

APPROVAL SHEET

ITEM	SK Broadband Bluetooth Remote
DESCRIPTION	AI2 STB
PART NUMBER	BRM-BT12
RS MODEL	RD12E00
BUYER	SKB
DATE	2021.08.27
RCU VERSION	1.1
DOC VERSION	0.5

MAKER : REMOTE SOLUTION CO.,LTD.

Writer	EE	ME	Design	Software	Approval
					
2021.08.27	2021.08.27	2021.08.27	2021.08.27	2021.08.27	2021.08.27

DATE : 2021.08.27

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RCU Ver	Doc Ver	Date	Change Part	Description	Page
1.0	0.1	21.05.24		Initial	
	0.2	21.06.23	Instrument	- Drawing update	43~44
	0.3	21.07.22	design	- Manual confirmation	30~34
1.1	0.4	21.08.23	soft	- Manufacture date applied (applied to S/N field of DIS)	9~20
	0.5	21.08.27	soft	B/list update	58~65

Product Design



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REFORM :			
DECISION : 2021.08.27		RD12E00	65

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1. Coverage : This product is manufactured as a remote solution and this specification applies to SK Broadband AI2/UHD4 STB remote control.

2. Product Specifications

2-1 Mechanical

2-1-1 Appearance

- 2-1-1-1 There should be no issue for Button Locking
- 2-1-1-2 There should be no stiff and looseness when opening or closing the battery cover
- 2-1-1-3 There should be no issue for attachment of label
- 2-1-1-4 There should be no spread of printing in RCU
- 2-1-1-5 There should be no warpage in RCU
- 2-1-1-6 There should be no stick effect from rubber
- 2-1-1-7 Spring turn count should be matching to Spec
- 2-1-1-8 There should be no electricity issue because of deformation of spring
- 2-1-1-9 Spring should be horizontal when inserting the Battery
- 2-1-1-10 Edge of Spring should be rounded
- 2-1-1-11 There should be no sharpness in case
- 2-1-1-12 The Printing of product should be same as product specification
- 2-1-1-13 When 5Kg of force is applied to each part of the body for 3 seconds, there should be no structural defects such as destruction
- 2-1-1-14 No other specific matters

2-1-2 Decomposition Structure

- 2-1-2-1 Confirmation of internal parts after disassembly should match specification (drawing)
- 2-1-2-2 There should be no abnormality when confirming the incorporation of components and soldering condition after disassembly
- 2-1-2-3 There should be no touching of Mechanical parts and Electrical parts
- 2-1-2-4 It should match the drawing (specification) when comparing with the parts list
- 2-1-2-5 PCB Print contents should match the drawings
- 2-1-2-6 Circuit components should use specified standard products
- 2-1-2-7 The Carbon Contact should not have Flux

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2-1-3 Button Specification

2-1-3-1 Touch Feeling : There is no defect when key button is pressed vertically

2-1-3-2 Operating Force : Metal Dome 110g±20g

Rubber Key : Less then 200g±30g (Small Key)

Rubber Key : Less then 210g±30g (Large Key)

2-1-3-3 Operating distance : 0.5±0.1 mm

2-1-3-4 Return force : more then 40% of the operating force Spec[Key center measurement]

2-1-3-5 Load: There should no defect PCB and other general , when applied for 3 seconds
with a force of 3Kg vertically

2-1-4 Battery Specifications

2-1-4-1 There should no defect when battery injecting and ejecting

2-1-4-2 There should no defect of electronical contact when battery insert

2-1-4-3 Gap distance : Gap distance between (+) side and (-) side should be less than 0.4mm

2-1-4-4 Battery should not be energized in reverse

2-1-4-5 There should no battery heating or deformation of the mechanic when reversed
battery inserting

2-1-4-6 There should be no problem when checking battery compatibility by manufacturer
[Compatibility by Size: AAA(L=44.2~43.4, Φ10.5 ~9.5)] , AA (L=50.5~49.0 , Φ14.5 ~ 13.5)]

2-1-5 Dimension

Outside dimension of the product : must meet individual approval specs (overall Length Tolerance:±0.8)

GAP (standard 0.3 mm) - GAP: Front knob and side gap should be less than 0.6 mm.

However, only the total length is measured during import inspection

Product Size : 48mm*175mm*23mm

Weight : 131.7(±2)g (With AA Battery x 2EA)

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2-2 Electrical properties

2-2-1 General Operating Test

2-2-1-1 There should be no problem in Button operation

2-2-1-2 In case of remote controller with Multi Brand, there should be no problem in operation by each other maker

2-2-1-3 Other buttons does not work when Button is operated

2-2-1-4 There should be no abnormality in continuous key operation

2-2-1-5 In case of various LEDs, there should be no problem when checking the brightness and blurring. [Set limit sample if necessary]

2-2-2 Current consumption

function	enter	Condition	SPEC		
			2.2V	2.5V	3.0V
Before leakage current pairing	Leave for 1 minute after power is applied	Average	20uA Below	20uA Below	20uA Below
After leakage current pairing	Leave for 1 minute after power is applied	Average	50uA Below	50uA Below	50uA Below
IR transmission	TV Volum (+) button 1 minute movement	Average	30mA Below	30mA Below	30mA Below
RF transmission	Volum (+) button 1 minute movement	Average	5mA Below	5mA Below	5mA Below
Buzzer	Text erase + 4	Peak	60mA Below	60mA Below	60mA Below
Backlight	Remote control angle 40° or more	Peak	OFF	20mA Below	20mA Below
Voice search	Voice search button	Peak	10mA Below	10mA Below	10mA Below

2-2-3 High Voltage : When inputting 3.4V voltage, there should be no abnormality in remote control key operation

2-2-4 IR LED Current(2ohm) : Over 300mA (2 Battery)

2-2-5 Power Consumption : Less then 300mW (Battery 3.0V)

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2-2-6 Oscillation frequency : Input Voltage : D.C 3.0V (Power supply 3.0V)
: 40.00 Mhz $\pm$ 10ppm

2-2-7 Oscillation stop voltage: Less than 1.9V

2-2-8 All Key Operation Test

2-2-8-1 All Key operation is abnormal or not checked

2-2-8-2 There should be no abnormality when operating each key ON / OFF more than 10 times
[ON / OFF every 1 second]

2-2-9 Decompression / Boost Operating Voltage

2-2-9-1 There should be no problem in operation when repeating 5 times at 2.2V ~ 3.4V

2-2-9-2 Check the voltage at 0V starting operation

2-2-9-3 Check the operation stop voltage at the voltage drop from 2.2V
[However, when there is no regulation, it should be less than 2.2V]

2-2-10 Contact resistance

2-2-10-1 Conduction / Carbon is inspected according to specification
[Conduction: 200 Ω or less / Carbon: 300 Ω or less]

2-2-11 Transmission Format (Output Wave Form)

2-2-11-1 Format : uPD6122

2-2-11-2 Carrier : 37.9kHz $\pm$ 3%

2-2-11-3 Frame : Interval(TF) : 108ms $\pm$ 3%

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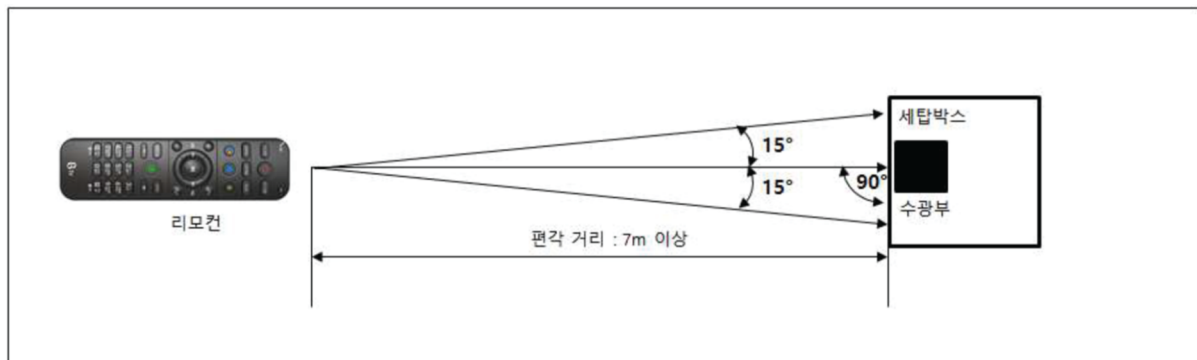
2-2-12 Operating distance and declination Operating distance:

2-2-12-1 Horizontal deflection (on optical axis) Straight line distance

When the receiver of the SET and the Remote Control Unit are horizontally or vertically on the optical axis



2-2-12-2 Remote control unit reference Horizontal deviation 15 ° (left, right, top, bottom) reaching distance (SET fixed)



2-2-12-3 RF straight line reach

RF Button : 7m

RF Voice transmission : 7m

- Measure using the buyer's set-top box. (Illumination : 200Lux, Temp. +25°C)

2-2-13 Buzzer Spec

Decibel : Measured at 10Cm distance using decibel meter: 85dB ±10dB [Applied voltage 3.0V]

(Measured using 1KHz test sound: 75±6dB) [Applied voltage 3.0V]

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3. Environmental characteristics

3-1 Printing test

3-1-1 Eraser test

3-1-1-1 No abnormality by carrying out the round trip 50 times with the load of 1.0Kg with the eraser

3-1-1-2 There should be no abnormality by scratching the printed surface with the fingernail 5 times.

3-1-2 Tape Test

3-1-2-1 After printing, coating area is attached with Tape with 1Kg load, it is peeled at 45 ° and tested after 3 times test

3-1-3 Alcohol test

3-1-3-1 Gently apply alcohol to the gauze and perform 20 ~ 50 reciprocations with a load of 1 kg.
(CASE: 20 times, RUBBER: 50 times)

3-1-4 Coating property

3-1-4-1 After leaving 2HR at room temperature, 3M SCOTCH Brand No. 600 or more TAPE equivalent or better After close contact, do not pull instantly at 15° from flat surface.

3-2 Reliability Test

3-2-1 Load Life Test

3-2-1-1 After inserting the batteries and operating at a rate of 30 ~ 60 times per minute and operating 100,000 times : There should be no abnormality in function when inspecting.

3-2-2 High temperature operation test

3-2-2-1 50 ° C ± 3 ° C, humidity 65%, and left for 24 hours

The operation inspection shall be carried out at intervals of 12 hours, so that there should be no abnormality in function and appearance

3-2-3 Low-temperature operation test

3-2-3-1 Put a rated load in a thermostat of -5 ± 3 ° C and leave it for 24 hours

The operation inspection shall be carried out at intervals of 12 hours, so that there should be no abnormality in function and appearance.

3-2-4 High temperature and high humidity operation test

3-2-4-1 Leave at rated temperature of 50 ± 3 ° C and humidity 80% for 24 hours

The operation inspection shall be carried out at intervals of 12 hours, so that there should be no abnormality in function and appearance.

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3-2-5 temperature preservation test

- 3-2-5-1 Leave in a thermostatic chamber at 70 ± 3 ° C for 48 hours in a no-load state, and leave it at room temperature and humidity for 1 hour
There should be no abnormality in function and appearance at the time of inspection

3-2-6 Cold storage test

- 3-2-6-1 Allow to stand for 48 hours in a no-load state in a thermostat at -20 ± 3 ° C for 1 hour
There should be no abnormality in function and appearance at the time of inspection

3-2-7 High temperature and high humidity preservation test

- 3-2-6-1 Temperature 50 ± 3 °C Leave in a constant temperature chamber of 95% humidity for 48 hours in a no-load state, and leave for one hour at normal temperature and humidity
There should be no abnormality in function and appearance at the time of inspection

3-2-8 Thermal shock test

- 3-2-8-1 Temperature: 70 ± 3 °C ~ -20 ± 3 °C, 50 cycles at intervals of 30 minutes, left at room temperature and humidity for 1 hour
There should be no abnormality in function and appearance at the time of inspection.

3-2-9 Vibration test

- 3-2-9-1 Vibration frequency: 10Hz~55Hz(7.5min) → 55Hz(2Hrs) → 55Hz~10Hz(7.5min), amplitude: 1.5mm, As a condition, there should be no abnormalities during inspection after conducting X, Y, Z directions.

3-2-10 Drop Test

- 3-2-10-1 Tested on Hardwood 6 times, once every 4 times [Dropping at 100cm after battery insertion]
3-2-10-1-1 No Top / Bottom Widening and Crack
3-2-10-1-2 No defective energization due to spring deformation
3-2-10-1-3 There should be no stick phenomenon due to the rubber deviation.
3-2-10-1-4 There should be no other unusual phenomenon.

3-2-11 Static test

- 3-2-11-1 Place the R / C with the battery inserted on the copper plate and perform the static test
3-2-11-1-1 ± 10 kV : No problem in operation
3-2-11-1-2 ± 12 kV : No destruction

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4. Software Specification (1/12)

RCU Key code table

SKB Smart TV control STB RCU Device Name : BRM_BT12_XXX Device Name : BMM_BT12_XXX									
Position	No	Key	Code			RF(BLE)		USB HID Usage Name	
			MODE1 CUSTOM [0x01FE]	MODE2 CUSTOM [0x01FE]	Page	Usage ID	Keyboard Page (0x07)	Consumer Page (0x0C)	Description
Front	1	통합전원	Btv 전원 + TV 전원	Btv 전원 + TV 전원					order: Btv power + BRK → TV power + VER → BRK
	2	TV 전원	삼성 + LG	삼성 + LG					dedicated TV only key Default Samsung/LG
	3	스마트TV	삼성 + LG	삼성 + LG					dedicated TV only key Default Samsung/LG
	4	바로그기	0x58A7	0x587A	0x07	0x005800			
	5	안호재널	0x58A9	0x589A	0x07	0x005800			
Side	6	한정표	0x6D92	0x6D29	0x07	0x006D00			
	7	외부입력	[0x01FE]~[0x0BF4]	[0x01FE]~[0x0BF4]					dedicated TV only key Default Samsung LG [Source] Navi keys is working TV
	8	조용비	0x45BA	0x45AB	0x07	0x004500			
	9	Btv 음량+	0x43BC	0x43CB	0x07	0x004300			
	10	Btv 음량-	0x42BD	0x42DB	0x07	0x004200			
Front	11	잠재	0x4FB0	0x4F0B	0x07	0x004F00			
	12	홈	0x02FD	0x02DF	0x07	0x000200			order: HOME → BRT → BATT INFO
	13	Zem KIDS	0x59A6	0x596A	0x07	0x005900			
	14	TV 음량+	삼성 + LG	삼성 + LG					dedicated TV only key Default Samsung/LG
	15	TV 음량- LG	삼성 + LG	삼성 + LG					
	16	▲(상)	0x49B6	0x49B6	0x07	0x004900			
	17	▼(하)	0x4AB5	0x4AB5	0x07	0x004A00			
	18	◀(좌) / ▶(우) (원전-원기)	0x4BB4	0x4BB4	0x07	0x004B00			
	19	▶(우) / ▶(우) (발전-원기)	0x4CB3	0x4CB3	0x07	0x004C00			
	20	OK / (원전-원기)	0x46B9	0x46B9	0x0C	0x0041			Menu Pick
	21	채널 △	0x40BF	0x40FB	0x07	0x004000			
	22	채널 ∇	0x41BE	0x41EB	0x07	0x004100			
	23	원전	0x4EB1	0x4EB1	0x07	0x004E00			TV code output in Smart TV mode
	24	1/2기	0x34CB	0x34CB	0x07	0x003400			TV code output in Smart TV mode
	25	이펙트	0x012E	0x012E	0x07	0x000200			
	26	◀(좌) / ▶(우) (원전-원기) / R	0x609F	0x60F9	0x07	0x006000			
	27	▶(우) / ▶(우) (원전-원기) / B	0x639C	0x63C9	0x07	0x006300			
	28	1	0x21DE	0x21ED	0x07	0x002100			
	29	2	0x22DD	0x22DD	0x07	0x002200			
	30	3	0x23DC	0x23DC	0x07	0x002300			
	31	4	0x24DB	0x24BD	0x07	0x002400			
	32	5	0x25DA	0x25AD	0x07	0x002500			
	33	6	0x26D9	0x26D9	0x07	0x002600			
	34	7	0x27D8	0x27BD	0x07	0x002700			
	35	8	0x28D7	0x28BD	0x07	0x002800			
	36	9	0x29D6	0x29BD	0x07	0x002900			
	37	*문자지움	0x2AD5	0x2AD5	0x07	0x002A00			
	38	0	0x20DF	0x20FD	0x07	0x002000			
	39	##문자변환	0x2BD4	0x2BD4	0x07	0x002B00			
Special Key Code	40	Btv 전원	0x01FE	0x01EF	0x07	0x000100			통합전원 버튼 입력 시 함께 송출 RBT 모드 변경에 의해 RBT 또는 BT 로 송출
	41	Normal Battery	0x3AC5	0x3AC5	0x07	0x003A00~0x00FFFF			
	42	Low Battery	0x3BC4	0x3BC4	0x07	0x003B00~0x00FFFF			
	43	Empty Battery	0x3CC3	0x3CC3	0x07	0x003C00~0x00FFFF			
	44	Bluetooth-Insert	0x0D62	0x0D62	0x07	0x000D00~0x00FFFF			이더넷 케이블 연결(BT Connected)
	45	Break Data Code	0xF000	0xF000	0x07	0x00FFFF			IR 송신기 작동, BT 전 기 작동 리모컨 제조사별 코드(RS) 0xF300~0xF30A : BT02 (UHD 이어폰1) 0xF310~0xF314 : BT06 (UHD 이어폰2 - BLE) 0xF320~0xF324 : BT03 (Smart STB 안구) 0xF330~0xF334 : BT05 (시리얼로 STB) 0xF340~0xF344 : BT07 (UHD 이어폰3 - BLE) 0xF350~0xF354 : BT08 (AI STB - BLE) 0xF360~0xF364 : BT09 (리조용할 리모컨 - BLE) 0xF370~0xF374 : BA01 (Android 리모컨 - BLE) 0xF380~0xF384 : BT10 (AI 2 STB - BLE) 0xF390~0xF394 : BT11 (AI 2 STB - BLE) 0xF3A0~0xF3A4 : BT12 (Smart TV 제어) 0xF3B0~0xF3B4 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	46	RCU Ver#3	0xF310 ~ 0xF314	0xF310 ~ 0xF314					리모컨 제조사별 코드(RS) 0xF400~0xF404 : BT02 (UHD 이어폰1) 0xF410~0xF414 : BT06 (UHD 이어폰2 - BLE) 0xF420~0xF424 : BT03 (Smart STB 안구) 0xF430~0xF434 : BT05 (시리얼로 STB) 0xF440~0xF444 : BT07 (UHD 이어폰3 - BLE) 0xF450~0xF454 : BT08 (AI STB - BLE) 0xF460~0xF464 : BT09 (리조용할 리모컨 - BLE) 0xF470~0xF474 : BA01 (Android 리모컨 - BLE) 0xF480~0xF484 : BT10 (AI 2 STB - BLE) 0xF490~0xF494 : BT11 (AI 2 STB - BLE) 0xF4A0~0xF4A4 : BA02 (ATV STB - BLE) 0xF4B0~0xF4B4 : BA03 (Smart TV 제어) 0xF4C0~0xF4C4 : BT12 (Smart TV 제어) 0xF4D0~0xF4D4 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	47	RCU Ver#4	0xF4A0 ~ 0xF4A4	0xF4A0 ~ 0xF4A4					리모컨 제조사별 코드(RS) 0xF500~0xF504 : BT07 (UHD 이어폰3 - BLE) 0xF510~0xF514 : BT09 (리조용할 리모컨 - BLE) 0xF520~0xF524 : BT03 (Smart STB 안구) 0xF530~0xF534 : BT05 (시리얼로 STB) 0xF540~0xF544 : BT06 (UHD 이어폰2 - BLE) 0xF550~0xF554 : BT08 (AI STB - BLE) 0xF560~0xF564 : BT09 (리조용할 리모컨 - BLE) 0xF570~0xF574 : BA01 (Android 리모컨 - BLE) 0xF580~0xF584 : BT10 (AI 2 STB - BLE) 0xF590~0xF594 : BT11 (AI 2 STB - BLE) 0xF5A0~0xF5A4 : BA02 (ATV STB - BLE) 0xF5B0~0xF5B4 : BA03 (Smart TV 제어) 0xF5C0~0xF5C4 : BT12 (Smart TV 제어) 0xF5D0~0xF5D4 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	48	RCU Ver#5	0xF510 ~ 0xF514	0xF510 ~ 0xF514					리모컨 제조사별 코드(RS) 0xF5A0~0xF5A4 : BT07 (UHD 이어폰3 - BLE) 0xF5B0~0xF5B4 : BT09 (리조용할 리모컨 - BLE) 0xF5C0~0xF5C4 : BT03 (Smart STB 안구) 0xF5D0~0xF5D4 : BT05 (시리얼로 STB) 0xF5E0~0xF5E4 : BT06 (UHD 이어폰2 - BLE) 0xF5F0~0xF5F4 : BT08 (AI STB - BLE) 0xF600~0xF604 : BT09 (리조용할 리모컨 - BLE) 0xF610~0xF614 : BA01 (Android 리모컨 - BLE) 0xF620~0xF624 : BT10 (AI 2 STB - BLE) 0xF630~0xF634 : BT11 (AI 2 STB - BLE) 0xF640~0xF644 : BA02 (ATV STB - BLE) 0xF650~0xF654 : BA03 (Smart TV 제어) 0xF660~0xF664 : BT12 (Smart TV 제어) 0xF670~0xF674 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	49	Setup-Start	0x54A6	0x54A6	0x07	0x005400~0x00FFFF			리모컨 제조사별 코드(RS) 0xF6A0~0xF6A4 : BT07 (UHD 이어폰3 - BLE) 0xF6B0~0xF6B4 : BT09 (리조용할 리모컨 - BLE) 0xF6C0~0xF6C4 : BT03 (Smart STB 안구) 0xF6D0~0xF6D4 : BT05 (시리얼로 STB) 0xF6E0~0xF6E4 : BT06 (UHD 이어폰2 - BLE) 0xF6F0~0xF6F4 : BT08 (AI STB - BLE) 0xF700~0xF704 : BT09 (리조용할 리모컨 - BLE) 0xF710~0xF714 : BA01 (Android 리모컨 - BLE) 0xF720~0xF724 : BT10 (AI 2 STB - BLE) 0xF730~0xF734 : BT11 (AI 2 STB - BLE) 0xF740~0xF744 : BA02 (ATV STB - BLE) 0xF750~0xF754 : BA03 (Smart TV 제어) 0xF760~0xF764 : BT12 (Smart TV 제어) 0xF770~0xF774 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	50	Setup-Stop	0x54A6	0x54A6	0x07	0x005400~0x00FFFF			리모컨 제조사별 코드(RS) 0xF7A0~0xF7A4 : BT07 (UHD 이어폰3 - BLE) 0xF7B0~0xF7B4 : BT09 (리조용할 리모컨 - BLE) 0xF7C0~0xF7C4 : BT03 (Smart STB 안구) 0xF7D0~0xF7D4 : BT05 (시리얼로 STB) 0xF7E0~0xF7E4 : BT06 (UHD 이어폰2 - BLE) 0xF7F0~0xF7F4 : BT08 (AI STB - BLE) 0xF800~0xF804 : BT09 (리조용할 리모컨 - BLE) 0xF810~0xF814 : BA01 (Android 리모컨 - BLE) 0xF820~0xF824 : BT10 (AI 2 STB - BLE) 0xF830~0xF834 : BT11 (AI 2 STB - BLE) 0xF840~0xF844 : BA02 (ATV STB - BLE) 0xF850~0xF854 : BA03 (Smart TV 제어) 0xF860~0xF864 : BT12 (Smart TV 제어) 0xF870~0xF874 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	51	Drag Up	0x8778	0x8787	0x07	0x008700~0x00FFFF			리모컨 제조사별 코드(RS) 0xF8A0~0xF8A4 : BT07 (UHD 이어폰3 - BLE) 0xF8B0~0xF8B4 : BT09 (리조용할 리모컨 - BLE) 0xF8C0~0xF8C4 : BT03 (Smart STB 안구) 0xF8D0~0xF8D4 : BT05 (시리얼로 STB) 0xF8E0~0xF8E4 : BT06 (UHD 이어폰2 - BLE) 0xF8F0~0xF8F4 : BT08 (AI STB - BLE) 0xF900~0xF904 : BT09 (리조용할 리모컨 - BLE) 0xF910~0xF914 : BA01 (Android 리모컨 - BLE) 0xF920~0xF924 : BT10 (AI 2 STB - BLE) 0xF930~0xF934 : BT11 (AI 2 STB - BLE) 0xF940~0xF944 : BA02 (ATV STB - BLE) 0xF950~0xF954 : BA03 (Smart TV 제어) 0xF960~0xF964 : BT12 (Smart TV 제어) 0xF970~0xF974 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	52	Drag Down	0x82D7	0x82D7	0x07	0x008200~0x00FFFF			리모컨 제조사별 코드(RS) 0xF9A0~0xF9A4 : BT07 (UHD 이어폰3 - BLE) 0xF9B0~0xF9B4 : BT09 (리조용할 리모컨 - BLE) 0xF9C0~0xF9C4 : BT03 (Smart STB 안구) 0xF9D0~0xF9D4 : BT05 (시리얼로 STB) 0xF9E0~0xF9E4 : BT06 (UHD 이어폰2 - BLE) 0xF9F0~0xF9F4 : BT08 (AI STB - BLE) 0xFA00~0xFA04 : BT09 (리조용할 리모컨 - BLE) 0xFA10~0xFA14 : BA01 (Android 리모컨 - BLE) 0xFA20~0xFA24 : BT10 (AI 2 STB - BLE) 0xFA30~0xFA34 : BT11 (AI 2 STB - BLE) 0xFA40~0xFA44 : BA02 (ATV STB - BLE) 0xFA50~0xFA54 : BA03 (Smart TV 제어) 0xFA60~0xFA64 : BT12 (Smart TV 제어) 0xFA70~0xFA74 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	53	Drag Left	0x83C7	0x83C7	0x07	0x008300~0x00FFFF			리모컨 제조사별 코드(RS) 0xFAA0~0xFAA4 : BT07 (UHD 이어폰3 - BLE) 0xFAB0~0xFAB4 : BT09 (리조용할 리모컨 - BLE) 0xFAC0~0xFAC4 : BT03 (Smart STB 안구) 0xFAD0~0xFAD4 : BT05 (시리얼로 STB) 0xFAE0~0xFAE4 : BT06 (UHD 이어폰2 - BLE) 0xFAF0~0xFAF4 : BT08 (AI STB - BLE) 0xFB00~0xFB04 : BT09 (리조용할 리모컨 - BLE) 0xFB10~0xFB14 : BA01 (Android 리모컨 - BLE) 0xFB20~0xFB24 : BT10 (AI 2 STB - BLE) 0xFB30~0xFB34 : BT11 (AI 2 STB - BLE) 0xFB40~0xFB44 : BA02 (ATV STB - BLE) 0xFB50~0xFB54 : BA03 (Smart TV 제어) 0xFB60~0xFB64 : BT12 (Smart TV 제어) 0xFB70~0xFB74 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	54	Drag Right	0x84B7	0x84B7	0x07	0x008400~0x00FFFF			리모컨 제조사별 코드(RS) 0xFB80~0xFB84 : BT07 (UHD 이어폰3 - BLE) 0xFB90~0xFB94 : BT09 (리조용할 리모컨 - BLE) 0xFBA0~0xFBA4 : BT03 (Smart STB 안구) 0xFBB0~0xFBB4 : BT05 (시리얼로 STB) 0xFBC0~0xFBC4 : BT06 (UHD 이어폰2 - BLE) 0xFBD0~0xFBD4 : BT08 (AI STB - BLE) 0xFBE0~0xFBE4 : BT09 (리조용할 리모컨 - BLE) 0xFBF0~0xFBF4 : BA01 (Android 리모컨 - BLE) 0xFC00~0xFC04 : BT10 (AI 2 STB - BLE) 0xFC10~0xFC14 : BT11 (AI 2 STB - BLE) 0xFC20~0xFC24 : BA02 (ATV STB - BLE) 0xFC30~0xFC34 : BA03 (Smart TV 제어) 0xFC40~0xFC44 : BT12 (Smart TV 제어) 0xFC50~0xFC54 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	55	test	0x85A7 ~ 0xF000	0x85A7 ~ 0xF000	0x07	0x008500~0x00FFFF			리모컨 제조사별 코드(RS) 0xFC80~0xFC84 : BT07 (UHD 이어폰3 - BLE) 0xFC90~0xFC94 : BT09 (리조용할 리모컨 - BLE) 0xFCA0~0xFCA4 : BT03 (Smart STB 안구) 0xFCB0~0xFCB4 : BT05 (시리얼로 STB) 0xFCC0~0xFCC4 : BT06 (UHD 이어폰2 - BLE) 0xFCF0~0xFCF4 : BT08 (AI STB - BLE) 0xFD00~0xFD04 : BT09 (리조용할 리모컨 - BLE) 0xFD10~0xFD14 : BA01 (Android 리모컨 - BLE) 0xFD20~0xFD24 : BT10 (AI 2 STB - BLE) 0xFD30~0xFD34 : BT11 (AI 2 STB - BLE) 0xFD40~0xFD44 : BA02 (ATV STB - BLE) 0xFD50~0xFD54 : BA03 (Smart TV 제어) 0xFD60~0xFD64 : BT12 (Smart TV 제어) 0xFD70~0xFD74 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	56	Unlink	0x85A7 ~ 0xF000	0x85A7 ~ 0xF000	0x07	0x008500~0x00FFFF			리모컨 제조사별 코드(RS) 0xFD80~0xFD84 : BT07 (UHD 이어폰3 - BLE) 0xFD90~0xFD94 : BT09 (리조용할 리모컨 - BLE) 0xFDA0~0xFDA4 : BT03 (Smart STB 안구) 0xFDB0~0xFDB4 : BT05 (시리얼로 STB) 0xFDC0~0xFDC4 : BT06 (UHD 이어폰2 - BLE) 0xFDF0~0xFDF4 : BT08 (AI STB - BLE) 0xFE00~0xFE04 : BT09 (리조용할 리모컨 - BLE) 0xFE10~0xFE14 : BA01 (Android 리모컨 - BLE) 0xFE20~0xFE24 : BT10 (AI 2 STB - BLE) 0xFE30~0xFE34 : BT11 (AI 2 STB - BLE) 0xFE40~0xFE44 : BA02 (ATV STB - BLE) 0xFE50~0xFE54 : BA03 (Smart TV 제어) 0xFE60~0xFE64 : BT12 (Smart TV 제어) 0xFE70~0xFE74 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	57	음성 제한	0x02D0	0x02D0	0x07	0x000200			리모컨 제조사별 코드(RS) 0xFE80~0xFE84 : BT07 (UHD 이어폰3 - BLE) 0xFE90~0xFE94 : BT09 (리조용할 리모컨 - BLE) 0xFEA0~0xFEA4 : BT03 (Smart STB 안구) 0xFEB0~0xFEB4 : BT05 (시리얼로 STB) 0xFEC0~0xFEC4 : BT06 (UHD 이어폰2 - BLE) 0xFED0~0xFED4 : BT08 (AI STB - BLE) 0xFEE0~0xFEE4 : BT09 (리조용할 리모컨 - BLE) 0xFEF0~0xFEF4 : BA01 (Android 리모컨 - BLE) 0xFF00~0xFF04 : BT10 (AI 2 STB - BLE) 0xFF10~0xFF14 : BT11 (AI 2 STB - BLE) 0xFF20~0xFF24 : BA02 (ATV STB - BLE) 0xFF30~0xFF34 : BA03 (Smart TV 제어) 0xFF40~0xFF44 : BT12 (Smart TV 제어) 0xFF50~0xFF54 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	58	Btv control mode	0x6999	0x6999	0x07	0x006900			리모컨 제조사별 코드(RS) 0xFF80~0xFF84 : BT07 (UHD 이어폰3 - BLE) 0xFF90~0xFF94 : BT09 (리조용할 리모컨 - BLE) 0xFFA0~0xFFA4 : BT03 (Smart STB 안구) 0xFFB0~0xFFB4 : BT05 (시리얼로 STB) 0xFFC0~0xFFC4 : BT06 (UHD 이어폰2 - BLE) 0xFFD0~0xFFD4 : BT08 (AI STB - BLE) 0xFFE0~0xFFE4 : BT09 (리조용할 리모컨 - BLE) 0xFFF0~0xFFF4 : BA01 (Android 리모컨 - BLE) 0x0000~0x0004 : BT10 (AI 2 STB - BLE) 0x0010~0x0014 : BT11 (AI 2 STB - BLE) 0x0020~0x0024 : BA02 (ATV STB - BLE) 0x0030~0x0034 : BA03 (Smart TV 제어) 0x0040~0x0044 : BT12 (Smart TV 제어) 0x0050~0x0054 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	59	TV control mode	0x6798	0x6798	0x07	0x006700			리모컨 제조사별 코드(RS) 0x0080~0x0084 : BT07 (UHD 이어폰3 - BLE) 0x0090~0x0094 : BT09 (리조용할 리모컨 - BLE) 0x00A0~0x00A4 : BT03 (Smart STB 안구) 0x00B0~0x00B4 : BT05 (시리얼로 STB) 0x00C0~0x00C4 : BT06 (UHD 이어폰2 - BLE) 0x00D0~0x00D4 : BT08 (AI STB - BLE) 0x00E0~0x00E4 : BT09 (리조용할 리모컨 - BLE) 0x00F0~0x00F4 : BA01 (Android 리모컨 - BLE) 0x0100~0x0104 : BT10 (AI 2 STB - BLE) 0x0110~0x0114 : BT11 (AI 2 STB - BLE) 0x0120~0x0124 : BA02 (ATV STB - BLE) 0x0130~0x0134 : BA03 (Smart TV 제어) 0x0140~0x0144 : BT12 (Smart TV 제어) 0x0150~0x0154 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)
	60	TV control mode not	0x6897	0x6879	0x07	0x006800			리모컨 제조사별 코드(RS) 0x0180~0x0184 : BT07 (UHD 이어폰3 - BLE) 0x0190~0x0194 : BT09 (리조용할 리모컨 - BLE) 0x01A0~0x01A4 : BT03 (Smart STB 안구) 0x01B0~0x01B4 : BT05 (시리얼로 STB) 0x01C0~0x01C4 : BT06 (UHD 이어폰2 - BLE) 0x01D0~0x01D4 : BT08 (AI STB - BLE) 0x01E0~0x01E4 : BT09 (리조용할 리모컨 - BLE) 0x01F0~0x01F4 : BA01 (Android 리모컨 - BLE) 0x0200~0x0204 : BT10 (AI 2 STB - BLE) 0x0210~0x0214 : BT11 (AI 2 STB - BLE) 0x0220~0x0224 : BA02 (ATV STB - BLE) 0x0230~0x0234 : BA03 (Smart TV 제어) 0x0240~0x0244 : BT12 (Smart TV 제어) 0x0250~0x0254 : BA03 (Smart TV 제어) * 리모컨 데이터 코드 (D-A)



