

BFX-UA300

Final Assembly Guideline

			Lonnie Kim
First Update	2020.09.22	Last Update	2021.01.05



Lonnie Kim

Revision History

Version	Date	Description	Owner
1.0	2020/09/22	1 st Draft version	SH, Son
1.1	2020/12/29	Updated Rub and buzz subsidiary materials & sub assembly(Page 25/26/28)	Lonnie Kim
1.2	2021/01/05	Updated PCBA pre-working and Rub and buzz improvement	Lonnie Kim

Read me before Mockup assembly

- **Electric screwdriver use only unlock the screw.**
- **Highly recommend screwdriver by hand when lock the screw.**
- **The Mockup has limited life time.**
 - If you assemble/reassemble more than 5 times, it may cause housing problems.
- **Please assemble in slide order**
- **The sound test**
 - Should be proceed after all screws are assembled.

Assembling from the PCBA Assembly

- **Among the 6 mockups status.**
 - All mockup is unlock the screw or semi locked.
 - Mockup No.4 set is fully assembled
 - Mockup No.5~9 set are semi assembled with speaker units.
- **Please see the fully assembly reference - Mockup No.4**
- **Mockup No.8 and 9 are prepared bottom vent hole.**
 - Please run the thermal test with vent hole and without vent hole.
 - If you don't need vent hole, please tape the vent hole and test

PCBA Pre-Working

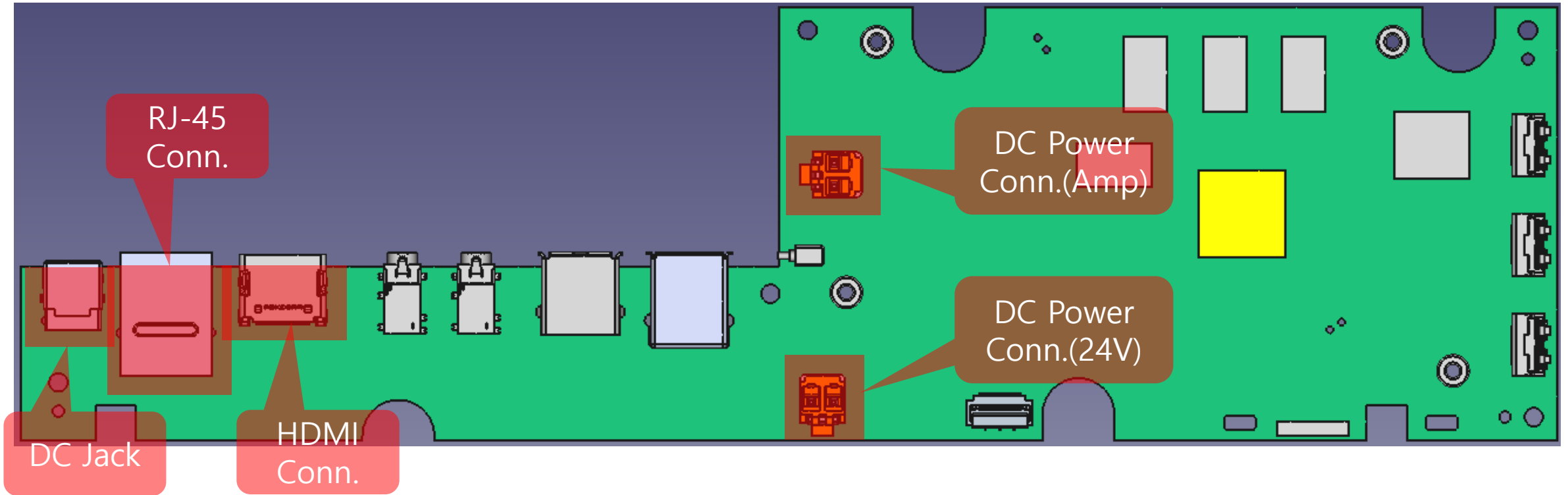
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PCBA Pre-working before Assembly

- Apply quick-drying chemicals on the components(SoC Board)



* Applying Area: 3 +/- 1mm (Components around)

* DC Jack/RJ-45/HDMI Conn.: 3 side exclude Connected direction

PCBA Pre-working before Assembly

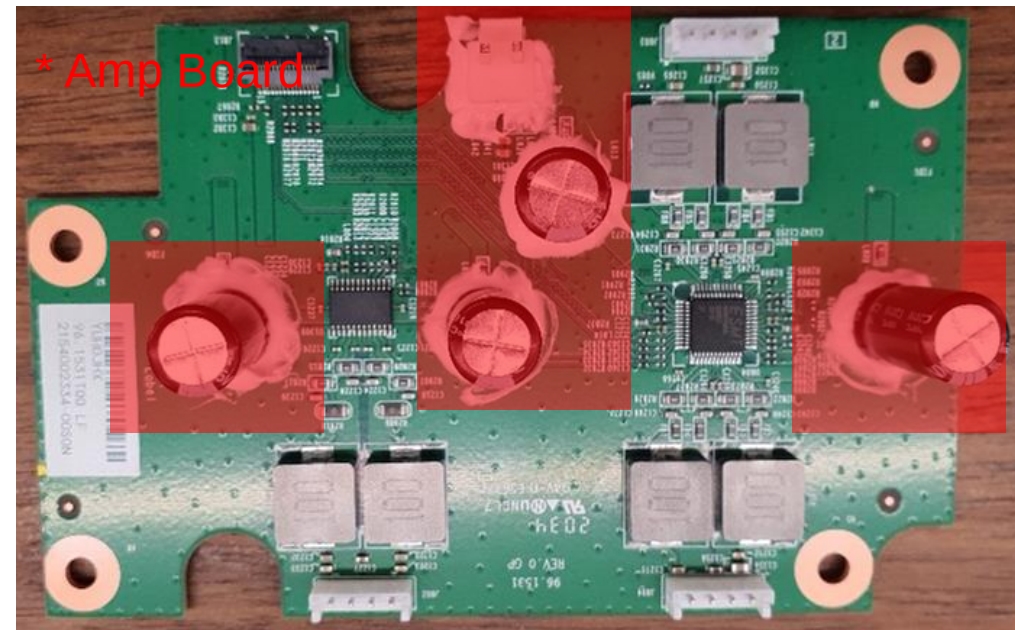
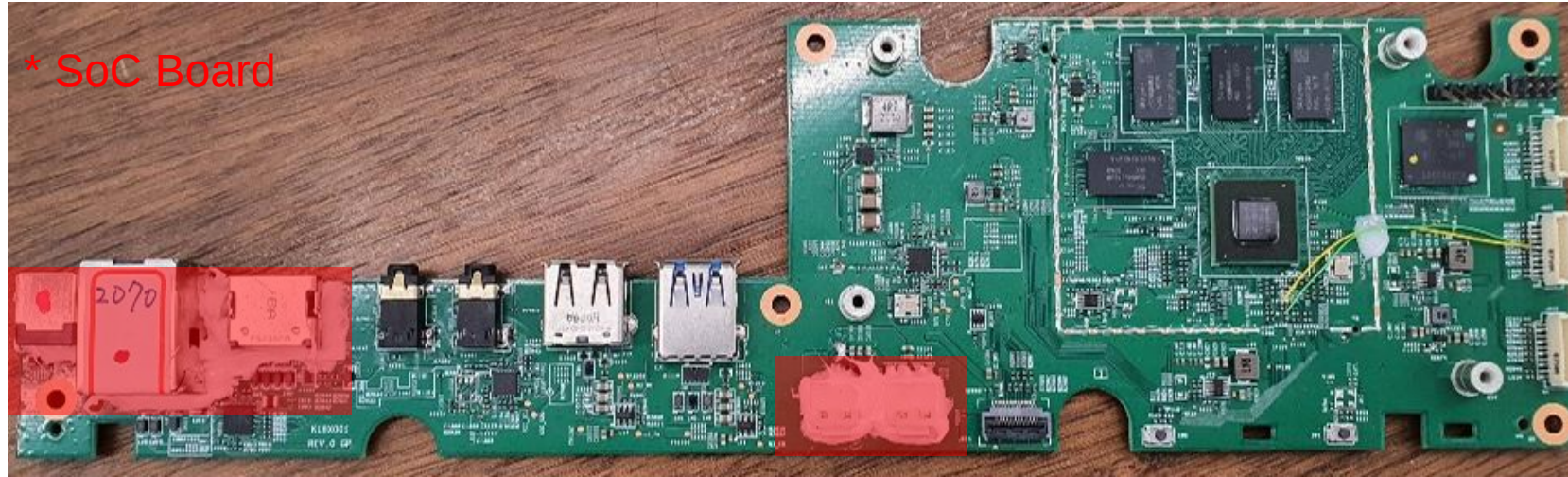
- Apply quick-drying chemicals on the components(Amp Board)

* Applying Area:
3 +/- 1mm
(Components around)



PCBA Pre-working before Assembly

- Example of EVT Board



Working Guide

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First Update	2020.09.22	Last Update	2021.01.05



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Open the Cover

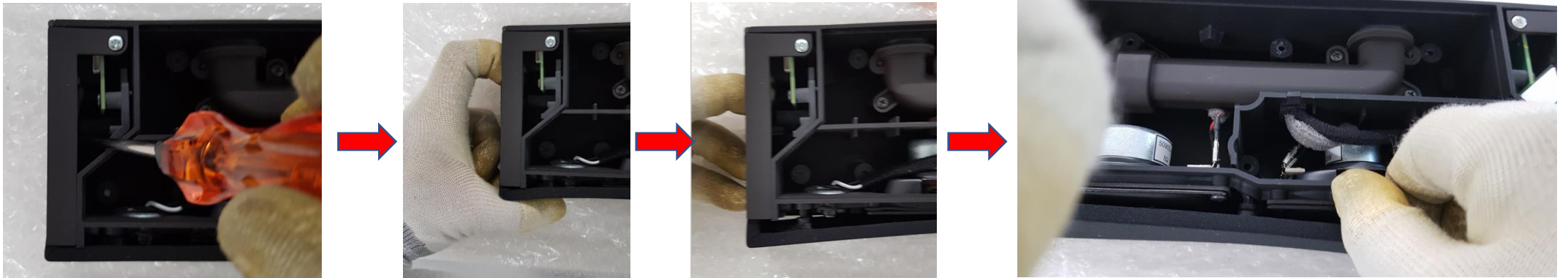
- **Mockup No.4 need to unlock the screw**
 - Locked below 4 points



Open the Cover

- **Please see the disassemble video clip.**

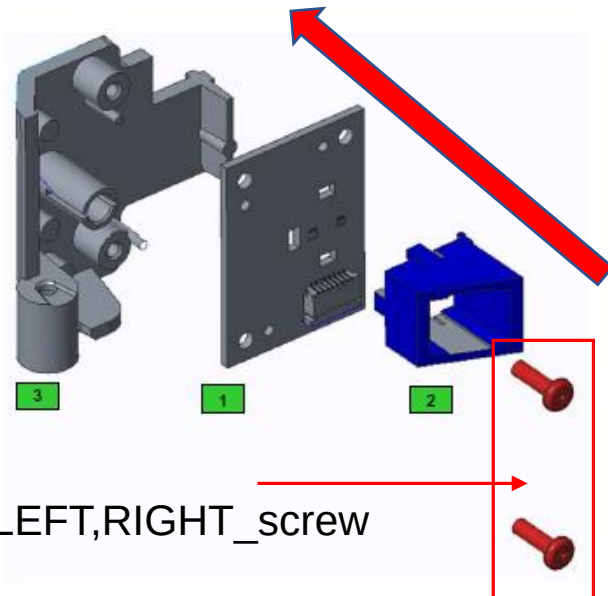
- 1. Open the Top cover
- <https://drive.google.com/file/d/1ChD6VU7j2TG-x04YPKEpFLqUYchHeDJ7/view?usp=sharing>
- 2. Open the front grill
- <https://drive.google.com/file/d/1QtUkCNSJKkbOTDqznmJGaA7q8G8afaJn/view?usp=sharing>



Assembly PCBA

- Side LED assembly and insert the cable

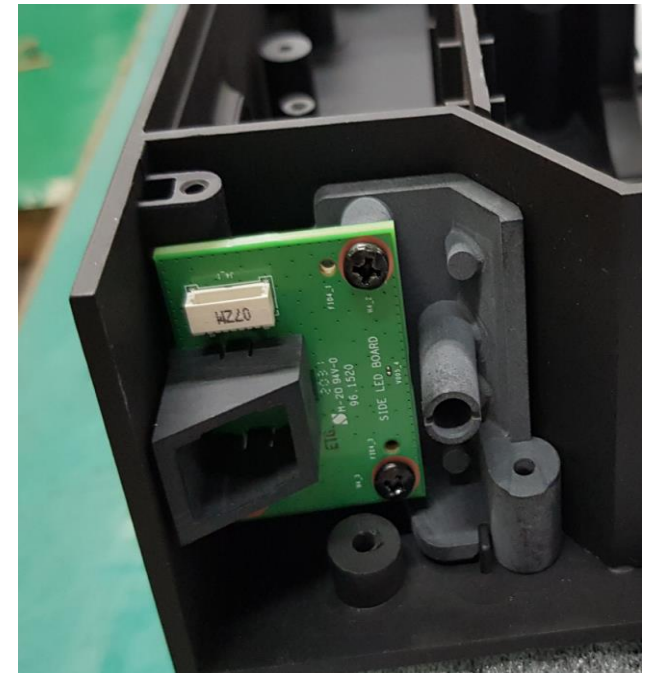
6 = **1** + **2** + **3** LEFT
6.1 = **1** + **2** + **3** RIGHT



PCBA_SIDE_LED_LEFT,RIGHT_screw
BH_3X10 TTS



Semi assembled.

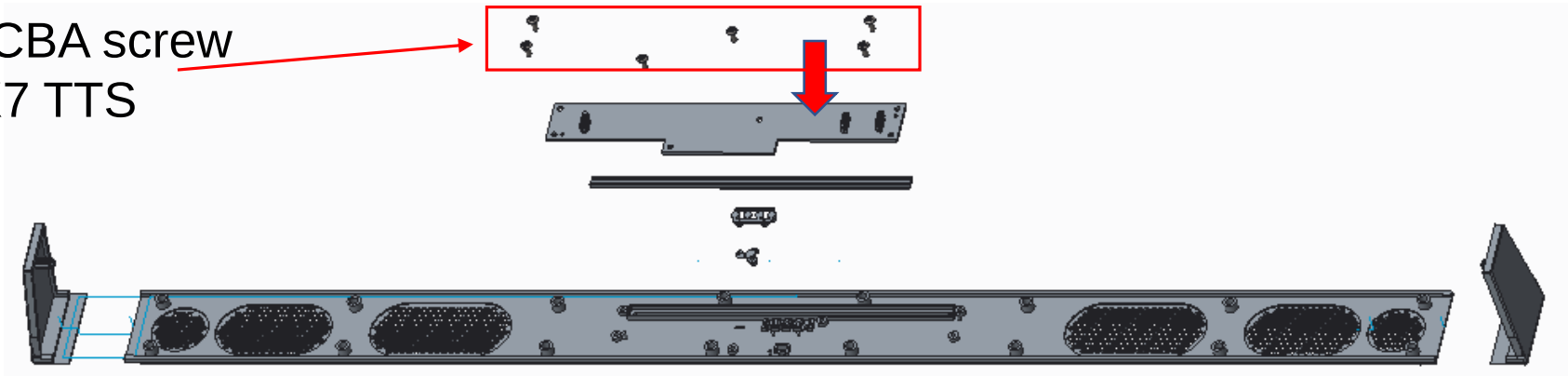


Fully assembled.

