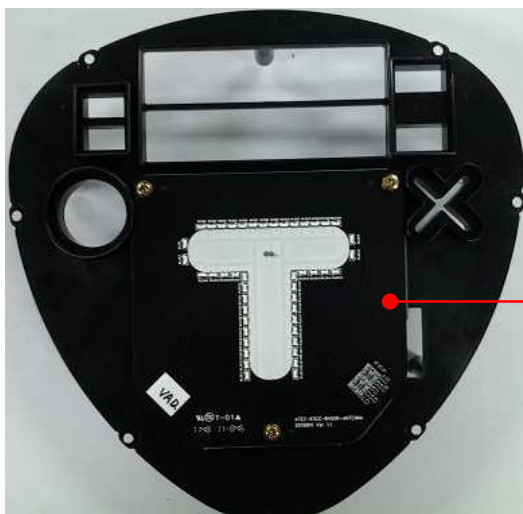


Main Board



Main Board

Display Board



Antenna Board

### 1.2.4 Main module structure

**1) 7 Segment FND(3DIGIT + 4DIGIT)**

Display deducted amount of card and after deducted amount of card.

**2) O, X LED**

Check card recognition

**3) RFID Antenna**

RF interface for reading 13.56MHz RF Card

**4) Main Board**

Control all parts of Validator, transfer processed information of each accessory to Main server.

- CPU
  - S3C2440(ARM9 Core) : 400MHz
- Memory
  - SDRAM : 128MByte
  - Nor : 8MByte
  - Nand : 512MByte
- RF Module
  - RC531( Type A,B)
- External PORT
  - Ethernet : 1EA
  - USB1.1 : 1EA
  - RS -232 : 1EA
- SAM
  - Socket 4EA(SIM Type)

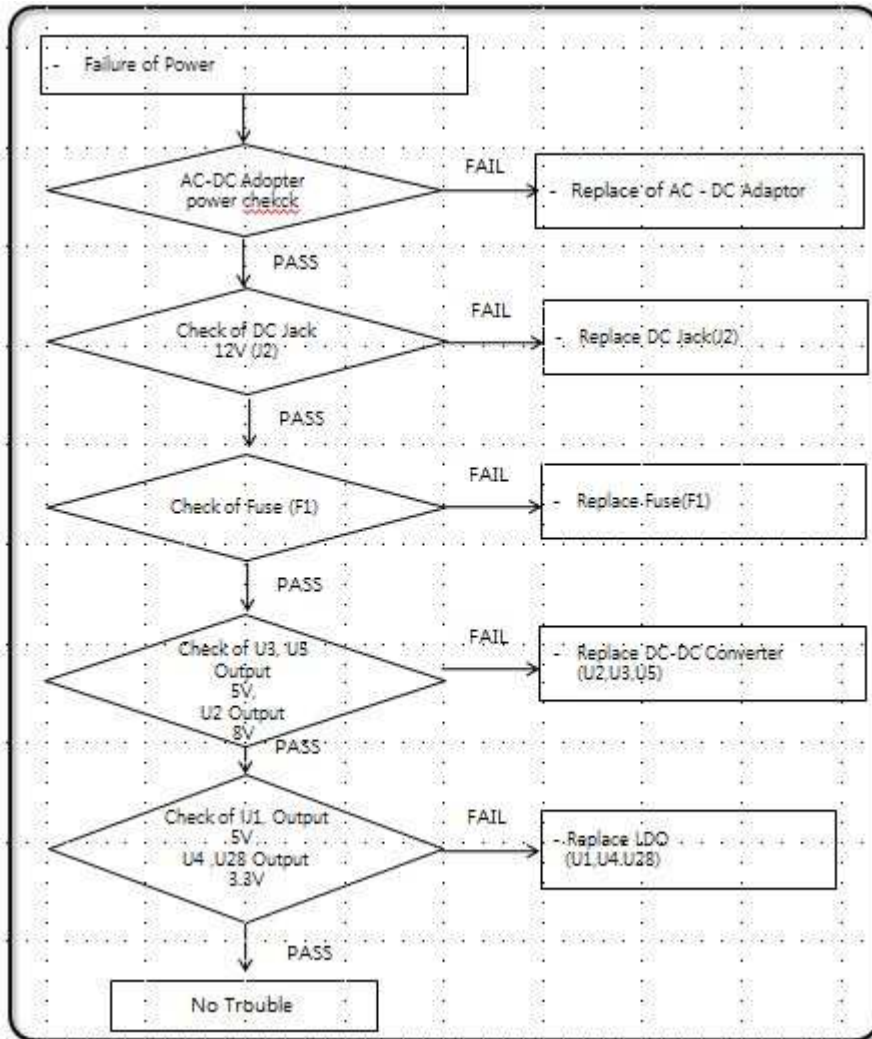
**5) Display Board**

Communicate with Main Board and control Display(7 Segment FND + Backlight LED).



