

Features:

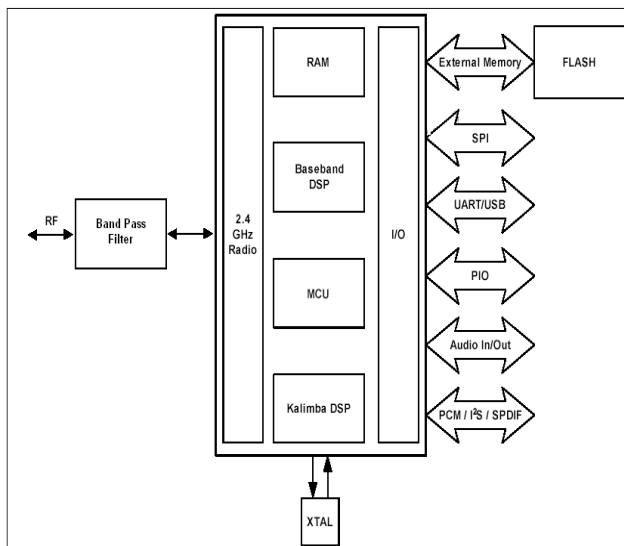
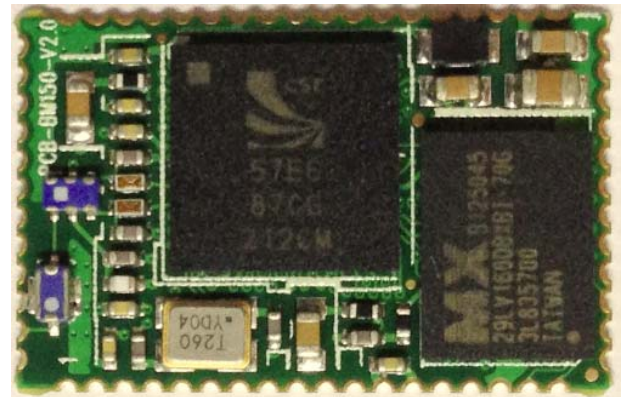
- Bluetooth Spec. V3.0 (V2.1+EDR) Compliant
- Class 2 type Output Power
- Support Firmware Upgrade
- USB 1.1 and UART Host Interface
- Multi-Configurable I2S, PCM or SPDIF Interface
- Integrated Switched-Mode Regulator
- Integrated Battery Charger
- Integrated Microphone bias
- Integrated LED Driver
- Built in 16-bit Stereo Codec- 95dB SNR for DAC
- Factory configurable to either 1.8V or 3.3V supply.
- Supports up to 32Mbits of External Flash Memory (16Mbits Typical Requirement)
- Enhanced Audibility and Noise Cancellation
- PCB material: FR4
- PCB Surface treatment: Immersion gold
- Size: 21mm x 13.5 mm x 2.35mm
- Weight: 0.8g

BM153 Class 2 Multimedia Module



CSR, BC57E687C

Jan. 2013



System Architecture

Product Description:

The BM153 is a Class 2 Bluetooth sub-system using BlueCore5-Multimedia External chipset from leading Bluetooth chipset supplier Cambridge Silicon Radio.

BM153 interfaces to 8Mbit of external Flash memory. When used with the CSR Bluetooth software stack, it provides a fully compliant Bluetooth system to V3.0 of the specification for data and voice communications.

The module and device firmware is fully compliant with the Bluetooth specification V3.0.

Applications:

- Hands-free Car Kit
- Stereo Headset
- AV Headphones
- Echo Cancellation
- High Performance Mono Headsets
- Analogue and USB Multimedia Dongles
- Wireless Speakers

Specifications:

| | |
|--------------------------|--------------------------------------|
| Operating Frequency Band | 2.4GHz ~ 2.48GHz unlicensed ISM band |
| Bluetooth Specification | BT V3.0 (V2.1+EDR) |
| Output Power Class | Class 2 |
| Max. Output Power | 2.5mW |
| Date Rate | 3Mbps |
| Channel No. | 79 |
| Modulation Type | GFSK $\pi/4$ DQPSK 8DPSK |
| Operating Voltage | 1.8V / 3.3V |
| Host Interface | USB 1.1 or UART |
| Audio Interface | PCM, I2S, SPDIF |
| Flash Memory Size | 8M, 16M, or 32Mbits |
| Dimension | 21mm (L) x 13.5 (W) mm x 2.35mm (H) |

Specifications are subject to change without prior notice



Electrical Characteristics

| Absolute Maximum Rating | Min | Max |
|-------------------------|--------|-------|
| Storage Temperature | -40°C | +85°C |
| Supply Voltage, (V_CHG) | -0.30V | +6.5V |

| Recommended Operating Conditions | Min | Max |
|----------------------------------|-------|-------|
| Operating Temperature Range | -20°C | +70°C |
| Supply Voltage, (V_BAT) | 2.5V | 4.2V |
| Supply Voltage, (V_CHG) | 4.5V | 5.75V |

| Power Consumption | Units | Average |
|--|-------|---------|
| SCO Connection HV3 (30ms interval sniff mode) | mA | 21 |
| SCO Connection HV1 | mA | 40 |
| ACL Data Transfer 115.2Kbps UART no traffic (Master) | mA | 4.4 |
| ACL Data Transfer 115.2Kbps UART no traffic (Slave) | mA | 15 |
| CODEC | | |
| Microphone inputs and ADC/channel | mA | TBD |
| DAC and loudspeaker driver, no signal/channel | mA | TBD |
| Digital audio processing subsystem | mA | TBD |