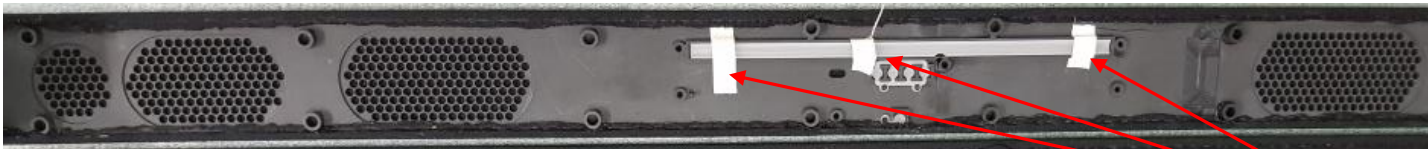
Assembly PCBA

▪ Front LED PCBA assembly

LED PCBA screw
BH_3X7 TTS



Semi
assembled.



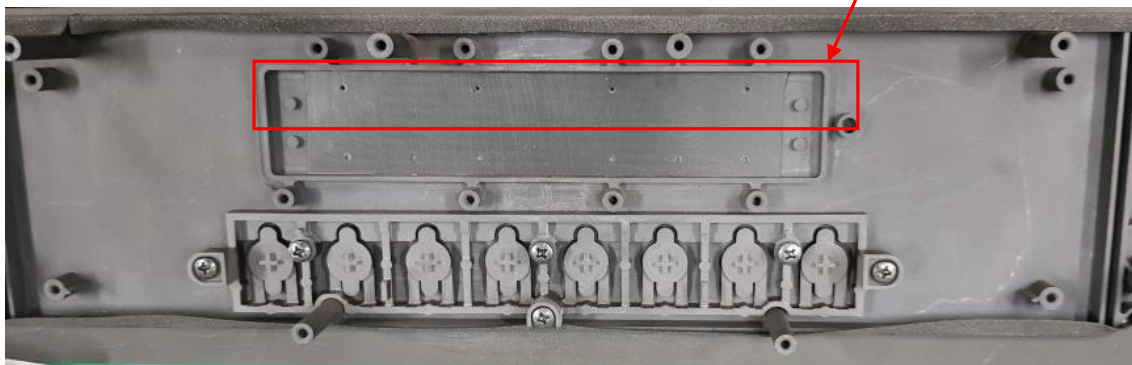
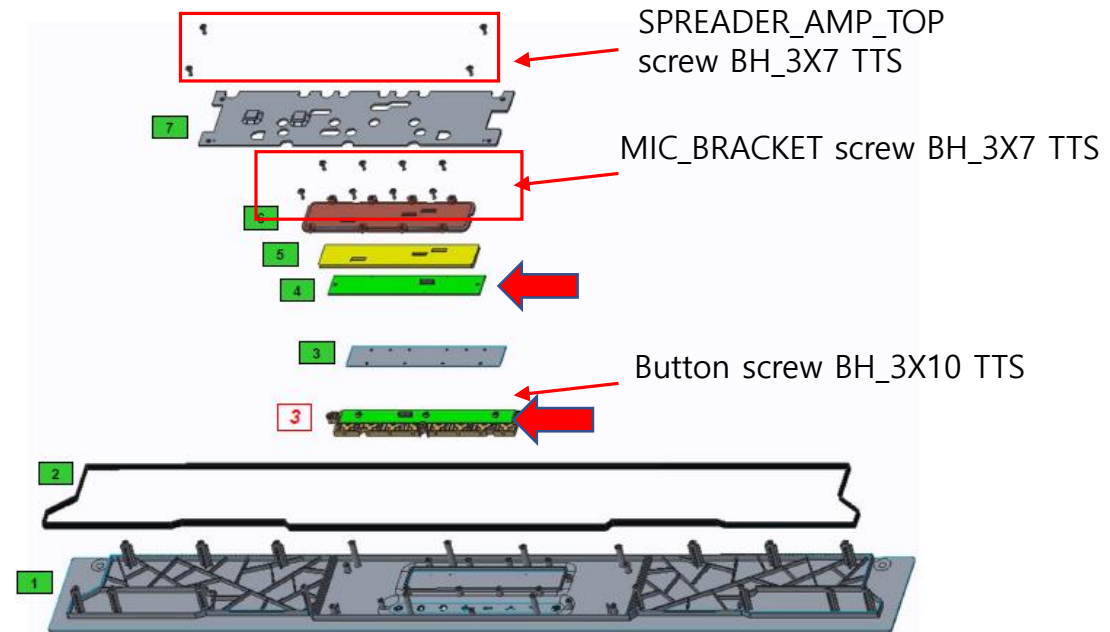
Temporary tape. Please removed before
assembly

Assembly PCBA

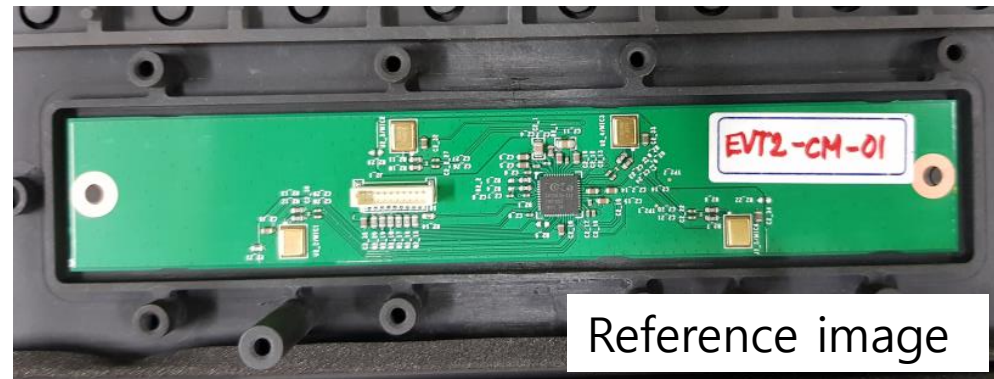
■ MIC and Button PCBA assembly

- Note.
- Please be sure alignment Mic hole when MIC PCB assembly

$$2 = 1 + 2 + 3 + 3 + 4 + 5 + 6 + 7$$



Semi assembled. With MIC bracket



Reference image



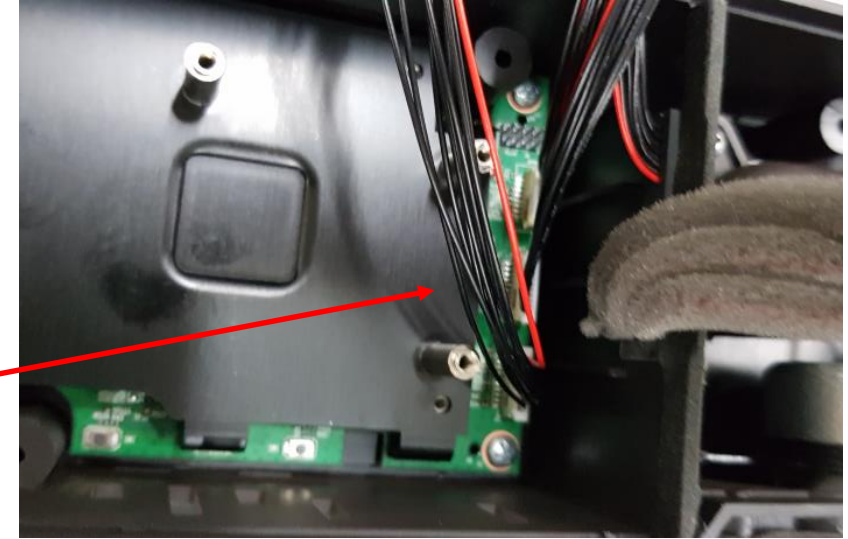
MIC

Assembly PCBA

▪ SoC Main PCBA assembly.

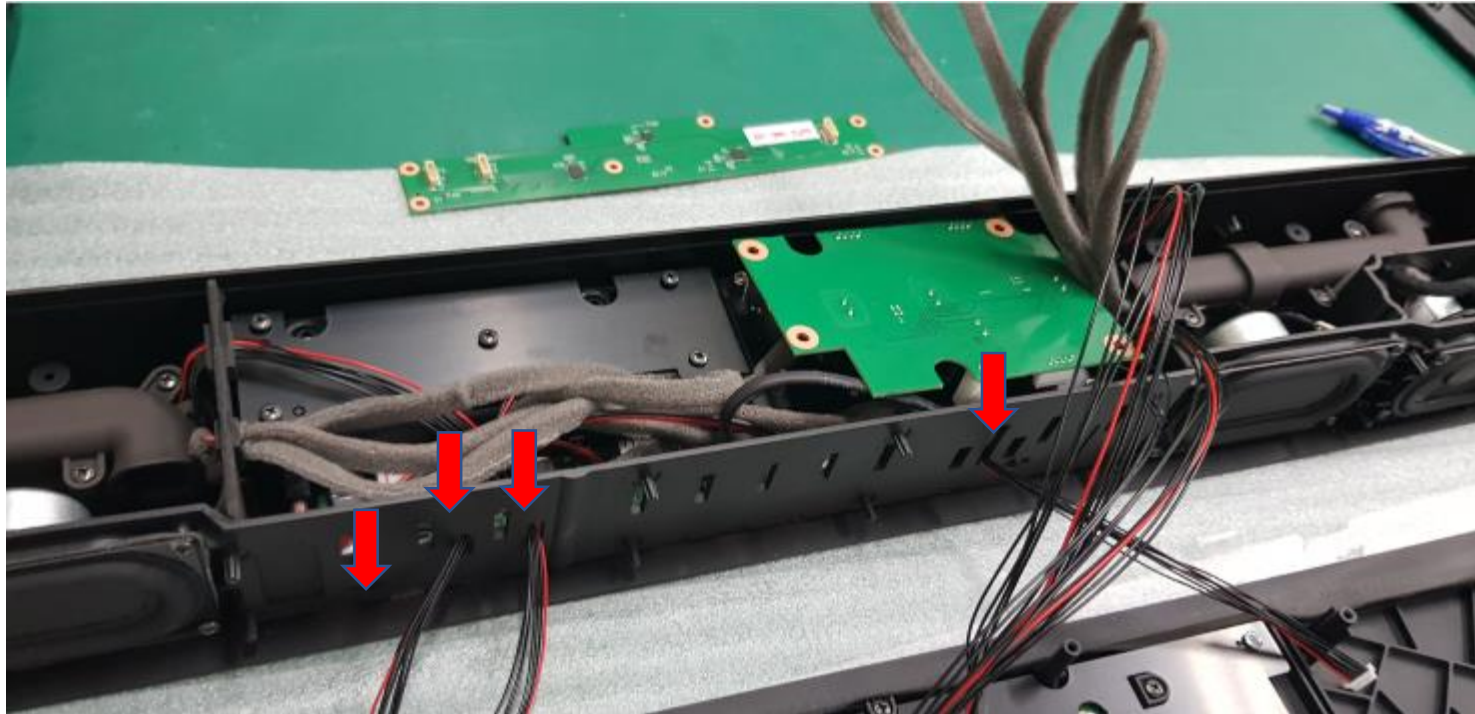
Please follow below step

- Heat spreader SoC Bottom
- SoC Main PCBA, BT antenna
 - Connect all of connector and cables
- Heat spreader SoC Top
- Heat spreader AMP Bottom
- AMP PCBA
 - Before assembly, please connect all of amp board connectors
- Note
 - If you need trim the cable, it can be actable.
 - The Mock No. 4 speaker cable was trimmed.



Assembly PCBA

- Connect Grill housing PCBA : LED PCBA, BT antenna



Assembly PCBA

- Connect Top housing PCBA : MIC and Button



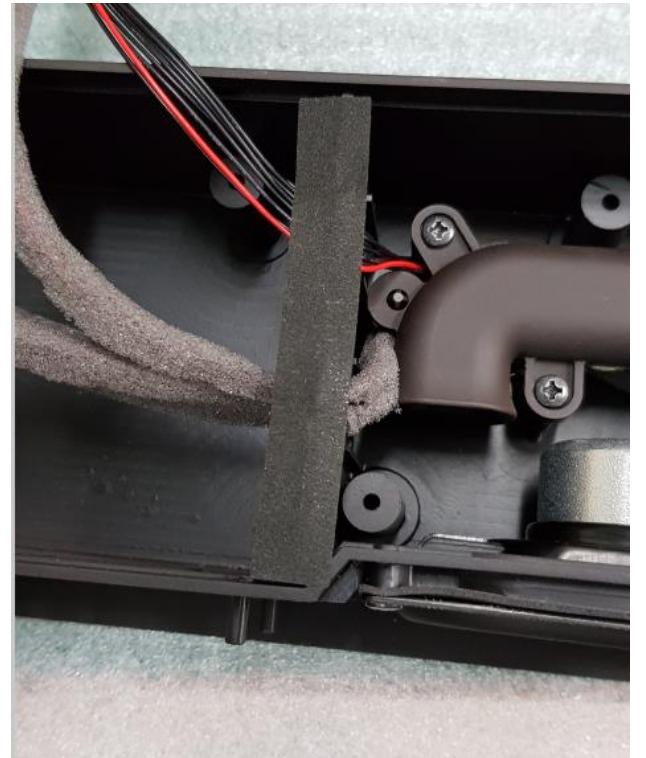
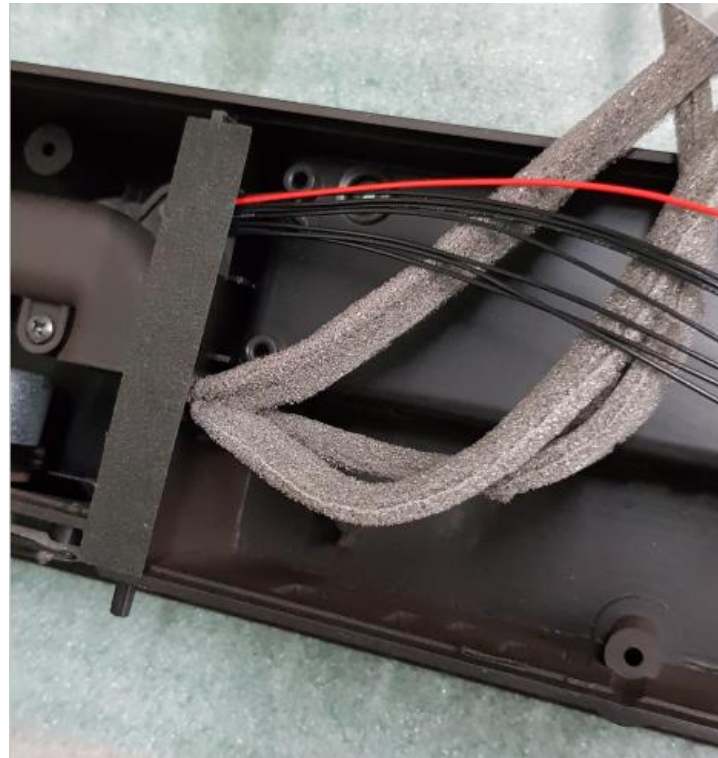
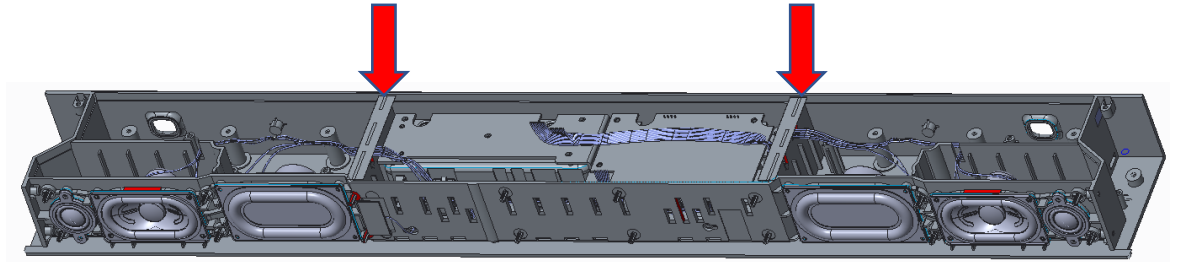
Assembly housing