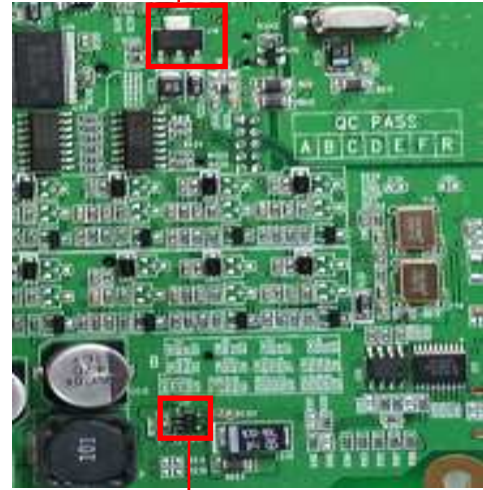
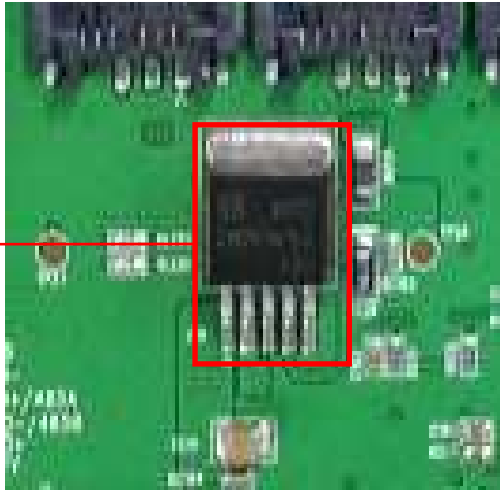
## 2. Error handling

### 2.1.1 Supply the power (1/2)



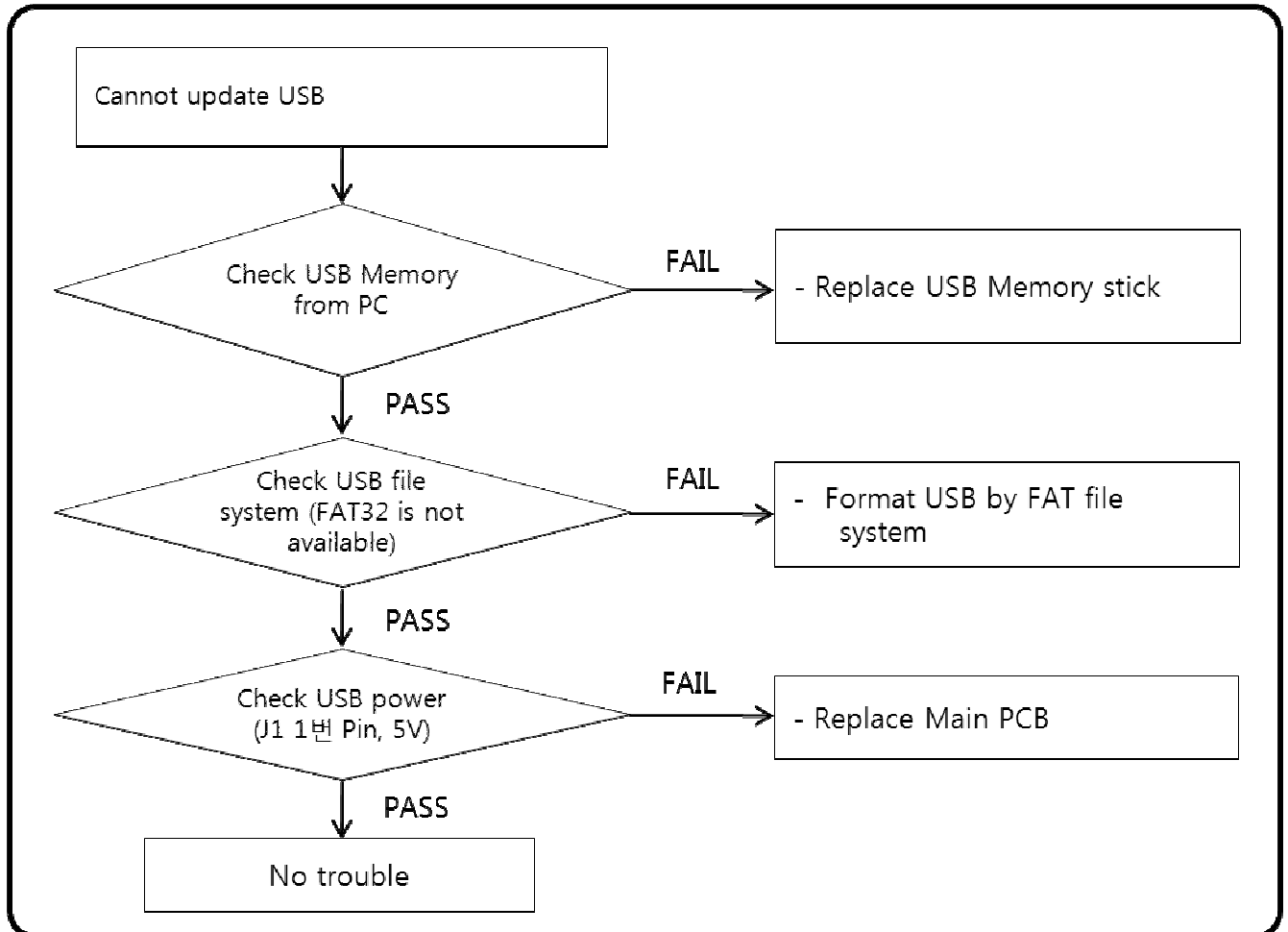
2.1.2 Supply the power (2/2)