VBAT = 4.2V; f = 2.441GHz; T=20°C

RF Characteristics

| Receiver | Units | Min | Typ | Max | Bluetooth Spec |
|--|-------|-----|-----|-----|----------------|
| Sensitivity at 0.1% BER | dBm | - | -90 | -86 | ≤ -70 |
| Maximum Receiver Signal | dBm | -20 | -10 | - | ≥ -20 |
| C/I Co-Channel | dB | - | 6 | 11 | ≤ 11 |
| Adjacent Channel Selectivity C/I -1MHz | dB | - | -6 | 0 | ≤ 0 |
| 2nd Adjacent Channel Selectivity C/I -2MHz | dB | - | -38 | -30 | ≤ -30 |
| 3rd Adjacent Channel Selectivity C/I -3MHz | dB | - | -45 | -40 | ≤ -40 |
| Image Rejection C/I | dB | - | -16 | -9 | ≤ -9 |

VBAT = 4.2V; f = 2.4441GHz; T=20°C

| Transmitter | Units | Min | Typ | Max | Bluetooth Spec |
|---------------------------------------|-------|-----|-----|------|----------------|
| RF Output Power | dBm | 0 | 3 | - | -6 to +4 |
| RF Power Control Range | dB | 16 | 24 | - | > 16 |
| RF Power Range Control Resolution | dB | - | 0.5 | - | - |
| 20dB Bandwidth for Modulated Carrier | KHz | - | 940 | 1000 | <1000 |
| 2nd Adjacent Channel Power (+/- 2MHz) | dBm | - | -36 | -20 | ≤ -20 |
| 3rd Adjacent Channel Power (+/- 3MHz) | dBm | - | -45 | -40 | ≤ -40 |

VBAT = 4.2V; f = 2.4441GHz; T=20°C

All specifications including pinouts and electrical specifications may be changed without prior notice

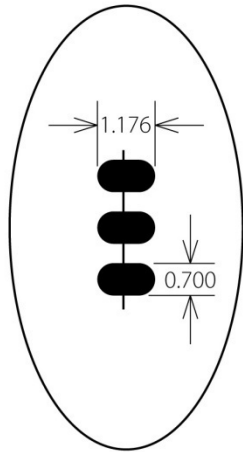
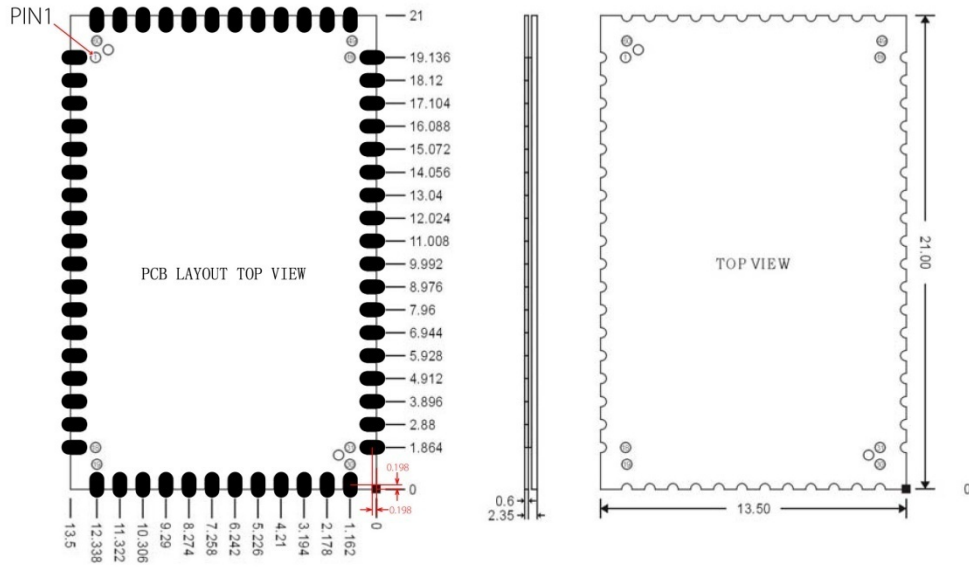