	Function	Key combination	Press time	Description
Setting mode	1 Unpairing	[*] + [8]	3sec	remove pairing information
	2 Re-Pairing	[*] + [9]	3sec	try pairing after removing pairing information
	3 TV Set (Manual)	[스마트TV] + [외부입력]	3sec	setup your TV with the numbering keys
	4 TV Set (Auto Search)	[스마트TV] + [외부입력]	3sec	setup your TV using CH+ key
	5 TV Set (Grouping)	그룹명 번호키[1~9] + [스마트TV]	3sec	setup your TV with CH+ key in TV group
	6 IR Code Learn	[TV 전원] + [OK]	3sec	BT0507 is not supported
	7 Code Read Out	[스마트TV] + [외부입력]	3sec	press [문장표] after entry setting mode
	8 Change BT-IR mode (BT)	[*] + [1]	3sec	
	9 Change BT-IR mode (IR)	[*] + [2]	3sec	Not-allowed-pairing/sleep-pairing
	10 Factory Default	[*] + [3]	3sec	
	11 Buzzer Test	[*] + [4]	3sec	stop buzzer when press any key
	12 Backlight On/Off	[*] + [5]		On/Off toggle(Default: On). On: LED twice/Off: LED 4-5times tick
	13 Change IR Code mode	[*] + [6]	3sec	Mode 1 <-> Mode 2
	14 Drag Up	[*] + [UP]	Immediately	
	15 Drag Down	[*] + [DOWN]	Immediately	
	16 Drag Left	[*] + [LEFT]	Immediately	see operation scenario
	17 Drag Right	[*] + [RIGHT]	Immediately	
	18 RGB-light-on/turn-off	[H]	3sec	
19 Advanced-Reset	RECALL + LOGO	3sec	BACK to IR mode, OFF to BT mode, after 3sec LED blink 5 times	

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	10
REFORM :			
DECISION : 2021.08.27		RD12E00	65

4. Software Specification (2/12)

SKB Smart TV Control STB RCU RF Protocol

1. BLE Device

RTL8762CKF (Bluetooth v4.2: Single-Mode BLE)

2. BLE Profile & Service

GAP, GATT

HID over GATT Profile

~~Find Me Profile (call RCU) --> included IAS~~

HIDS(HID Service)

Realtek OTA Update Service

~~Voice transmission service --> Realtek mSBC uses HIDS because it is a HOGP type~~

BAS(Battery Service)

DIS(Device Information Service)

~~ATVVS(Android TV Voice Service) - Google Assistant~~

iSet Service - TV auto setup & power/input sync

~~Scan Parameters Service - undecided~~

~~Bond Management Service - undecided~~

IAS(Immediate Alert Service) - call RCU

~~LLS(Link Loss Service) - undecided~~

~~TPS(Tx Power Service) - undecided~~

3. Vendor ID / Product ID

Vendor ID : 0x005D (Realtek)

Product ID : 0x0003(BT12)

4. GAP Appearance Value(Device Class)

0x0180 : Generic Remote Control

5. BD Address

14 4E 34 xx xx xx (14 4E 34 assigned by RemoteSolution)

00 13 7B xx xx xx (00 13 7B assigned by Movon)

40 19 20 xx xx xx (40 19 20 assigned by Movon added)

6. Device Name

BRM_BT12_XXX (BLE)

B : B tv,

RM : RemoteSolution, MM : Movon, UE : UEI

XXX : MAC Address last 3 characters

~~BRM-Audio11 (A2DP)~~

~~B : B tv,~~

~~RM : RemoteSolution, MM : Movon, UE : UEI~~

7. Method of pairing

Just Works

8. Voice feature

NUGU: 120byte mSBC (60bytes transmitted twice, 57+3 byte, 4.2 Extended LE not used.)

9. HID protocol table

* HID Key press & hold code on ATT - Report ID(0x80)

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x18	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Keycode	Usage ID	3byte	

Ex) When [B tv power] key is pressed: 0x00, 0x01, 0x00

When any key is released: 0x00, 0xFF, 0xFF

* HID Consumer Key code on ATT - Report ID(0x03)

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x18	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Keycode	Usage ID	2byte	
4			0x0000	2byte	

Release key code: 0x00 00 00 00

* HID Voice Search code on ATT - Report ID(0x85)

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x18	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Reserved	0x00	1byte	
4		Start voice	0x23	1byte	
5		Keycode 2	0x00	1byte	

Release key code: 0x00 23 FF

* HID Mic Start on ATT - Report ID(0x85)

NUM	Field	Description	Values	Size	Direction
1	Opcode	Write Request	0x12	1byte	STB -> RCU
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Reserved	0x00	1byte	
4		MIC Start	0x26	1byte	
5		Keycode 2	0x00	1byte	

* HID Mic Stop on ATT - Report ID(0x85)

NUM	Field	Description	Values	Size	Direction
1	Opcode	Write Request	0x12	1byte	STB -> RCU
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Reserved	0x00	1byte	
4		MIC Stop	0x27	1byte	
5		Keycode 2	0x00	1byte	

* HID RCU Unpairing on ATT - Report ID(0x81)

NUM	Field	Description	Values	Size	Direction
1	Opcode	Write Request	0x12	1byte	STB -> RCU
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Reserved	0x00	1byte	
4		Unpaired	0x2A	1byte	
5		Keycode 2	0x00	1byte	

* The RCU removes the pairing information of the RCU when it receives the command from the STB.

* Voice data on ATT - Report ID(0xF8)

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x18	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Voice data	0xXX...	120byte	

10. Advertisement data format

GAP ADTYPE FLAG

Discovery Mode: LE General Discoverable Mode | BR/EDR Not Supported

GAP ADTYPE LOCAL NAME

see 6 section

GAP ADTYPE 16BIT COMPLETE

Service: 0x1812(HID)

GAP ADTYPE APPEARANCE

see 4 section

11. Scan response data format

GAP ADTYPE LOCAL NAME

see 6 section

GAP ADTYPE APPEARANCE

see 4 section

12. Connection Parameters

Connection interval(IDLE)	Connection interval(Voice)	Connection interval(OTA)
Minimum: 7.5ms 11.25ms	Minimum: 7.5ms 11.25ms	Minimum: 7.5ms 11.25ms
Maximum: 7.5ms 11.25ms	Maximum: 7.5ms 11.25ms	Maximum: 7.5ms 11.25ms
Slave Latency: 499-133	Slave Latency: 499-133	Slave Latency: 0
Supervision timeout: 10sec	Supervision timeout: 10sec	Supervision timeout: 10sec

13. Advertising interval

		Pairing 시 ADV	
		interval(min/max)	duration
Step1.	undirect	50ms	20s
Step2.	Standby state		
Reconnect 시 ADV_DIRECT			
		interval(min/max)	duration
Step1.	direct (high duty)	1.87ms	1.28s
Step2.	direct (low duty)	30ms	5s
Step3.	direct (idle low duty)	1.5s	계속 (1.5s 간격으로 1 cycle)

*When inserting/removing a battery:

Depending on the paired / un-paired state, the above scheme works.

If paired after RCU cold boot, High duty DIRECT_ADV starts after 12 seconds regardless of whether or not there is a key input.

* When connecting, when entering Any Key during ADV_DIRECT:

Regardless of the current step, if there is a key input, it is immediately executed again from Step1 (high duty ADV_DIRECT).

14. BT key code Interval

BT key press interval: 300ms (continuous key), 80ms (normal key)

BT release key code: 30ms

15. DIS(Device Information Service)

Property	Value	Value(ex: RS)	Value(ex: Movon)
Serial Number String	Manufacturing date	20210819	20210819
Manufacturer Name String	Manufacturer	RemoteSolution Co.,LTD.	Movon corporation
Model Number String	Model No	BRM_BT12	BMM_BT12
Firmware Revision String	F/W Revision	1.0	1.0
Software Revision String	Rom Patch Revision	1.0.552.8	1.0.552.8
Hardware Revision String	H/W Revision	1.0	1.0
System ID	IEEE 64bit ID(with OUI)	xxxxxxxxFF344E14	xxxxxxxxFF201940

* Serial Number String: The BT chipset MAC is applied to the remote control without the manufacturing date

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4. Software Specification (3/12)

* QuickSet data on ATT - Report ID(0x86)

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1B	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Sequence	0x00 ~ 0xFF	1byte	
4		Data	0xFF....	max	

* QuickSet data on ATT - Report ID(0x86)

NUM	Field	Description	Values	Size	Direction
1	Opcode	Write Request	0x12	1byte	STB -> RCU
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Sequence	0x00 ~ 0xFF	1byte	
4		Data	0xFF....	max	

[i-SET Protocol]

* i-Set Service Class UUID : 0000FFE0-0000-1000-8000-00805F9B34F8

* i-Set Command - UUID : 0000FFE1-0000-1000-8000-00805F9B34F8

NUM	Field	Description	Values	Size	Direction
1	Opcode	Write Request	0x12	1byte	STB -> RCU
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Command	0x00: i-Set Stop	1byte	
			0x01: i-Set Start		
			0x02: STB screen off		
			0x03: STB screen on		
			0x04: i-Set Get TV code		

* i-Set Command Response - UUID : 0000FFE1-0000-1000-8000-00805F9B34F8

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1b	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Result	0x00: NG 0x01: OK	1byte	
4		Error code	0x00: ISET_ERROR_NONE 0x01: ISET_ERROR_CODE_TIMEOUT 0x02: ISET_ERROR_CODE_CHKSUM_ERROR 0x03: ISET_ERROR_CODE_INVALID_COMMAND 0x04: ISET_ERROR_CODE_INVALID_EDID_FORMAT 0x05: ISET_ERROR_CODE_UNKNOWN_VENDOR 0x06: ISET_ERROR_CODE_IDENTICAL_VENDOR 0x07: ISET_ERROR_CODE_INVALID_EDID_LENGTH 0x08: ISET_ERROR_CODE_UNKNOWN_DEVICE 0x09: ISET_ERROR_CODE_NONE_SEQ_ORDER	1byte	
5		TV	Set Type 0x00: ISET - only assigned when i-Set TV setup is OK 0x01: Manual(digit or autosearch) 0x02: IR Learning	1byte	
6		Code	0x0000 ~ 0xFFFF(TV set No) eg: Set No is 320 0x01 0x40	2byte	

* i-Set EDID Data - UUID : 0000FFE3-0000-1000-8000-00805F9B34F8

NUM	Field	Description	Values	Size	Direction
1	Opcode	Write Command	0x52	1byte	STB -> RCU
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	EDID Parameters	0x00 ~ 0xFF	256byte	

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4. Software Specification (4/12)

SKB Android STB RCU Operation Scenarios

BT mode: BLE connected, IR mode: BLE disconnected

Bluetooth pairing scenario (BLE + A2DP)

1. In the unpairing state, pressing any key(excluded key: TV전원/통합전원/TV음량+/-,외부입력) on the remote control will transmit the pairing st
~~Or, when the ear jack is inserted (battery voltage>= 2.4V), it transmits the pairing IR code.~~
2. After transmitting the IR code, the remote control enters Advertising Mode and switches to the pairing mode.
3. In Advertising Mode, LED blinks at 1s (ON: 250ms, OFF: 750ms) cycle.
-Ignore entering the setting mode by voice search and key combination during pairing (however, unpairing and repairing are supported)
4. When the IR Trigger Code is received from the STB, it searches for Bluetooth devices and tries to pair with the remote control BLE.
5. After BT pairing is completed, CSR8630 (after Audio BT) of the remote controller enters Discovery Mode and switches to pairing mode.
6. After pairing BT in STB, search for additional Bluetooth devices and try to pair with Audio BT.
7. When the audio BT is successfully paired with the remote control, LED Blink 5 times at 200ms (ON: 100ms, OFF: 100ms) cycle.
8. The remote controller ends Advertising after 20 seconds in BLE Advertising mode. And, Audio BT Discovery does not.
9. After 30 seconds in the Audio BT Discovery mode, the Discovery mode is terminated, and BT Unpair is completed and the pairing scenario en
10. LED OFF when pairing fails

Bluetooth pairing reset (Unpairing) scenario

1. Press the [*] + [Home] keys for 3 seconds
2. When BT Unpair is completed normally, LED blinks 5 times quickly (ON: 100ms, OFF: 100ms)
→ When BT Unpair is completed normally, Power Off Audio BT
→ Audio stream if connected, disconnect and proceed with Unpair

Bluetooth re-pairing scenario

1. Press the [*] + [#] keys for 3 seconds
2. If BT is connected, RCU performs disconnection
3. Store the BT pairing information in the temporary area, and delete the pairing information related to the BT stack.
4. Start BT pairing(always new pairing)
5. When pairing fails, the pairing information in the temporary area is resorted to the pairing area of the BT stack.