Check U14 Output  
1.3V



Check U17 Output  
3.3V

### 2.1.3 USB Trouble (1/2)

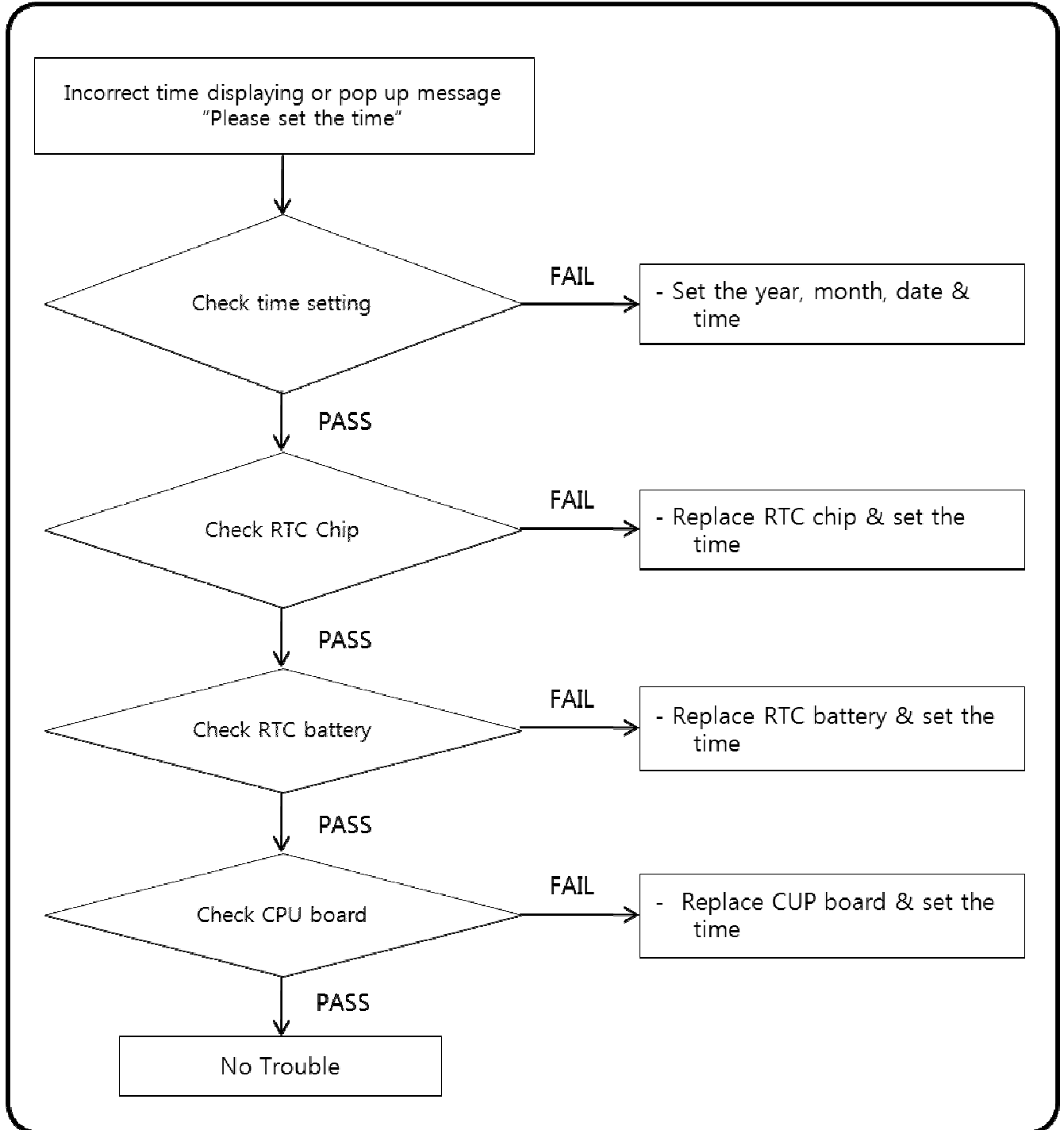


### 2.1.4 USB Trouble (2/2)

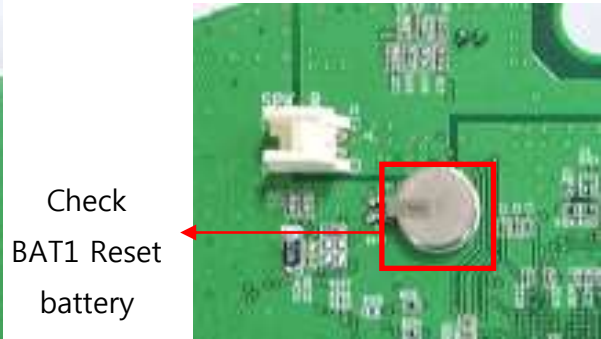
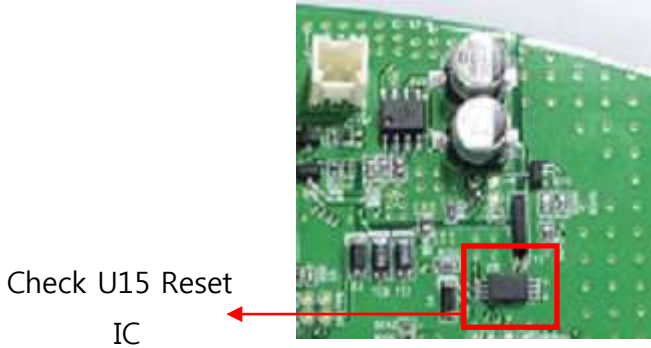
Check U1 Output  
Pin No. 1 5Votage



2.1.5 RTC Trouble (1/2)



2.1.6 RTC Trouble (2/2)



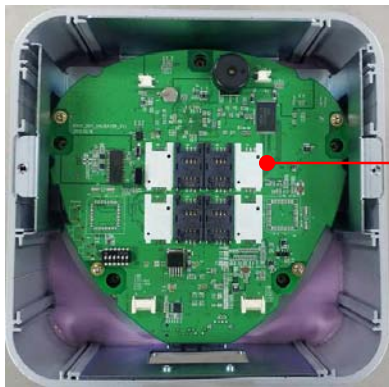
### 3. Device maintenance

#### 3.1 Main Board

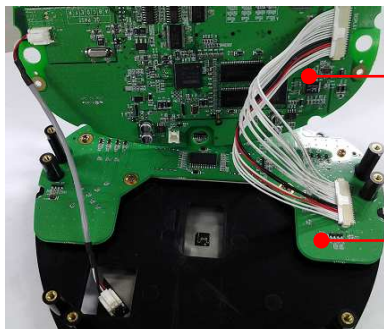
##### 3.1.1 Outline

Control all parts of Validator, transfer processed information of each accessory to Main server.