- **Grill assembly**

- Please see the assemble video clip.
- <https://drive.google.com/file/d/1EaDG6on-bYc0eBSkYdti3xOcflilb3Hp/view?usp=sharing>

Assembly housing

- Attached non-woven fabric tape *2ea



Assembly housing

■ Top assembly

- Aline top and bottom housing
 - Press gently from the center to each side
- Please see the assemble video clip.
 - <https://drive.google.com/file/d/1MkhYCeYYQNYbX3rwsKwFCxK-ABhrUYZK/view?usp=sharing>



CASE screw BH_3X10 TTS

Assembly housing

- **Attached Bottom Foot and Screw cover**

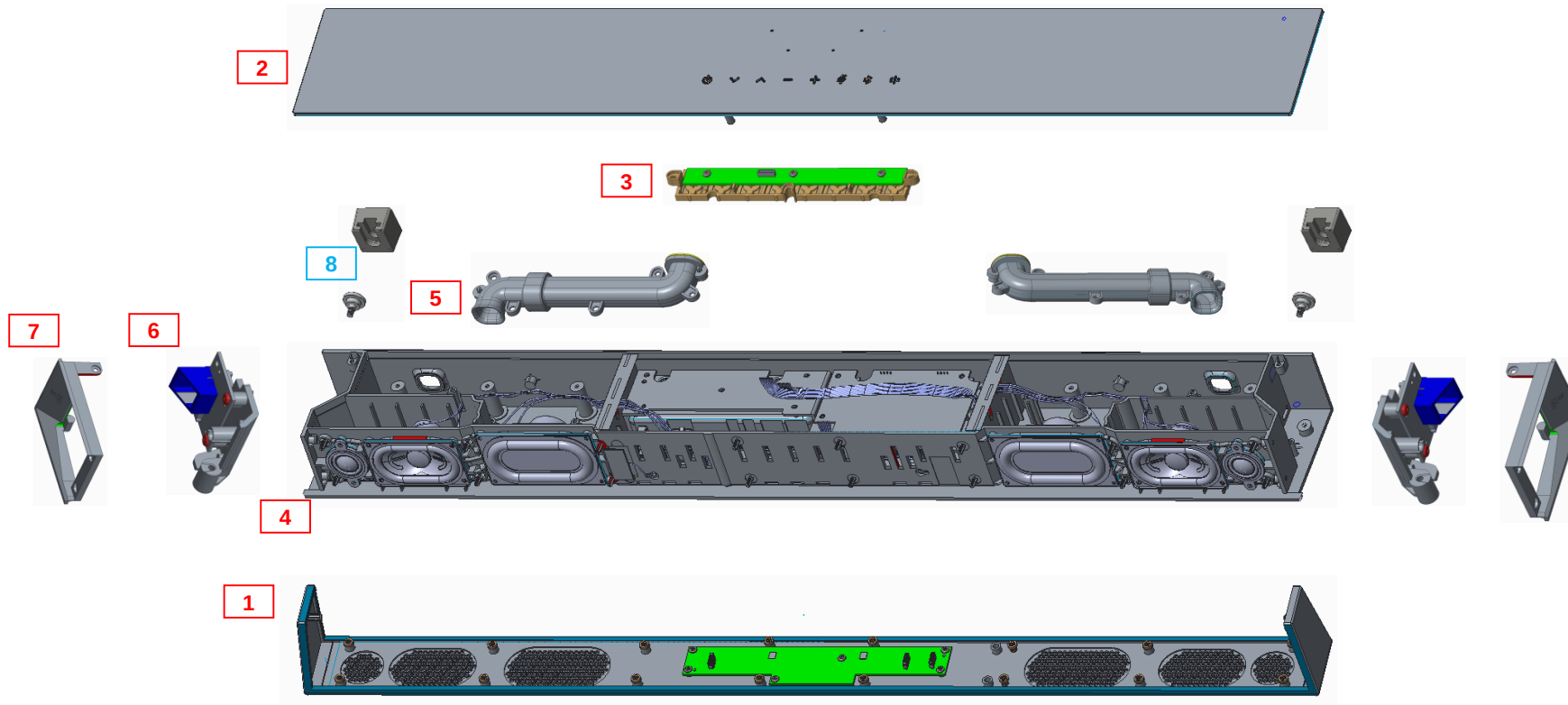
Assembly from the sub assembly

- When you start the sub-assembly level, Please assemble in slide order
- Sub assembly owner is not defined yet. It is under discussion with vender. It is just for your reference.
- Mechanical structure and BOM may changed next revision.

Overall structure

Exploded View (Total Assembly)

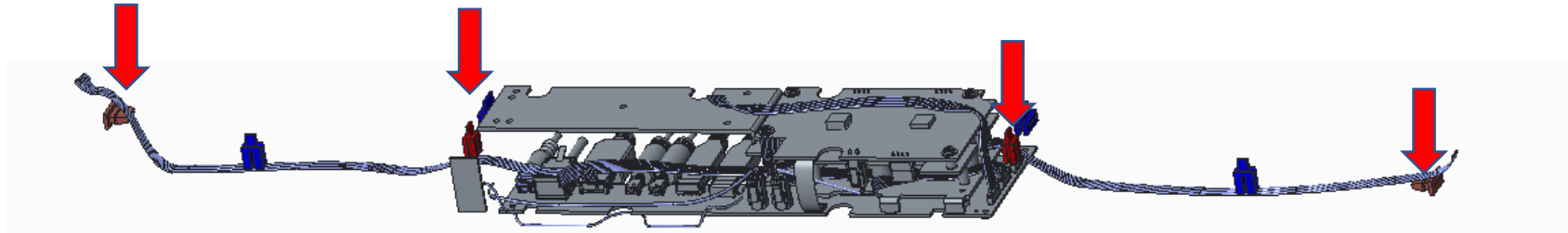
$$\text{SET} = 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8$$



Sub Assembly

Harness with bushing : side LED

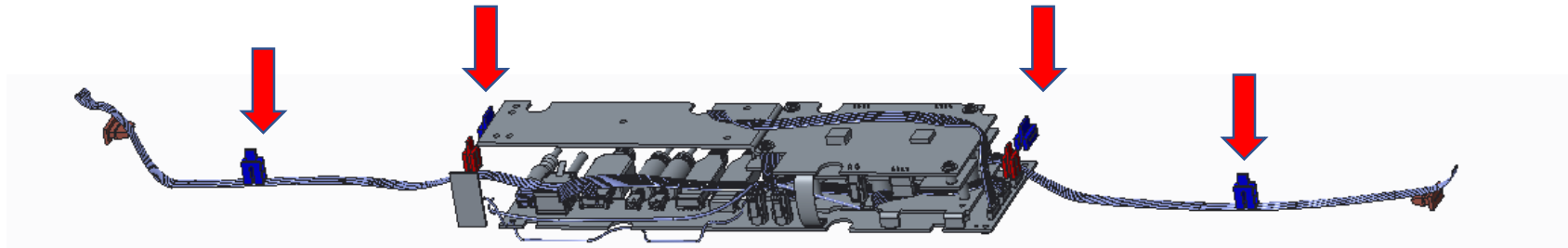
- **Each side cable has 2 bushing (Red / Orange color)**
 - For side led PCBA cable



Sub Assembly

Harness with bushing : Speaker units

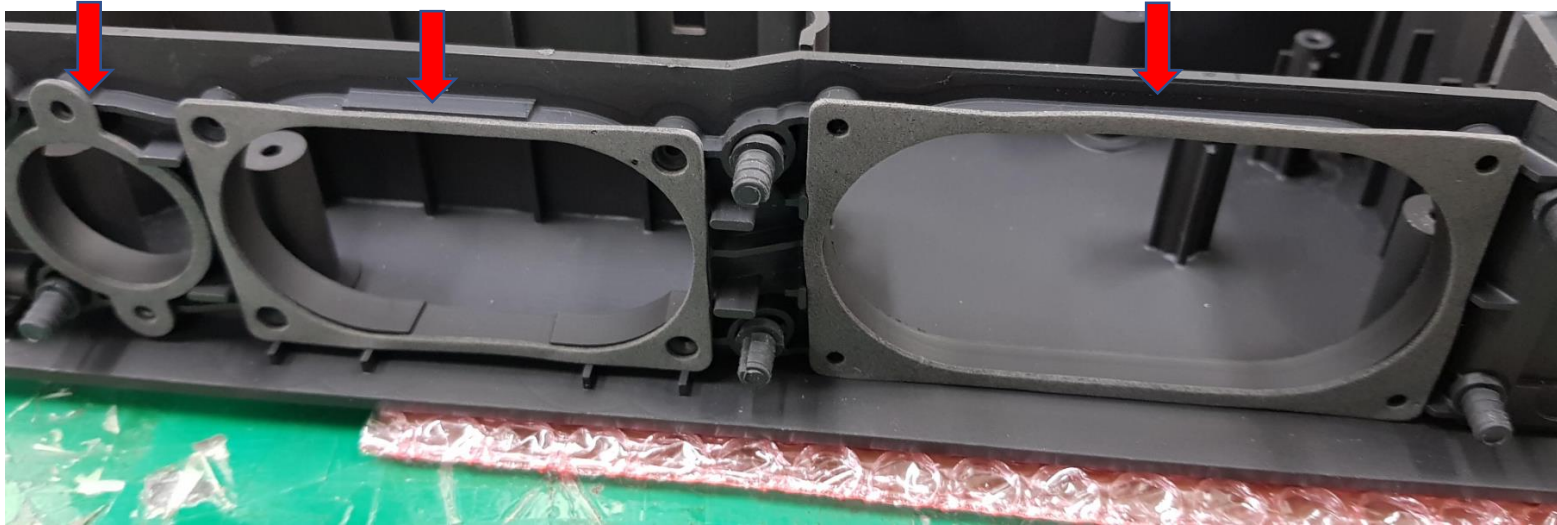
- **Each side cable has 2 bushing (Blue color)**
 - For Speaker unit cable



Sub Assembly

Speaker back gasket

- Need to attached EVA Gasket (Ethylene Vinyl Acetate) Foam on the housing



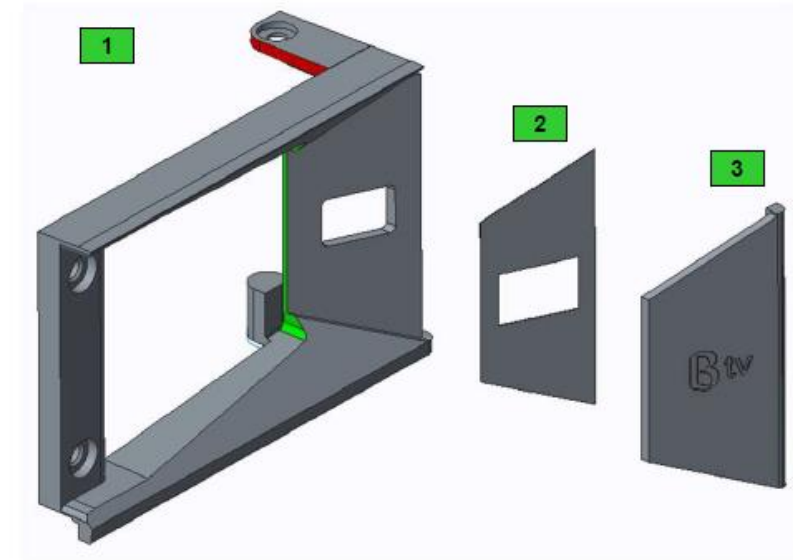
Sub Assembly

Parts List –Exploded View (Side Deco_Left / Right Ass’y)

7					SIDE DECO LEFT ASS'Y			1	EA		
	1				(DECO SIDE LEFT)	ABS_V0_BLACK, SPRAY		1	EA		
	2				(ADHESIVE DOUBLE SIDE LEFT)	ADHESIVE_DOUBLE SIDED, T=0.2, BLACK, 3M社		1	EA		
	3				(PLATE BTV LOGO LEFT)	PMMA_MILKY, SPRAY_OUTER, LASER MARKING		1	EA		

7 = **1** + **2** + **3** LEFT

7.1 = **1** + **2** + **3** RIGHT



Sub Assembly

Parts List –Exploded View (Port_Left / Right Ass’y)

5				PORT RIGHT ASS'Y			1	EA		
	1			(PORT UPPER RIGHT)		ABS_V0_BLACK, SPRAY_INNER, ULTRASONIC WELDING	1	EA		
	2			(PORT LOWER RIGHT)		ABS_V0_BLACK, SPRAY_INNER, ULTRASONIC WELDING	1	EA		
	3			(Acoustic Foam)		PU Foam, Detail spec TBD	1	EA		
	4			(GASKET PORT)		EVA_BLACK_ADHESIVE, T=1.0	1	EA		
	5			(ADHESIVE GLUE)		Detail spec TBD		g		