Operation scenario when not paired

1. Regardless of whether pairing is successful, all keys except voice search key operate as IR.
2. Attempt pairing when performing the following operation.
 - 2-1. Any Key(excluded key: TV전원/통합전원/TV음량+/-,외부입력) is pressed
 - 2-2. Enter [*] + [#] for 3sec
 - 2-3. Insert ear jack (battery voltage>= 2.4V)

Operation scenario when paired

1. TV key (TV전원 / TV음량+/- / 외부입력) operates irrespective of whether pairing is successful or not.
2. The integrated power key is operated by IR. (B tv + TV)
3. [Btv-전원] key operates by IR.
4. All other keys operate as BT. (But TV전원/통합전원/TV음량+/-,외부입력 key works only with IR)
5. In the case of BT disconnection in pairing state, all keys operate as IR.
- 5-1. However, re-pairing is performed when the voice (NUGU) or [G/A] key is pressed. (Same operation as pressing the [*] +[#] keys for 3 seconds)

All power operation scenario

1. When the [통합전원] key is pressed, it is output in the following order.
Btv power code -> TV power code (toggle, discrete, learning) -> RCU version code --> iSet Macro (optional)
 2. TV power code classification
 - 2.1 Toggle: When the TV power code is toggled during manual setting or iSet setting
 - 2.2 Discrete: When the TV power code is discrete by the iSet setting
 - 2.3 IR learning: In case of learning IR on the [TV전원] button
 3. iSet Macro
 - 3.1 Output when iSet is set and TV's input code is discrete code
- * If iSet is wroked, see Section 4 of the "iSet Operation Scenario" sheet.
1. When iSet is not set
 - 1-1. Btv Power Code -> Break Code -> TV Code -> RCU Ver Code
RCU ver information can be transmitted by DIS (Device Information Service). RCU Ver code is reviewed for deletion (TBD).
 - 1-2. Default TV Code: Samsung, LG batch code transmission
 2. When setting iSet
 - 2-1. Btv Power Code -> RCU Ver Code -> iSet linkage operation -> iSet TV power supply code (ON or OFF)
RCU ver information can be transmitted by DIS (Device Information Service). RCU Ver code is reviewed for deletion (TBD).
 - 2-2. Determine if a trigger code is required for iS operation (TBD)
 - 2-3. Send TV Code when BT connection is disconnected
Code output sequence: Btv power -> RCU ver -> iS TV power (toggle)
 - 2-4. Even when changing from BT mode to IR mode, iSet linkage operation
- * DIS is not used in the integrated power supply scenario, and will be used for other purposes (compared to eta version) in the future.
3. When the TV is powered by IR learning
 - 3-1. Use the last set setting.
 - 3-2. Ex) If IR learning is done at the end, the value is also used for integrated power supply; iSet MACRO is not used.

Battery information transmission scenario

1. Battery level transmission when the [home] key is pressed (in BT mode, BT / IR mode, IR code)
2. Detect voltage range: 1.8V ~ 3.2V divided into 3 levels (Empty / Low / Normal)
 - 2-1. Normal: 2.4V or more-green LED
 - 2-2. Low: More than 2.2V ~ less than 2.4V-red LED
 - 2-3. Empty: less than 2.2V-red LED
3. Battery level transmission when BT Connect (Pairing or Reconnecting)
 - 3-1. Battery level means key code (Normal, Low, Empty)
4. After RCU booting, after about 40ms after any key release, transmit the battery status (3 step code).
 - 4-1. However, the [통합전원], [TV 전원], [TV 음량+/-], [외부입력], [Home], [MIC], [GA](BA03) keys are excluded from this operation.
 - 4-2. Battery information is not transmitted for key release that occurs after entering pairing mode.
 - 4-3. After the key is released, it is applied up to 10 times based on the battery information transmission.

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4. Software Specification (5/12)

- (If key input occurs before sending the battery information code, the input key code output is given priority.)
- 4-4. If BT is connected 10 times (battery code) before and battery information is transmitted, battery information is not transmitted for the key release that occurs thereafter.
5. Battery voltage should be transmitted in level [%] and follow BAS specification.
- 5-1. 1.8 V or less: 0%
- 5-2. 3.2V or higher: 100%
- 5-3. The voltage between the above voltages is converted as a percentage.

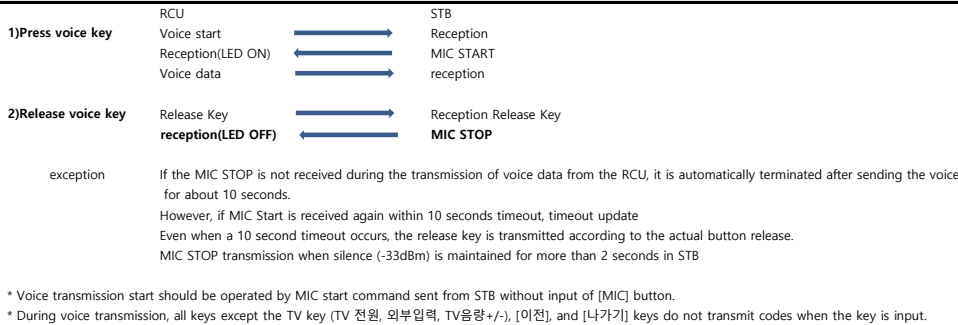
RCU Low Battery operation scenario

- Low Voltage: 2.2V or more ~ less than 2.4V
- RED LED ON when key code is transmitted at low voltage
- No change in BT / IR mode
- Restrict audio-BT (Streaming) operation at low voltage (maintain while streaming is in progress)
- After inserting the ear-jack, the low voltage battery level code is output (usage limit pop-up display), (in BT mode in BT / IR mode in IR code)
- OTA upgrade restrictions

RCU Empty Battery operation scenario

- Empty Battery: Less than 2.2V
- RED LED ON when key code is transmitted during empty voltage
- BT / IR mode maintenance
- AD2P operation restriction (STOP during use), Empty Battery Code output when earphone is inserted
- When the voice search key is input, the empty battery code is output. Do not transmit Mic Start
- Empty Battery Code output when pairing is attempted. No pairing code sent
- No cut-off voltage. Operates in empty until the battery runs out

Voice Transmission operation scenario



Drag Mode

- When the [문자지움] key + four-way key is combined, drag works as the four-way key (response to drag operation to use the web browser)
- In the process of entering the first drag mode, no break code is transmitted when one key is input while another key is input.
- For BT mode / IR mode key code definition, refer to the special key code in the CodeTable sheet.
- < Android key value of drag mode >
- | Key Name | Scancode | Android Keycode |
|------------|----------|-------------------|
| Drag Up | 0x136 | KEYCODE_BUTTON_L1 |
| Drag Down | 0x137 | KEYCODE_BUTTON_R1 |
| Drag Left | 0x138 | KEYCODE_BUTTON_L2 |
| Drag Right | 0x139 | KEYCODE_BUTTON_R2 |
- When any one key is released after key combination, code transmission stops without sending break code.
 - When drag key combination again, send the corresponding key code (drag mode up / down / left / right)

BLE/IR Mode change operation scenario

- This concept is different from IR transmission when unpaired or disconnected.
- Factory Default: BLE mode.
- How to switch modes
- BLE mode: [*] + [1] BLE mode when input for 3 seconds. LED 2 times Blink (ON: 250ms, OFF: 250ms)
- IR mode: [*] + [2] IR mode switching when input for 3 seconds. LED 4 times Blink (ON: 250ms, OFF: 250ms)
- IR mode operation
- IR transmission when a button is pressed. However, when the [Microphone] button is pressed, the voice is transmitted.
- BT connection must be maintained and attempted to reconnect (Find Me)
- When BT connection is made by attempting pairing by unpairing or repairing, it automatically switches to BT mode (maintains the previous mode in case of failure)
- BLE mode operation
- Includes all operation scenarios except IR mode operation.
- Maintains mode information during POR / repair.

Find me(Call RCU) operation scenario

- Using IAS (Immediate alert level service)
- Buzzer Well: See Buzzer Spec
- Backlight: Backlight is on while the buzzer is ringing in normal battery condition
- Buzzer sound output time: 1 minute
- Abort when inputting any button. (Output when the button is input)
- ~~Stopped buzzer sound when combining / disengaging earjack~~
- Periodic connection attempt is required in disconnected state. (TBD)
- After BT disconnection due to STB shutdown or link loss, the remote controller attempts to connect every 1.5 seconds.
- At this time, the average standby current consumed should be similar to the BT connection state.
- [*] + [4] Buzzer sound confirmation function when input for 3 seconds (test mode)

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4. Software Specification (6/12)

Factory Default operation scenario

Factory default function by 2 key combination

[*] + [3] Input for 3 seconds

Initializes pairing information, TV setting information, BLE / IR mode information, iSet, IR learning contents, and manual setting of backlight On / Off.

-LED blink is processed in the same way as unpairing.

OTA mode

1. When requesting the battery level (BAS) of the OTA app, the remote control sends the battery level [%] value to the STB.

-STB executes OTA only when the battery level of the remote control is 2.4V or higher.

-STB shows a pop-up window indicating that OTA is impossible for other battery levels.

~~Before upgrading, stop the audio stream.~~

-Before upgrade, turn off the back light.

2. When the OTA is upgraded, the GREEN LED turns on.

~~Blink time may change later~~

3. LED operation for OTA result (Judging whether OTA was successful before rebooting after OTA is completed)

-Success: GREEN LED blinks 3 times at 250ms intervals (ON: 250ms, OFF: 250ms)

* When the new f / w version and the old f / w version are different after the upgrade is completed

-Failure: RED LED blinks 3 times at 250ms intervals (ON: 250ms, OFF: 250ms)

* If the new f / w version and the old f / w version are the same after completing the upgrade

* BT connection fails after entering OTA mode

* BT connection is lost when upgrading (Battery removal, STB shutdown)

4. The OTA upgrade image is divided into app code and patch code.

-App code image file name definition by manufacturer

* RS: BRM_BT12_Vx.x_YYYYMMDD.bin

* MOVON: BMM_BT12_Vx.x_YYYYMMDD.bin

-Define patch code image file name (common to manufacturer)

* RTL_Bee2_Patch_Vx.x.x.x.bin

5. OTA image creation uses Realtek MP_PackTool.

* OTA AES256 key define by remote control manufacturer

RS

0x52,0x53,0x5F,0x52,0x44,0x31,0x32,0x45,

0x28,0x53,0x4B,0x42,0x5F,0x42,0x52,0x4D,

0x5F,0x42,0x54,0x31,0x32,0x29,0x5F,0x53,

0x6D,0x61,0x72,0x74,0x54,0x56,0x5F,0x58

MOVON

0x4D,0x4F,0x56,0x4F,0x4E,0x20,0x53,0x4B,

0x42,0x20,0x52,0x43,0x55,0x20,0x42,0x54,

0x31,0x32,0x97,0x0D,0x8E,0xEF,0xC0,0xD3,

0xD1,0x11,0xF6,0x8E,0x10,0x60,0xF8,0x1A

* Remote control manufacturer information

Address: 0x00002A00

Data Length: 8-bytes

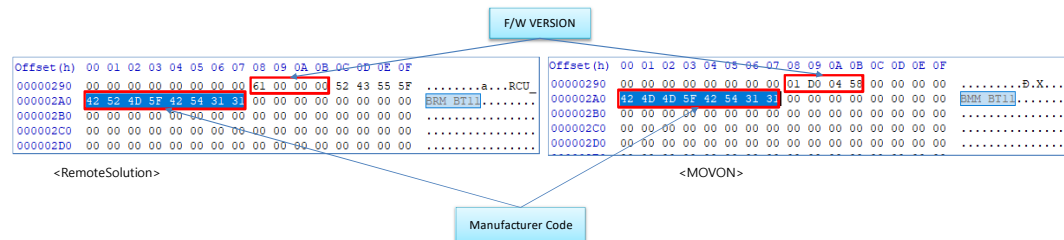
Manufacturer	OTA Manufacturer Code (ASCII)
RemoteSolution	BRM_BT12
Movon	BMM_BT12

* Remote control version information location in RCU f/w

Address: 0x00002908

Date Length: 4-bytes

- It is possible to obtain version information of images loaded from the OTA app.



TV Setup scenario

1. Manual setting

1-1. [스마트TV] + [외부입력] Press simultaneously for 3 seconds-> LED ON

→ TV start code transmission

1-2. 3-digit numeric button input (LED OFF when key input, LED ON when key release)

→ When the 3 digits entered are in the IR DB, the power off code of 3-Frame is transmitted, otherwise, the RED (regardless of battery level) LED is ON for 1 second and then the GREEN LED is ON.

→ However, when 0,0,0 is input, it is set as default (Samsung, LG) and at the same time, 3 times of LED Blink (ON: 250ms, OFF: 250ms), then the setting mode ends.

→ 1-2 ~ 1-3 can be repeated

1-3. Enter the [Play/Pause] key to complete the setting. At this time, LED 3 times Blink (ON: 250ms, OFF: 250ms)

→ TV termination code transmission

* Keys that can be entered except for numeric keys during manual setting

→ [TV전원] key: Sends a TV power off code 3 frame corresponding to a 3-digit number when input.

→ [채널+/-] key: Switch to Auto search mode (search starts from next / previous of the current setting number)

→ When other keys are input, exit the setting mode with output of the TV synchronization end code.

2. Auto Search (full DB search)

2-1. [스마트TV] + [외부입력] Press simultaneously for 3 seconds-> LED ON

→ TV start code transmission

2-2. Enter the [채널+] or [채널-] button.

→ Power off code transmission of 3-Frame (LED is OFF during code transmission, and remains ON when transmission is completed)

→ [채널+]: Power off code transmission of the next setting number

→ [채널-]: Power off code transmission of previous setting number

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- > If the key is continuously input, the next or previous setting number is searched at about 500ms intervals and the power off code is automatically transmitted.
- > Even if the entire IR DB is looped, the search is still possible.
- 2-3. Enter the [Play/Pause] key to complete the setting. At this time, LED 3 times Blink (ON: 250ms, OFF: 250ms)
- ~~TV termination code transmission~~

- * Searchable keys except [채널+] and [채널-]
- > [TV전원] key: Sends the TV Power off code 3 frame of the set number searched when input.
- > Numeric keys: Switch to manual setting mode
- > When other keys are input, exit the setting mode with output of the TV synchronization end code.

3. Group Search (Brand DB search)

- 3-1. [스마트TV] + Press one of [1] ~ [9] keys simultaneously for 3 seconds-> LED ON
- ~~TV start code transmission~~
- 3-2. Enter the [채널+] or [채널-] button.
 - > Power-off code transmission of 3-Frame (LED is turned off during code transmission and keeps ON when transmission is completed)
 - > [채널+]: Power off code transmission of the next setting number
 - > [채널-]: Power off code transmission of previous setting number
 - > If the key is continuously input, the next or previous setting number is searched at about 500ms intervals and the power off code is automatically transmitted.
 - > Even if the IR DB of the group is looped, the search is still possible.
- 3-3. Enter the [Play/Pause] key to complete the setting. At this time, LED 3 times Blink (ON: 250ms, OFF: 250ms)
- ~~TV termination code transmission~~
- * Searchable keys except [CH +] and [CH-]
- > [TV전원] key: Sends the TV Power off code 3 frame of the set number searched when input.
- > When other keys are input, exit the setting mode with output of the TV synchronization end code.

- * The power-off code of the 3-Frame that is output when setting may differ depending on the TV. If necessary, the power-off code must be output in more than 3-Frame.
- * The waiting time for the setting mode is 15 seconds, and after this time, the setting mode ends with the TV sync code output. At this time, LED is blinked 10 times (ON: 100ms, OFF: 100ms).
- > Keep the previous setting.
- * After completing the setting, iSet integration is not possible.

IR code mode changing

- 1. Mode 1-> Mode 2 switching
 - 1-1. Press [*] + [9] keys simultaneously for 3 seconds
 - 1-2. Completed after 4 LED Blinks (ON: 250ms, OFF: 250ms)
- 2. Mode 2-> Mode 1 switching
 - 2-1. Press [*] + [9] keys simultaneously for 3 seconds
 - 2-2. Completed after 2 LED Blinks (ON: 250ms, OFF: 250ms)
- * IR code assignment after switching IR mode: see CodeTable

Code Read Out

- This function reads the 3 digit TV number set on the RCU.
- 1. Press [스마트TV] + [외부입력] key simultaneously for 3 seconds-> LED ON
- ~~TV start code transmission~~
- 2. Enter [원래메뉴] [편성표]-> LED OFF for about 1 second
- 3. The set 3 digit number indicates LED Blink.
 - > LED Blink time for each digit (ON: 250ms, OFF: 250ms)
 - > LED OFF time between digits: 1 second
 - > Digit "0" blinks 10 times
- 4. After the 3-digit setting number blinks, the TV sync exit code is transmitted.
- * The waiting time for the setting mode is 15 seconds, and after this time, the setting mode is terminated with the TV sync code output. At this time, LED is blinked 10 times (ON: 100ms, OFF: 100ms).
- * Any key input is ignored while this function is being executed.

Back Light operating scenario

- 1. ON condition
 - ON when remote pick-up or buzzer operation
 - ON when any key is input during audio playback (B / light is not ON when picked up)
 - If key input continues, enters OFF mode after 2 seconds
 - OFF when Find me (buzzer) is running (must be OFF even when ON)
- 2. ON time: It remains ON for 2 seconds, and OFF when there is no operation
 - 2 seconds extension when picking up before OFF
- 3. Voltage range: 2.4V or more
 - At a voltage less than 2.4V, it does not turn on even if the pick up or buzzer operates.
- * Detailed specifications: see "Backlight" tab

Stuck Key

- If any key is pressed for a certain period of time, code transmission is restricted to reduce battery consumption.
- 1. When any key is pressed for 2 minutes, the code (IR / BT) transmission is stopped.
- ~~When QS interlock key is input, code transmission stops after 30 seconds~~
- > In case of key combination in drag mode, code is stopped when pressed for 2 minutes.

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4. Software Specification (8/12)

- Link operation after entering Stuck Key mode
 - > ~~LED OFF~~ RED RED ON(OFF when all keys are released)
 - > Back light auto OFF, no reaction when pick up
 - > ~~Automatic shutdown when A2DP working~~
 - > ~~No operation when inserting ear-jack~~

* Find me should work.

BackLight manual ON/OFF setup

You can manually control the On / Off setting of the backlight.
Press [*] + [S] keys simultaneously for 3 seconds

- Backlight ON setting (default)
 - > When the backlight setting is Off, it is changed to the On state.
 - > Completed after 2 LED Blinks (ON: 250ms, OFF: 250ms)
- Set backlight OFF
 - > When the backlight setting is On, it is changed to the Off state.
 - > After 4 LED Blinks (ON: 250ms, OFF: 250ms)

RCU Version Read Out

This is a function to indicate the RCU F/W Version 2 digits as the number of LED blinks.

- Press the [스마트TV] + [외부입력] keys simultaneously for 3 seconds -> LED ON
- [통합전원] input -> LED OFF for about 1 second
- LED Blink indicates the 2-digit (major.minor) version.
 - > LED Blink time by version (ON: 250ms, OFF: 250ms)
 - > LED OFF time between versions: 1 second
 - > Version "0" blinks 10 times

* Setting mode standby time is 15 seconds, and after this time, setting mode is terminated. At this time, blink the LED 10 times (ON: 100ms, OFF: 100ms).

* Any key input while this function is being executed is ignored.

* Example): When F/W version is 1.2

- > LED blinks once
- > LED OFF for 1 second
- > LED blinks twice

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4. Software Specification (9/12)

iSet operation scenario

This function is to set the TV manufacturer code of the remote control automatically by using the EDID information of the TV.

1. Scenario after pairing

- 1.1 After pairing is completed, STB sends power status information to the remote control.
 - * STB power OFF state: STB screen off command (0x02)
 - * STB power ON state: STB screen on command (0x03)The remote control stores the above information in memory and uses it for power and external input sync between STB and TV when the [Integrated Power] and [Btv Power] buttons are pressed.
 - 1.2 STB sends the iSet Start command (0x01) to the remote control and waits for a response from the remote control (0x0100).
 - 1.2.1 The remote control enables zero slave latency to speed up data reception (zero latency disable after success and failure (timeout)).
 - 1.2.2 The remote control has a timeout of 20 seconds after receiving the 0x01 command, in case there is no iSet operation of the STB.
When the timeout ends, the RCU responds with 0x0001.
 - 1.3 After receiving the response (0x0100) of the remote control, STB sends EDID raw data (256 bytes) of the TV to the remote control.
 - 1.3.1 STB is divided into 256 bytes of EDID data to be sent.
 - 1.3.2 After receiving EDID data, the remote controller responds with 0x0100 and restarts the 20-second timer.
 - 1.3.3 Check the received EDID length and if it exceeds 256 bytes, respond with 0x0007, end the 20-second timer, disable zero latency, and terminate the iSet.
 - 1.4 After sending all EDIDs, STB sends the iSet Stop command (0x00) command and ends the iSet task.
 - 1.4.1 The remote control disables the 20-second timer and disables zero slave latency.
 - 1.4.2 Validate some attributes as shown below.
 - * When the data length is less than 128 or the number of extension blocks is greater than 0 and the length exceeds 256
NG response code: 0x0107-> ISET_ERROR_CODE_INVALID_EDID_LENGTH
 - * Header information is wrong (first 8 digits of EDID data)
NG response code: 0x0104-> ISET_ERROR_CODE_INVALID_EDID_FORMAT
 - * When CheckSum is wrong
NG response code: 0x0102-> ISET_ERROR_CODE_CHKSUM_ERROR
 - * If HDMI OUI is wrong
NG response code: 0x0104-> ISET_ERROR_CODE_INVALID_EDID_FORMAT
 - 1.5 If the validity check is completed without abnormality, proceed as follows.
 - 1.5.1 When VID is "0"
- * Send OK response code (0x0005-> ISET_ERROR_CODE_UNKNOWN_VENDOR).
 - * Save VID, PID, HDMI port number in NVM and exit iSet.
- 1.5.2 When VID and PID are searched in EDID TABLE (When the PID of the table is 0xFFFF, only VID is searched)

EDID TABLE example

```
/* Table structure
 * vid[2], pid[2], set_no[2] // ; VID & PID 는 EDID law data 순서로 기재한다.
 * end mark
 */
const byte IR_TV_EDID_TABLE[] = {
    TU_VID(0x4C2D), TU_PID(0x940B), SET_NUM(341), // SAMSUNG(SAM) - LFD TV(옥외 전광판/광고용)
    TU_VID(0x4C2D), TU_PID(0xFFFF), SET_NUM(226), // SAMSUNG(SAM)
    TU_VID(0x1E60), TU_PID(0xFFFF), SET_NUM(227), // LG(LSH)
    TU_VID(0x215A), TU_PID(0xFFFF), SET_NUM(9), // HITACHI(HIT)
    TU_VID(0x2AC3), TU_PID(0xFFFF), SET_NUM(66), // JVC(JVC)
    TU_VID(0x40D9), TU_PID(0xFFFF), SET_NUM(194), // SONY(SHW)
    TU_VID(0x3449), TU_PID(0xFFFF), SET_NUM(95), // PANASONIC(HEI)
    TU_VID(0x5262), TU_PID(0xFFFF), SET_NUM(21), // TOSHIBA(TSB)
```

- In the table above, if SET_NUM is not in F / W
- * Send OK response code (0x0008-> ISET_ERROR_CODE_UNKNOWN_DEVICE).
 - * Save the VID, PID, and HDMI port numbers in NVM (optional) and exit iSet.
- In the table above, if SET_NUM is within F / W
- * Send OK response code (0x0000-> ISET_ERROR_NONE).
 - * VID, PID, and HDMI port numbers are stored in NVM.
 - * LED 3 times Blink (ON: 100ms, OFF: 100ms) and iSet is finished.
- Note: The code of this setting number is used for power and external input synchronization between STB & TV.

- 1.5.3 When VID and PID are not searched in EDID TABLE
 - * Send OK response code (0x0005-> ISET_ERROR_CODE_UNKNOWN_VENDOR).
 - * Save VID, PID, HDMI port number in NVM and exit iSet.
- 1.6 The TV field (3-byte) of the response code is described in detail in Section 6 below.

2. Scenario when TV EDID is changed (TV change or HDMI port change)

Even if the previous EDID data (256 bytes) and the currently read EDID data 1 byte are different
Proceed from Section 1.2 of "Post-Pairing Scenario".
However, if the VID and PID are the same and the HDMI port is changed, there is no LED blink.