##### 3.1.2 Structure



Main Board



Main Board

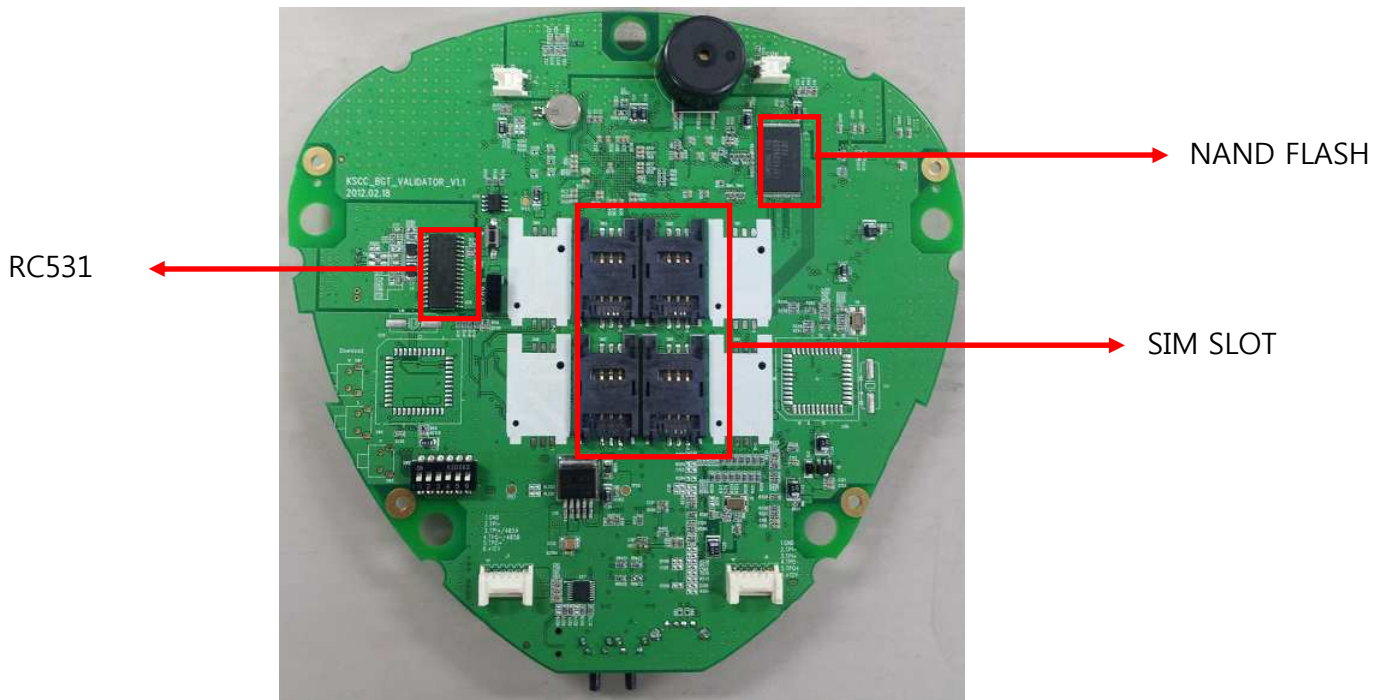
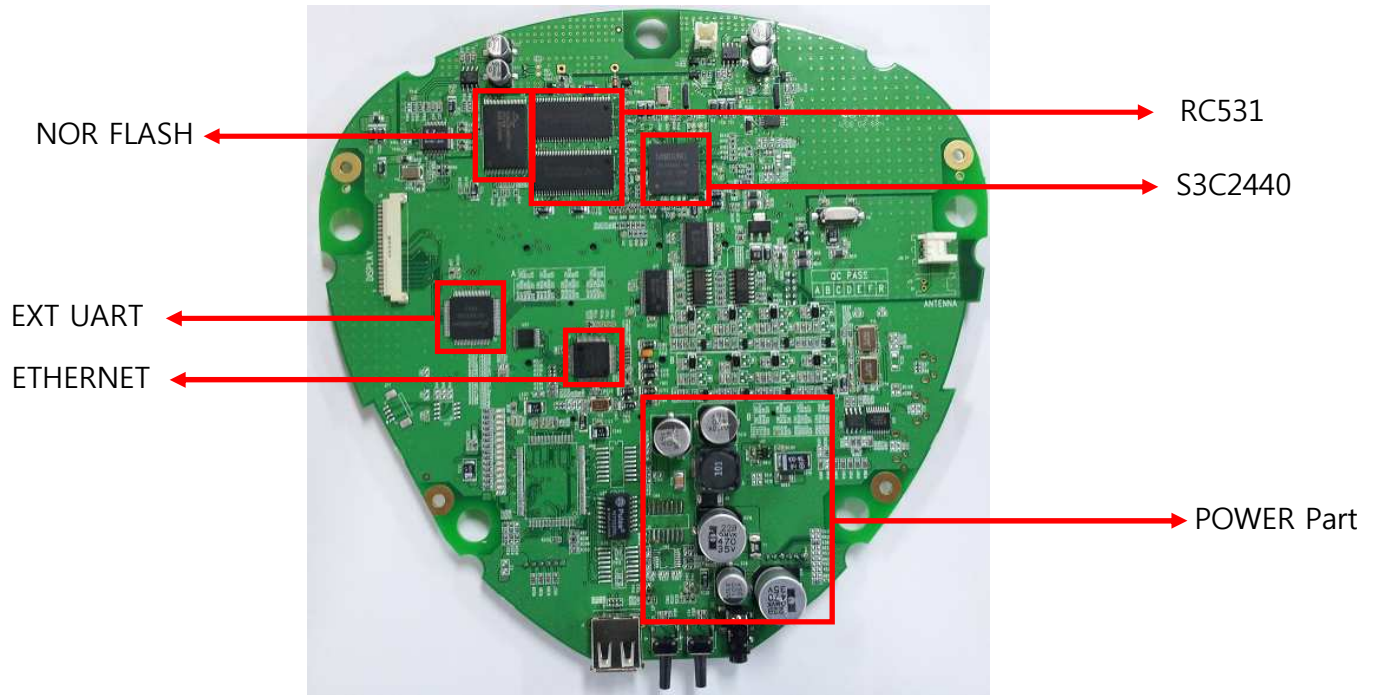
Display Board