5

=

1

+

2

+

3

+

4

LEFT

5.1

=

1

+

2

+

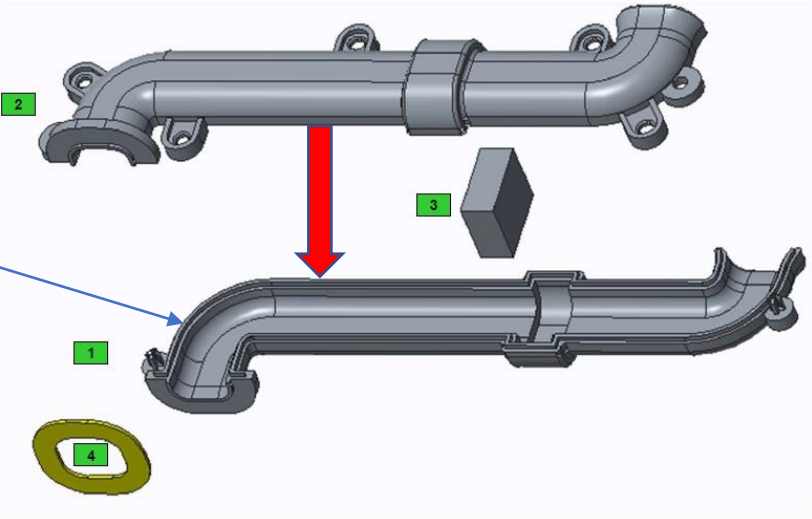
3

+

4

RIGHT

Apply ADHESIVE GLUE [5]

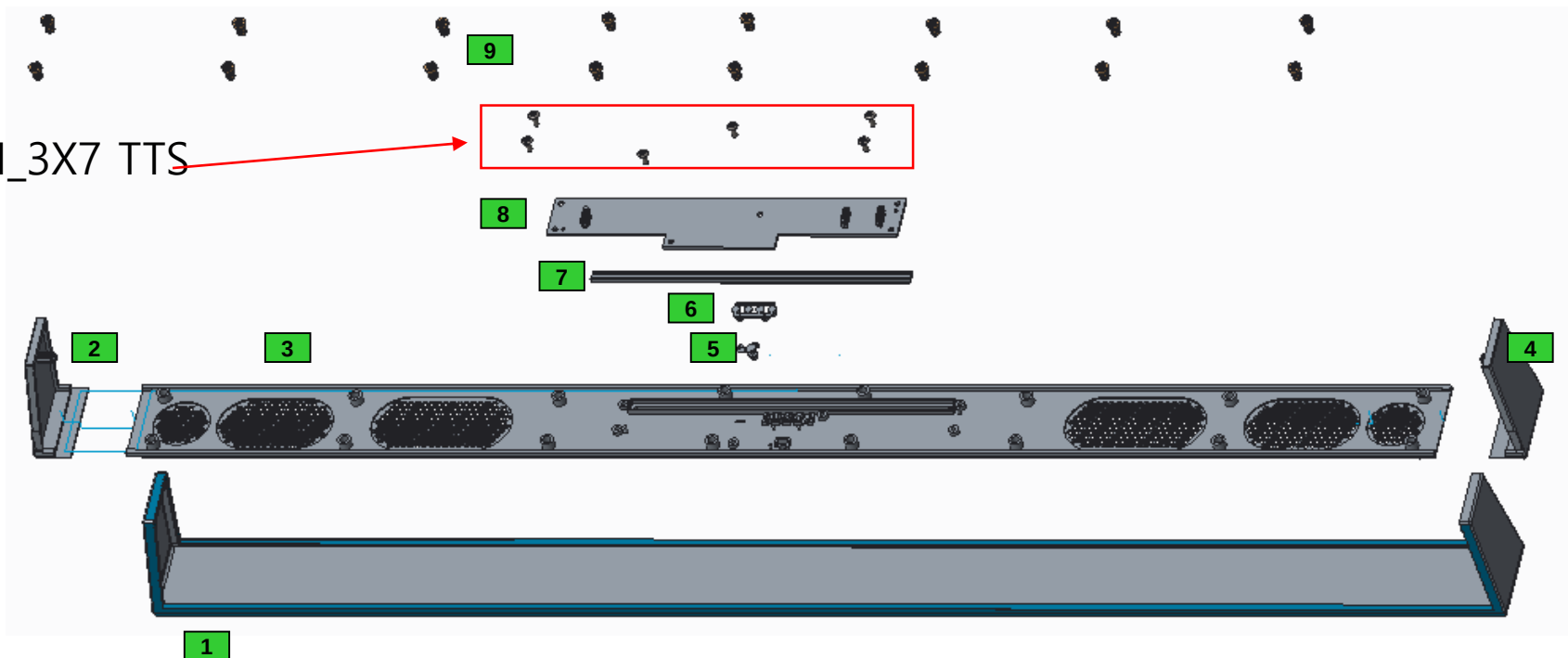


Sub Assembly : Front

Parts List –Exploded View (Grill Fabric Ass'y)

3				GRILL FABRIC ASS'Y			1	EA		
	1			(NET FRAME_MIDDLE)		ABS_V0_BLACK, HEAT STAKING	1	EA		
	2			(NET FRAME_SIDE_RIGHT)		ABS_V0_BLACK, HEAT STAKING	1	EA		
	3			(NET FRAME_SIDE_LEFT)		ABS_V0_BLACK, HEAT STAKING	1	EA		
	4			(FABRIC_JERSEY)		POLYESTER, COLOR: TBD	1	EA		
	5			(LENS LED STATUS)		PMMA_MILKY, HEAT STAKING	1	EA		
	6			(LENS LED GOOGLE)		PMMA_MILKY, HEAT STAKING	1	EA		
	7			(LENS LED NUGU)		PMMA_MILKY, HEAT STAKING	1	EA		
	8			(LED PCBA)		LED PCBA	1	EA		
	9			(HOLDER GRILL)		TPE_BLACK, HARDNESS 20	16	EA		

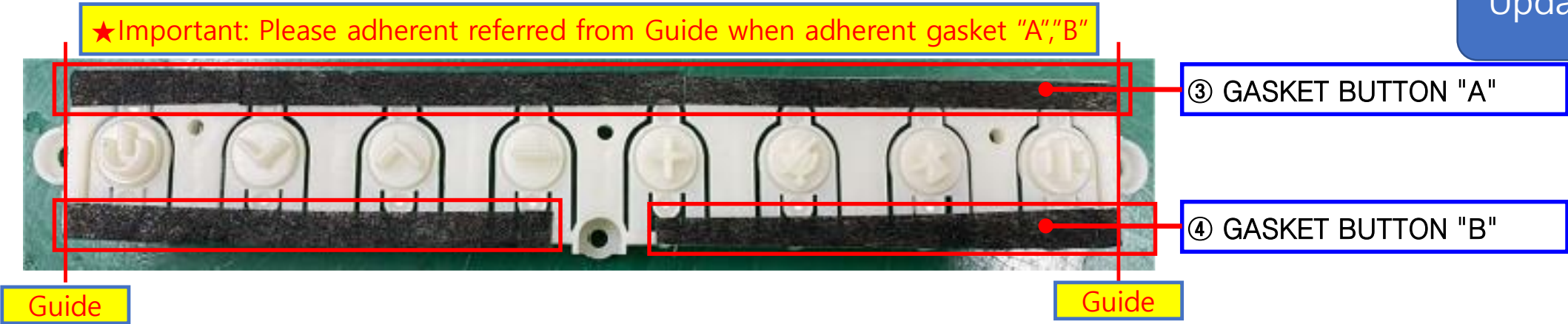
LED PCBA screw BH_3X7 TTS



Sub Assembly : Top housing

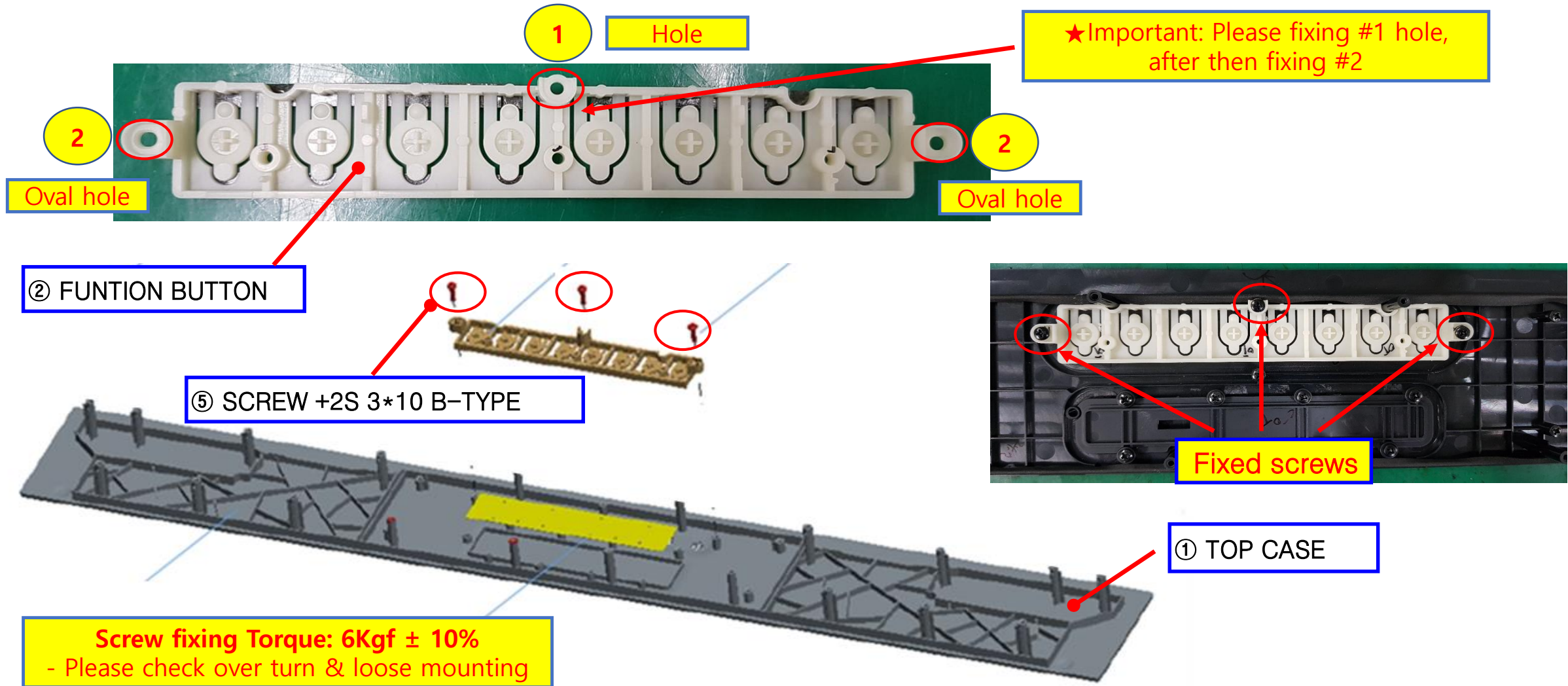
Parts List –Exploded View (Button Ass’y)

LEVEL					Part Name	Part No.	Spec.	Q'ty	Unit	
1					CASE TOP ASS'Y			1	EA	
	1				(CASE TOP)		ABS_V0_BLACK, SILK PRINT, SPRAY	1	EA	
	2				(BUTTON FUNCTION)		ABS_BLACK, PLATED or DEPOSITION	1	EA	
	3				(GASKET BUTTON "A")			1	EA	
	4				(GASKET BUTTON "B")			2	EA	
	5				(SCREW +2S 3*10 B-TYPE)			3	EA	



Sub Assembly : Top housing

Parts List –Exploded View (Button Ass'y)



Sub Assembly : Top housing

Parts List –Exploded View

1				CASE TOP ASS'Y			1	EA		
	1			(CASE TOP)		ABS_V0_BLACK, SILK PRINT, SPRAY	1	EA		
	2			(BUTTON FUNCTION)		ABS_BLACK, PLATED or DEPOSITION	1	EA		
	3			(BUTTON PCBA)		ALT社 기록 요망	1	EA		
	4			(HOLDER BRACKET MIC)		ABS_V0, BLACK	1	EA		
	5			(MIC PCBA)		ALT社 기록 요망	1	EA		
	6			(SILICON MIC)		SILICON_BLACK	1	EA		
	7			(HEATSPREADER AMP TOP)		ALT社 기록 요망	1	EA		
	8			(GASKET)		EVA_BLACK_ADHESIVE, T=1.0	1	EA		

$$2 = 1 + 2 + 3 + 3 + 4 + 5 + 6 + 7$$

Heat spreader Amp_Top screw BH_3X7 TTS

HOLDER BRACKET MIC screw BH_3X7 TTS

(GASKET)

EVA_BLACK_ADHESIVE, T=1.0



Sub Assembly

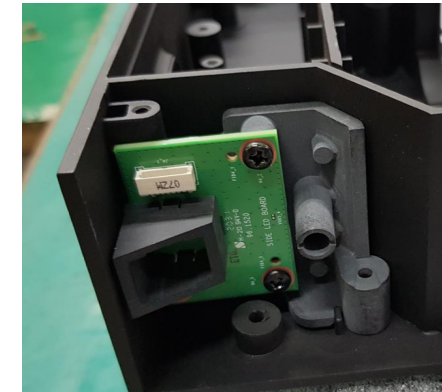
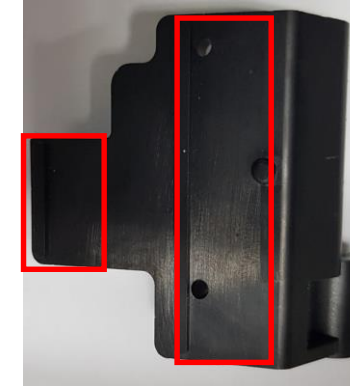
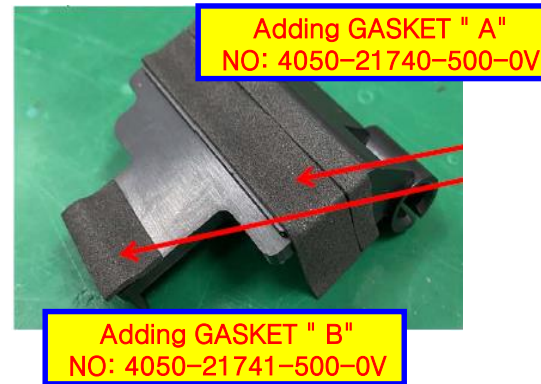
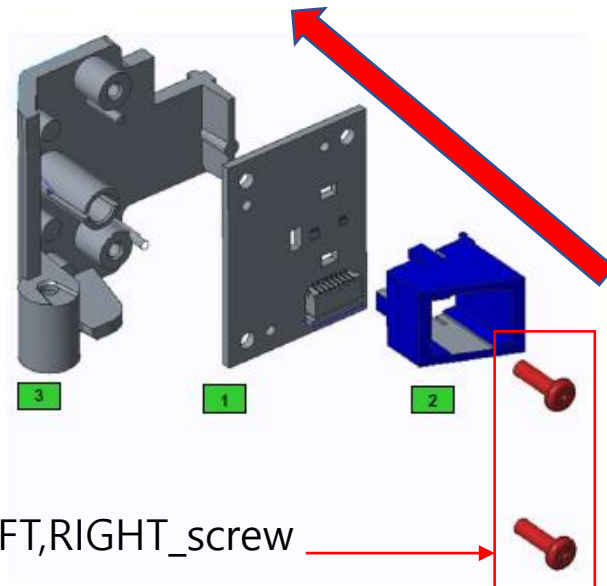
Parts List –Exploded View (Side LED_Left / Right Ass'y)