3. Scenario after BT reconnection

- After the BT reconnects, the STB sends STB power status information to the remote control as in section 1.1 above.
- * STB power OFF state: STB screen off command (0x02)
 - * STB power ON state: STB screen on command (0x03)
- ~~If the change of EDID is confirmed, follow item 2 above.~~
- After that, the STB sends EDID data to the remote control (always with or without change).

4. Scenario according to STB [Integrated Power] button operation (BT connected state)

When the [Integrated Power] button is input while BT is connected, the TV power (toggle, ON, OFF) code is sent according to the current STB power status.
Also, when it turns ON from STB OFF, it sends TV INPUT code 3 times repeatedly to switch HDMI port to STB.
BT disconnected state is output in the order of STB power cord (IR)-> TV power toggle code-> STB version code (IR).

4.1 Enter the [All Power] button

The remote control checks the existence of the "TV power ON and OFF" code (discrete) in the TV manufacturer's setting number set in the EDID table.

- 4.1.1 When the TV power Discrete code (ON, OFF) is present, send the TV power cord as follows according to the STB power state.
 - STB power ON status: STB power cord (BT/IR) transmission -> TV power OFF code transmission -> STB version code (IR)
 - STB power OFF status: STB power cord (BT/IR) transmission -> TV power ON code transmission -> STB version code (IR) -> MACRO (TV INPUT)
 - * MACRO output order
 - 1. Send TV INPUT code 2 seconds after inputting [Integrated power]
 - 2. Send TV INPUT code 3 seconds after above 1
 - 3. Transmit and terminate the TV INPUT code 5 seconds after the above 2
- * Macro output is available only when the TV INPUT code is discrete (no output when there is no discrete code)

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4. Software Specification (10/12)

* During the TV INPUT code macro output, the LED turns ON.

* If EDID is received during TV INPUT code macro output, macro output is stopped.

4.1.2 Discrete code does not exist

STB power cord (IR)-> TV power toggle code-> STB version code (IR).

4.2 STB screen ON / OFF command reception

Save screen status information from STB

* During TV INPUT code transmission, when TV power OFF code is transmitted, TV INPUT code transmission is stopped.

5. Scenario according to STB [Btv power] button operation

If there is HDMI discrete code regardless of BT connection or not, send the TV INPUT code at the [Btv power] button to synchronize the external input.

5.1 [Btv Power] button input

STB power cord (BT) transmission-> TV INPUT code transmission and termination after 1 second

5.2 The remote control transmits the corresponding code when there is an HDMI discrete code of the set TV.

-No TV INPUT code transmission

6. i-Set Command Response Code "TV" Field Operation Scenario

This is a function to transmit the currently set TV tuning code to the STB, and the type and setting number set in the TV field (3-byte) are loaded.

6.1 When receiving EDID of TV starting with i-Set Start cmd (0x01)

6.1.1 i-Set TV setup OK: "0x00" in TV Type field and synchronized code allocation by EDID in TV code field

TV Type: 0x00

TV Code: 0x0140 (320)-When the TV setting number set to EDID is 320

6.1.2 i-Set TV setup NG: Allocate the last set type (0x01 or 0x02) and tuned code in the TV Type field

Example 1: User manually tuned 350 times

TV Type: 0x01

TV Code: 0x015E (320)

Example 2: When the user has learned (Manual tuning code is 350)

TV Type: 0x02

TV Code: 0x015E (320)

6.2 For STB request: i-Set Get TV code cmd (0x04)

6.2.1 When the remote control receives the above command (0x04) from the STB, it should send a response code within 5 seconds.

6.2.2 "Result" and "Error Code" fields are assigned as 0x01 and 0x00.

6.2.3 The "TV Type" field is assigned one of 0x00 (iSET), 0x01 (Manual), and 0x02 (IR Learning) according to the method in which the TV is tuned.

6.2.4 The "TV Code" field assigns the currently tuned code.

7. 기타

7. Other

7.1 If TV manufacturer code is set manually after iSet setup

* iSet function disable: Operates regardless of STB power status.

7.2 When VID & PID are connected to another TV, iSet setting and STB interlocking operation should be performed.

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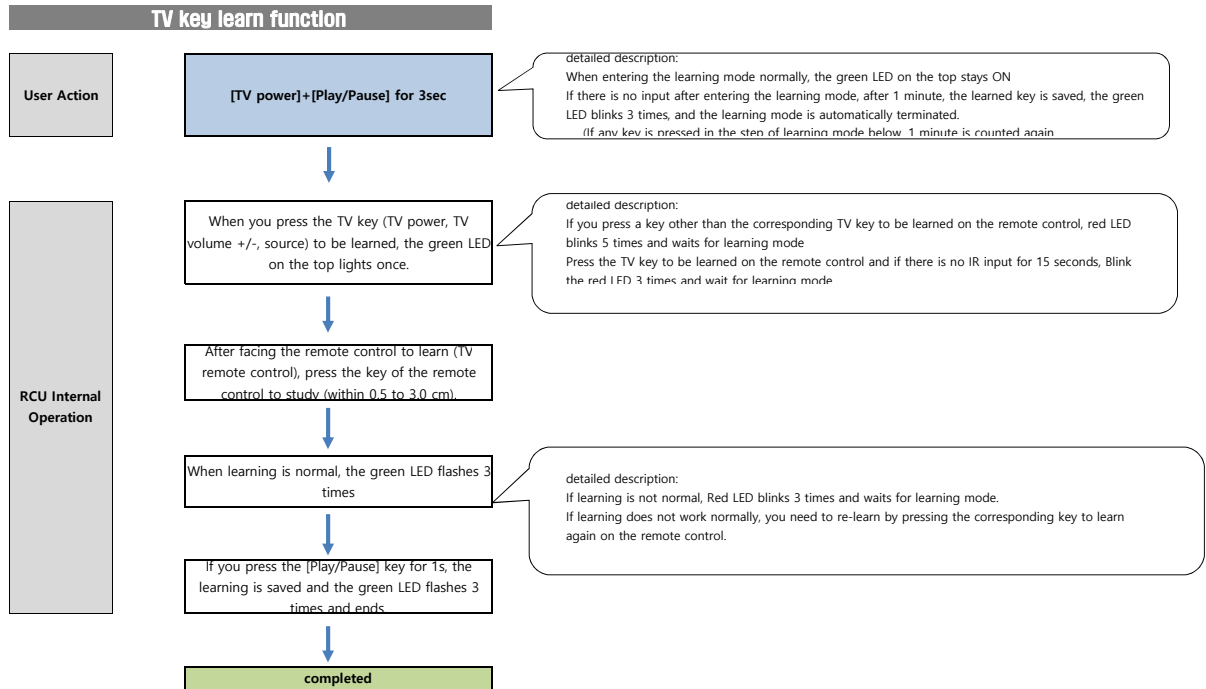
4. Software Specification (11/12)

Smart TV control operation scenario
1. How to switch smart TV control mode 1.1 When the [스마트TV] button is input, the following key code is transmitted and switched at the same time - Smart home (IR) of the synchronized (manual, automatic, learning) TV - Smart TV control mode (IR/BT) - Btv Break code (BT) - BT unconnected status (IR) is not transmitted * Pairing proceeds in unpaired state (no smart TV mode conversion). * If the 'smart home' IR code of the TV does not exist, the 'smart TV control' mode will not be switched. 1.2 Controllable Buttons - Includes TV-only button(s) as well as [이전] and [나가기] buttons. * 12 buttons: [TV전원], [외부입력], [TV음량+/-], 4-way, [Play/Pause], [스마트TV], [이전], [나가기] * The upper button always maintains TV mode in TV control mode. Note: When the external input button is input, the 5-second timer does not run (because it is already in TV mode). * It should be IR learning. 2. How to switch Btv control mode 2.1 [Home] button input - Exit (IR) of the tuned TV - Btv control mode (IR/BT) - Btv Break/Release code (IR/BT) - Btv Home (IR/BT) - Btv Break/Release code (IR/BT) - BT unconnected status (IR) is not transmitted - HDMI discrete code (IR) of the tuned TV after 300ms - Transmitted only when discrete code exists in the state of BT connection and iSet synchronization * If the [Home] button is input after changing to the Btv control mode, the 'Btv Home' key code is transmitted. (No macro transmission) 2.2 Special purpose button input - Apply button: NUGU, GA (BA03), schedule, ZEM kids, shortcut - Transition method: same logic as Btv home button (instead of sending home button, sending the corresponding Btv keycode) 2.3 Btv dedicated button repeat input - Applied buttons: Btv dedicated buttons (numbers (0~9), *, #, favorite channels, channels +/-, REW (Red), FF (Blue), Btv volume +/-, mute) - How to switch . When the target button is repeatedly inputted 3 times within 60 seconds, it switches to Btv mode (same macro as the Btv home button. However, the corresponding key code is transmitted instead of the home key) . Only the corresponding key code is transmitted normally until you enter it twice within 60 seconds. . Input the smart TV control mode target button (see Section 1.2) within 60 seconds, or reset the count 3 times when the last input exceeds 60 seconds 2.4 Enter number + [Play/Pause] button - Apply button: number button (0~9) - How to switch . When the [Play/Pause] button is input after inputting the number buttons (0~9), it switches to Btv mode (same macro as the Btv home button with the [Play/Pause] button key code) . It operates when the [Play/Pause] button is input after entering the number button once, or when the [Play/Pause] button is input after entering the number button twice. (In case of input 3 times, it is changed to Btv mode by operation of section 2.3) 2.5 In case of switching to other Btv control mode - When H/W reset occurs, Btv mode is default. - When [통합전원] is input - In case of TV synchronization (manual, automatic) - Factory reset (including unpairing) 3. Notification while using TV mode 3.1 Transmission of key code (IR/BT) indicating 'TV control mode' - Apply button: 4-way button, [Play/Pause], [이전], [나가기] - Transmission method: When the button is pressed and released, it is transmitted (repeated when the corresponding key is pressed 5 times) - Count is cleared because it is converted to Btv control mode during factory reset. 3.2 Buzzer sound indicating 'TV control mode' - Apply button: numbers (0~9), *, #, favorite channel, channel +/-, REW, FF Buzzer Specification: Refer to 'RCU Smart TV Warning Buzzer Operation Specification' of Buzzer Spec 4. LED Color Operation Scenario 4.1 Btv Control Mode: Green Green is lit even when the TV dedicated button is input 4.2 Smart TV control mode: Blue -> Only the button that transmits the TV code turns blue Green turns on when Btv dedicated button is input 4.3 When the battery voltage is below the low voltage (including empty), Red is always on regardless of the control mode.

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4. Software Specification (12/12)



* However, when low battery, flashing of green LED is replaced with red

Learnable keys: [TV전원], [TV음량 +/-], [외부입력], [UP], [DOWN], [LEFT], [RIGHT], [Play/Pause], [스마트TV], [이전], [나가기]

* In the case of [Play/Pause] key, there is a button for learning and a function to end learning. If it is input for more than 1.5 seconds, the learning mode is terminated.

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5. Part List

5.1 Mechanical List

No.	Part Name	Spec	Q'ty	Maker	비고
1	TOP CASE	ABS HF-0680, K21383(BLACK), SILK1	1	일상전자	
2	BOTTOM COVER	ABS HF-0680, K21383(BLACK)	1	일상전자	
3	BATTERY COVER	ABS HF-0680, K21383(BLACK)	1	일상전자	
4	IR WINDOW	PC SC-1220R, 40697 B(D/RED)	1	일상전자	
5	CH VOL KNOB	ABS HF-0680, K21383(BLACK), SILK1	1	일상전자	
6	INDICATOR LED	PC LD7800, W1020J(MIKY) / TP-1020, LDW542(MILKY)	1	일상전자	
7	SIDE KEY MUTE	ABS HF-0680, K21383(BLACK), SILK1	1	일상전자	
8	SIDE KEY VOLUME	ABS HF-0680, K21383(BLACK), SILK1	1	일상전자	
9	RUBBER KEYPAD	SILICONE, COLOR1(CLEAR), SILK5, SPRAY2, LASER, SF COATING	1	RS HK	
10	METAL DOME SHEET	Φ5DR, 110G, 35KEY	1	제이앤티텍	
11	(+)SPRING	SUS 304 NI-CO Φ0.6	1	대성하이텍	
12	(-)SPRING	SUS 304 NI-CO Φ0.6	1	대성하이텍	
13	COMMON SPRING	SUS 304 NI-CO Φ0.6	1	신광스프링	
14	MESH	MESH, RC56,0.05T	1	알로테크	
15	PE BAG	80X265X0.08T, RECYCLE MARK	1	건아테크	
16	CARTON BOX	553*415*282 (80EA/1Box)	0.0125	대흥포장	
17	BACK LABEL	BOPP,30X42,SILK2	1	탐인쇄	
18	MANUAL	SMILAR PAPER,250X170	1	아침인쇄	
19	LABEL	ART PAPER, 16X4	1	탐인쇄	
20	PASS LABEL	ART PAPER,15X30,SILK2	1	탐인쇄	
21	TAPE	TAPE, RB50	1	제이앤티텍	
22	Alkaline Battery	ALKALINE BATTERY, 1.5V LR6, AA	2	HUATAI BEXEL ROCKET DURACELL	

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5.2 Electronical Part List

No	Components Name	Components Spec	Manufacturer	Quantity	Reference
1	Antenna Chip	ACA3216A1CCS	Inpaq	1	ANT1
2	Buzzer SMD	BM9027S HR-9027BT3S2 KDM-09D-3V BMY-2703	FHD Bosan HS Tech	1	BZ1
3	Electrolytic Capacitor SMD	47UF,16V,±20%,5053	Samhwa Samyoung	1	CE1
4	Ceramic Capacitor Chip	1.2PF,NP0,±0.25PF,1005	MURATA	2	C5,C6
5	Ceramic Capacitor Chip	22PF,C0G,±5%,1005	TDK	1	C2
6	Ceramic Capacitor Chip	100PF,C0G,±5%,1005	Samsung	1	C28
7	Ceramic Capacitor Chip	150PF,X7R,±10%,1005	YAGEO	1	C27
8	Ceramic Capacitor Chip	10NF,X5R,±10%,1005	Taiyo-uden	1	C34
9	Ceramic Capacitor Chip	100NF,10V,X7R,±10%,1005	WALSIN	9	C7,C8,C9,C10,C21,C23,C25,C30,C31
10	Ceramic Capacitor Chip	1UF,X5R,±10%,1005	Darfon	6	C1,C17,C19,C20,C22,C24
11	Ceramic Capacitor Chip	2.2UF,X5R,±10%,1005	samhwa	1	C18
12	Ceramic Capacitor Chip	10UF,6.3V,X5R,±20%,1005	ABCO	10	C11,C12,C13,C14,C26,C29,C32,C33,C35,C36
13	Resistor Chip	0 OHM,1/16W,±5%,1005	YAGEO	3	R1,L1,R4
14	Resistor Chip	2 OHM,1/16W,±5%,1005	TYCO	1	FB1
15	Resistor Chip	2 OHM,1/10W,±5%,1608	Cosmetech	1	R52
16	Resistor Chip	2.7 OHM,1/10W,±5%,1608	Samsung	1	R17
17	Resistor Chip	180 OHM,1/16W,±5%,1005	ROHM	1	R30
18	Resistor Chip	270 OHM,1/16W,±5%,1005	TA-I	5	R41,R46,R47,R48,R49
19	Resistor Chip	300 OHM,1/16W,±5%,1005	WALSIN	1	R9
20	Resistor Chip	330 OHM,1/16W,±5%,1005	PILKCOR	5	R31,R33,R34,R42,R43
21	Resistor Chip	470 OHM,1/16W,±5%,1005	Fenghua	6	R20,R21,R22,R23,R50,R53
22	Resistor Chip	560 OHM,1/16W,±1%,1005	AVX	7	R27,R28,R29,R36,R37,R38,R39
23	Resistor Chip	1K OHM,1/16W,±5%,1005	Murata	1	R16
24	Resistor Chip	2.7K OHM,1/16W,±5%,1005	TDK	1	R56
25	Resistor Chip	4.7K OHM,1/16W,±5%,1005	Taiyouden	3	R2,R3,R5
26	Resistor Chip	10K OHM,1/16W,±5%,1005	Darfon	3	R8,R10,R12
27	Resistor Chip	18K OHM,1/16W,±1%,1005	Eyang	1	R7
28	Resistor Chip	33K OHM,1/16W,±5%,1005	KEMET	1	R19
29	Resistor Chip	47K OHM,1/16W,±5%,1005	Kyocera	2	R11,R15
30	Resistor Chip	82K OHM,1/16W,±5%,1005	Murata	1	R13
31	Resistor Chip	100K OHM,1/16W,±5%,1005	TDK	6	R18,R24,R25,R26,R51,R54
32	Resistor Chip	820K OHM,1/16W,±5%,1005	Sunlord	1	R14
33	Inductor Chip	3.3NH,±0.3NH,1005	INPAQ	1	L2
34	Inductor Chip	3.9NH,±0.3NH,1005	KEXIN	1	C3
35	Power Inductor Chip	PCLS2012-2R2M(2.2UH,1A)	LRC	1	L3
36	Power Inductor Chip	10UH,±10%,2012	PANJIT	1	L4
37	FET N-CH	2KK5009(SOT23) L2N7002SLT1G(SOT23) 2N7002K(SOT23) PIA3430(SOT-23) MMBT7002K(SOT23)	KEC	4	Q7,Q8,Q9,Q10
38	NPN Transistor Chip	FTC8050H(SOT23) MMBT5D123(SOT23) STD123S(SOT23) KST8050(SOT23) SS8050(SOT23)	IMS	6	Q1,Q2,Q3,Q4,Q5,Q6
39	Switching Diode Chip	1N4148WS(SOD323)	Semtech	1	D1
40	Schottky Diode Chip	1KK2104(SOD123) MBR0540W-HAF(SOD123FL) MBR0540T1-D(SOD123) MBR0540(SOD123)	UTC	1	D2
41	IR LED SMD	I BIR-HMC33M-TRC-SIDE(30DEG) IR26-61C-L510-R-2G (30DEG)	Vishay	1	IR1
42	RGB LED Chip	YLS191RGB2206A-C (1616)	First silicon	1	LED1
43	White LED	BL-HZ336G-L8-TRB(WHITE,T4-4J,1608) 27-21/T1D-KPQHY/3C (1608,WHITE)	Bright LED	18	LED2,LED3,LED4,LED5,LED6,LED8,LED9,LED11,LED12,LED13,LED14,LED16,LED17,LED18,LED21,LED22,LED23,LED24
44	Analog Microphone SMD	ZTS6151 AOS3729A-R38-NTM	Everight	1	MIC1
45	Tact Switch SMD	PTS099160(1.6N,R/A) SKRTLAE010(1.6N,R/A)	Hong-Li	4	KB15,KB22,KB28,KB34
46	Photo Transistor Chip	PT12-21B-TR8(SMD,R/A) BPT-HPG33A-TRB	ALPS	1	PT1
47	Bluetooth IC	RTL8762CKF(QFN48)	Bright LED	1	U1
48	Accelerometer IC	LIS2DH12TR(LGA-12) LIS2DE12TR(LGA-12)	Realtek	1	U2
49	Boost Converter IC	SYV7070 TPS61097A-33DBVR IM8132S	STM	1	U3
50	Crystal SMD	40MHZ,±10PPM,9PF,2016 40MHZ,7R40000002_S1,2016	SILERGY	1	X1
51	PCB	RD12E,F(FR-4, 4L,1.2T,OSP,CARBON)	TI	1	

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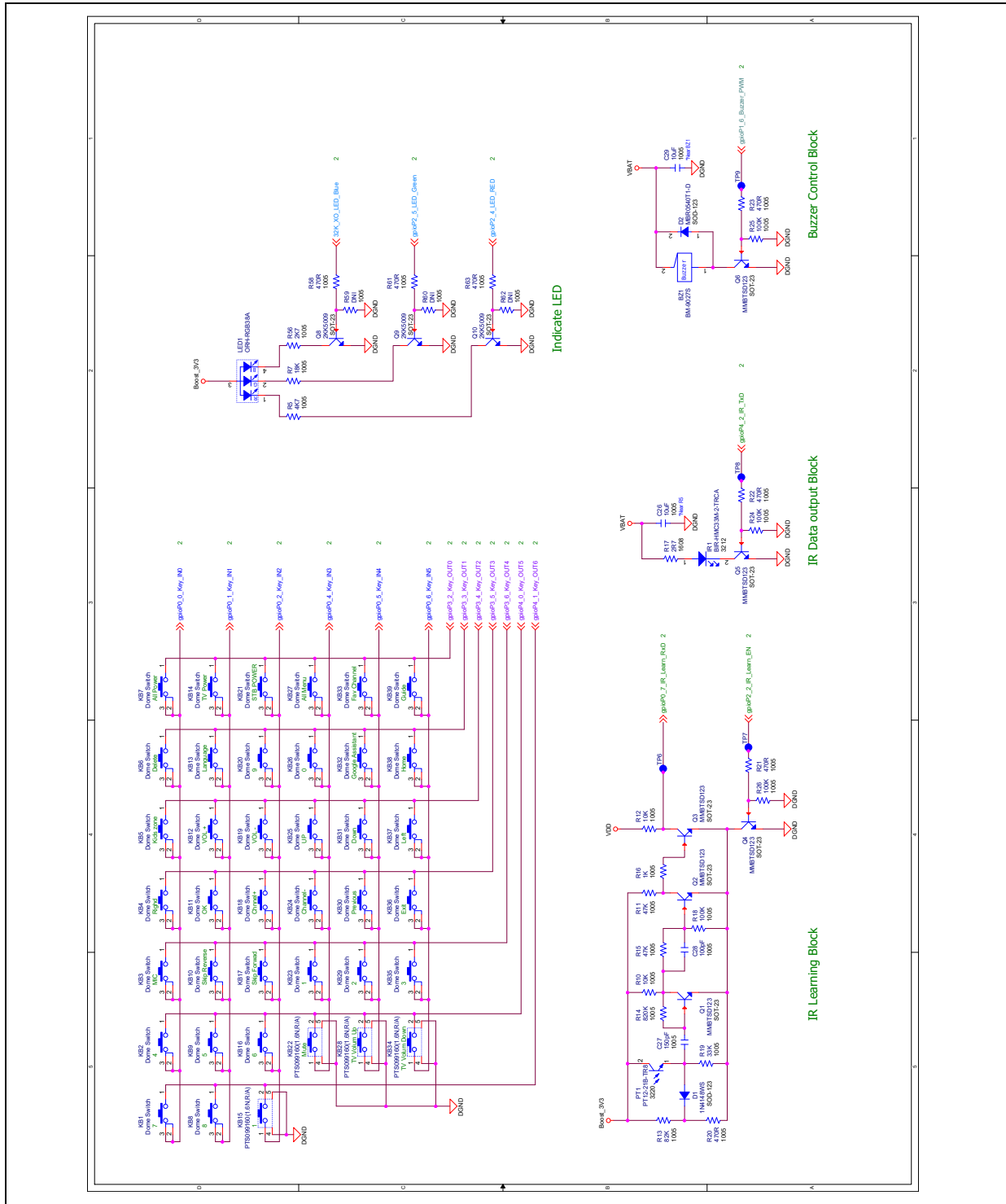
MODEL NO :

RD12E00

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6.2 Keys / IR Learning / IR TxD / Buzzer PART