Pin Configurations

| PIN NO. | NAME | TYPE | FUNCTION | RE-MARK |
|---------|----------|---------------------------------------|--|------------------|
| 1 | AIO1 | Bi-directional | Programmable input/output line | |
| 2 | AIO0 | Bi-directional | Programmable input/output line | |
| 3 | RESET | CMOS input with weak internal pull-up | Reset if low. Input debounced so must be low for >5ms to cause a reset | |
| 4 | GND | GND | Ground | |
| 5 | PIO9 | Bi-directional | Programmable Input/Output Line | |
| 6 | PIO10 | Bi-directional | Programmable Input/Output Line | |
| 7 | PIO11 | Bi-directional | Programmable Input/Output Line | |
| 8 | PIO12 | Bi-directional | Programmable Input/Output Line | |
| 9 | PIO13 | Bi-directional | Programmable Input/Output Line | |
| 10 | PIO14 | Bi-directional | Programmable Input/Output Line | |
| 11 | PIO15 | Bi-directional | Programmable Input/Output Line | |
| 12 | GND | GND | Ground | |
| 13 | VDD | Power | +3.3V Supply | For 3.3V Version |
| | VDD | Power | Connect to +1V8 | For 1.8V Version |
| 14 | VDD_USB | Power | Positive supply for UART/USB ports, Connect to VDD | |
| 15 | +1V8 | Power | +1.8V Supply | |
| 16 | GND | GND | Ground | |
| 17 | USB_DP | Bi-directional | USB Data Plus | |
| 18 | USB_DN | Bi-directional | USB Data Minus | |
| 19 | UART_RTS | CMOS Output | UART Request To Send (Active Low) | |
| 20 | UART_CTS | CMOS Input | UART Clear To Send (Active Low) | |
| 21 | UART_RX | CMOS Input | UART Data Input (Active High) | |
| 22 | UART_TX | CMOS Output | UART Data Output (Active High) | |
| 23 | PCM_IN | CMOS Input | Synchronous Data Input | |
| 24 | PCM_SYNC | Bi-directional | Synchronous Data Sync | |
| 25 | PCM_CLK | Bi-directional | Synchronous Data Clock | |
| 26 | PCM_OUT | CMOS Output | Synchronous Data Output | |
| 27 | SPI_CSB | CMOS Input | Chip Select For Synchronous Serial Interface (Active Low) | |
| 28 | SPI_MISO | CMOS Output | Serial Peripheral Interface Data Output | |
| 29 | SPI_CLK | CMOS Input | Serial Peripheral Interface Clock | |
| 30 | SPI_MOSI | CMOS Input | Serial Peripheral Interface Data Input | |
| 31 | VRE_IN | Analogue | Take high to enable switch-mode regulator | |
| 32 | VDD_BAT | Battery terminal +ve | Lithium ion/polymer battery positive terminal. Battery charger output and input to switch-mode regulator | |
| 33 | GND | GND | Ground | |
| 34 | VDD_CHG | Charger input | Lithium ion/polymer battery charger input | |
| 35 | LED1 | Open drain output | LED Driver | |
| 36 | LED0 | Open drain output | LED Driver | |
| 37 | GND | GND | Ground | |
| 38 | SPK_L_N | Analogue | Speaker output negative, left | |
| 39 | SPK_L_P | Analogue | Speaker output positive, left | |
| 40 | SPK_R_N | Analogue | Speaker output negative, right | |
| 41 | SPK_R_P | Analogue | Speaker output positive, right | |
| 42 | GND_S | GND S | Analogue Signal Ground | |
| 43 | MIC_BIAS | Analogue | Microphone bias | |
| 44 | MIC_B_P | Analogue | Microphone input positive, right | |
| 45 | MIC_B_N | Analogue | Microphone input negative, right | |
| 46 | MIC_A_P | Analogue | Microphone input positive, left | |
| 47 | MIC_A_N | Analogue | Microphone input negative, left | |
| 48 | GND | GND | Ground | |
| 49 | PIO0 | Bi-directional | Programmable Input/Output Line | |
| 50 | PIO1 | Bi-directional | Programmable Input/Output Line | |
| 51 | PIO2 | Bi-directional | Programmable Input/Output Line | |
| 52 | PIO3 | Bi-directional | Programmable Input/Output Line | |
| 53 | PIO4 | Bi-directional | Programmable Input/Output Line | |
| 54 | PIO5 | Bi-directional | Programmable Input/Output Line | |
| 55 | PIO6 | Bi-directional | Programmable Input/Output Line | |
| 56 | PIO7 | Bi-directional | Programmable Input/Output Line | |
| 57 | PIO8 | Bi-directional | Programmable Input/Output Line | |
| 58 | GND | GND | Ground | |
| 59 | RF-IN | RF | RF Interface | |
| 60 | GND | GND | Ground | |

Recommended Layout patterns:

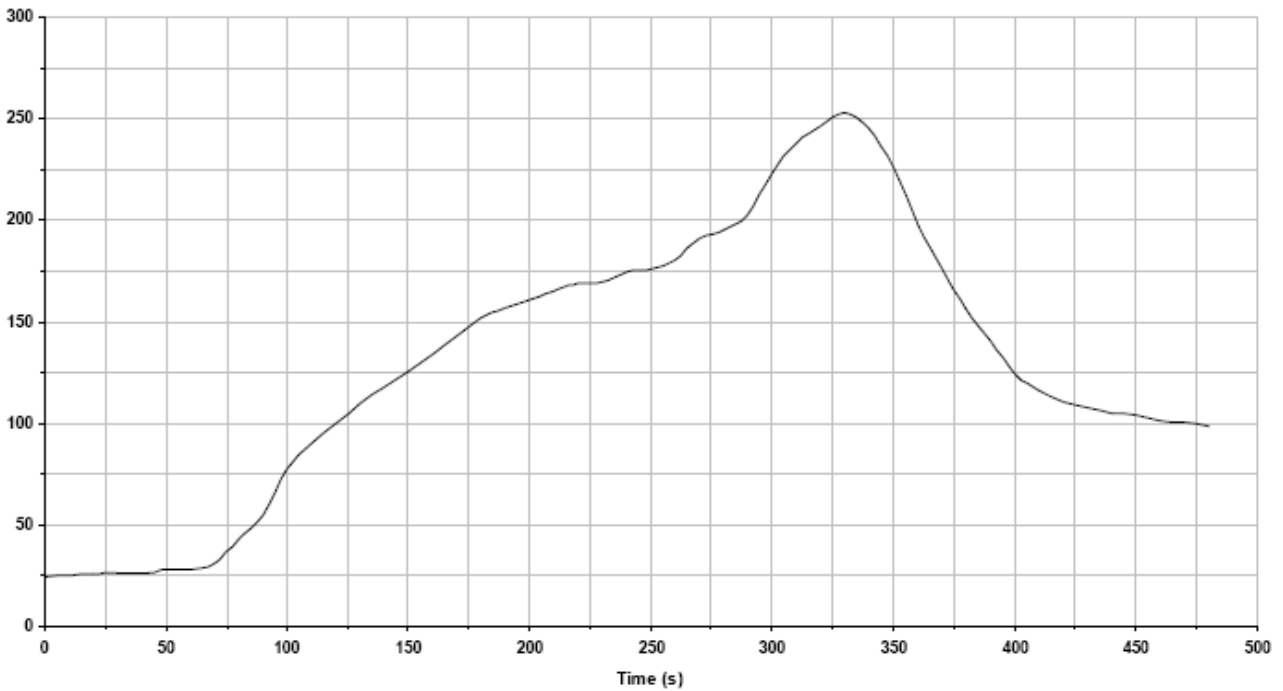
Physical Dimension Unit in mm



| NO | PINNAME | NO | PINNAME |
|----|----------|----|----------|
| 1 | A101 | 31 | VRE_IN |
| 2 | A100 | 32 | VDD_BAT |
| 3 | RESET | 33 | GND |
| 4 | GND | 34 | VDD_CHG |
| 5 | P109 | 35 | LEO1 |
| 6 | P1010 | 36 | LEO0 |
| 7 | P1011 | 37 | GND |
| 8 | P1012 | 38 | SPK_L_N |
| 9 | P1013 | 39 | SPK_L_P |
| 10 | P1014 | 40 | SPK_R_N |
| 11 | P1015 | 41 | SPK_R_P |
| 12 | GND | 42 | GND_S |
| 13 | VDD | 43 | MIC_BIAS |
| 14 | VDD_USB | 44 | MIC_B_P |
| 15 | +1V8 | 45 | MIC_B_N |
| 16 | GND | 46 | MIC_A_P |
| 17 | USB_DP | 47 | MIC_A_N |
| 18 | USB_DN | 48 | CND |
| 19 | UART_RTS | 49 | PIDO |
| 20 | USRT_CTS | 50 | PIO1 |
| 21 | UART_RX | 51 | PIO2 |
| 22 | UART_TX | 52 | PIO3 |
| 23 | PCM_IN | 53 | PIO4 |
| 24 | PCM_SYNC | 54 | PIO5 |
| 25 | PCM_CLK | 55 | PIO6 |
| 26 | PCM_OUT | 56 | PIO7 |
| 27 | SPI_CSB | 57 | PIO8 |
| 28 | SPI_MISO | 58 | GND |
| 29 | SPI_CLK | 59 | RF |
| 30 | SPI_MOSI | 60 | GND |

Configuration

Recommended Reflow Temperature Profile:



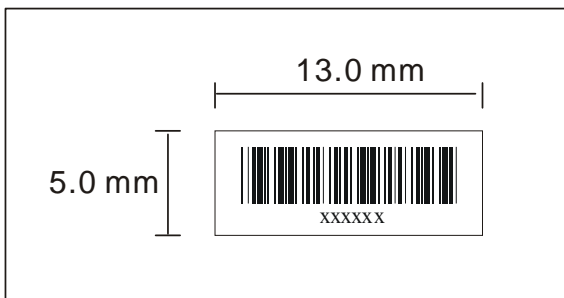
Key features of the profile:

- Initial Ramp=1-2.5°C/sec to 175°C equilibrium
- Equilibrium time=60 to 80 seconds
- Ramp to Maximum temperature (250°C)=3°C/sec Max
- Time above liquidus temperature(217°C): 45 - 90 seconds
- Device absolute maximum reflow temperature: 250°C

MAC Address:

Each Module has his MAC Address
001D DF XXXXXX

Concerning the dimension of the tab, only printing the last six letters of the LAP on the module.



The tab code pastes style:



QDL Certificate



Bluetooth SIG Qualification Design (QDL) Certificate

QDL Certificate: This certificate represents the Specifications declared by the Member as having passed the Bluetooth Qualification/Certification Process as specified within the Bluetooth Specifications and as required within the PRD 2.0.

Design Name: **Bluetooth Class 2 Multimedia Module (v2.1+EDR)**

This Product Design has passed the Bluetooth Qualification Process!



Specification Version: 2.1/2.1+EDR

QDID: B014839

Declared Specifications: Baseband Conformance, Radio, Link Manager, Summary ICS, Product Type

Member Company:
Sunitec
10F.-1, No.200, Jingping Rd.
Jhonghe City, Taipei County
23581 T

Requirements:
1. Testing
2. Documentation
3. Assessment
4. Declaration
5. Listing
6. Marking
7. Compliance to Auditing and Enforcement

Project Dates:
Assessment Date:
December/08/2008

Listing Date:
December/08/2008

| | | | |
|--|---|------|----------------------|
| Qualified Design ID (QD ID) | B014839 Export PICS | | |
| PRD 1.0 ID (QP ID) | | | |
| Design Name | Bluetooth Class 2 Multimedia Module (v2.1+EDR) | | |
| Wi-Fi® Certification ID | | | |
| Subsetted Designs | Date Created | Type | PICS |
| | Dec 7, 2008 | Main | PICS |
| Member Company | Sunitec | | |
| Specification Name | 2.1+EDR | | |
| Core Spec Addenda | N/A | | |
| Design Model Number | BM150, BM151, BM153, BMXXX | | |
| Hardware Version Number | V1.0 | | |
| Software Version Number | N/A | | |
| Qualification Assessment Date | November/24/2011 | | |
| Listing Date | December/08/2008 | | |
| Design Description | Bluetooth Class 2 Multimedia Module | | |
| Product Type | Component (Tested) | | |
| Technical Data Sheet (RIN) | ** Open Reference Integration Notes (RIN) ** | | |
| Listed By | li yuanshun | | |
| BQE | H.M. Chen | | |

Ordering Information

| No | Items | Ordering Code (Class 2) | Description |
|----|----------------------------|-------------------------|--|
| 1 | BC05mm-ext Module-3V3 | BM153 | 16Mbit Flash Operating Voltage is 3.3V |
| 2 | BC05mm-ext Module-3V3 | BM153-08 | 8Mbit Flash Operating Voltage is 3.3V |
| 3 | BC05mm-ext Module-3V3 | BM153-32 | 32Mbit Flash Operating Voltage is 3.3V |
| 4 | BC05mm-ext Module Test Kit | BM153 TK | Test kit base BM153 |



Document References

| References | Version |
|--|-----------------------------|
| Specifications of the Bluetooth System | V2.1+EDR, 26 July 2007 |
| BlueCore5-Multimedia External Product Data Sheet | CS-121064-DSP2 15 July 2008 |

Document History

| Revision | Date | History |
|------------|------------|--|
| Draft V0.1 | 2006-12-12 | |
| V1.0 | 2007-04-12 | First release |
| V2.0 | 2008-09-11 | Update from Revision V1.0 |
| V3.0 | 2008-09-19 | Update from Revision V2.0 |
| V4.0 | 2009-05-22 | Update from V2.0+EDR compliant to V2.1+EDR compliant |
| V4.1 | 2009-07-30 | Update from printing MAC address "UAP" to "LAP" |
| V4.2 | 2009-08-22 | Remove BC57E687B-ITB-E4 from BOM |
| V4.3 | 2009-12-02 | Modify page 3 PIN OUT mistake (Swap AIO0 and AIO1) |
| V4.4 | 2011-7-1 | Add more order information |
| V4.5 | 2011-12-19 | Add more order information BM153-32 |
| V4.6 | 2013-01-10 | Add BM153 Test board |