8				SIDE LED RIGHT ASS'Y			1	EA		
	1			(BRACKET SIDE LED RIGHT)		ABS_V0_BLACK	1	EA		
	2			(SIDE LED PCBA)		ALT社 기록 요망	1	EA		
	3			(LIGHT PIPE)		ABS_V0_BLACK	1	EA		
	4			(GASKET_A_T=1.0, 0.55x15)	4050-21740-500-0V	EVA Foam Gasket	1	EA		
	5			(GASKET_B_T=1.0, 0.15x15)	4050-21741-500-0V	EVA Foam Gasket	1	EA		
9				SIDE LED LEFT ASS'Y			1	EA		
	1			(BRACKET SIDE LED LEFT)		ABS_V0_BLACK	1	EA		
	2			(SIDE LED PCBA)		ALT社 기록 요망	1	EA		
	3			(LIGHT PIPE)		ABS_V0_BLACK	1	EA		
	4			(GASKET_A_T=1.0, 0.55x15)	4050-21740-500-0V	EVA Foam Gasket	1	EA		
	5			(GASKET_B_T=1.0, 0.15x15)	4050-21741-500-0V	EVA Foam Gasket	1	EA		

Updated

6 = 1 + 2 + 3 LEFT

6.1 = 1 + 2 + 3 RIGHT

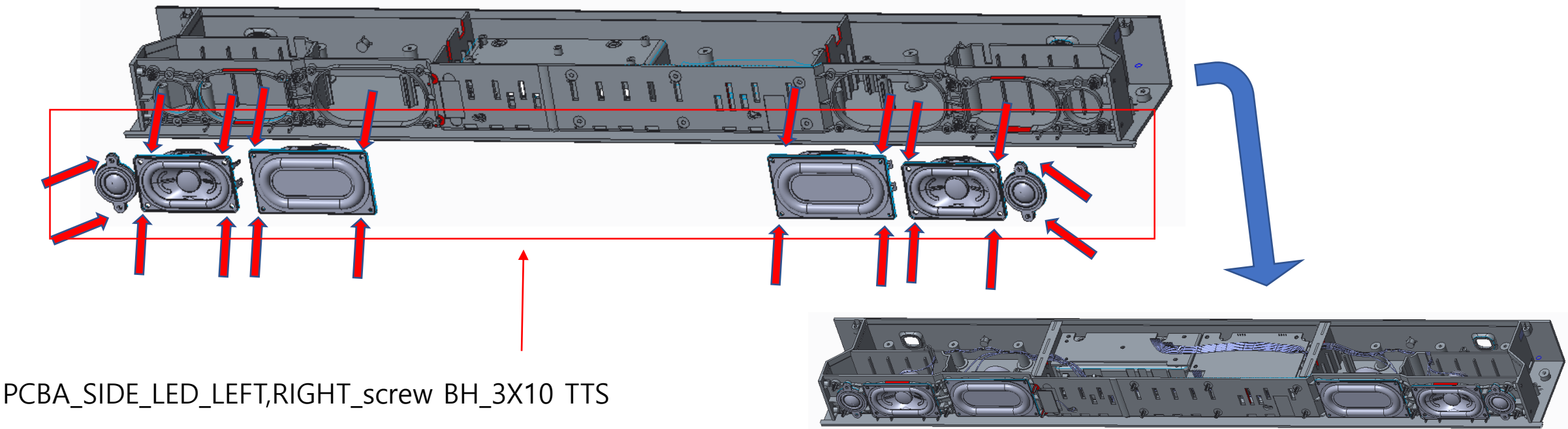


PCBA_SIDE_LED_LEFT,RIGHT_screw
BH_3X10 TTS

Final Assembly

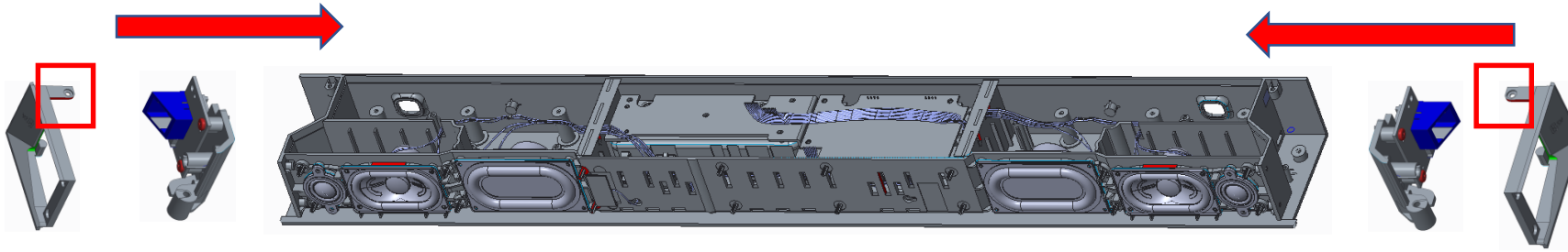
▪ Speaker unit assembly : Total 6 units

(SPEAKER UNIT TWEETER)		ALT社 기록 요망	2	EA
(SPEAKER UNIT MIDRAGNE)		ALT社 기록 요망	2	EA
(SPEAKER UNIT WOOFER)		ALT社 기록 요망	2	EA
SCREW_SPEAKER_UNITS		BH_3X10 TTS, BLACK	20	EA
CABLE Woofer				
Cable Mid & Twittter				



Final Assembly

▪ Side LED module assembly



SIDE_DECO_LEFT,RIGHT_screw BH_3X10 TTS



Final Assembly

▪ Cable routing with bushing

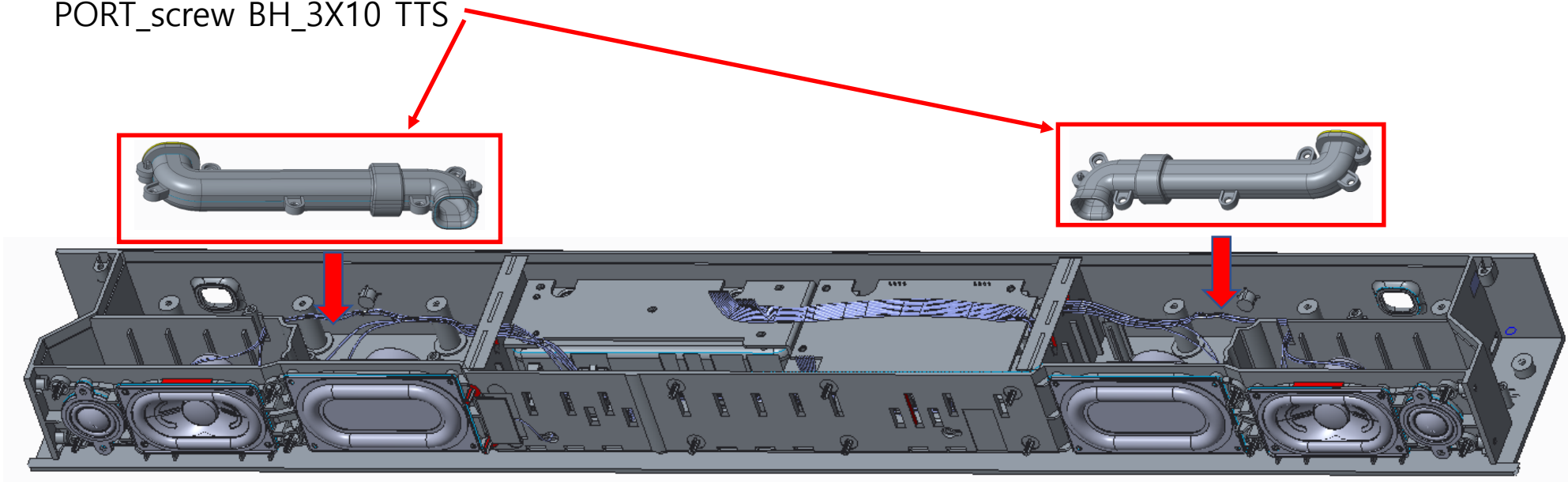
- Speaker cable
- Side LED cable



Final Assembly

▪ Port assembly

PORT_screw BH_3X10 TTS



Final Assembly

- **Cable routing reference**
 - Speaker cable
 - Side LED cable
- **Port assembly**



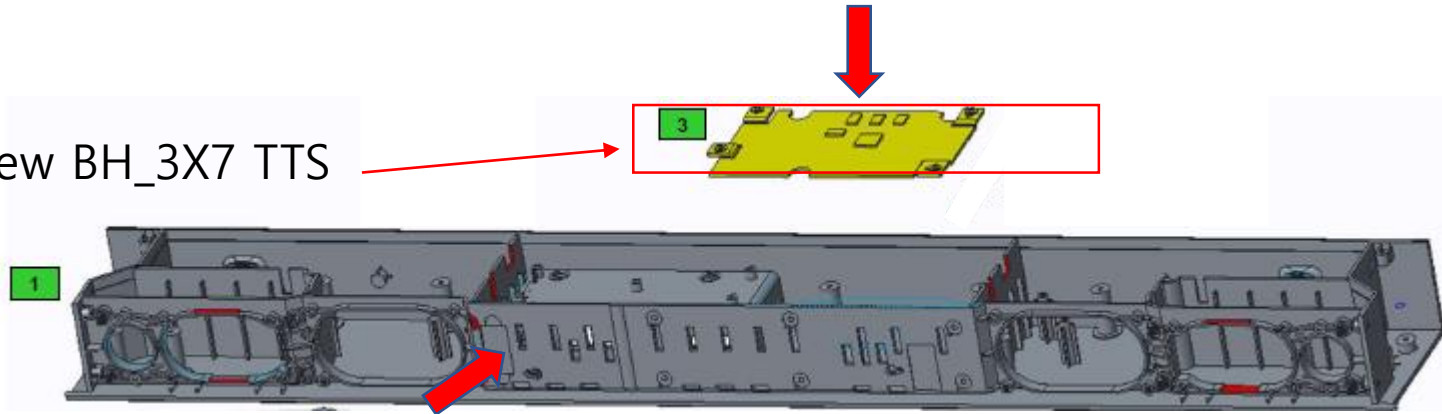
Final Assembly – Foxconn

▪ Assembly

- SoC Bottom heat spreader
- PCBA SOC

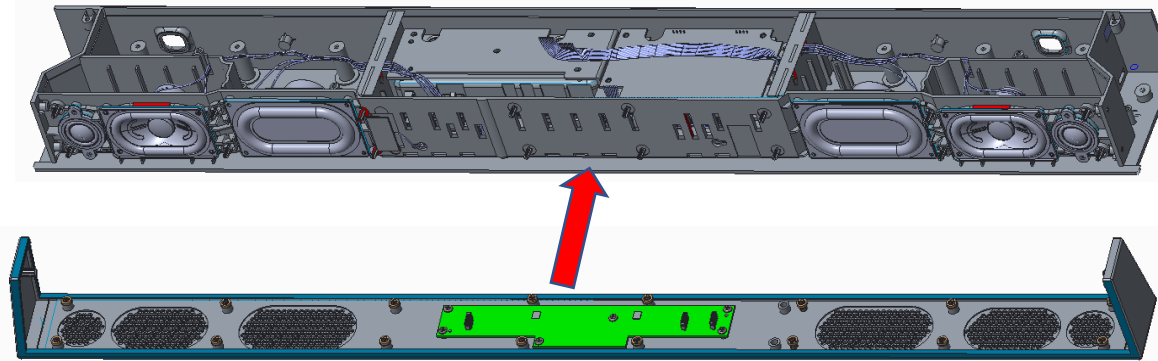
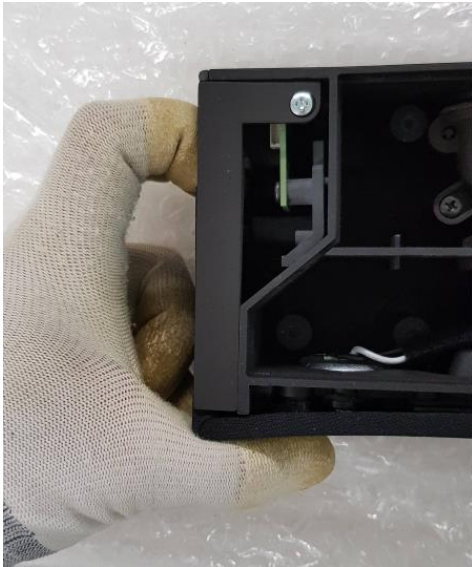
• Bluetooth antenna

SOC PCBA screw BH_3X7 TTS



Final Assembly

- Assembly with Bottom housing and Front assy (Grill Fabric)



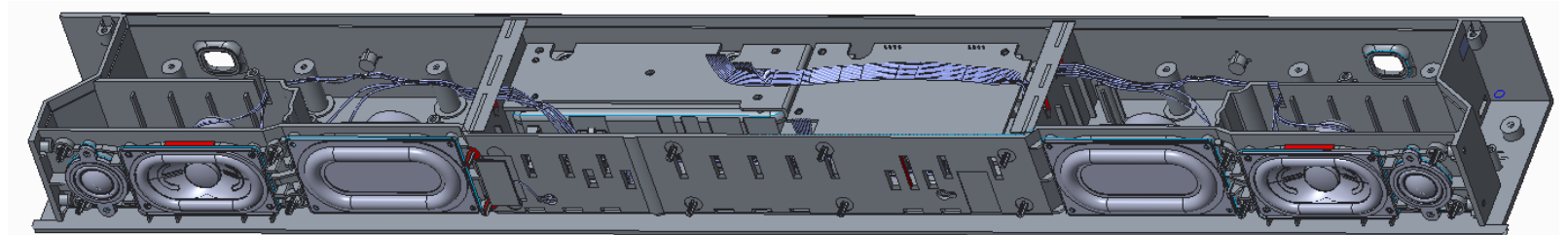
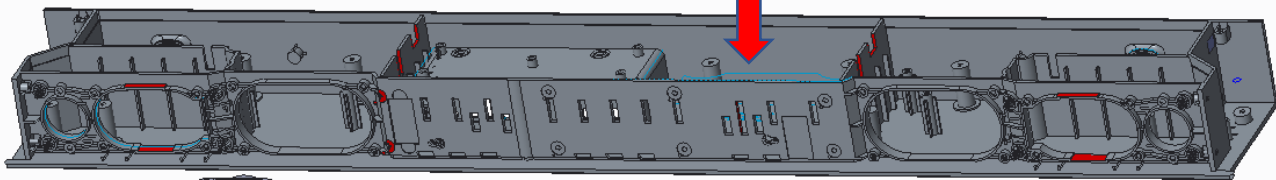
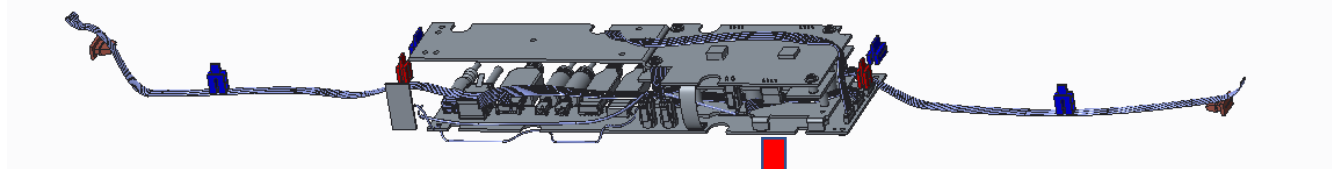
Final assembly