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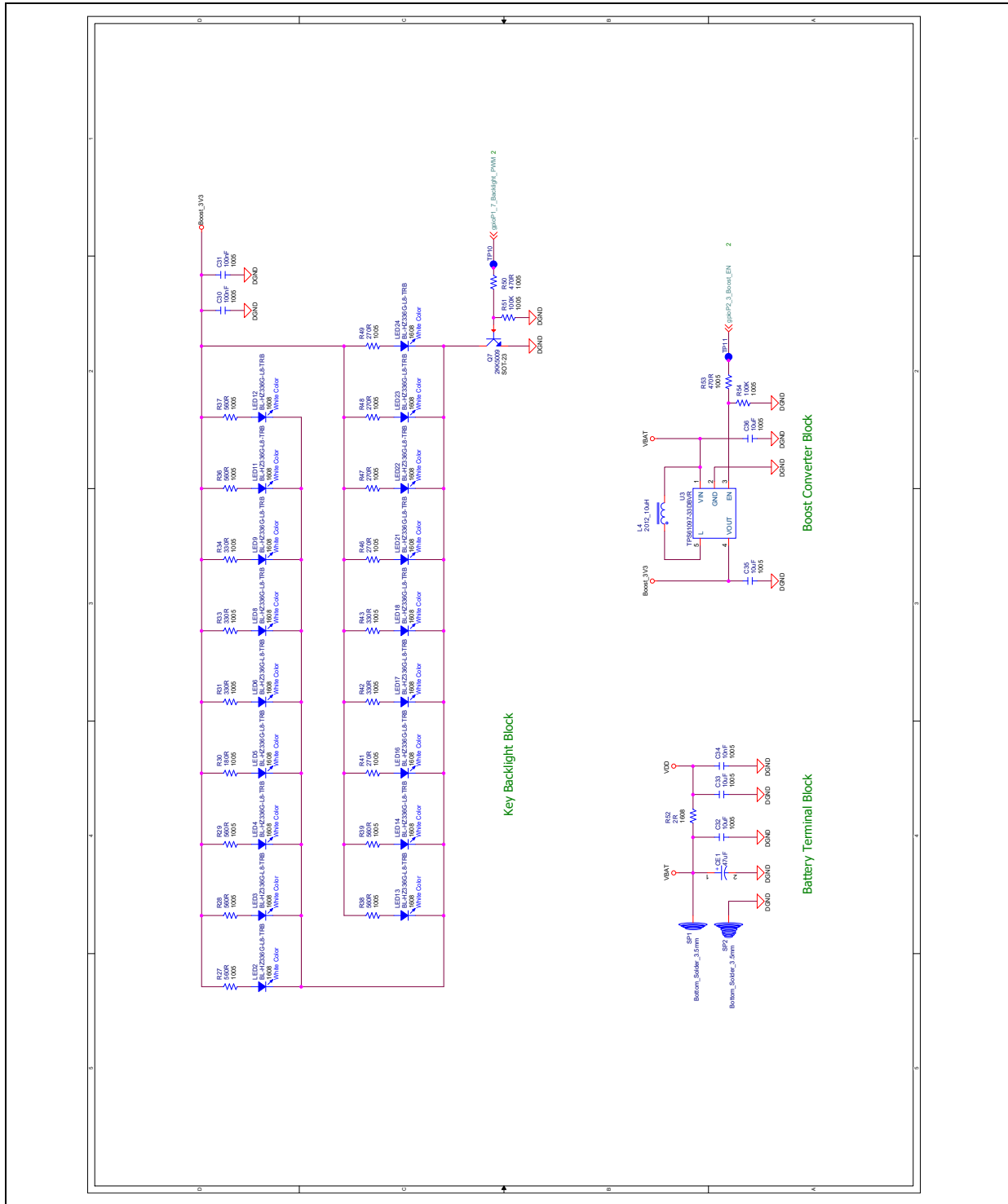
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6.3 Backlight / Battery Terminal Part



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MODEL NO :

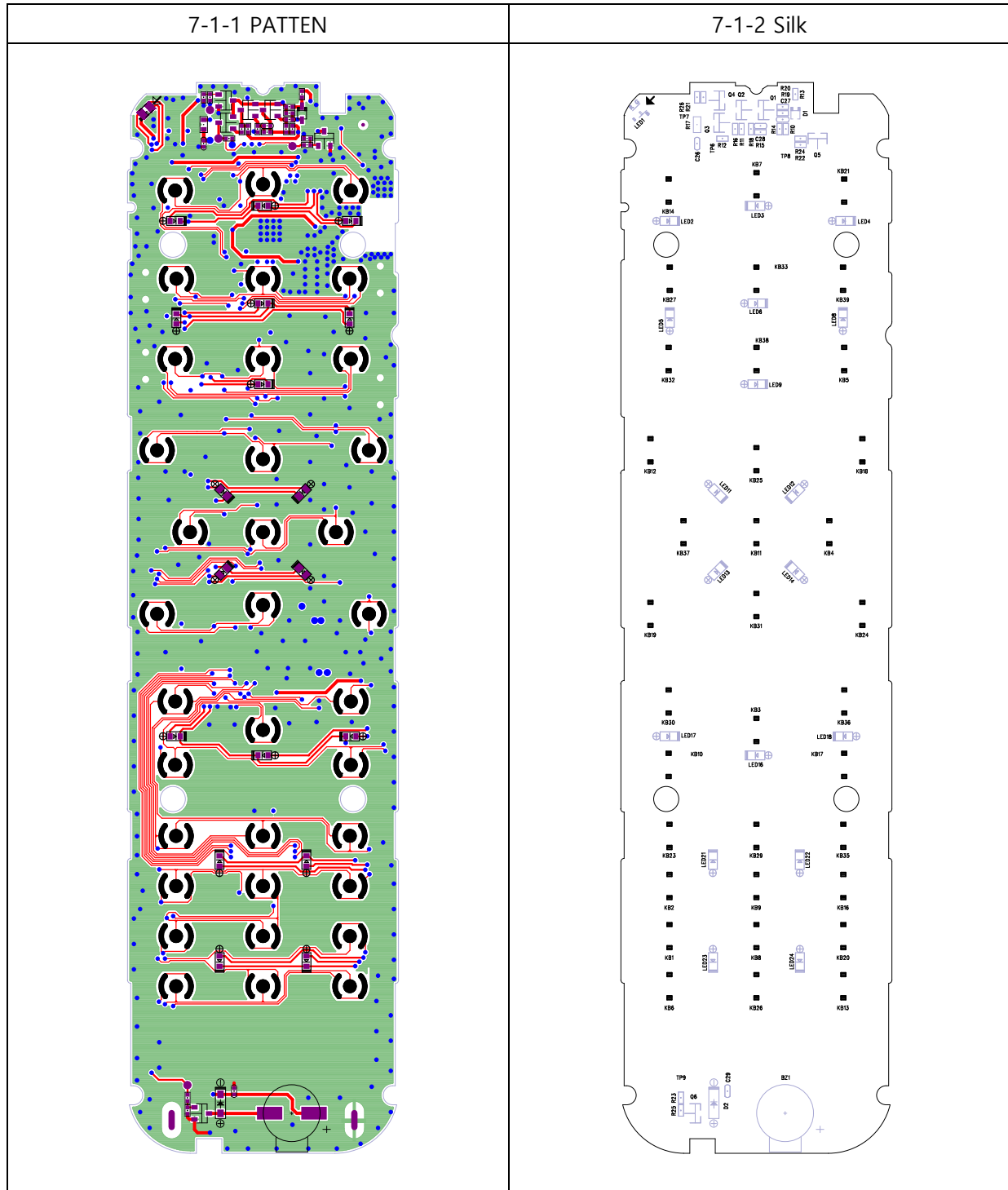
RD12E00

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7. PCB Diagram

7.1 TOP PCB (1/3)



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7.2 BOTTOM PCB (2/3)

7-1-3 PATTEN	7-1-4 Silk

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7.3 MAIN PCB (3/3)

7-1-5 Drill Chart

SIZE	QTY	SYM	PLATED	TOL
0.3	513	+	YES	+/-0.0
0.8 x 3	2	×	YES	+/-0.0
0.5	8	□	YES	+/-0.0
0.8	8	◇	NO	+/-0.0

7-1-6 Main PCB 사양

1) PCB Material : FR4, 4-Layer

2) PCB Thickness : 1.2T

3) Copper Foil Thickness :

- Out Layer 0.5 OZ

- Inner Layer 1 OZ

4) PCB Size

Single - 42.7_mm x 168.8mm

Array – 132.6_mm x _188.85_mm (5 In 1)

5) SilkScreen Color : White

6) PSR Ink Color : Green

7) Surface : OSP

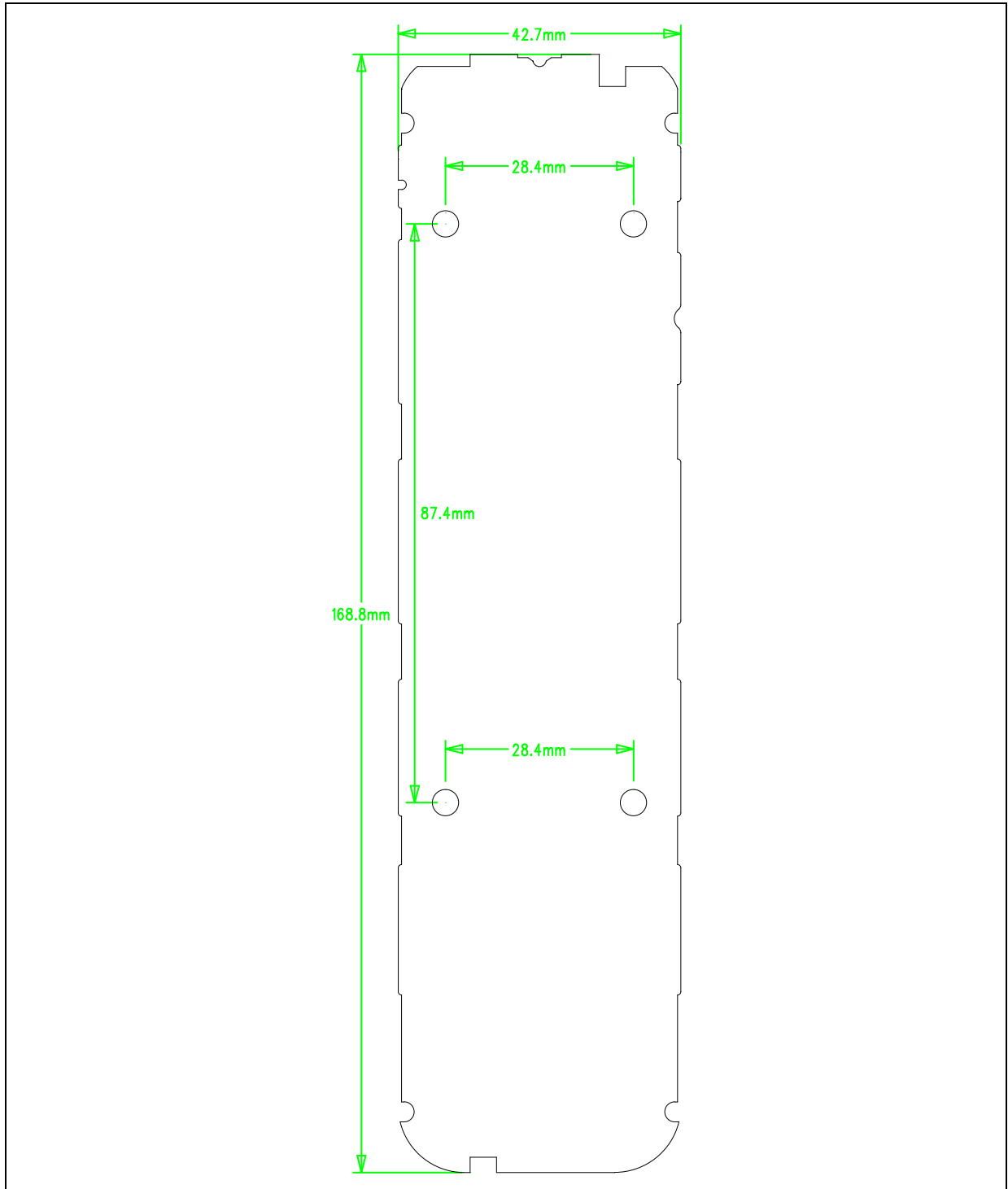
8) Dome Key : Carbon

9) PCB Version : 1BL-3096D

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8. PCB Outline Specification – Main PCB



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9. Design & Mechanical Specification

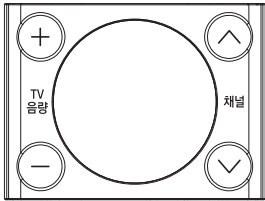
9. Design (1/5) – Mold

DESIGN SPECIFICATION	Model : RD12E00
1. MOLD 1.1 MOLD COLOR * CASE, B/T COVER : ABS, HF-0680, K21383(Black), TEXTURE * COVER : ABS, HF-0680, K21383(Black), TEXTURE & HIGH GROSSY * IR WINDOW : PC, SC-1220R, 40697B(D/Red), HIGH GROSSY 1.2 SILK COLOR * COOLGREY 3C	

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	31
REFORM :			
DECISION : 2021.08.27		RD12E00	65

9. Design (2/5) – KNOB

DESIGN SPECIFICATION		Model : RD12E00
 CH/VOL KNOB  SIDE KNOB		
2.KNOB		
2.1 MOLD COLOR * ABS, HF-0680, K21383(Black), TEXTURE	2.2 SILK COLOR * COOLGREY 3C	

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	32
REFORM :			
DECISION : 2021.08.27		RD12E00	65

9. Design (3/5) – RUBBER

DESIGN SPECIFICATION		Model : RD12E00
3.1.1	P/T 7619C(RED) P/T 7724C(GREEN) P/T 660C(BLUE) BLACK TV 전원 바로가기 신호채널 편성표 이전(○) 나가기 1. 2. 3. 4. 5. 6. 7. 8. 9. 문자 ← 자음 * 0 문자 가/나 변환 #	
ALL BACK LIGHTING		

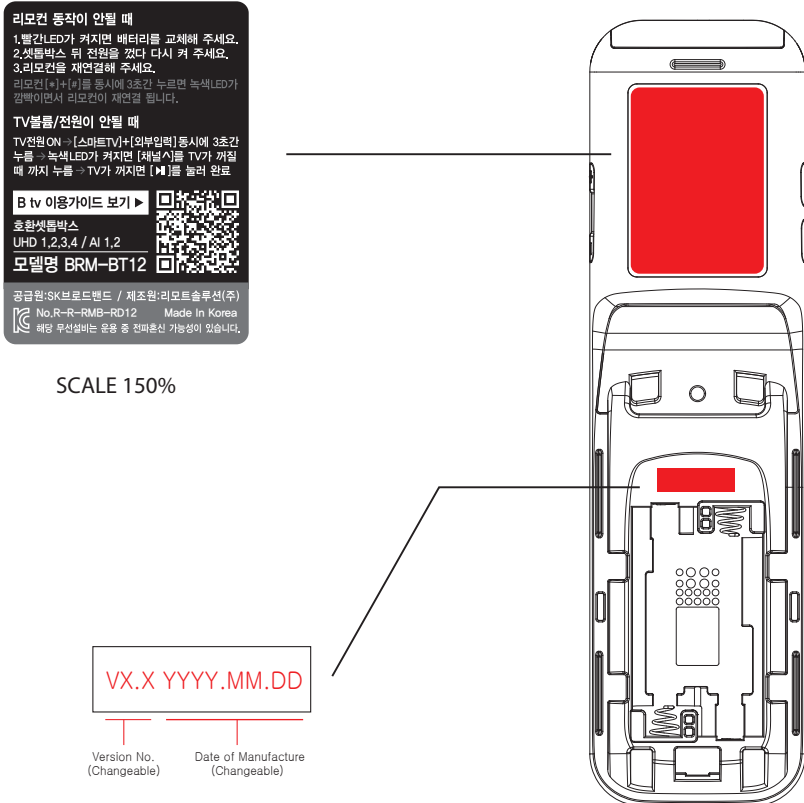
3.RUBBER	
3.1 RUBBER COLOR 3.1.1 P/T 1205C 3.1.2 OTHER TRANSLUCENCE WHITE	3.2 SPRAY & SILK COLOR COOLGREY 3C SPRAY SILK-7619C,7724C,660C,BLACK BLACK SPRAY LASER ETCHING SOFT COATING

- 3 -

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	33
REFORM :			
DECISION : 2021.08.27		RD12E00	65

9. Design (4/5) – LABEL

DESIGN SPECIFICATION		Model :RD12E00
 리모컨 동작이 안될 때 1.빨간LED가 켜지면 배터리를 교체해 주세요. 2.셋톱박스 뒤 전원을 껐다 다시 켜 주세요. 3.리모컨을 재연결해 주세요. 리모컨 [⏻] + [⏻]을 동시에 3초간 누르면 녹색LED가 깜빡이면서 리모컨이 재연결 됩니다. TV볼륨/전원이 안될 때 TV전원 ON → [스마트TV] + [외부입력] 동시에 3초간 누름 → 녹색LED가 켜지면 [채널시]를 TV가 꺼질 때 까지 누름 → TV가 꺼지면 [M]을 눌러 완료 B tv 이용가이드 보기 ▶  홍원샘플박스 UHD 1.2.3.4 / AI 1.2 모델명 BRM-BT12 공급원:SK브로드밴드 / 제조원:리모트솔루션(주) No.R-RMB-RD12 Made In Korea 해당 무선설비는 운용 중 전파혼신 가능성이 있습니다. SCALE 150% VX.X YYYY.MM.DD Version No. (Changeable) Date of Manufacture (Changeable)		
4.BACK LABEL	5.VERSION LABEL	
4.1 Material : White Bopp 4.2 Size : 30 X 42mm(±0.1mm) 4.3 Silk Color : Black, P/T 422C 4.4 Coating : Matte Laminating	5.1 Material : Art Paper 5.2 Size : 16 X 4mm(±0.1mm) 5.3 Silk Color : Black	

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	34
REFORM :		RD12E00	65
DECISION : 2021.08.27			

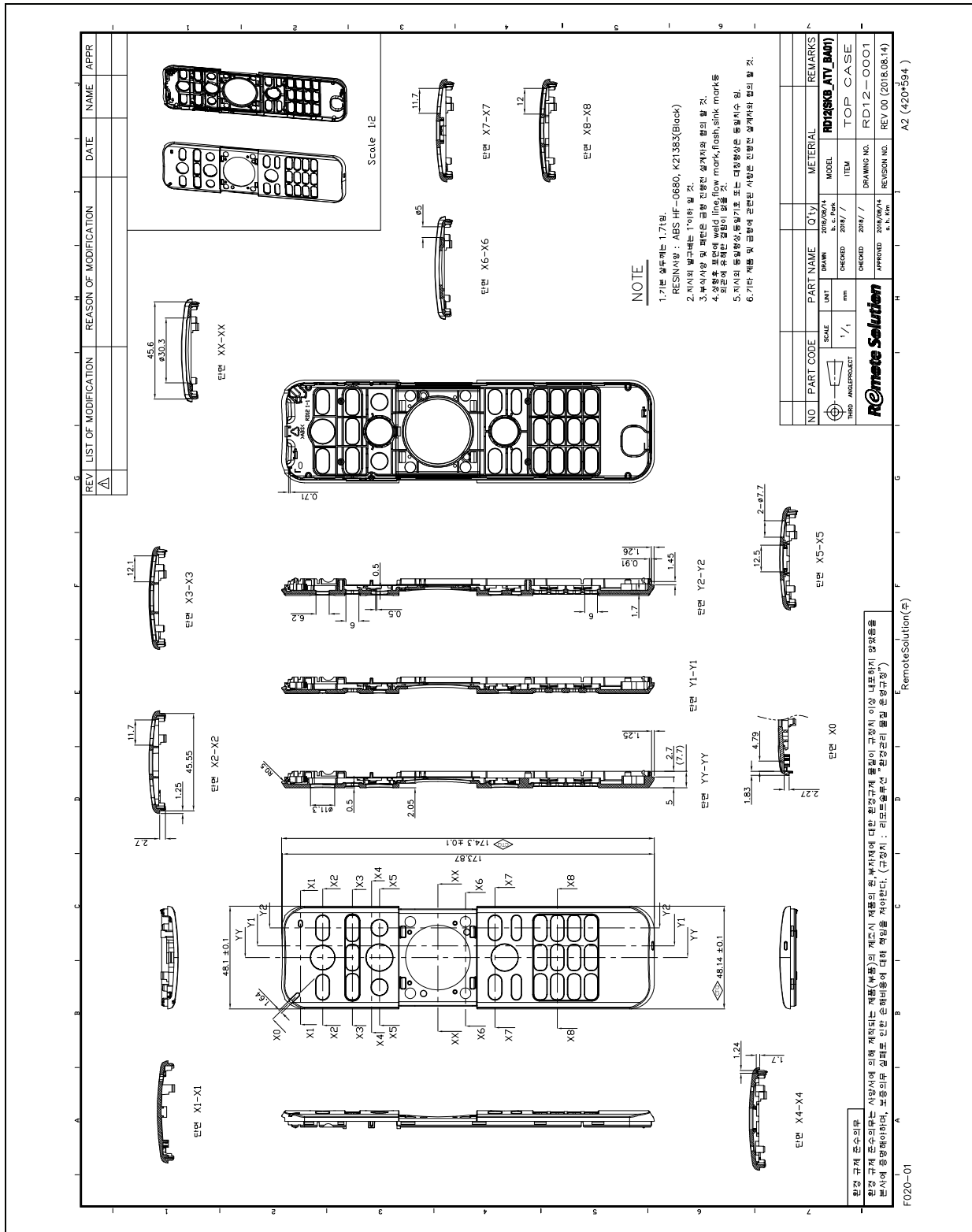
9. Design (5/5) – MANUAL

DESIGN SPECIFICATION		Model : RD12E00
Passed Label		
RS PASSED KWONYB		
간단한 문제 해결하기 ※ 아래 방법으로 문제가 해결되지 않으면 고객센터로 문의해 주세요. (고객센터 1599) ▶ 리모컨 사용 지침서지 읽기(1599) 리모컨 사용 지침서지에는 리모컨의 사용법, 주의사항		

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	35
REFORM :			
DECISION : 2021.08.27		RD12E00	65

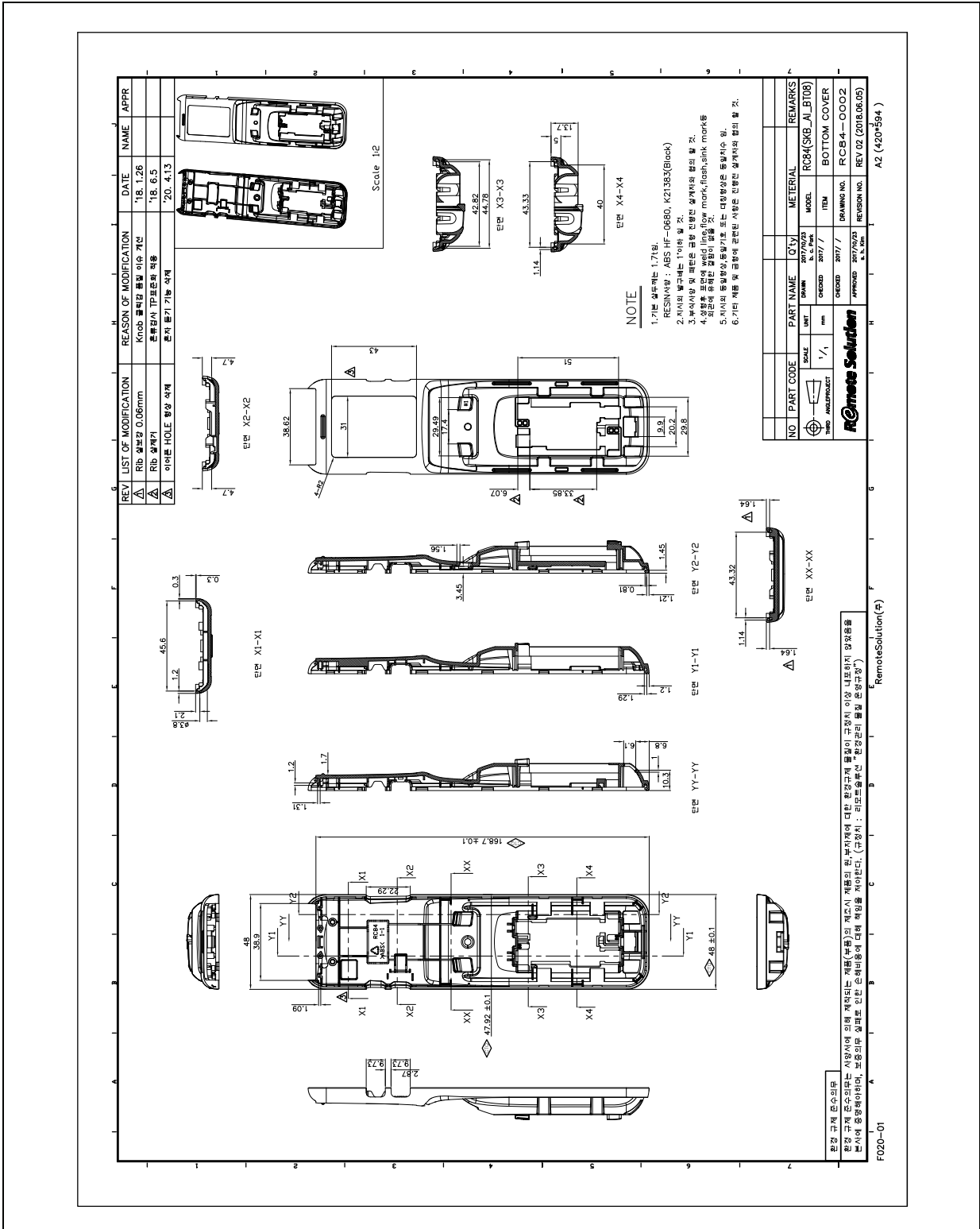
10. Mechanical Spec (1/15) – TOP CASE



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	36
REFORM :		RD12E00	65
DECISION : 2021.08.27			