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[Http://www.sunitec-cn.com](http://www.sunitec-cn.com)

Internal Photo

Sony Corporation
Personal Audio System
[Model:SRS-X5]



Internal Photo

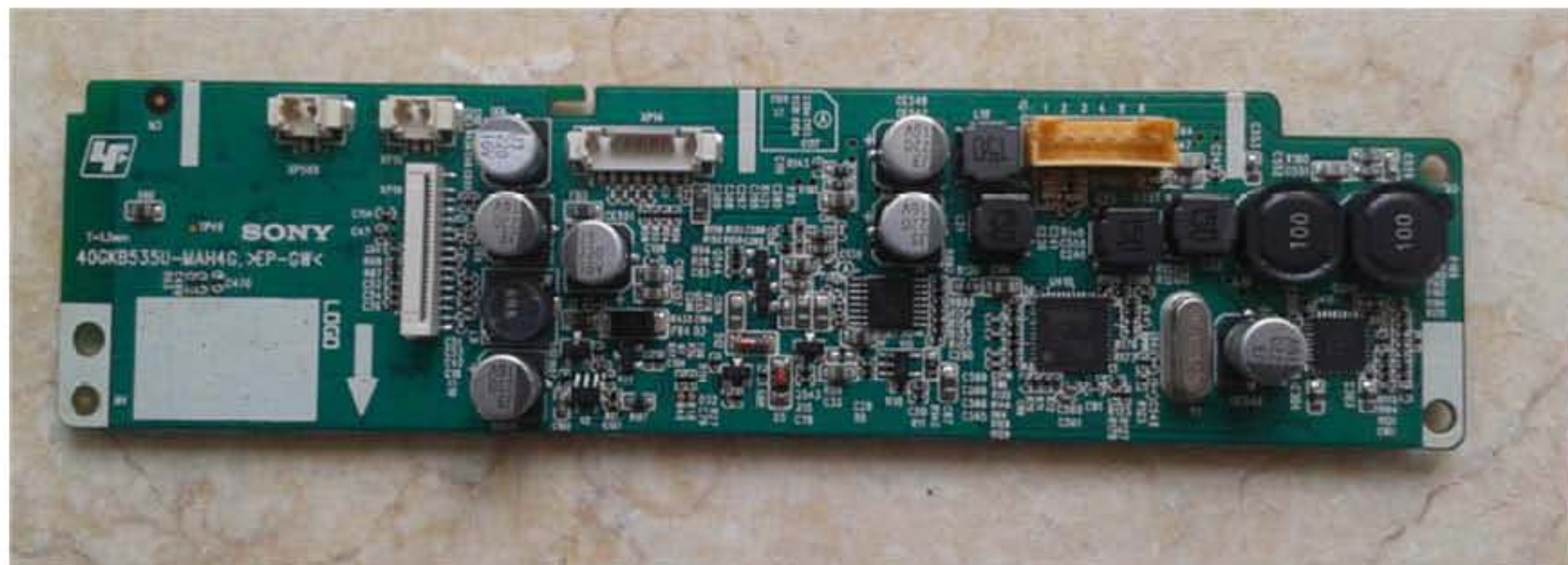
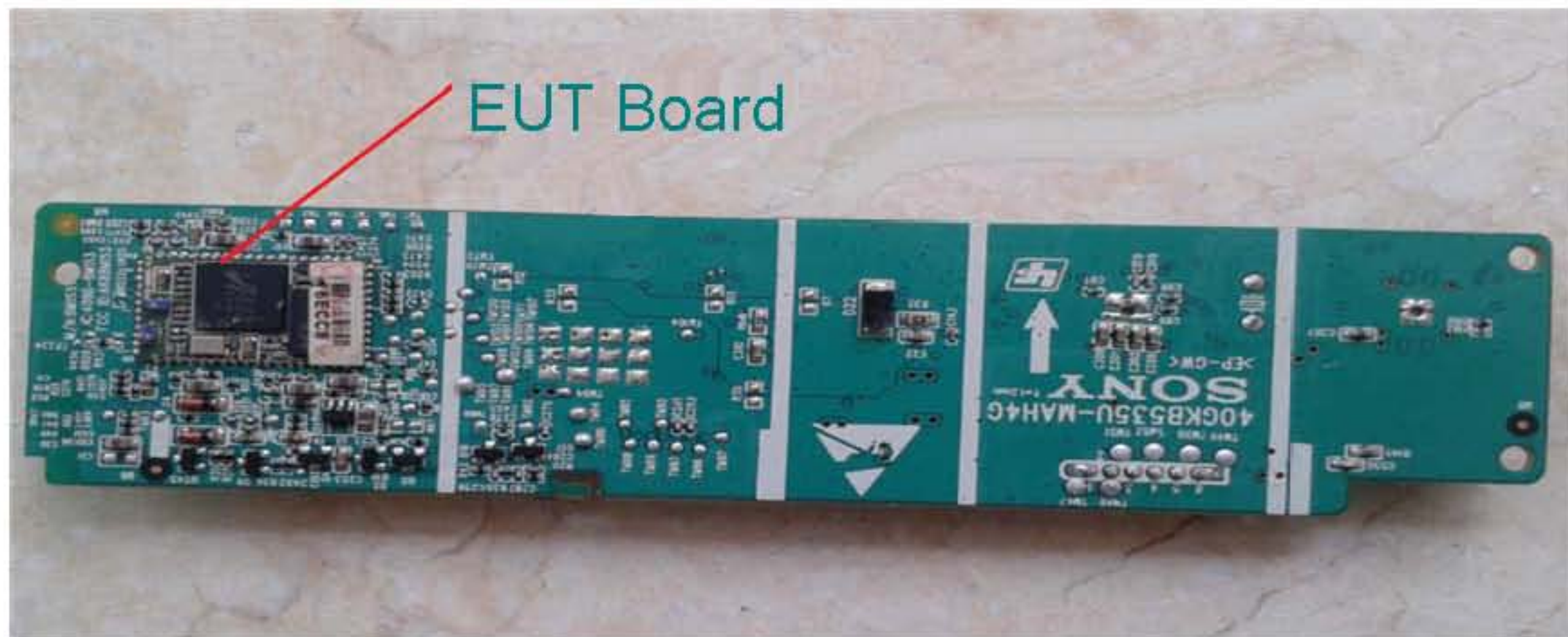
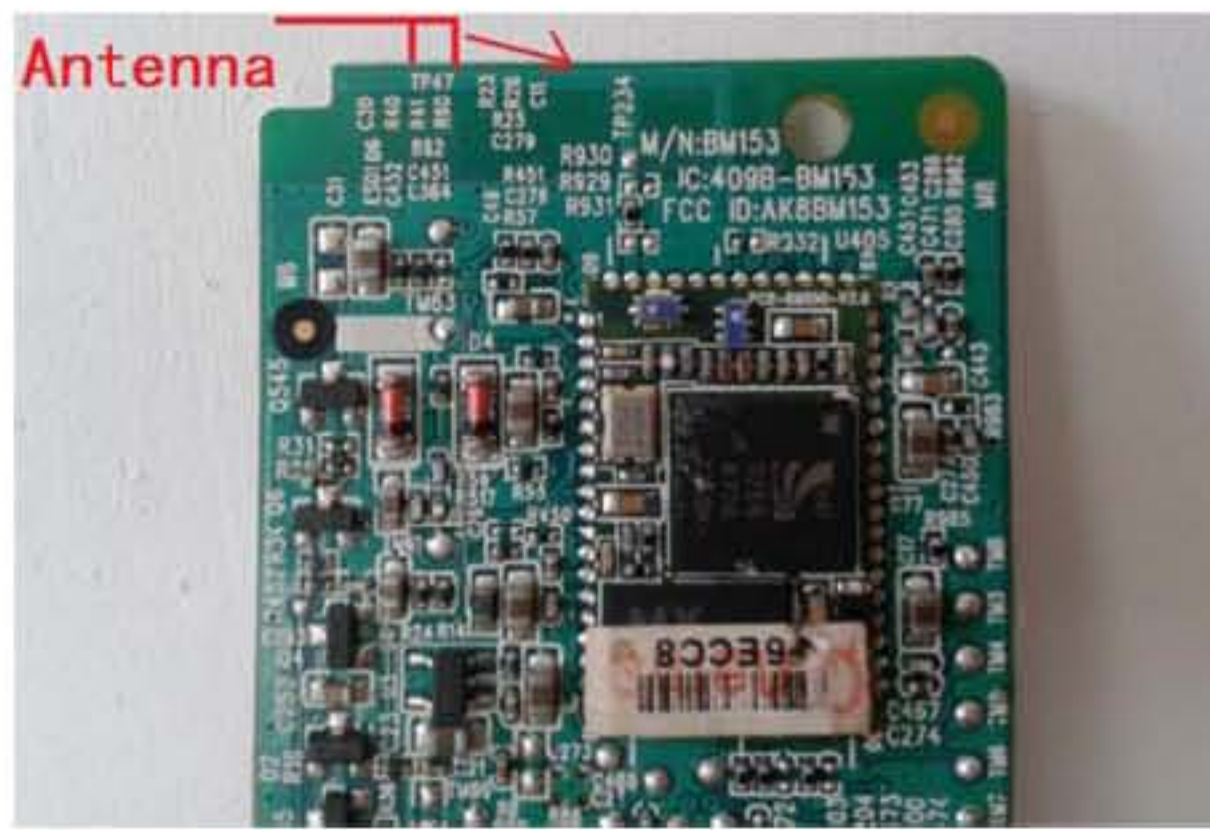
Sony Corporation
Personal Audio System
[Model:SRS-X5]