▪ AMP board assembly

- Heat spreader SoC Top and Heat AMP bot
- PCBA AMP

• Cable insert on the PCBA

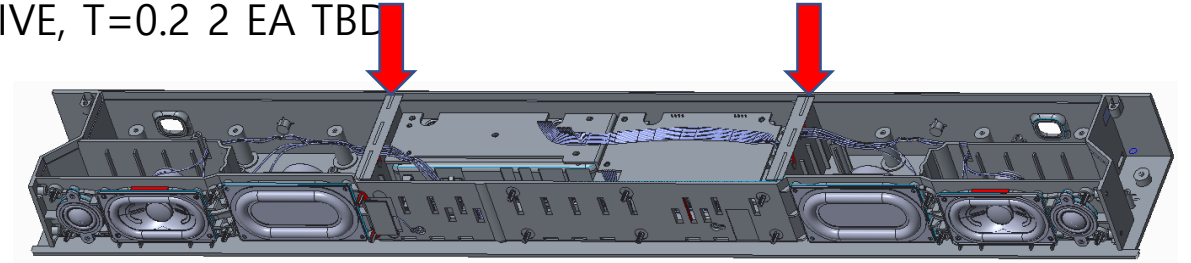
- AMP with Speaker
- SoC with LED PCBA / LED PCBA with side LED PCBA
- BT antenna



Final Assembly

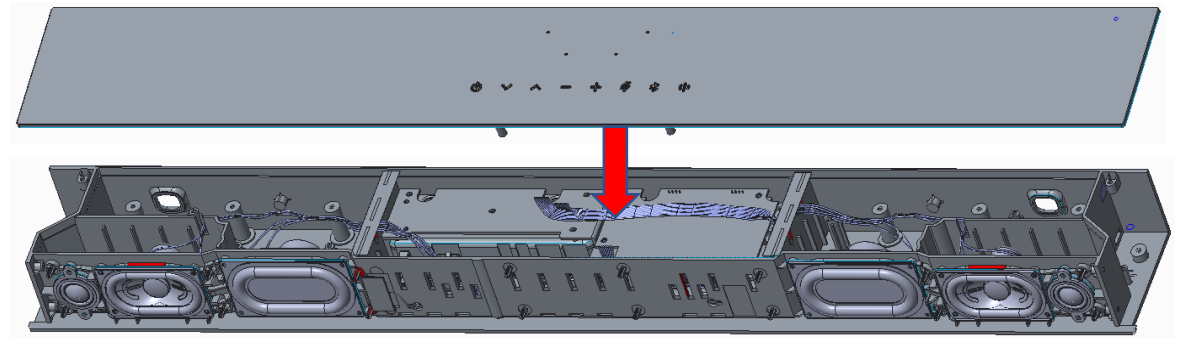
▪ Attached gasket inner *2ea

(GASKET_INNER) NONWOVEN TAPE_BLACK,ADHESIVE, T=0.2 2 EA TBD



➤ Top housing assy

- Insert Mic & button cable
- Assembly with Top and bottom housing



Final Assembly

- Screw on bottom side
- Insert the screw cover
- Attached Foot

(FOOT)		SILICON_COLOR: TBD	2	EA	
(COVER SCREW)		TPE_COLOR: TBD, HARDNESS 50	16	EA	
(BOTTOM SCREW)			18		

SOC PCBA screw BH_3X10 TTS



APPENDIX

			Lonnie Kim
First Update	2020.09.22	Last Update	2021.01.05



Rub and Buzz Improvement Points



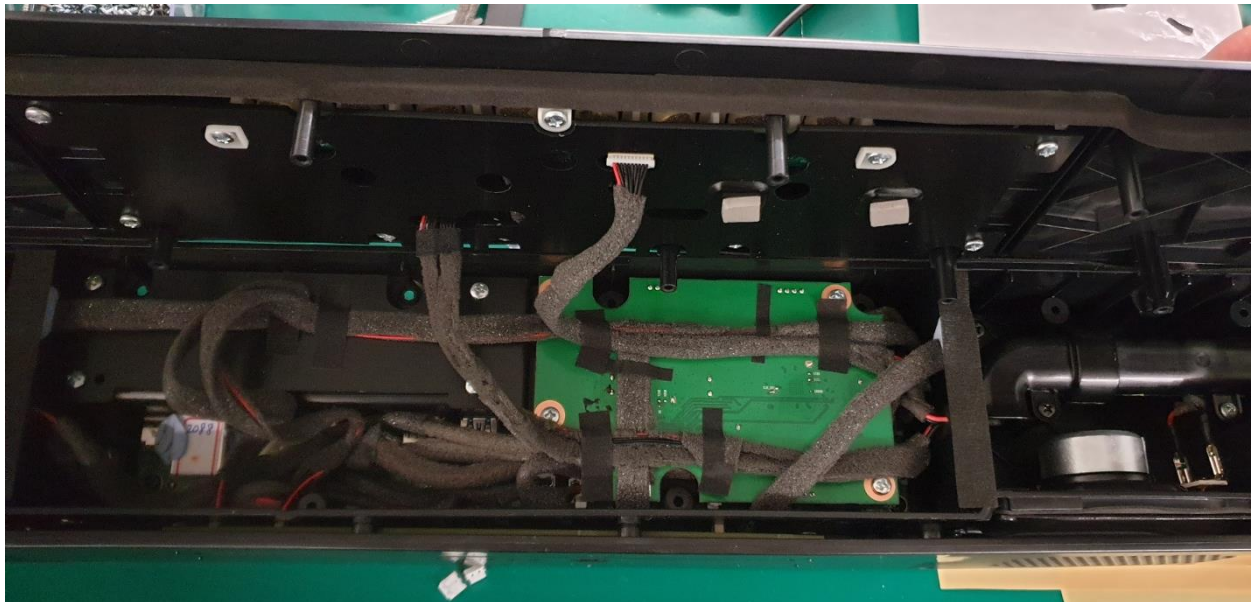
Overall

1. Base line : EVT PCBA and Thermal solution + T0 housing

- Some of parts or structure are may different then DVT build.
- many point from noise occurred in the PCBA area : components, cables, etc..

2. Reference assembly picture

- Applied all of improvement this document below.



70Hz / 100Hz



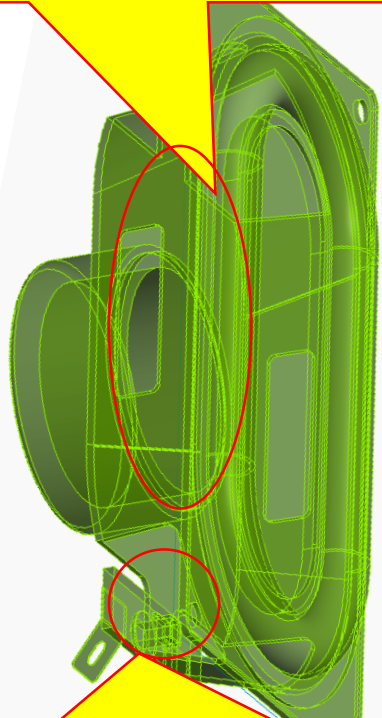
● Speaker Unit : Woofer(Owner: Dreamus)

- Speaker units will Improve for self-vibration
 - Improving the edge of the diaphragm
 - Additional bonding : terminal and voice coil
- Appliance: Next production

Test condition

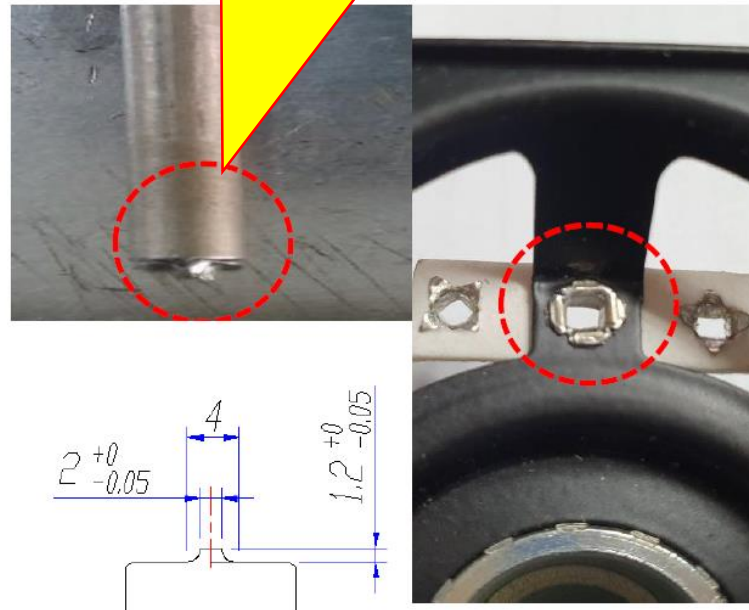
SPK input voltage	8.94V
Input source	Woofer Left

Improving the edge of the diaphragm



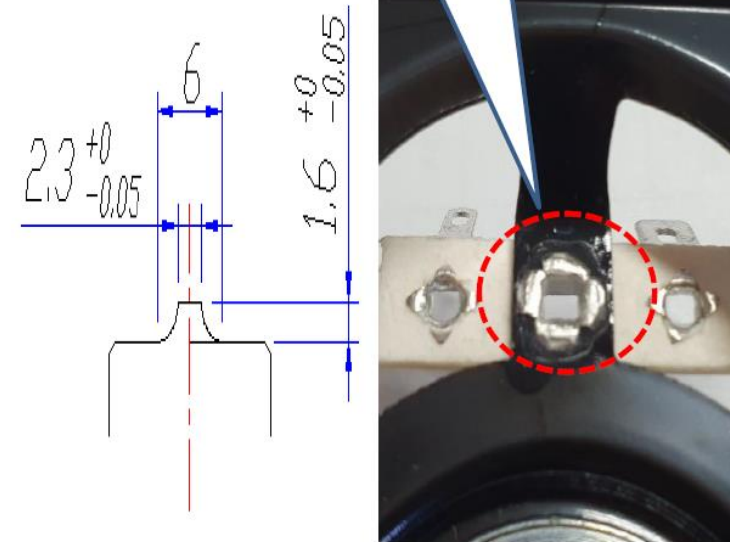
- Additional bonding : terminal and voice coil

Terminal Caulking Mold update



Before

Add bonding



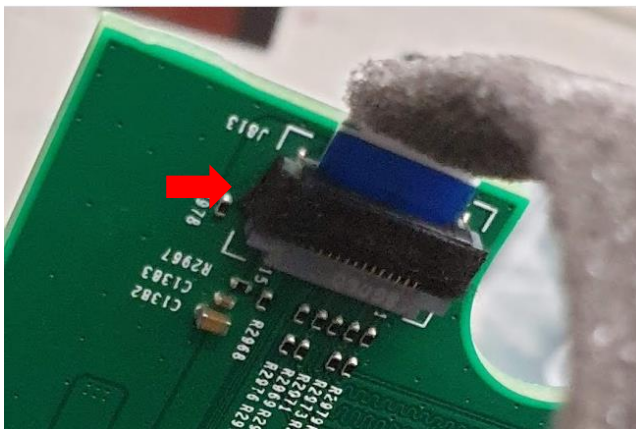
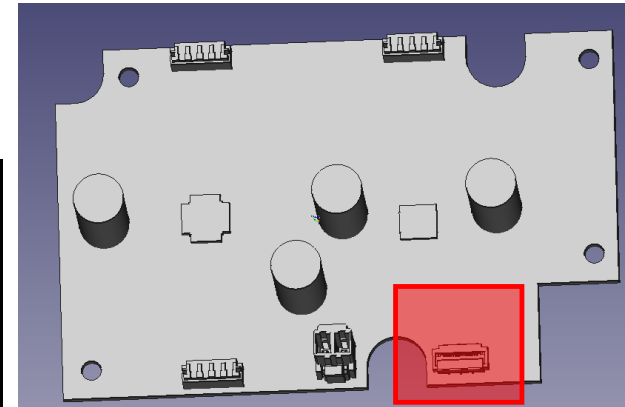
After

- **FFC Cable(Owner: Foxconn)**

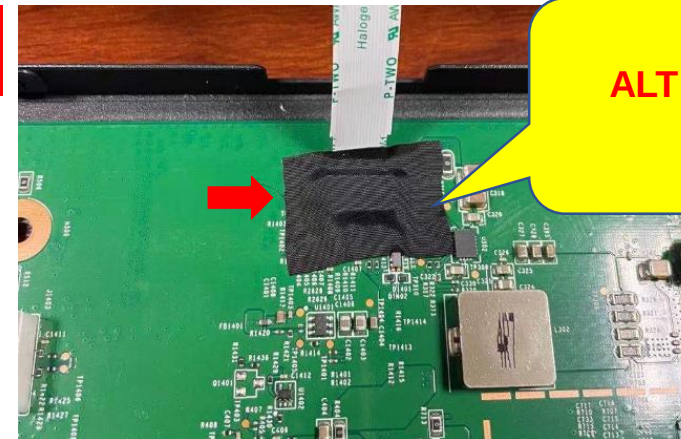
- Apply Polyurethane foam for cable
- Apply quick-drying chemicals or Non-woven fabric tape for connector at locking area
 - AMP PCBA and SoC PCBA
 - : To avoid vibration with FFC cable and connector
- Appliance: DVT build

Test condition	
SPK input voltage	8.94V
Input source	Woofer Left

Example picture



FII Proposal &
Conclusion



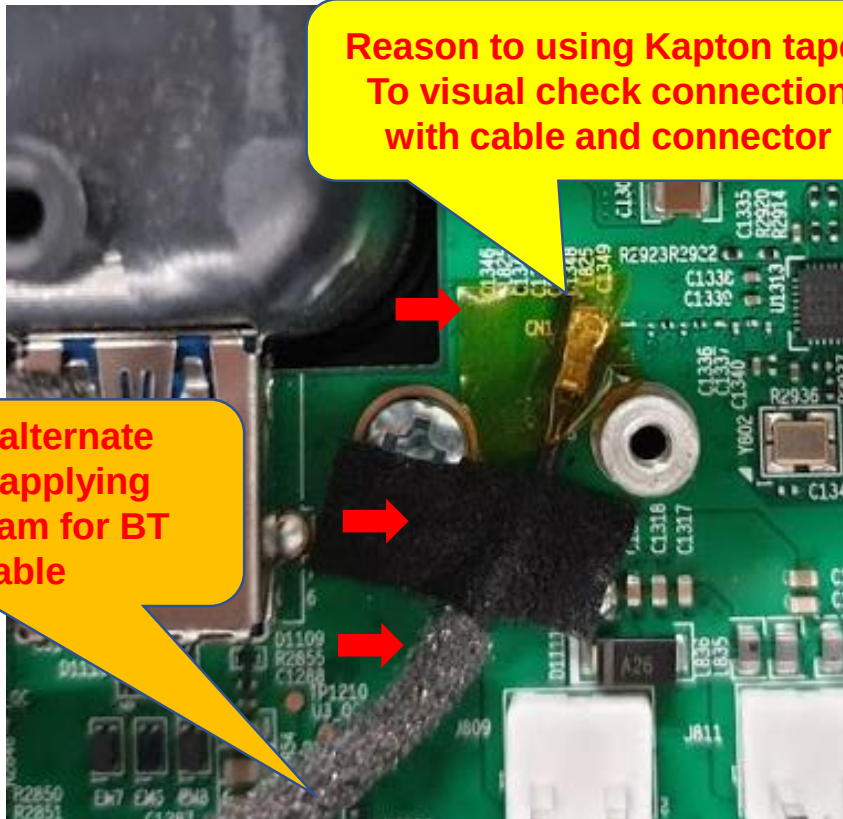
ALT additional comment:
It's okay.