Antenna Board

### 3.1.3 Spec

#### 1) Main Board Spec

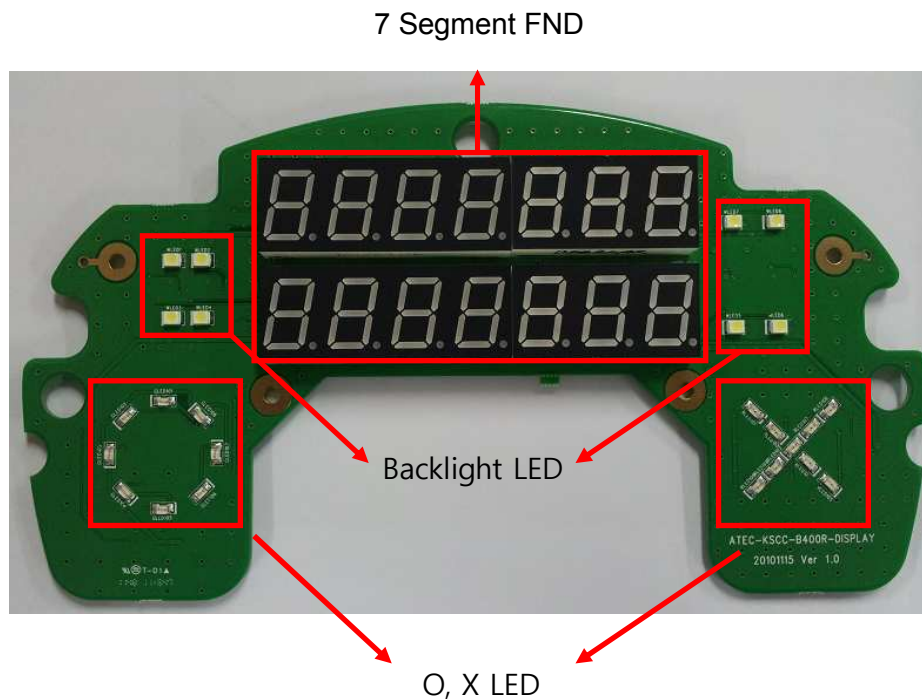




Control all parts of Validator, transfer processed information of each accessory to Main server.

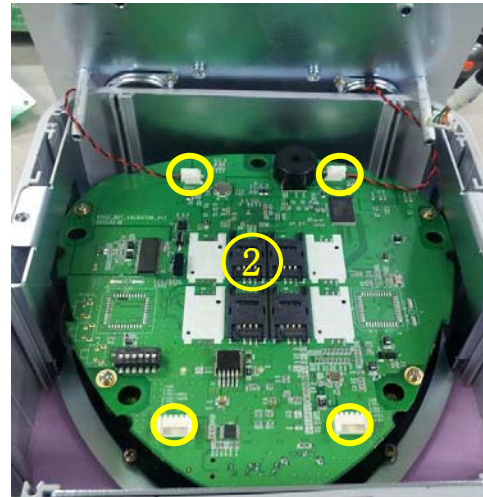
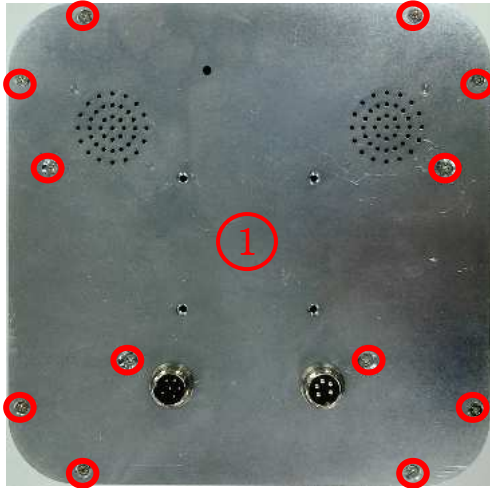
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  - S3C2440(ARM9 Core) : 400MHz
- Memory
  - SDRAM : 128MByte
  - Nor : 8MByte
  - Nand : 512MByte
- RF Module
  - RC531( Type A,B)
- External PORT
  - Ethernet : 1EA
  - USB1.1 : 1EA
  - RS -232 : 1EA
- SAM
  - Socket 4EA(SIM Type)