Internal Photo

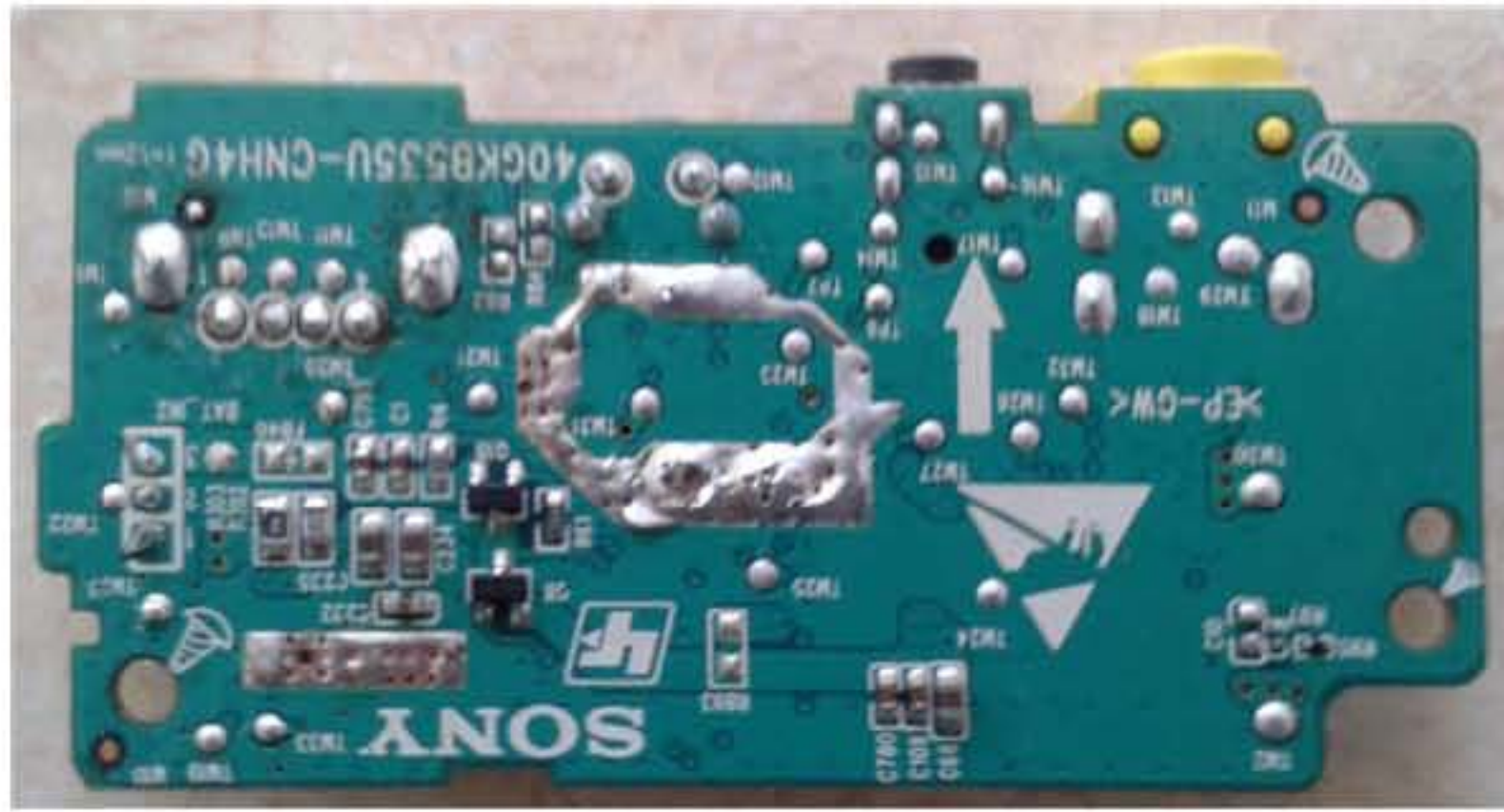
Sony Corporation
Personal Audio System
[Model:SRS-X5

EUT Board:



CN board Photo:



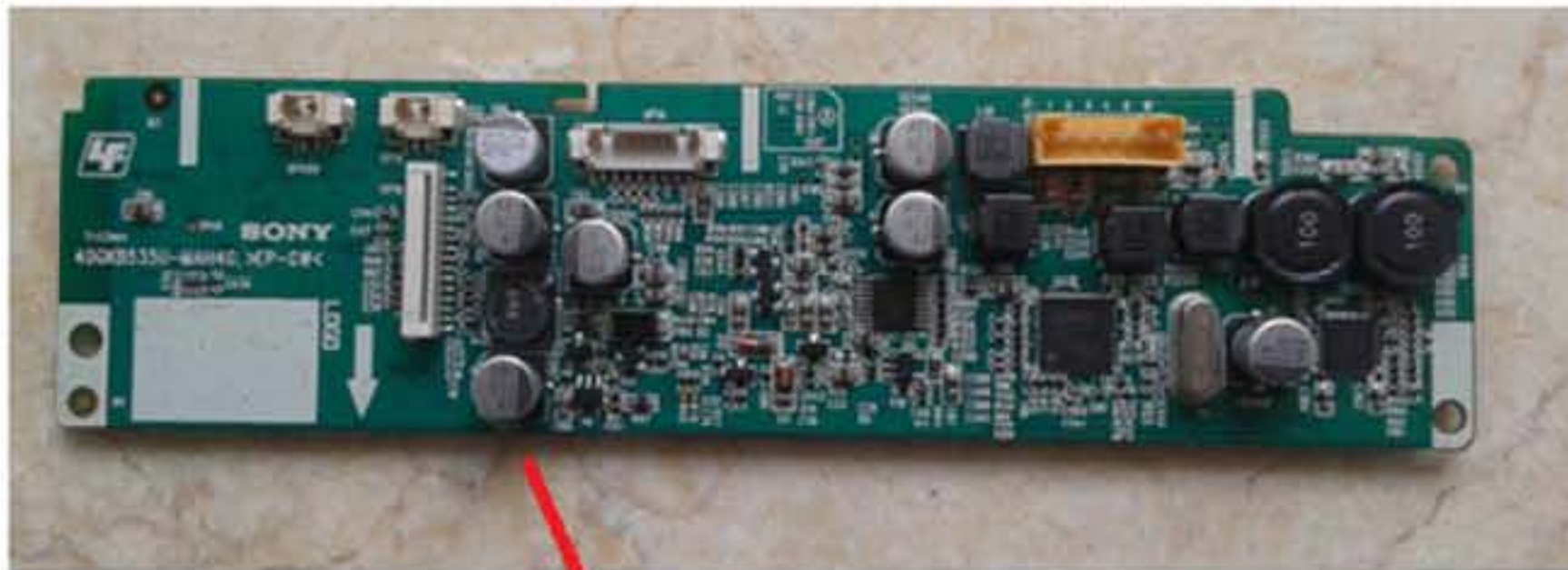


Key board Photo:

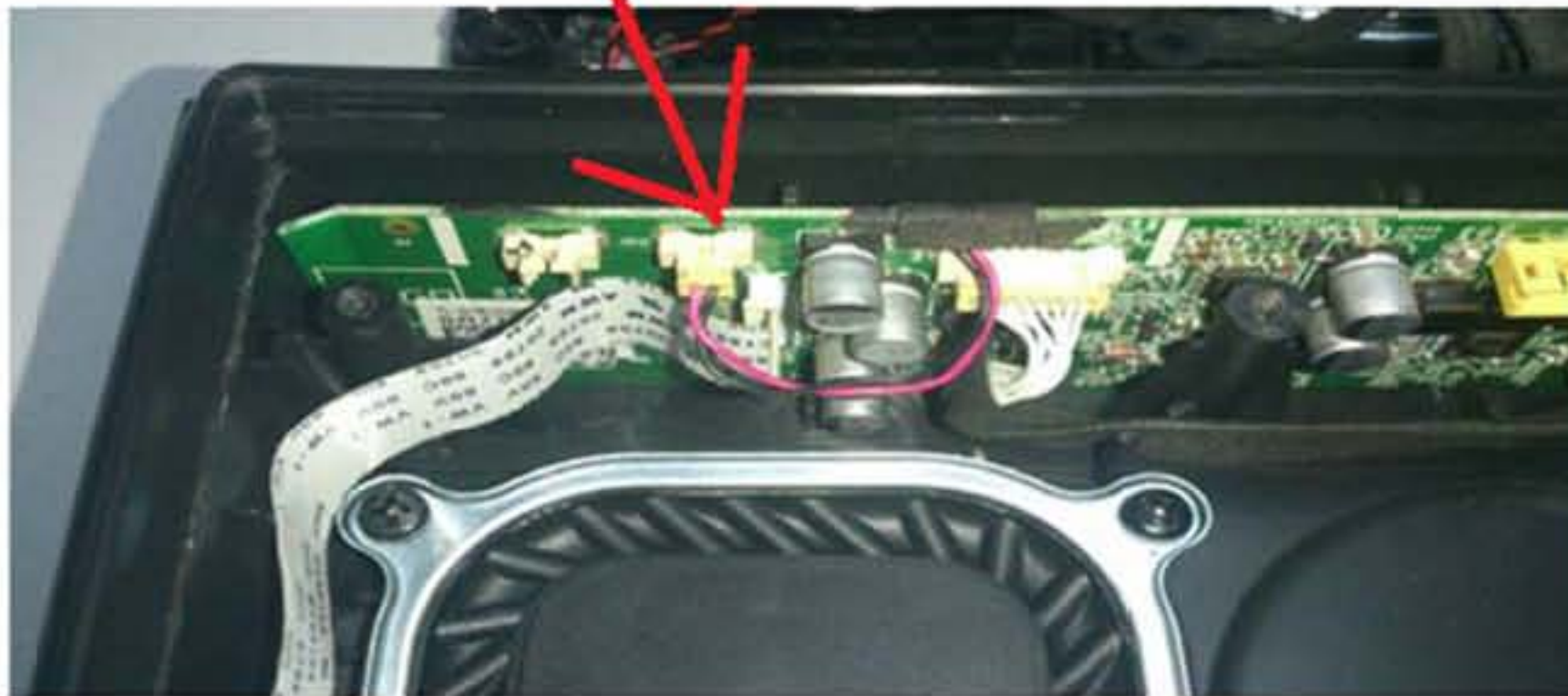


How to fixed the module to SRS-X5.

when the PCBA CN board、 EUT board、 key board and others is OK.
Fixed the EUT board to plastic case,as follow photo.



insert EUT board.



Next: connect the cablei

Jack XP589 on main board connect to MIC cable

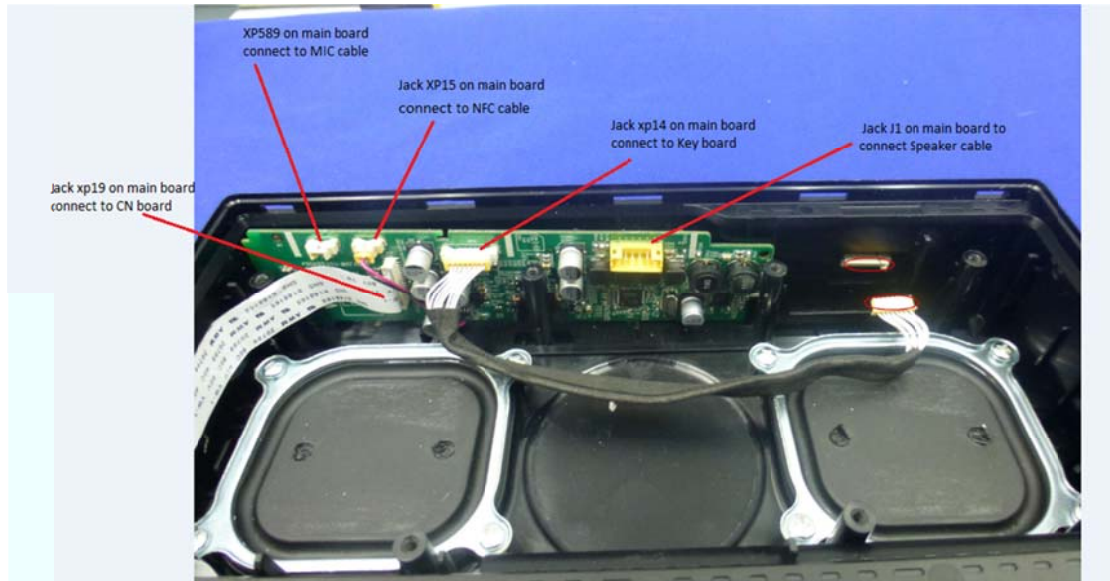
Jack XP15 on main board connect to NFC cable

Jack J1 on main board to connect Speaker cable

Jack xp19 on main board connect to CN board;

Jack xp14 on main board connect to Key board

As follow photo:



All is ok ,fixed the speaker and front plastic case. As follow photo



Next: fixed the iron net and backboard.as follow photo;



Now, one SRS-x5 is fixed OK. as follow photo.



Front View



Back View

FCC Statement

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

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.

IC Statement

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The end host device should bear the label which indicate "Contains FCC ID:AK8BM153" or "Contains IC:409B-BM153".