- **Bluetooth antenna cable and connector** (Owner: Foxconn)

- Apply Non-woven fabric tape for BT antenna cable
- Apply Kapton tape to fixing connector
- Apply Polyurethane foam for BT antenna cable
: To avoid vibration BT cable
- Appliance: DVT build

Test condition	
SPK input voltage	8.94V
Input source	Woofer Left

Example picture





130Hz / 220Hz

- **Grill Fabric vibration(Owner: Inkel)**
 - Apply glue for tight fix fabric
: To avoid fabric vibration between grill
 - Appliance: DVT build

Test condition	
SPK input voltage	8.94V
Input source	Woofer_Left : 130Hz Woofer_Right : 220Hz

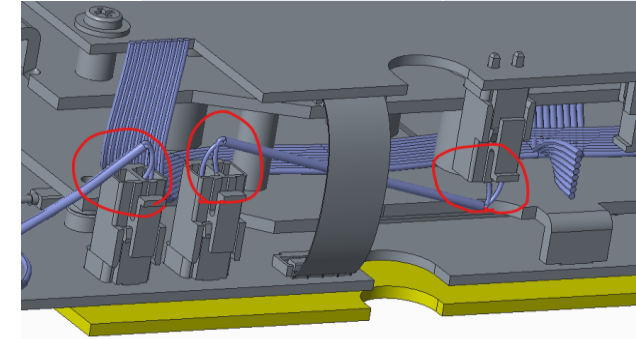
Example picture



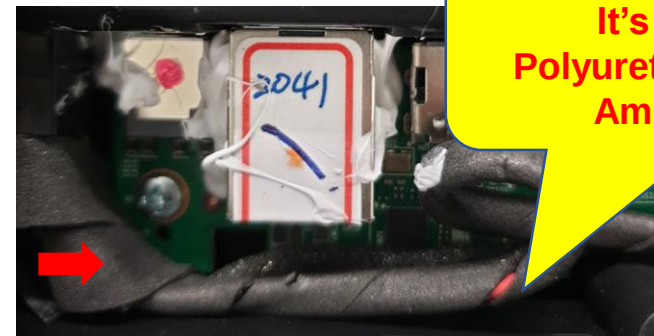
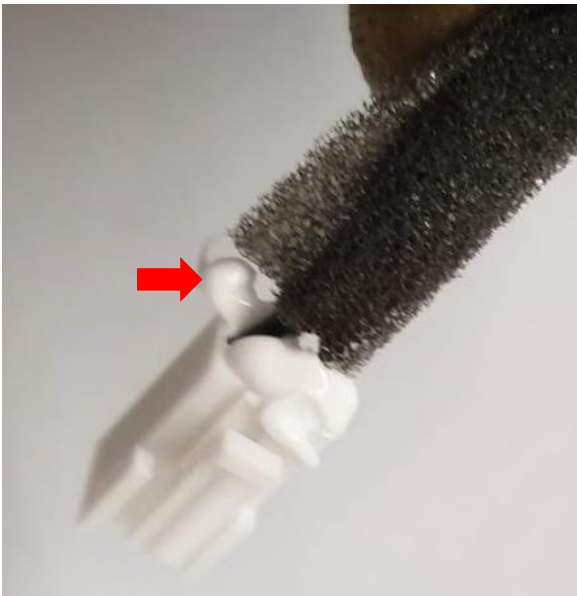


- **Power connector + Wire module** (Owner: Foxconn)
 - Apply quick-drying chemicals all of power connector and wire module
: To avoid vibration with connector and cable
 - Appliance: DVT build
- **Power Cable and Case Bottom Interference** (Owner: Foxconn)
 - Apply Polyurethane foam for Amp power cable
 - Apply EVA foam gasket for DC Power cable
: To avoid vibration with cable and bottom case
 - Appliance: DVT build

Test condition	
SPK input voltage	8.94V
Input source	Woofer_Left



Example picture



ALT additional comment:
It's okay to using
Polyurethane foam as like
Amp power cable

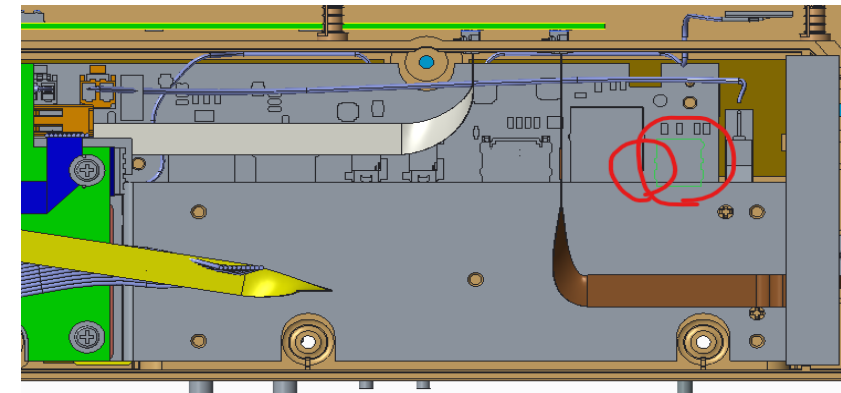
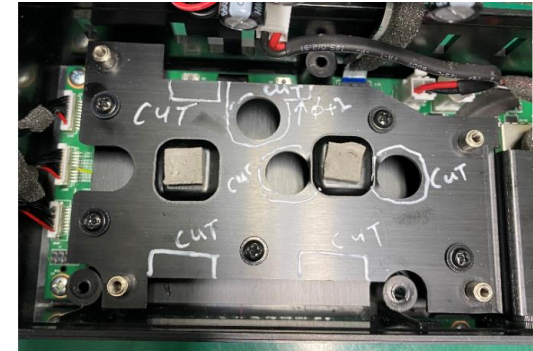
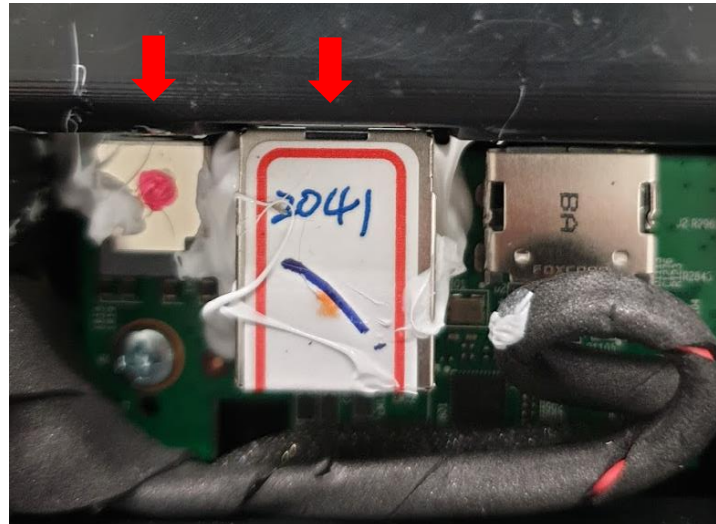
- **Interference between PCBA parts and thermal parts**(Owner: Foxconn)

- Additional cutting of heat sink
: To avoid Interference with PCBA and thermal parts
: connector side cutting area is only for EVT
- Appliance: DVT build

- **DC jack in main board**(Owner: Foxconn)

- Apply quick-drying chemicals on the connector(DC Jack/RJ-45)
: To avoid vibration connector
- Appliance: DVT build

Example picture



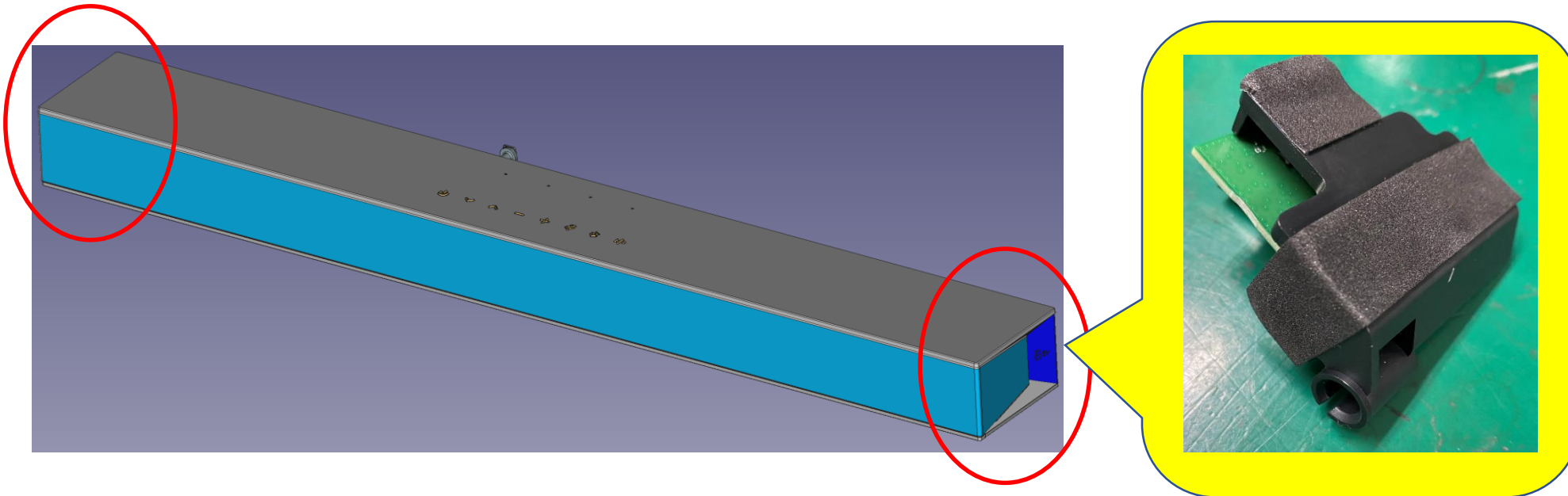
Test condition	
SPK input voltage	8.94V
Input source	Woofer_Left



- **Side LED bracket**(Owner: Foxconn)

- Apply EVA foam gasket
: To avoid vibration with bracket and bottom case
- Appliance: DVT build
- EVA foam gaskets will be supplied by Inkel

Test condition	
SPK input voltage	8.94V
Input source	Woofer_Left



Example picture



320Hz / 390Hz

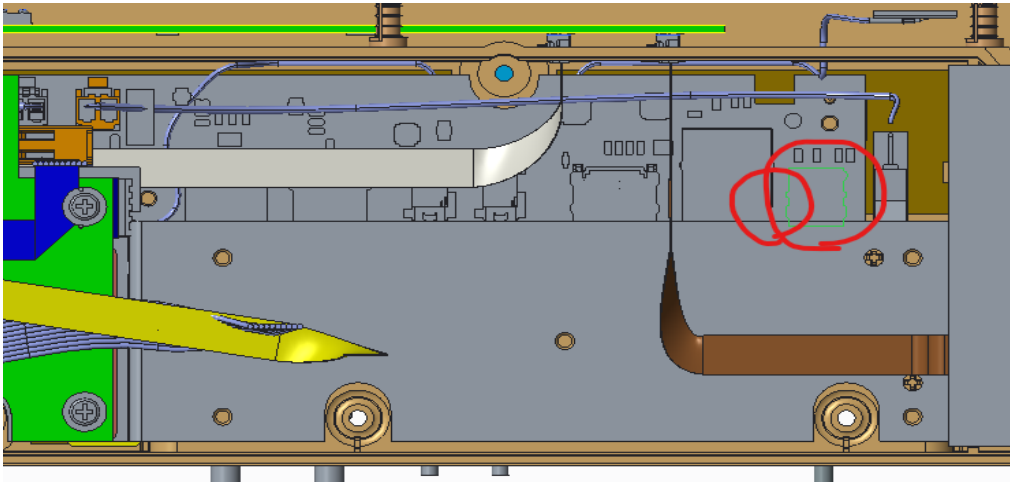
- **Main Board DC jack with Ethernet connector** (Owner: Foxconn)

- Apply quick-drying chemicals on the connector
 - : To avoid vibration with DC jack and Ethernet connector
 - : Same as 150Hz
- Appliance: DVT build