## 2) Display Board Spec



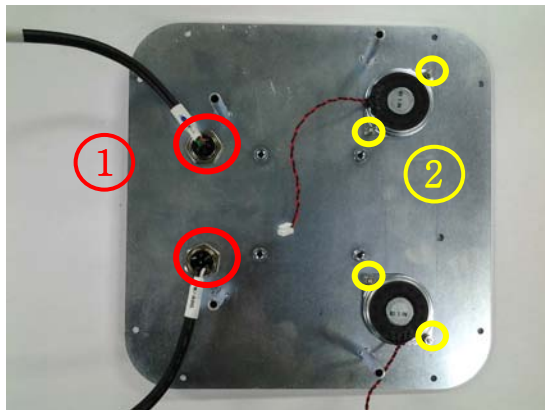
### 3.1.4 Replacement method

#### 3.1.4.1 Separation back cover



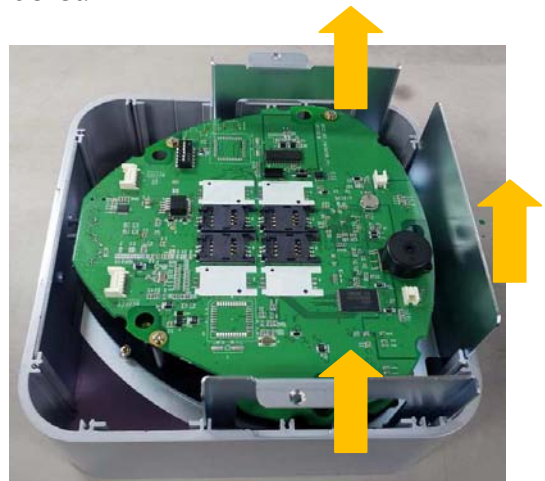
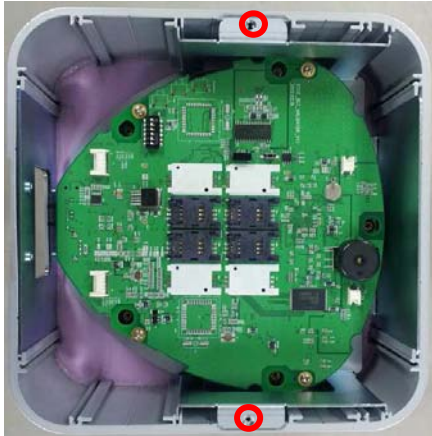
- ① Loosen fixed 12 bolts and separate cover.
- ② Remove the cover and 4 inside connector and separate back cover completely.

#### 3.1.4.2 Cable separation



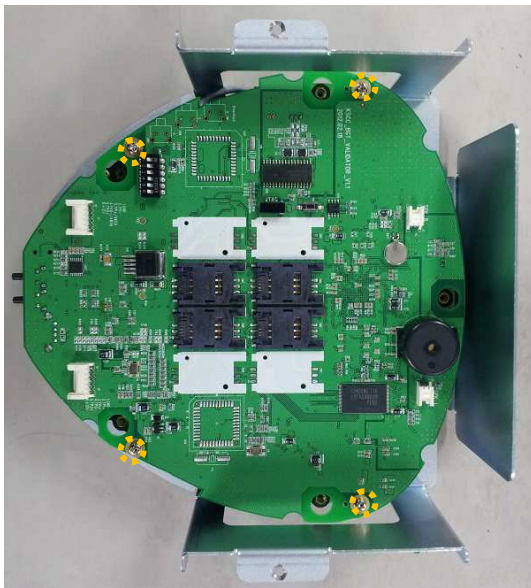
- ① Loosen the hex nut to separate circular connector
- ② Loosen the 4 hex nuts to separate speaker.

3.1.4.3 Separate external enclosure and internal Bracket.



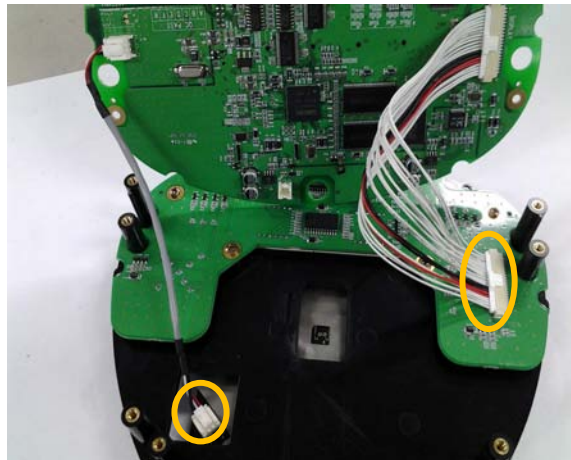
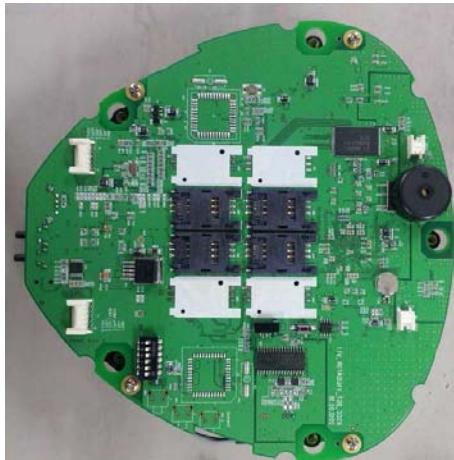
- ① Loosen 2 fixed bolts of each sides and lift PCB fixed Bracket in the direction of the arrow in the picture.