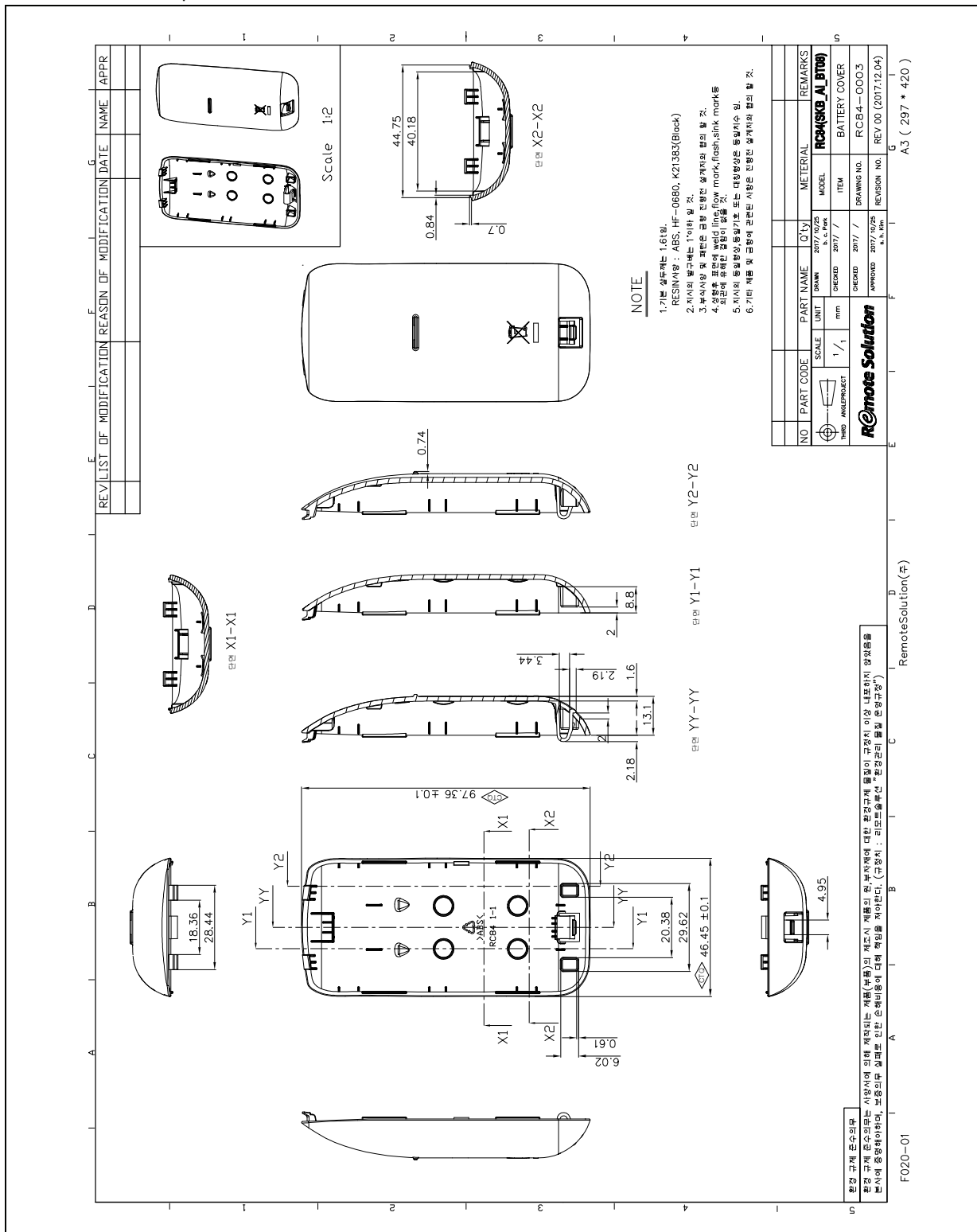
10. Mechanical Spec (2/15) – BOTTOM COVER



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	37
REFORM :			
DECISION : 2021.08.27		RD12E00	65

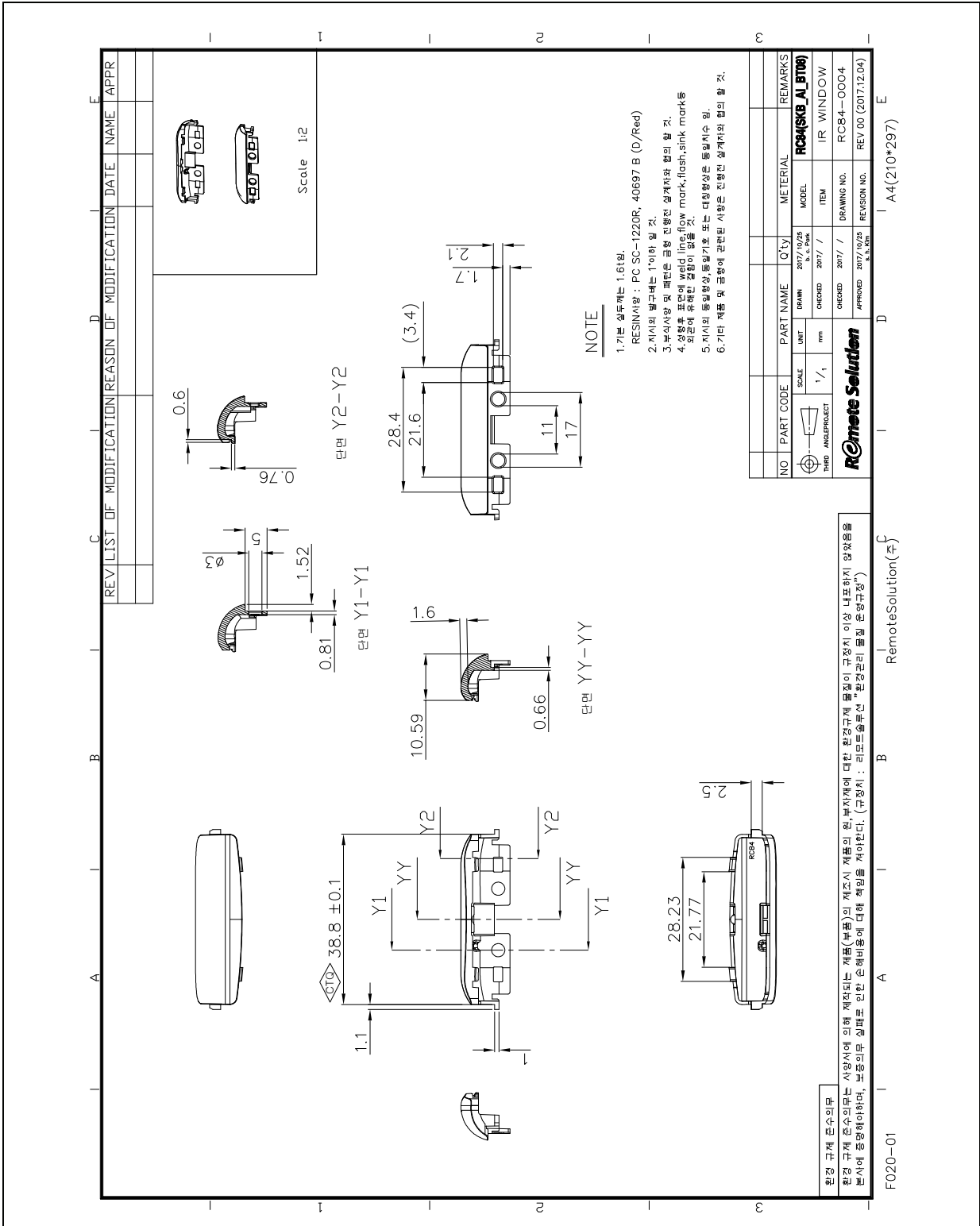
10. Mechanical Spec (3/15) – BATTERY COVER



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	<u>SPECIFICATION</u> (TRANSMITTER REMOCON)	MODEL NO :	38
REFORM :		RD12E00	
DECISION : 2021.08.27			65

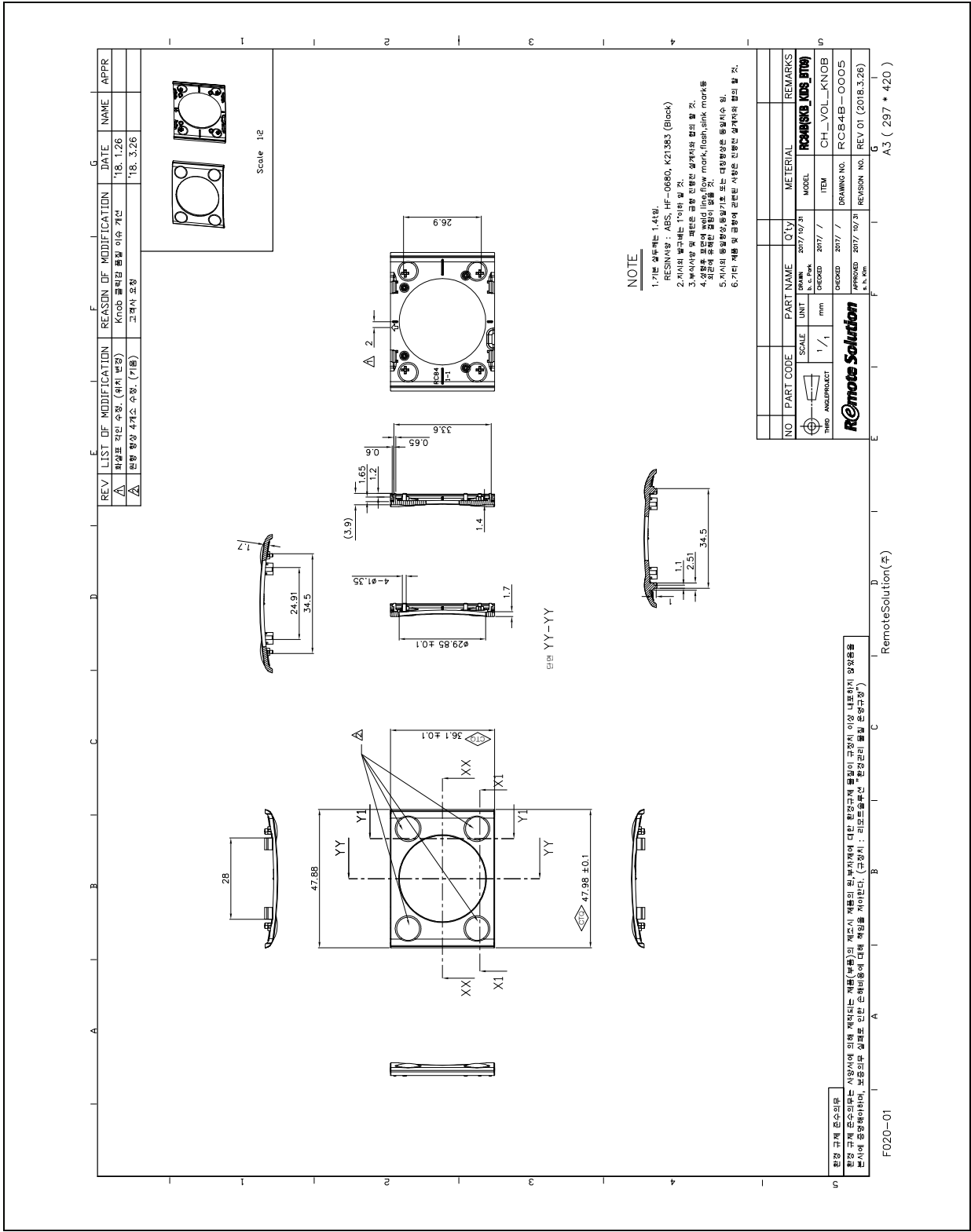
10. Mechanical Spec (4/15) – IR WINDOW



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	39
REFORM :			
DECISION : 2021.08.27		RD12E00	65

10. Mechanical Spec (5/15) – CH , VOL KNOB



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	40
REFORM :			
DECISION : 2021.08.27		RD12E00	65

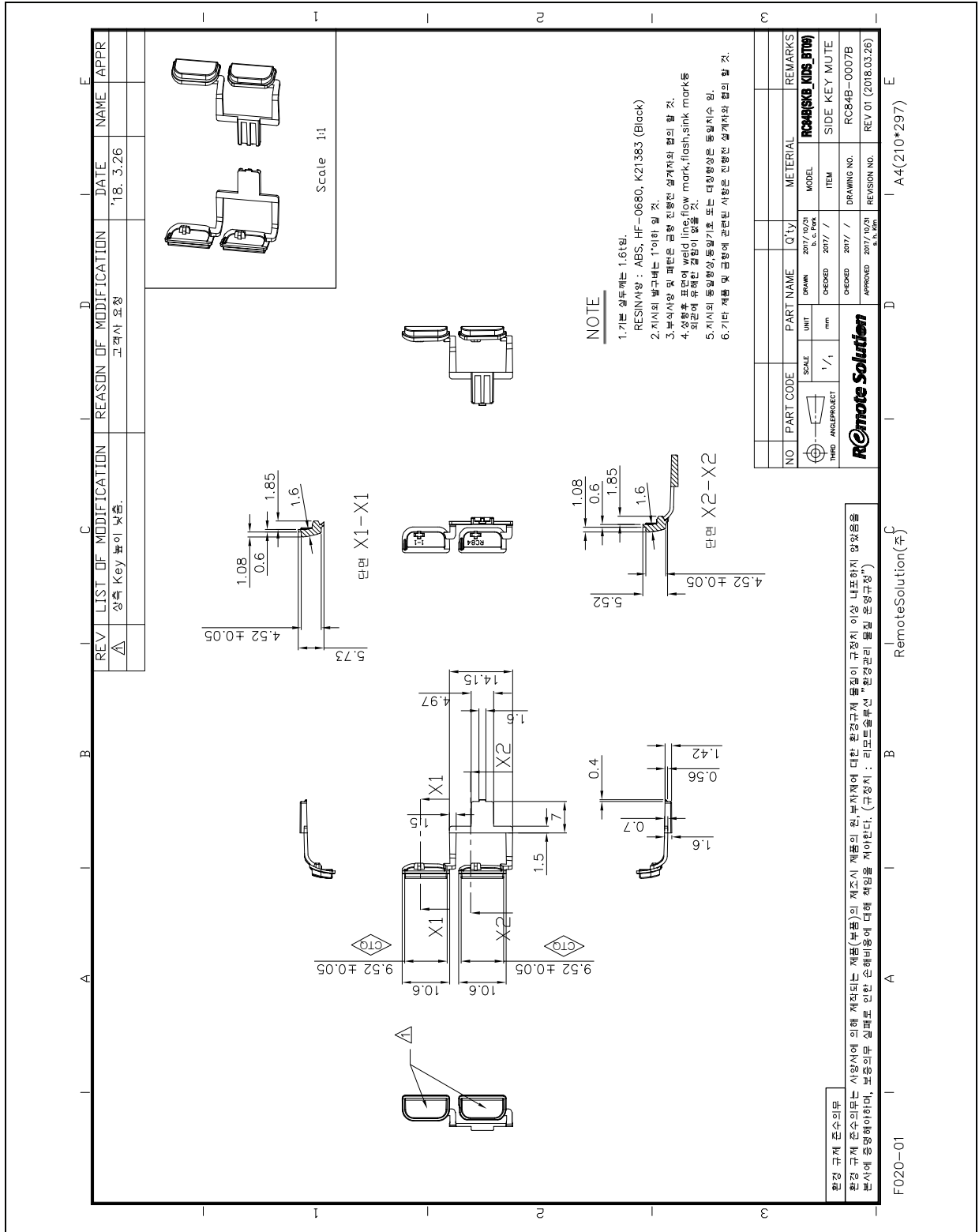
10. Mechanical Spec (6/15) – INDICATOR LED

[illegible]

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	41
REFORM :			
DECISION : 2021.08.27		RD12E00	65

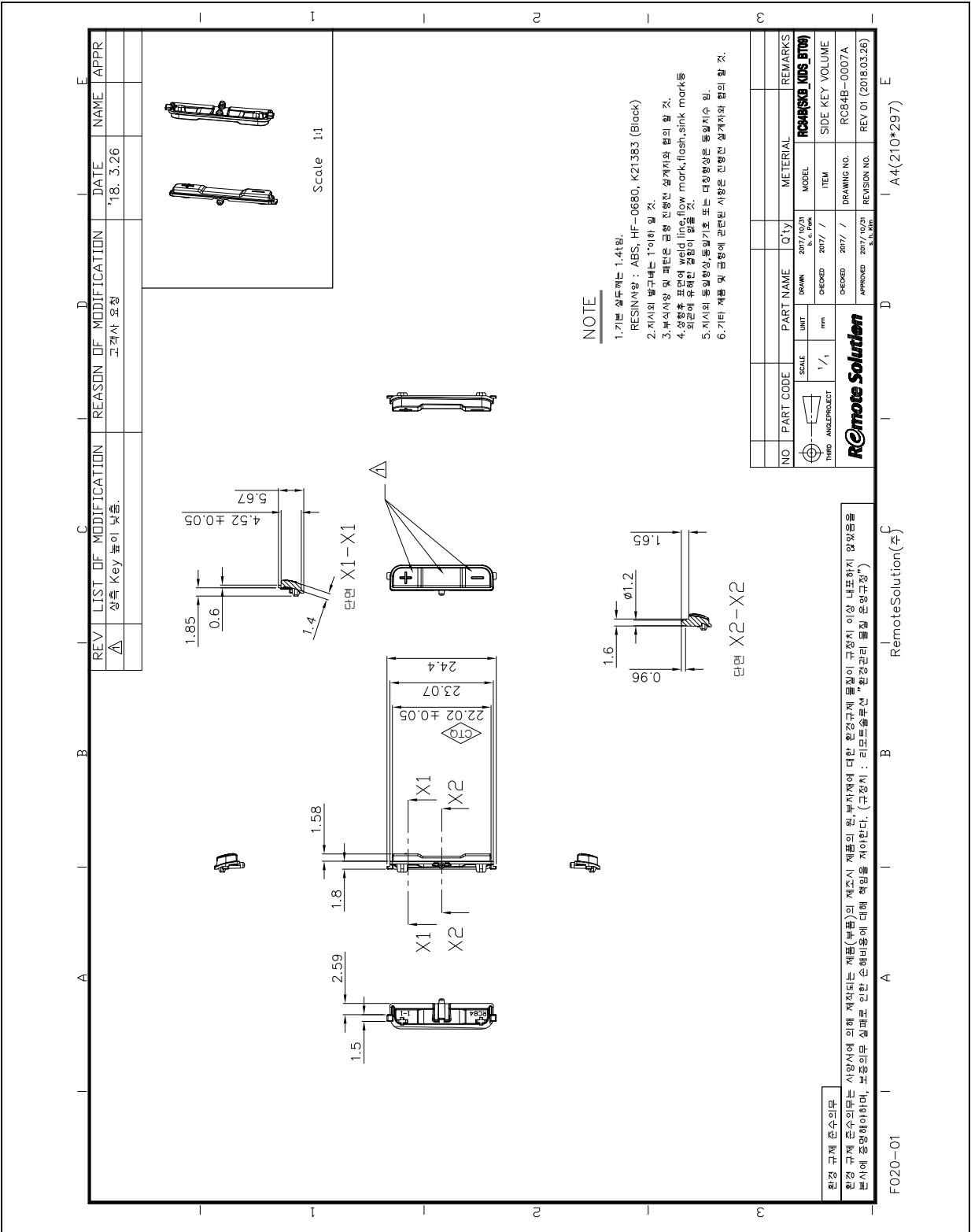
10. Mechanical Spec (7/15) – SIDE KEY MUTE



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	<u>SPECIFICATION</u> (TRANSMITTER REMOCON)	MODEL NO :	42
REFORM :			
DECISION : 2021.08.27		RD12E00	65

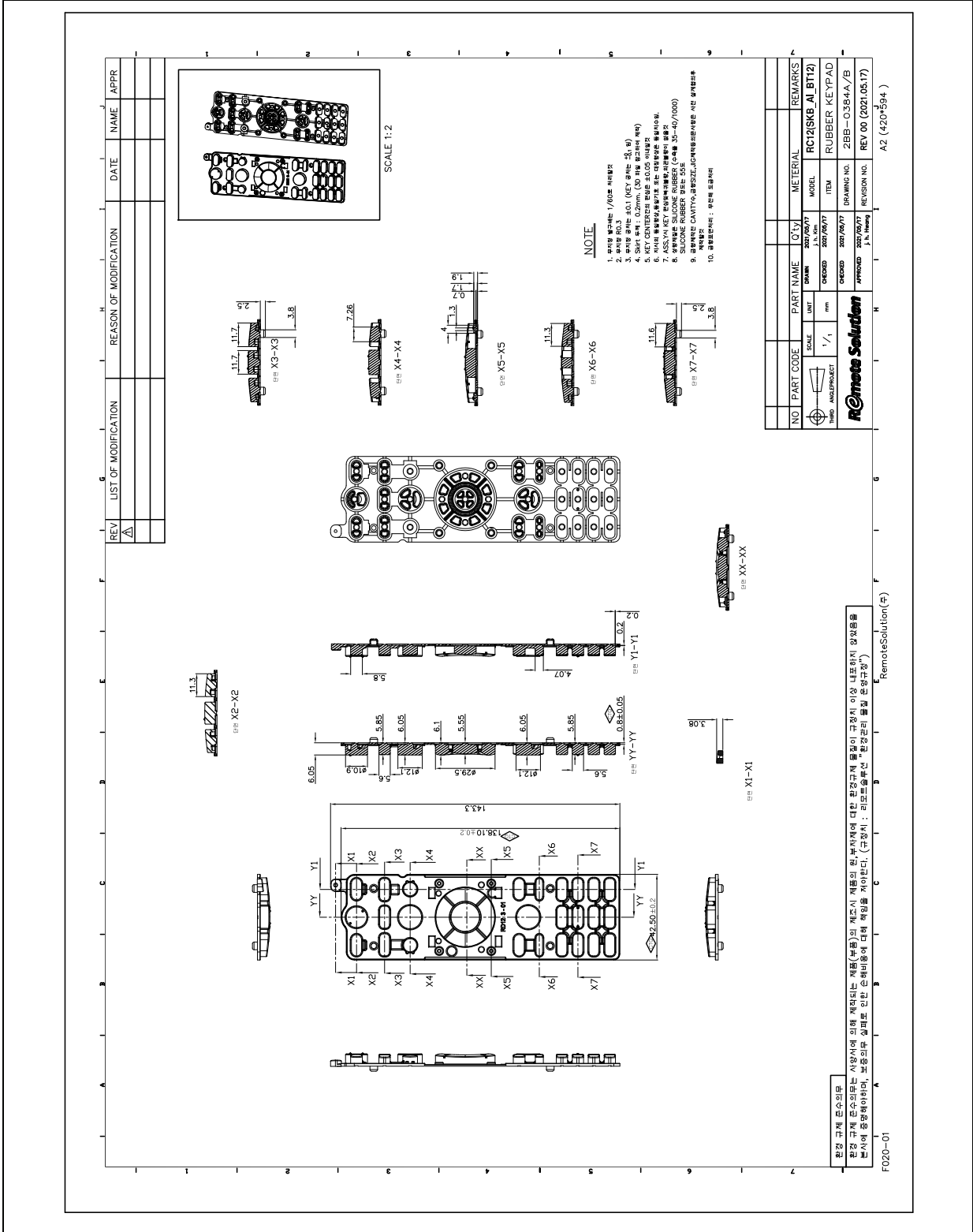
10. Mechanical Spec (8/15) – SIDE KEY VOLUME