Test condition

SPK input voltage	8.94V
Input source	Woofer_Left : 320Hz Woofer_Right : 390Hz

Example picture



350Hz

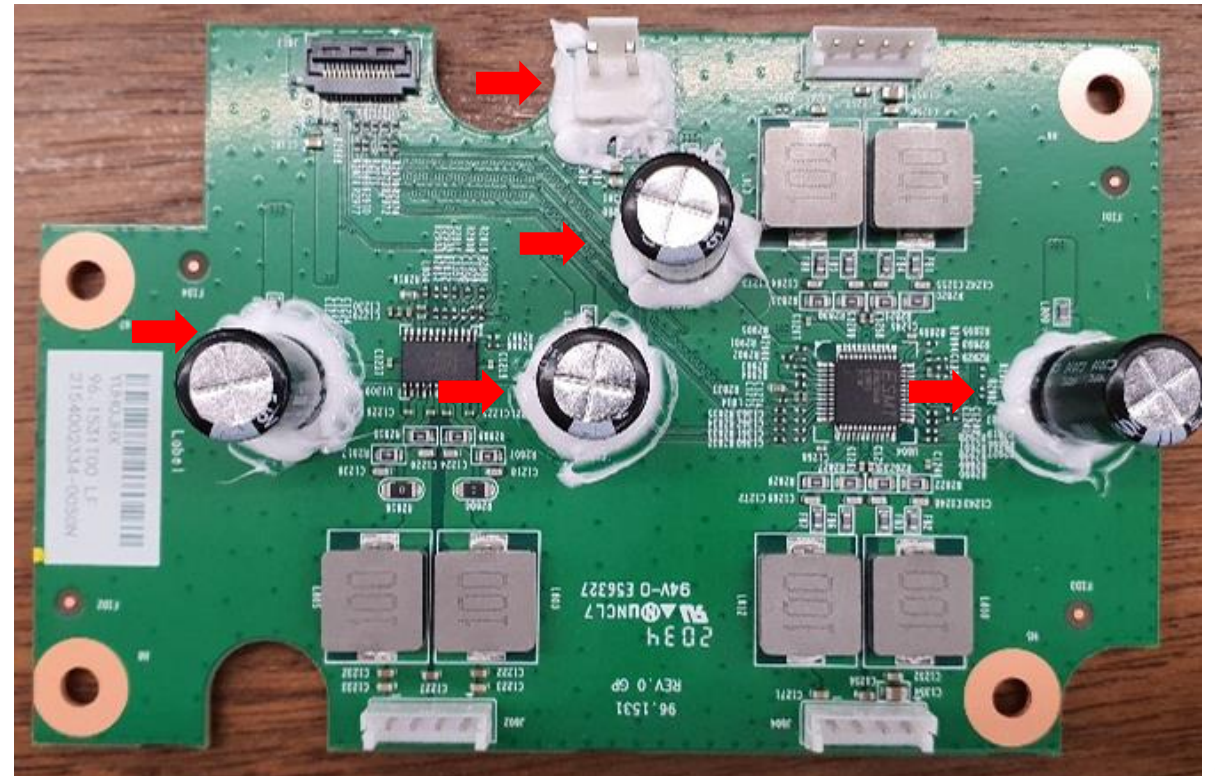
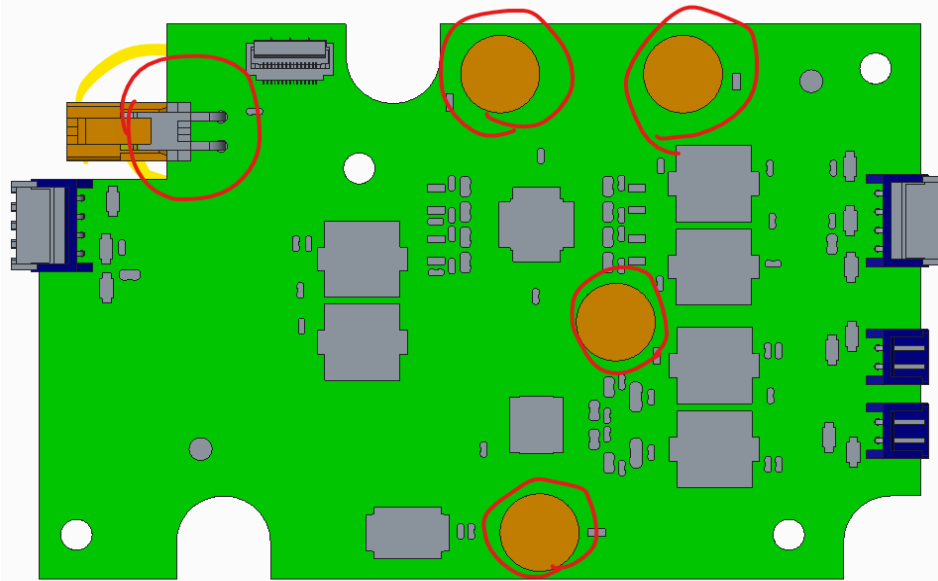


- **AMP board components vibration**(Owner: Foxconn)

- Apply quick-drying chemicals on the connector
: To avoid vibration with board
- Apply quick-drying chemicals on E-Caps
: To avoid vibration with board
- Appliance: DVT build

Test condition	
SPK input voltage	8.94V
Input source	Woofer_Left

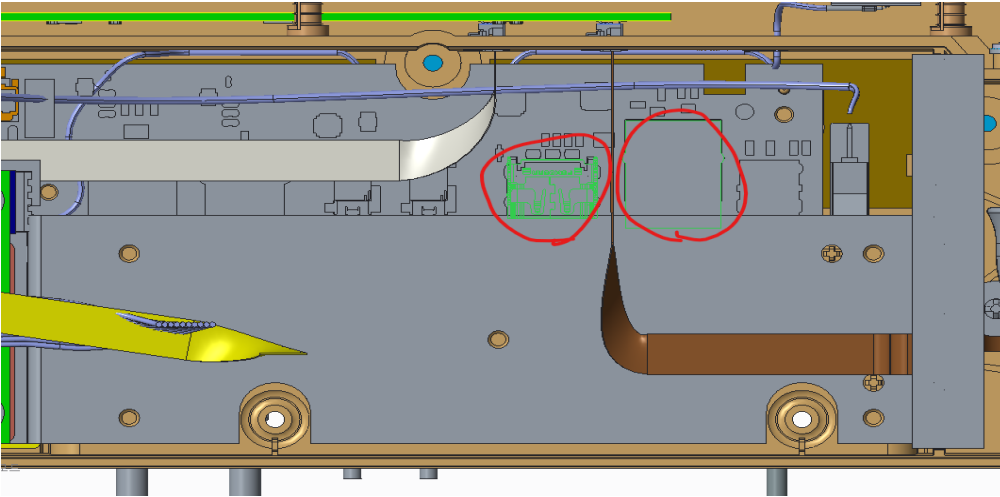
Example picture



- **Main Board Ethernet connector with HDMI connector** (Owner: Foxconn)

- Apply quick-drying chemicals on the connector
: To avoid vibration with Ethernet connector and HDMI Connector
- Appliance: DVT build

Test condition	
SPK input voltage	8.94V
Input source	Woofer_Left



Example picture

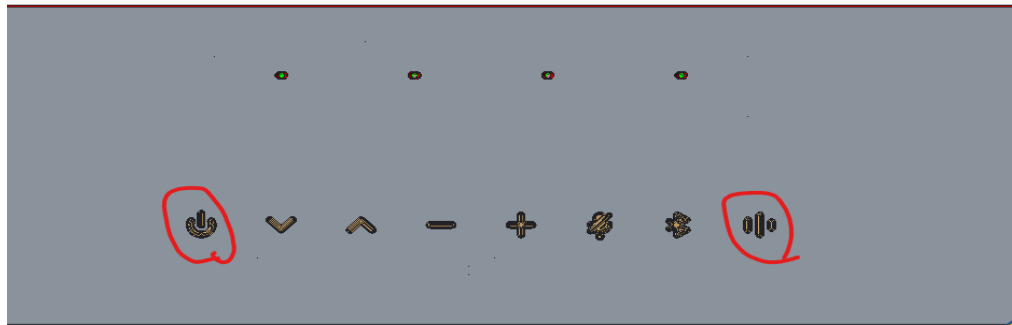




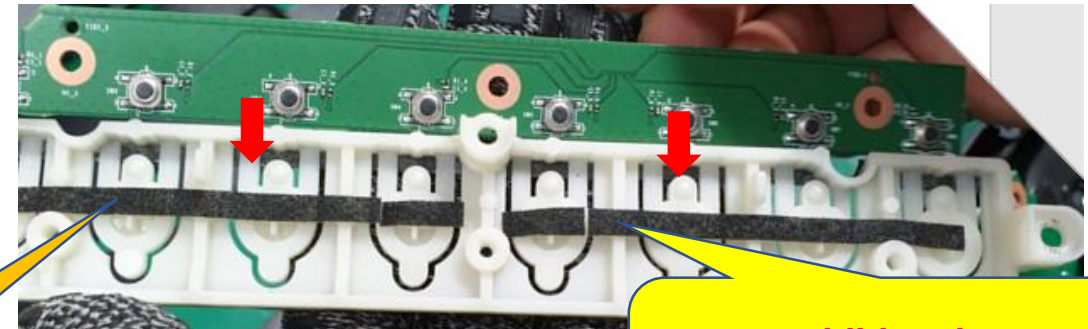
- **Button Knob vibration(Owner: Inkel): Power key and Sound field key**

- Apply non-woven fabric tape between button knob and Top housing.
: To avoid vibration with key knob and key button on button board
- Appliance: DVT build

Test condition	
SPK input voltage	8.94V
Input source	Woofer Left



Example picture

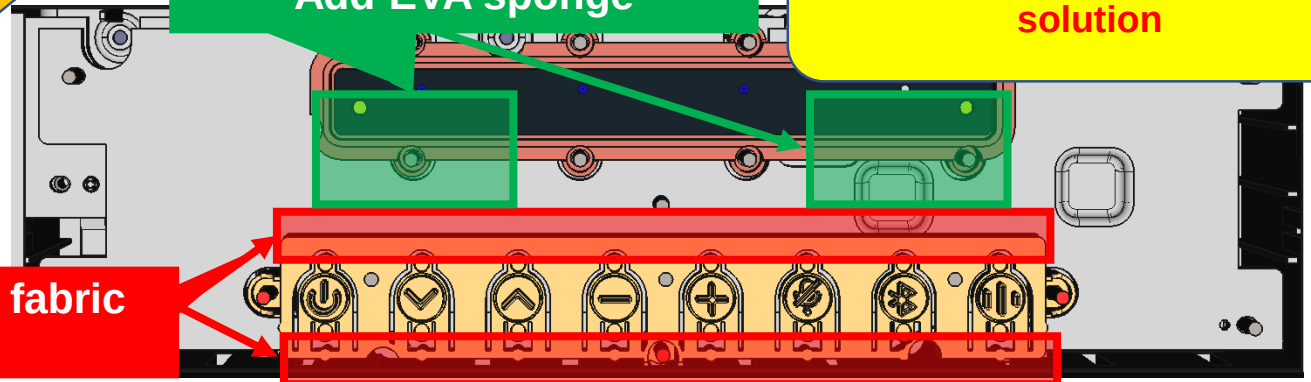


FII commented gap(button knob and button) is almost 0.1mm, but non-woven fabric tape is almost 0.25mm. So, button should be malfunction or not pressed.

Add EVA sponge

ALT additional comment:
Will discuss with Inkel about solution

Apply non-woven fabric tape



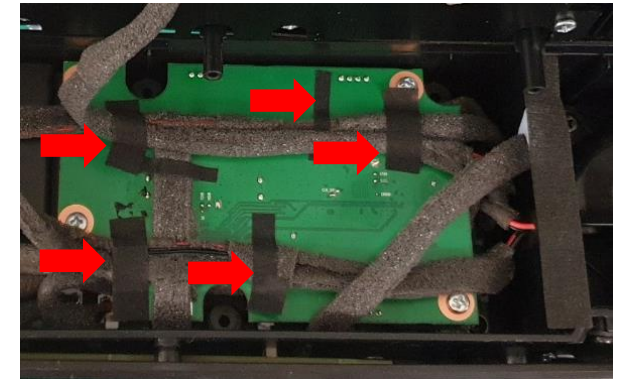
Action item



1. All of cables need to apply Polyurethane foam.

- If not in cable specification of Polyurethane foam supplied by Foxconn, need to be apply before DVT assembly.
- SPK cables use Polyurethane foam 3T sheet
: reference PU foam data sheet will be update

Example picture



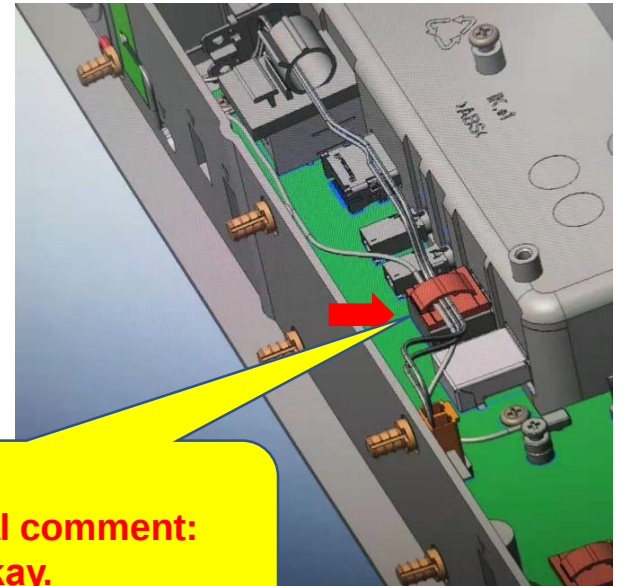
2. Factory have to prepare to fact quick-drying chemicals

- Need to check the list of subsidiary materials approved by the factory
: Other sound product manufacturing line may use this item.
- This document improvement used this silicon. Also Inkel use this silicon
: GB-508W_[En_TDS__rev20111108]

Fill Proposal &
Conclusion

3. Factory have to prepare to non-woven fabric tape for cable fix to assembly

- Need to check the list of subsidiary materials approved by the factory
: Other sound product manufacturing line may use this item.
- Please refer to the below picture.



ALT additional comment:
It's okay.

Subsidiary materials information (Reference data)



No.	Items	Unit	Specification	Comment
1	Apparent density	Kg/m ³	119.6	
2	Spring hardness	-	47	
3	Tensile strength	MPa	1.19	
4	Elongation	%	90	



Non-woven fabric

1. Part Name: OB40HB-2
2. Weight(g/m²): 55.0 ± 5
3. Thickness(cm): 0.25 ± 0.04
4. Materials
 - Viscose Rayon 42%
 - PET 28%
 - Water-soluble acrylic binder 21%
 - Carbon black 9%
5. Tensile strength(Kg/30cm)
 - MD 7.0 Kg ±2.0
 - CD 2.0 Kg ±1.0
6. Tensile elongation(%)
 - MD 10.0 Kg ±5.0
 - CD 10.0 Kg ±5.0
7. Ventilation: 180 ±20 cm² /cm² /S

POLYURETHANE FOAM



Items	Unit	Specification	Test Result	Test Methods	Comment
Apparent density	Kg/m ³	20 ± 2	19.92	JIS K 7222	
Hardness(I.L.D. 25%)	kgf/3 ₂ 14cm	11 ± 2	12.85	JIS K 6400-2(D)	
Tensile strength	kgf/cm ²	Over 0.6	1.222	JIS K 6400-5	
Elongation	%	Over 100	148.59	JIS K 6400-5	
Tear strength	kgf/cm	Over 0.6	0.937	JIS K 6400-5	
Combustibility	mm/min	Under 100	SE	FMVSS 302	

項 目 ITEM	單 位 UNIT	規 格 值 SPEC. VALUES	檢 驗 方 法 TEST METHOD
I.組成 Composition:			
1.基材 Backing:		Polyimide Film	
厚度 Thickness	mm	0.025	ASTM D-1000
基重 Base Weight	g/m ²	-	ASTM D-1000
2.粘膠 Glue:		Silicone Adhesive	
3.離型材料 Liner:		-	
II.物性與化性 Physical & Chemical Properties:			
1.總厚度 Total Thickness:	mm	0.065±10%	ASTM D-1000
2.總基重 Total Weight:	g/m ²	-	ASTM D-1000
3.180°剝離粘著力 180° Peel Adhesion			
對鋼板 To Steel:	kgf/25mm	0.65-0.95	ASTM D-1000
4.初期力 Tack:	#14/cm	1-5	PSTC-6
5.剝離力 Unwind Force:	gf/25mm	600-1300	ASTM D-1000
6.保持力 Holding Power:	min	-	PSTC-7
(25mm*25mm*2kg)			
7.抗張強度 Tensile Strength:	kgf/25mm	9 ↑	ASTM D-1000
8.伸長率 Elongation:	%	50 ↑	ASTM D-1000
9.耐熱性 Heat Resistance:		PASS	
(200°C*2hrs)			
10.耐燃性 Flammability :	sec	60 ↓	UL 510A
11.耐溶劑性 Solvent Resistance :	min	30 ↑	
12 破壞電壓 Dielectric Breakdown :	KV	5.2 ↑	
13 其他 Other:			

THANK YOU