3.1.4.4 Separate inside Bracket and PCB Bracket



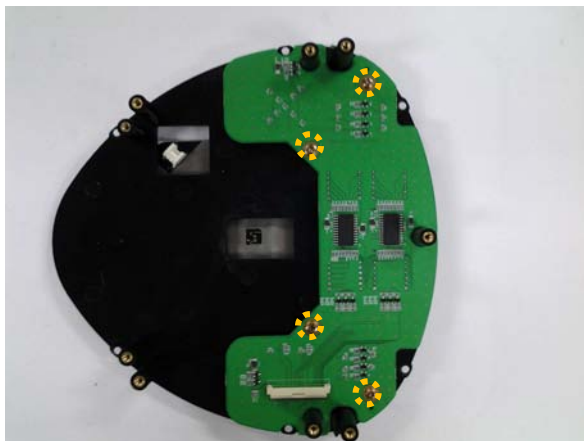
- ① Loosen fixed 4 bolts and push Bracket slightly and separate board.

3.1.4.5 Separate PCB Bracket and Main PCB



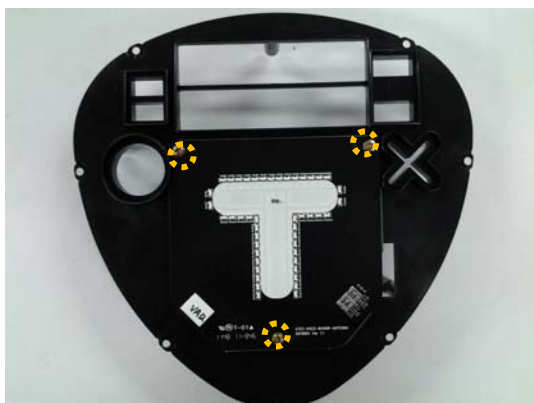
① Loosen 4 fixed bolts and pick up the board, separate connectors as shown to the right picture and separate the board completely.

3.1.4.6 Separate PCB Bracket and Display



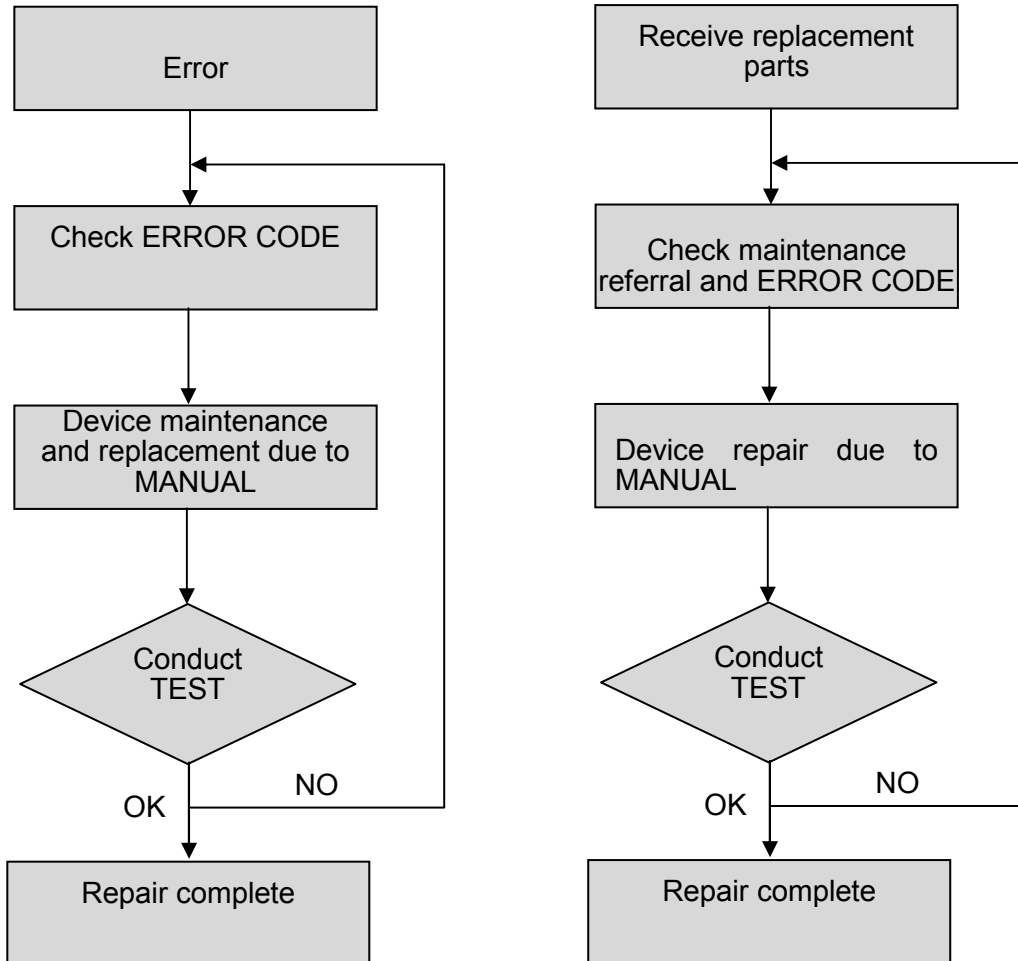
① Loosen 4 fixed bolts and separate display board.