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	<u>SPECIFICATION</u> (TRANSMITTER REMOCON)	MODEL NO :	43
REFORM :		RD12E00	
DECISION : 2021.08.27			65

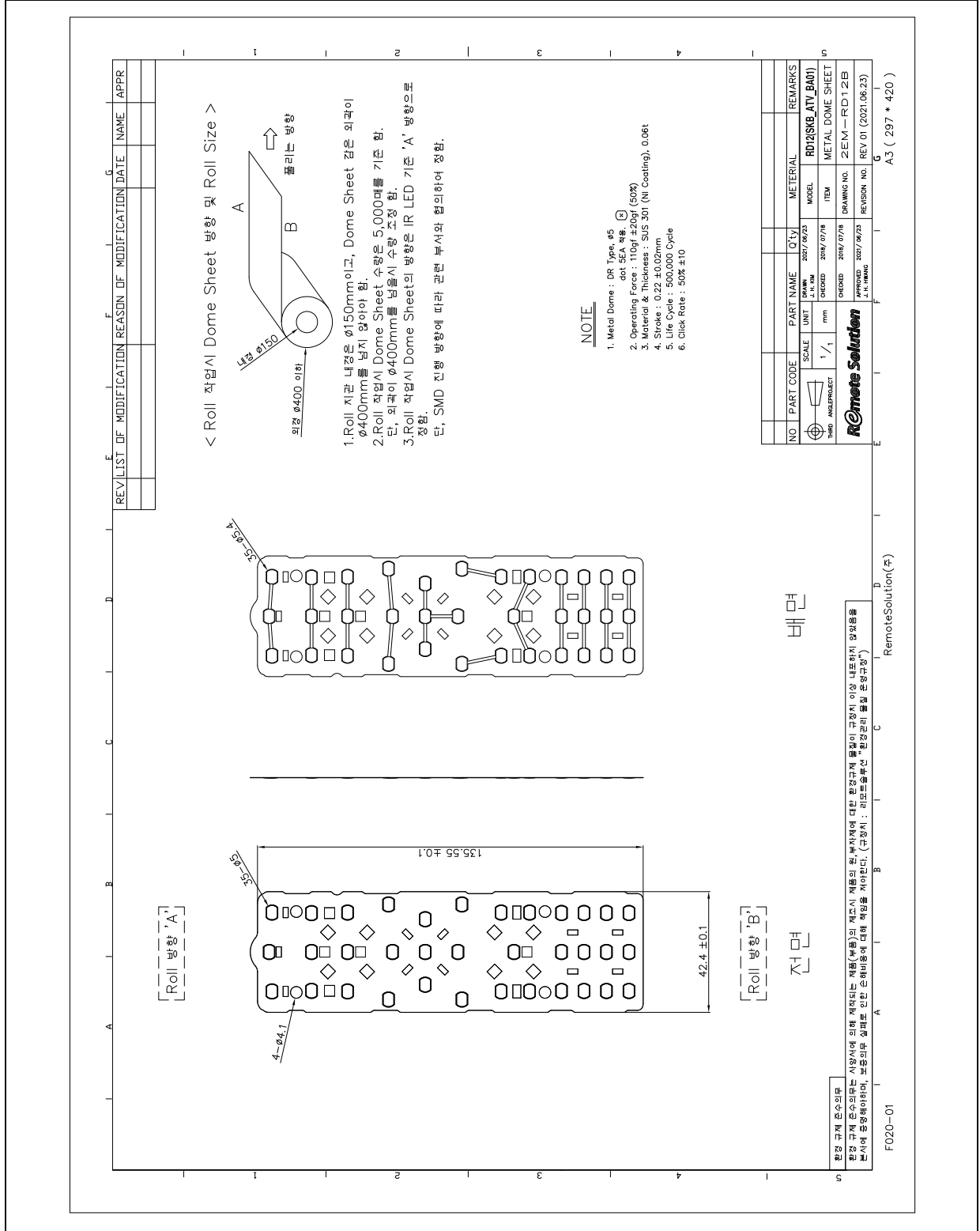
10. Mechanical Spec (9/15) – RUBBER KEYPAD



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	44
REFORM :			
DECISION : 2021.08.27		RD12E00	65

10. Mechanical Spec (10/15) – METAL DOME



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	45
REFORM :			
DECISION : 2021.08.27		RD12E00	65

10. Mechanical Spec (11/15) – (+) SPRING

NO	MODEL	TITLE	MATERIAL	FINISH	REMARK
1					
2					

종 류	압 축 SPRING	총 권 수	2.25 권
재 질	SUS304-WPB NI-CO	권 방 향	우
선 경	0.6	자유장 길이	1.2 ±0.2

NOTE

- ① 지시치수 중점관리할 것
- 재료 절단부 처리 주의할 것
- BENDING 부 직각 유지 할 것
직각부는 필히 자연 "R" 가공 할 것

환경 규제 준수 의무

환경 규제 준수 의무는 사양서에 의해 제작되는 제품(부품)의 제조시 제품의 원,부자재에 대한 환경규제 물질이 규정치 이상 내포하지 않았음을 본사에 증명해야하며, 보증의무 실패로 인한 손해비용에 대해 책임을 져야한다. (규정치 : 리모트솔루션 "환경관리 물질 운영규정")

NO	PART CODE	PART NAME	Q'ty	MATERIAL	REMARKS

	SCALE	UNIT	DRAWN	(+)SPRING RC84(SKB_AI_BT08) 2SP-RC84
	2/1	mm	2017/10/19 b. c. Park	
			2017/10/19 s. b. Lim	
			2017/10/19 s. h. Kim	

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	46
REFORM :			
DECISION : 2021.08.27		RD12E00	65

10. Mechanical Spec (12/15) – (-) SPRING

NO	M O D E L	TITLE	MATERIAL	FINISH	REMARK
1					
2					

종 류	압 축 SPRING	총 권 수	4.25 권
재 질	SUS304-WPB NI-C□	권 방 향	좌
선 경	φ0.6	자유장 길이	8 ± 0.2

NOTE

- ① 지시치수 중점관리 할 것
- 재료 절단부 처리 주의 할 것
- BENDING 부 직각 유지 할 것
직각부는 필히 자연 "R" 가공 할 것

환경 규제 준수 의무

환경 규제 준수의무는 사양서에 의해 제작되는 제품(부품)의 제조시 제품의 원,부자재에 대한 환경규제 물질이 규정치 이상 내포하지 않았음을 본사에 증명해야하며, 보증의무 실패로 인한 손해비용에 대해 책임을 져야한다. (규정치 : 리모트솔루션 "환경관리 물질 운영규정")

NO	PART CODE	PART NAME	Q'ty	MATERIAL	REMARKS

	SCALE	UNIT	DRAWN	(-)SPRING RC84(SKB_AI_BT08) 2SM-RC84
	2/1	mm	2017/10/19 b. c. Park	
			2017/10/19 s. b. Lim	
			2017/10/19	
Remote Solution			APPROVED 2017/10/19 s. h. Kim	ISSUE Z

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	47
REFORM :			
DECISION : 2021.08.27		RD12E00	65

10. Mechanical Spec (13/15) – (±) SPRING

NO	M O D E L	TITLE	MATERIAL	FINISH	REMARK
1					
2					

종 류	압 축 SPRING	총 권 수	A	2.25 권	B	4.25 권
재 질	SUS304-WPB NI-C□	권 방 향	A	좌	B	우
선 경	Ø0.6	자유장 길이	A	1.2 ⁺⁰ _{-0.2}	B	8 ± 0.2

NOTE

- ① 지시치수 중점관리할것
2. 재료 절단부 처리 주의할것
3. BENDING부 직각유지할것
직각부는 필히 자연"R"가공할것

환경 규제 준수 의무

환경 규제 준수의무는 사양서에 의해 제작되는 제품(부품)의 제조시 제품의 원,부자재에 대한 환경규제 물질이 규정치 이상 내포하지 않았음을 본사에 증명해야하며, 보증의무 실패로 인한 손해비용에 대해 책임을 지어한다. (규정치 : 리모트솔루션 "환경관리 물질 운영규정")

NO	PART CODE	PART NAME	Q'ty	METERIAL	REMARKS

COMMON SPRING

RC65(SK_B_Smart)

2SC-RC65

F020-01

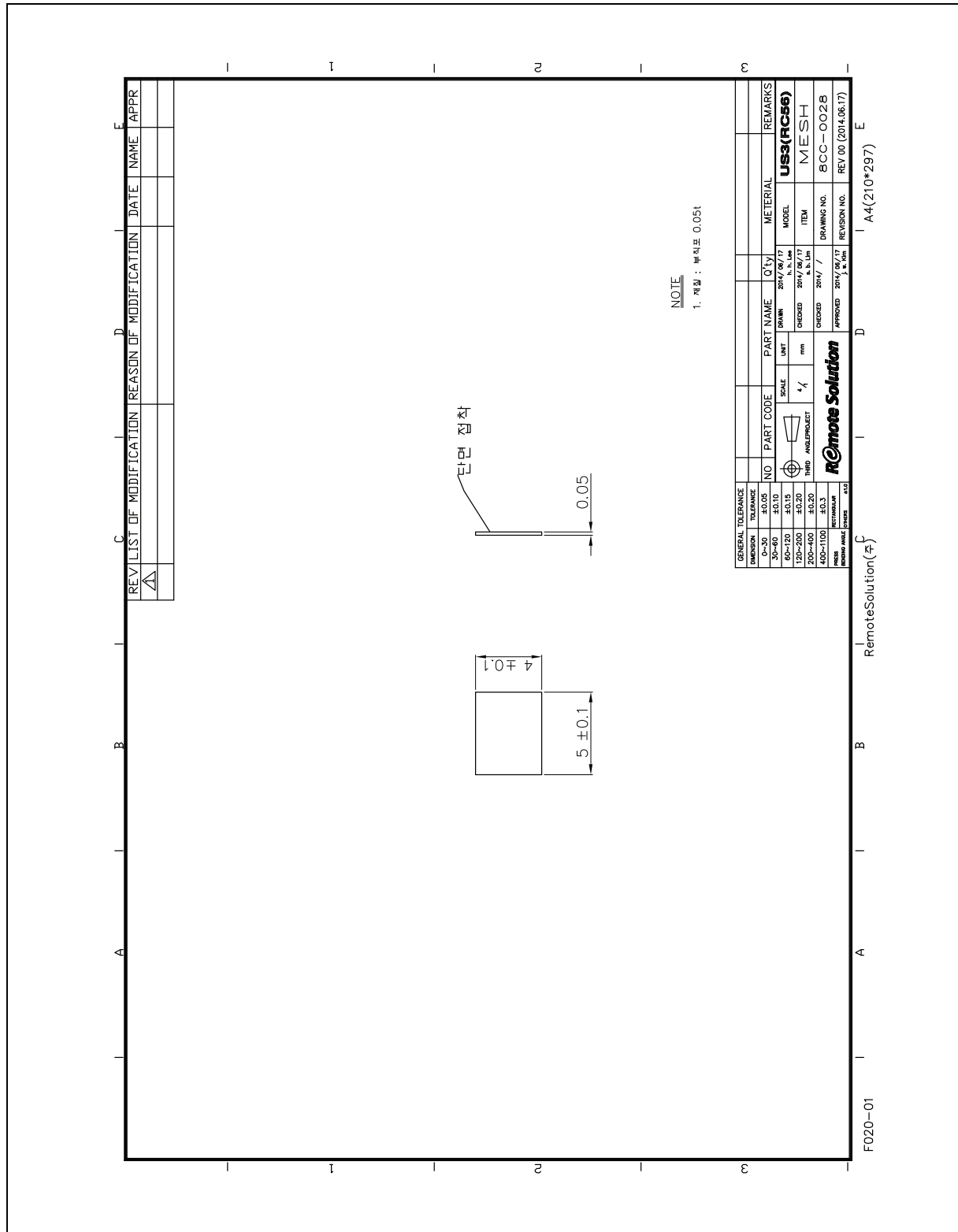
리모트솔루션(주)

A4 (210 * 297)

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	48
REFORM :			
DECISION : 2021.08.27		RD12E00	65

10. Mechanical Spec (14/15) – MESH



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	49
REFORM :			
DECISION : 2021.08.27		RD12E00	65

10. Mechanical Spec (15/15) PE BAG

NO	MODEL	TITLE	MATERIAL	FINISH
1				

COLOR : BLACK

NOTE

1. 도면 치수로 관리 할 것.
2. 재료 : PE 0.05t 투명

△	ISSUE NO	MM/DD/YY	SIGNATURE	GHANGE NO	CHANGE CONTENTS
SCALE		UNIT			
N / S		mm			
			DRAWN	2014/12/10	h. h. Lee
			CHECKED	2014/12/10	s. b. Lim
			DRAWN	2014/12/10	j. w. Kim
			ISSUE		

PE BAG

CJ(RC60)

7PP-0052T

REMOTE SOLUTION CO., LTD.

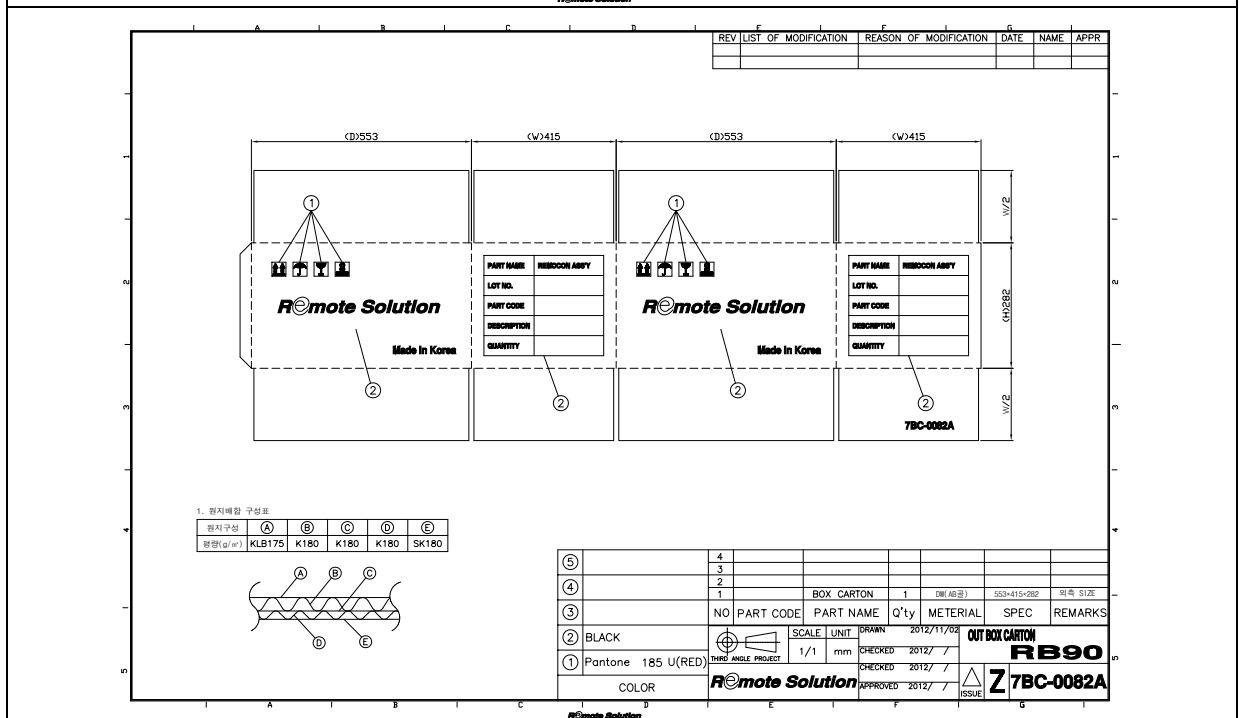
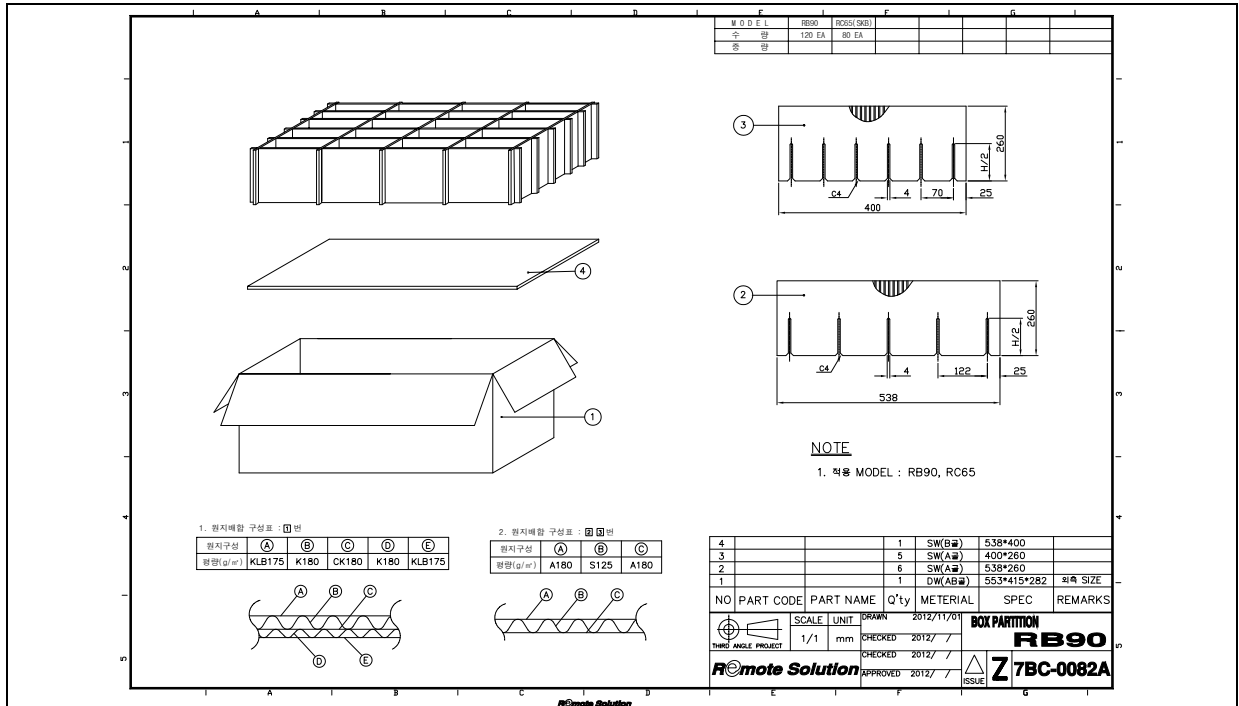
INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	50
REFORM :			
DECISION : 2021.08.27		RD12E00	65

11. Packaging Specification

10-1 MATERIAL : CARTON

10-2 SIZE : 553 (L)* 415 (W)* 282 (H) (Out Side)

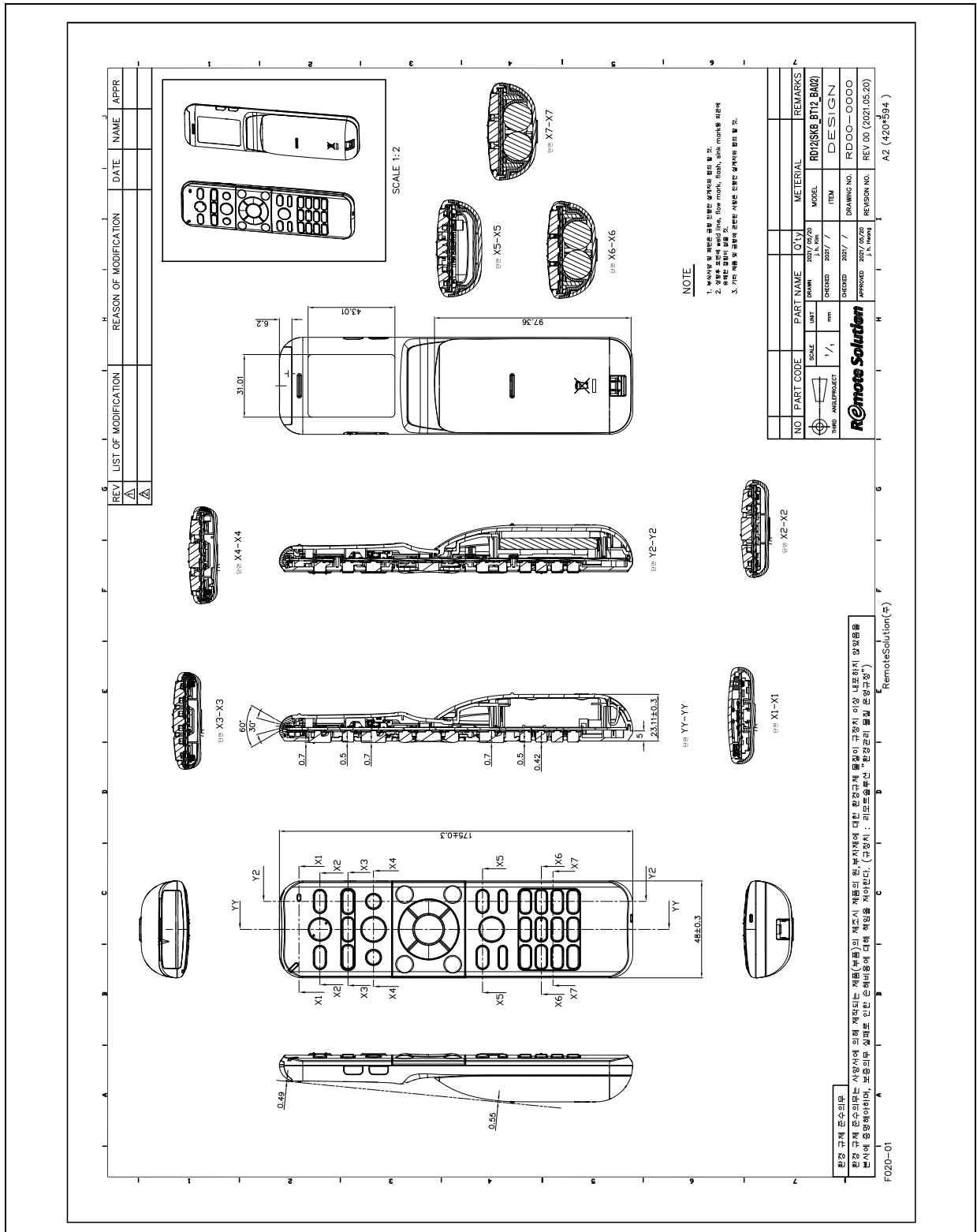
10-3 QUANTITY : 80EA



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	<u>SPECIFICATION</u> (TRANSMITTER REMOCON)	MODEL NO :	51
REFORM :		RD12E00	
DECISION : 2021.08.27			65

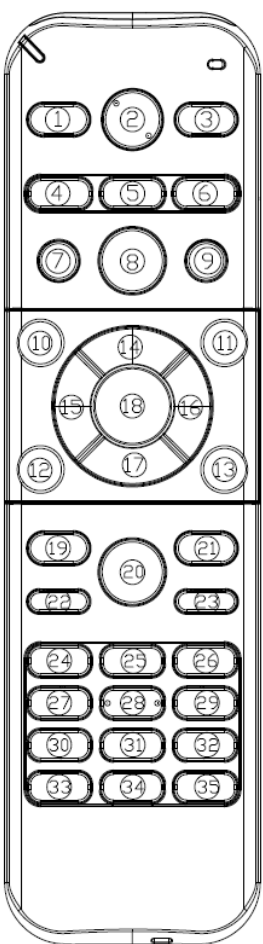
12. Assembling Specification



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	52
REFORM :			
DECISION : 2021.08.27		RD12E00	65