3.1.4.7 Separate Antenna board



① Loosen 3 fixed bolts and separate antenna board.

3.2 Maintenance Flow chart



1) 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
		1 month	3months	6months	12months	
1	Power/Voltage Check					
2	Check LCD operation					
3	Check O,XLED operation					

## 4. Validator installation and update

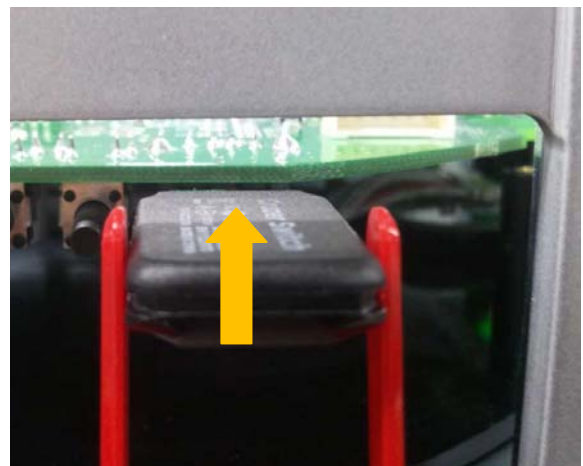
### 4.1 Validator installation

#### 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

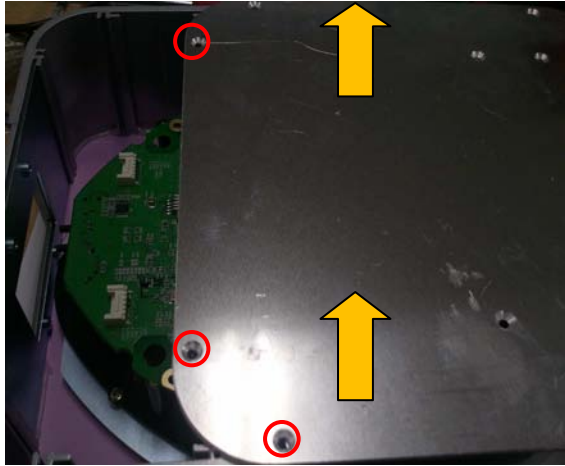
##### 4.1.2.1 USB mounting method



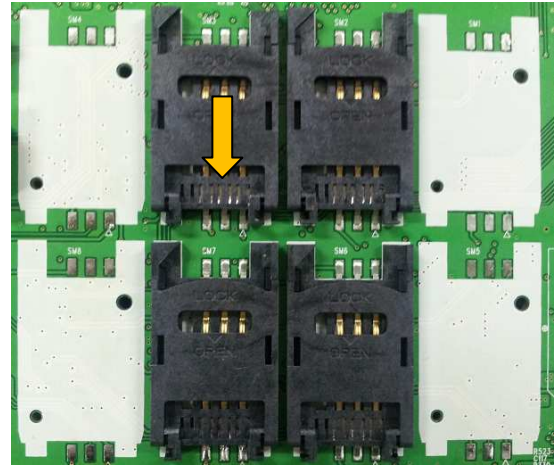
- ① Turn OFF terminal.
- ② Insert USB to at the bottom of the USB PORT and turn ON.
- ③ After update, disconnect USB from terminal and reboot.



4.1.2.2 SAM mounting

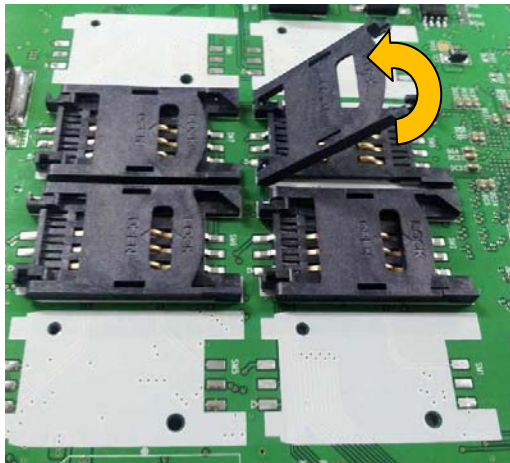


<Picture 1>

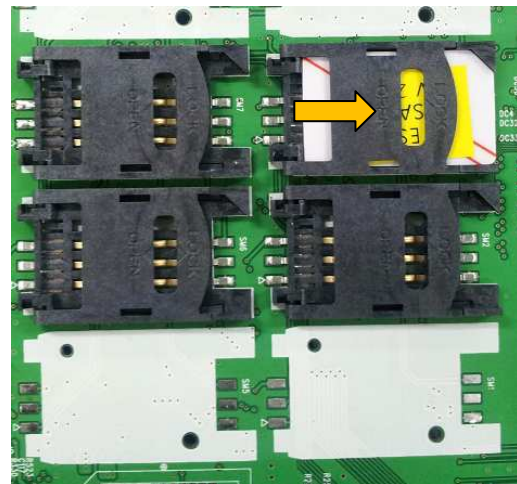


<Picture 2>

- ① Picture 1: Loosen fixed nut and separate back case.
- ② Push SAM socket in the direction of the arrow shown in picture 2, and lift like picture 3.



<Picture 3>



<Picture 4>

- ③ After combined SAM, push and combine completely.
- ④ Combine all of SAM and assemble back case.

4.1.2.3 Power ON

- ① Connect adopter to outlet.
- ② When hear BUZZER, normal booting complete  
< 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.

### UNINTENTIONAL RADIATORS (Part15, Subpart B, 15.105)

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.