13. Rubber Tension Test

	NO.	Tension	Return	NO.	Tension	Return
	1	190	113	25	206	125
	2	192	109	26	197	123
	3	195	108	27	22	130
	4	205	120	28	212	125
	5	197	122	29	211	116
	6	203	120	30	215	130
	7	187	112	31	206	112
	8	184	116	32	197	118
	9	172	110	33	224	129
	10	211	126	34	202	110
	11	204	129	35	214	115
	12	201	125			
	13	209	121			
	14	201	121			
	15	199	105			
	16	203	115			
	17	197	111			
	18	257	152			
	19	197	122			
	20	201	121			
	21	200	116			
	22	200	120			
	23	192	104			
	24	232	148			
	Tension Spec :		Small Key : 200 ± 30gr			
			Large Key(10,11,12,13,14,15,16,17,18번 Key) : 210 ±30gr			

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	53
REFORM :			
DECISION : 2021.08.27		RD12E00	64

14. Manufacturing Process Flow Chart(1/3) - SMD

Customer	SKB		Process Flow Diagram			Document No	RS-20210518	Sign	권태걸
Product	BT12					Date	2021.05.18	Review	
Model	RD12E					Part	SMD	Approval	
No.	Revision date	Content		Check	No.	Revision date	Content		Check
Process No		01	02	03	04	05	06	07	08
P r o c e s s	Outsourcing								
	MAIN								
	SUB								
	Personnel	-	-			-	-	-	
Process	LOADER	SCREEN PRINTER	Worktable	CHIP MOUNTER	CHIP MOUNTER	REFLOW	UNLOADER	VISION TEST	
Content	.PCB Loading	.Solder Paste Printing	.Spring Insert	.Chip Mounting	.Chip Mounting	.Soldering	.PCB Unloading	.PCB Inspection (Solder , part's)	
Machine	LOADER	SCREEN PRINTER	.	CHIP MOUNTER	CHIP MOUNTER	REFLOW	UNLOADER	VISION Machine	
Tools	.	.	.Spring Insert Part's	.	.	.	.	.	
Inspection Machine	.	.3D Inspection machine	.	.	.	.	.	.	
Focused Management Item	.PCB Loading position	.Solder cream height	.Spring Reverse shovel	.Coordinate value	.Coordinate value	.temperature control	.PCB Loading position	.Inspection criteria	

RSC-200-001(Rev.0)

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	54
REFORM :			
DECISION : 2021.08.27		RD12E00	64

14.Manufacturing Process Flow Chart(2/3) - PBA

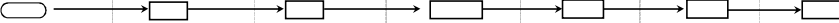
Customer	SKB		Process Flow Diagram				Document_No	RS-20210518	Sign	권태걸
Product	BT12						Date	2021.05.18	Review	
Model	RD12E						Part	PBA	Approval	
No.	Revision date	Content			Check	No.	Revision date	Content		Check
Process No		01	02	03	04	05	06	07	08	
P r o c e s s	Outsourcing									
	MAIN									
	SUB									
	Personnel	 								
Process		Dome Sheet	Realtek Writing	leakage current test	IR operation test	date printing marking	Appearance inspection			
Content		.Dome Sheet Attach	.RTL8762CA Writing	.leakage current test	.IR operation test	.date printing marking	.Appearance inspection			
Machine		.Dome Sheet jig	.Writing jig,PC	.PC	.PC	.marking machine				
Tools		.Dome Sheet jig tool	.	.ammeter .POWER Supply	.ammeter .POWER Supply					
Inspection Machine										
Focused Management Item		.Dome Sheet Attachment Check	.Writing Firmware check	.Nonconforming product management	.Nonconforming product management	.Check print status	.Nonconforming product management			

RSC-200-D01(Rev.0)

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2021.05.24	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	55
REFORM :			
DECISION : 2021.08.27		RD12E00	64

14. Manufacturing Process Flow Chart (3/3) – Assembly

Customer	SKB	Process Flow Diagram				Document No	RS-20210518	Sign	권대걸	
Product	BT12					Date	2021.05.18	Review		
Model	RD12E					Part	Assembly	Approval		
No.	Revision date	Content			Check	No.	Revision date	Content		Check
Process No		01	02	03	04	05	06	07	08	
P r o c e s s	Outsourcing									
	MAIN									
	SUB									
	Personnel									
Process		Preparation work	TOP CASE Assembly	Bottom case Assembly	TOP CASE Assembly	Assembly	backlight TEST	IR CODE TEST	PCB RMC TEST	
Content		.battery insert .PE-Bag package	.KNOB insert .Mike mesh attach	.indicator LED insert .SIDE KEY insert	.PCB cutting & insert .SIDE KEY insert .Rubber insert	.IR Window insert .Assembly	.Attaching protective film .battery insert .backlight TEST	.IR CODE TEST .Back Label attach .SIDE KEY TEST .Back Light TEST	.Pairing TEST .Rssi TEST .Voice TEST .BACK LIGHT CHECK	
Machine		-	-	-	-	-	-	4IN1 Machine	.PC	
Tools		-	-	-	.Assembly machine	.Assembly machine	.Darkroom	.IR receiver	.Pairing Dongle	
Inspection Machine		-	-	-	-	-	-	-	.Monitor .darkroom box	
Focused Management Item		.Scratch	.Scratch	.Scratch	.Scratch	.Assembly Status check	.Attaching protective film	.IR CODE check .LED check	.Rssi Test .PAIRING Test .Voice Test .Unpairing Test	
Process No		09	10							
P r o c e s s	Outsourcing									
	MAIN									
	SUB									
	Personnel									
Process		Appearance Inspection	Package							
Content		.BATTERYCOVER insert .Appearance inspection	.PE BAG Package .Passed Label attach .Insert Battery							
Machine		-	-							
Tools		-	-							
Inspection Machine		-	-							
Focused Management Item		.BATTERYCOVER insert .Appearance inspection	.packing quantity							

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15. Manufacturing Controlplan (1/2)

Production management plan (Control Plan)

REMOTESOLUTION (KR)				*Manufacture process : SMD PBA Assembly									
STEPS	ITEMS	Remote Control	NO	Revision date	The Reason of revision	Man	Review	Appr	Set the date : 2021.05.19				
☐	Model	SK Broadband A12/UHD4 STB RCU	△						A	made	review	admit	
☐	Proto		△						P				
☐	Part Number	RD12E00	△						P				
☐	양산선행		△						P				
☐	CFT	PM(MB Kim), R&D(UH Kim, YT Ahn, H Hong, CH Kim), Prod.(YR Na,KH Noh), Prod Tech(RK Kim, TG Kwon), QC(SG Son, SM Kim), Purchase(SJ Woo), Sale(GH Lee)	△	2021.05.19	Initial preparation				A	5/19	-	-	5/19
MP													
VENDOR CODE				Other admit/date (when required)									
Customer technical acknowledge/date (when required)				Management Criteria									
PROCESS	Process	Equipment	NO	Products	Process	Standard	How to check	Cycle	Management Plan	PD	QC	Corrective Action	Remark
10	Raw material inventory		1	Raw materials	Supplier (warehouse)	Vendor Input							
	Visual, Text film		1	Raw materials	A visual inspection (Design)	Don't allow harmful defects	Visual inspection	Sampling	Inspection specification			Isolation, return money, Issuance of	
	Vernier caliper		2	Raw materials	The dimensional check	In line with the structure drawings - length size management	measurement Data	Sampling	Inspection specification			Isolation, return money, Issuance of	
	Tension Gauge		3	Raw materials	Characteristics of check	In accordance with specifications of the structures	measurement Data	Sampling	Inspection specification			Isolation, return money, Issuance of	
	Visual		4	Raw materials	Combined inspection	After the merger is not allowed to produce abnormal	The assembly	Sampling	Inspection specification			Isolation, return money, Issuance of	
	Chamber		5	Raw materials	Reliability Test	Reliability test no abnormalities	measurement Data	once a month	Test specification			Isolation, return money, Issuance of	
20	Materials Warehousing/ releasing		1	Raw materials	FIFO	Confirm materials specifications FIFO management	Now product labeling	Every Lot	ERP PIG(SAP)			Isolation, return money	
	Prevention of static electricity	Static Electricity Checker	1	Static Electricity	Management of static Electricity	Should be within Good Zone	Electrostatic tester	once a day	Check Sheet			Anti-static shoes and Electrostatic ring to	
52	Stirring solder cream	Solder paste mixer (DMS200)	1	Solder cream	Storage of Solder cream	In cold storage with 5±3 ℃	Thermometer	once a day	Measurement sheet of temperature			Reset, Adjustment	
			2	Solder cream	Stirring of Solder cream	45 sec	Timer	Before using	Management register of Stock and Delivery			Reset, Adjustment	
			3	Solder cream	Leaving room temperature	25±5℃, 24hr (Foot_proof)	Timer	Before using	Management register of Stock and Delivery			Reset, Adjustment	
30	Supplying PCB	Vacuum Loader (SBSF-200)	1	PCB	Sorting status	For direction to sort out	Visual inspection	1/Lot	-			rearrange	
			2	PCB	PCB The installation	PCB Pick upAfter drop phenomenon	Visual inspection	1/Lot	-			The new installation	
40	Cleaning PCB	PCB Cleaner (PCC-4000)	1	PCB	Cleaning PCB's dirt	Location of brush and Air should be fine	Visual	1/Lot				The new setting	
50	Spreading Solder cream	Screen Printer (HP-520S)	1	Solder Cream	Squeeze pressure	14-16kgf	Check Equipment	1/Lot	Equipment checklist			From the rear device	
			2	Solder Cream	Squeeze speed/angle	35 ~ 100mm/sec, 60°E (Normal : 70~80mm/sec)	Check Equipment	1/Lot	Equipment checklist			From the rear device	
		Maintain a constant temperature device	3	Solder Cream	Condition of printing solder cream	Tin less, Tin over, No blockage	Visual Inspection (Magnifier)	1/Lot	At the beginning, middle, end			From the rear device	
		(HTC-1380)	4	Solder Cream	Keeping internal fixed temperature	23 ~ 27 degrees	Set Display	once a day	-			From the set temperature	
			5	Solder Cream	Automatic cleaning → Metal mask	There should be no scraps around the opening area (Manual Cleaning : 1Time/4hrs.)	Check Equipment	once in 5 times	Equipment			Manual cleaning	
60	SMD components patch	Chip Mount	1	Chip components	Nozzle pressure	Air : 0.45 ~ 0.55 MPa Nozzle : -80 ± 10 mmHg	Pressure gauge	1time/daily	Equipment work sheet			Reset, Adjustment	
			2	Chip components	PMC specification is consistent	Feeder List (MONITOR) - To prevent the mixing system	Visual inspection	When the mode changes	Record the account			Reset, Adjustment	
			3	Chip components	Part a Pick up location	5~25% of component area	Equipment to confirm	When the mode changes	Equipment work sheet			Reset, Adjustment	
		이형 Mount (SM421)	4	Chip components	Air/Nozzle pressure	Air : 4.5 ~ 5.5 MPa Nozzle : -100 ± 10 mmHg	Pressure gauge	1 time/ monthly	equipment work sheet			Reset, Adjustment	
			5	Chip components	Part a Pick up location	5~25% of component area	Equipment to confirm	When the mode changes	equipment work sheet			Reset, Adjustment	
70	Spring assembly	Manual work	1	SMD products	Insert the spring (+/-)	Meet standard of BOM	Visual	When receiving material	System (SAP)			From the set parameters	
80	Reflow Soldering	Reflow Soldering	1	SMD products	Preheat interval	Temperature : 150 ~ 200℃	Preheating temperature Check	1time/ daily	Reflow Profile			From the set parameters	
					Soldering time : 90 ~ 130sec	Temperature : 200℃ 이상 (peak:235~250℃) - PCB 1.2t / FR-4	Preheating temperature Check	1time/ daily	Reflow Profile			From the set parameters	
			2	SMD products	Soldering	Soldering time : 40 ~ 70sec	Profile Check	1time/ daily	Reflow Profile			From the set parameters	
90	PCB Out	SMB-220	1	SMD products	cool down	PCB finishing Impeded (not allowed)	Visual inspection	All	equipment			From the set parameters	
100	visual inspection	Lupe, Visual	1	SMD products	Confirm the part soldering condition	- no tin, tin, less skewed, plug, inverse interpolation, not advanced - part control within 1/3 of the scope of	Visual Inspection	All	work sheet			Identification, Isolation, Repair	
53	Analysis nonconfirming products and disassembling	Lupe, Iron Solder	1	SMD products	Management of Soldering Iron temperature	Temperature management of soldering iron(380~420℃)	Measuring temperature	once a day	Checklist for temperature of Soldering Iron			Reset temperature, Change soldering iron	
110	Attaching Metal Dome sheet	MetalDome sheet M/C	1	Raw Materials	Attaching Metal Dome sheet	Adhesion shall be good.	Equipment	All	work sheet			Identification, Isolation, Repair	

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15. Manufacturing Controlplan (2/2)

No.	Process Flow chart Sub-Process	Process	Equipment	Manage the project		Special trial test	Management Criteria			Division		Corrective Action	Remarks
				NO	Products		Process	Standard	How to check	Cycle	Management Plan		
120		Realtek IC Writing	Writing M/C	1	Main PCBA	Realtek IC Writing (RTL8762CA)	Writing(Programming) should be fine - RS / Test Program	Equipment	All	work sheet	○	Identification, Isolation, Repair	
130		Leakage current inspection	Function Test M/C	1	Main PCBA	Leakage current inspection	Current should be fine (satisfied with the spec)	Equipment	All	work sheet	○	Identification, Isolation, Repair	
140		IR/RF Power & Operating current inspection	Function Test M/C	1	Main PCBA	IR/RF Operating (Low voltage 2.3V input)	No defect on IR/RF Operating	Equipment	All	work sheet	○	Identification, Isolation, Repair	
140				2	Main PCBA	Operating current	Current should be fine (satisfied with the spec)	Equipment	All	work sheet	○	Identification, Isolation, Repair	
150	Marking	Marking M/C	1	PCB Assy	Criteria management	Nondefect - Marking manufacture date Defect - Attach nonconforming label	Equipment	All	work sheet	○	Identification, Isolation, Repair		
160	Packing	Magazine	1	PCB Assy	Product Packaging	No model mixing Identification confirmation	Visually	All	equipment	○	Re packing		
54	Analysis nonconforming products and repair	Magnifier, Soldering Iron, Inspection JIG	1	PCB Assy	Management of Soldering Iron temperature	Temperature management of soldering iron (380~420℃)	Measuring temperature	once a day	Checklist for temperature of Soldering Iron	○	Reset temperature, Change soldering iron		
			2	PCB Assy	Analysis and repair	Should pass retest after repair Should be no issue on soldered point	Function / Current test	nonconforming	Nonconforming Process checklist	○	Re-test after repair, scrap		
170	Top Case Assembly	Guide cutter	1	PCB Assy	Removing the PCB Guide	PCB without bending. No pattern damage when removing the guide	visually	All	work sheet	○	Isolation, Repair		
			2	Top Case, Keypad, Main PCBA	Top Case + Keypad + Main PCBA	Keypad and Main PCBA should not be lifted when seated	visually	All	work sheet	○	Isolation, Repair		
180	Assembling	Handwork	1	Top Assy, Bottom Cover, Filter	Assembling, Top Case Assy + Bottom Cover	There should be no deviations, gaps or gaps in spring Check the filter combination After the provisional match, the full match Be careful not to damage the phone jack during temporary molding	visually	All	work sheet	○	Isolation, Repair		
190	IR Operating Inspection	4IN1 Inspection JIG	1	Finished	IR operation Attach Back Label Side key inspection	No abnormality of Full Key IR output Check LED lighting No side key abnormalities	Equipment	All	work sheet	○	Identification, Isolation, Repair		
200	RF Operating Inspection	RF Inspection JIG	1	Finished Barcode	Pairing RF operation	Check pairing status and buzzer sound Check RSSI value, SW, FW version Voice and leakage current check Version label (manufacture date)	Visually	All	work sheet	○	Containment, repair		
210	PE-BAG fusion	fusion JIG	1	finished	PFusion of PE-BAG batteries	No abnormality of PE-BAG fusion	Visually	All	work sheet	○	Containment, repair		
220	visual Inspection	Visually	1	finished	Appearance	There should be no abnormality in the state of matching (Gap, step) There should be no abnormality on the IR Filter part's protective skin. No abnormality in specifications, no foreign matter and no marks	Visually	All	work sheet	○	Containment, repair		
			2	finished	Insert PE-BAG batteries	Inserting batteries into PE-BAG	Visually	All	work sheet	○	Containment, repair		
230	Product packing	Handwork	1	finished	Manual, PE-Bag	No manual missing or tearing	Visually	All	work sheet	○	Containment, repair		
			2	finished	Carton Box packaging	There should be no abnormality in mixing and quantitation (Box: 80EA)	Visually	Box	work sheet Barcode label	○	Containment, repair		
55	Analysis nonconforming products and repair	Handwork	1	finished	Analyzing and dismantling	Management of equipment and poor performance, Caution and confirmation of parts damage when dismantling	Visually/ Identification label	Nonconforming	Nonconformity Management ledger	○	Re-inspection after repair, Disposal		
			2	finished	Identification Management	Good and non-conforming products should not be mixed		Nonconforming	Nonconformity Management ledger	○	Re-inspection after repair, Disposal		
			1	finished	Visual inspection (Design)	There should be no deleterious defect	Standard Sample /Visual	Sampling G-II, 0.65	Standard document of test, Inspection Manual	○	Sorting, Rework, Releasing nonconforming		
			2	finished	Function test	Pairing, voice, LED lighting, buzzer, Full Key, i-Set No abnormal operation	Inspection P/G	Sampling G-II, 0.65	Standard document of test, Inspection Manual	○	Sorting, Rework, Releasing nonconforming		
240	OQC	Pairing Dongle, Inspection P/G, JIG, Power Supply, Current meter, Lupe	3	finished	Electrical characteristics	1. RF (volume) operation current: TBD 2. IR (TV volume) operating current: TBD 3. Leakage current -Before pairing: (AVR) TBD -After pairing: (AVR) TBD 4. Operating voltage: TBD	Power Supply, current meter	Sampling n=5, c=0	Standard document of test, Inspection Manual	○	Sorting, Rework, Releasing nonconforming		
			4	finished	Overhaul	Pattern open/short, copper lift, Cold sold, Solderless, Foreign substances inside, There should be no Mission cause	Visually, Lupe	n=1, c=0	Standard document of test, Inspection Manual	○	Sorting, Rework, Releasing nonconforming		
			5	finished	Condition of packing	There should be no issues with packaging condition, dirt, identification and quantification	Visual	Sampling Check	Standard document of test, Inspection Manual	○	Sorting, Rework, Releasing nonconforming		
56	Out Going	Forklift, Truck	1	finished	Product inventory management	There should be no issues with quantity of stock, mixing product and condition of storage	Products list	Standby stock	System(SAP)				

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16. TV Brand List (1/4)

Rev 1.7	2021.08.31
	SAMSUNG TM1940/TM1240 외 IR DB 43종 업데이트
Maker(Brand)Name	Code number (3 digit) List
삼성(SAMSUNG)	226 163 218 215 212 206 167 191 162 181 037 183 178 185 232 225 154 092 052 035 034 231 135 157 187 341 465
엘지(LG,금성,GOLDSTAR)	227 236 206 192 186 193 175 178 185 224 201 092 183 003 002 030 164 168 032 072 031 094 096 417
대우(DAEWOO)	014 231 043 190 177 217 176 159 166 233 029 158 150 206 178 185 216 165 169 156 152 155 151 228 195 153 170 188 198 038 160 189 039 199 182 235 092 050 053 202 047 051 179 344 375 420
대우루컴즈(DAEWOO LUCOMS)	327 335 350 351 352 353 321
아남(ANAM)	204 174 234 018 019 223 193 180 171 053 220 222 161 095 221 210 211 122 158 049 054 055 069 099 302 357 374
에이텍(ATEC)	031
이레전자(ERAE)	004 006 007 008 011 012 013
덱트론(DECTRON)	033
디보스(DIBOSS)	015 109
디지털 디바이스(DIGITAL DEVICE)	301 312
디지털스트림테크놀로지(DIGITAL STREAM)	351 360
디지털 싸이노스(DIGIAL CYNOS)	016
삼보컴퓨터(TRIGEM COMPUTER)	332
새찬전자(SAECHAN)	028 041 044
코리아데이터시스템스(KDS)	033 073
티디에스(TDS)	103
트라이뷰(TRIVIEW)	302
프리즘 테크놀로지(PRISM TECHNOLOGY)	303 355 072
하이얼(HAIER)	033 077 078 302 333 345
한국전자(KEC)	053 206
한성(HANSUNG)	378 414 420
현대아이티(HYUNDAI IT) -현대이미지퀘스트	022 017 107 108 309
현우 맥 플러스(MCPLUS)	206
휴리프(HULIF)	104
쿠메스전자(QUMES)	106
뉴콤월드(NEWCOMMWORLD)	219
다오코리아(DaoKorea)	304
모뉴엘(Moneual) - 롯데마트	305 306 307 326
드림뷰(DreamView) - 이마트	308 332
노브랜드(No Brand) - 이마트	308 332 330 463 373 351
일렉트로맨(ELECTROMAN) - 이마트	308
제이엘통상(XPEER) - 홈플러스	321
우성엔터프라이즈(WeCube) - 홈플러스	322
티바(TIVA, 스피드테크놀로지)	324
스카이미디아(Vishorn)	325 330 336
동양전자(DONGYANG)	068
비티씨정보통신(BTC)	316
씨마디지털(CIMADIGITEC)	318 319 072
LS전자(LS ELECTRONICS)	313
모티브씨엔씨(MOTV)	311
시그마TV(SIGMACOM)	310
유니크로(UNIKRO)	100 317
보임틀(VOIMTLE)	304
보림전자(BOLIM)	028 315 323
3S DIGITAL	028
삼인디스플레이(XSTIM)	104 320 329
유투스(케이엘전자 UTUS)	314
인디텍(VIEWPIA)	107
재원전자(JAEWON)	333
지파엔씨(GPNC)	327 306
제노스미디어(ZENOS)	303 328
제이아이케이솔루션(LEGRAND)	342
파인포스(FINEFORCE)	306
더블유시디(WCD)	331
토마토디스플레이(TOMATO DISPLAY)	337 306 356
넥스디지털(NEX)	338
매직나라(MAGIC NARA)	332 339
유니크컴퍼니(UNIQUE COMPANY)	340
알파스캔(ALPHASCAN)	306 203 345

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16. TV Brand List (2/4)

Maker(Brand)Name	Code number (3 digit) List
야마카시(YAMAKASI, 바이텍코리아)	343 346 347 348 349
자비오씨앤씨(XAVVIO)	354
티베라(TVERA)	355
스카이워스(SKYWORTH)	353
오리온정보통신(TOPSYNC)	351 330 357 306
한스정보(HANSJUNGBO, HANS TOUCH)	356
샤오미(XIAOMI)	361
디스플레이파크(DISPLAY PARK)	072
스마트홈 일렉트로닉스 - 스마트라(SMART HOME ELECTRONICS)	362 363 072 420
주연테크(JOOYON)	302 346 373
대우위니아(WINIADAERWOO, WINIADIMCHAE)	338
아낙(ANAC)	345
매직뷰(MAGICVU)	355
모넥스(MONEX)	302
엘디케이(LDK)	321 206
와사비망고(WASABIMANGO)	072 419
하이메이드(HIMADE)	072 072
인트로스(INTROS)	072 355
삼화디스플레이(SAMHWA)	072
아도나스(ADONIS)	355
큐닉스(QNIX)	370 371 372
와이드뷰(WIDE VU)	373 360
벅셀(BEXEL)	350
폴라로이드(POLAROID)	072
클라인즈(KLEINZ)	373
아인즈(IEINZ)	373
티비스타(TVSTAR)	355
더함 TV (THEHAM)	072
이엔티비(ENTV)	374
MOZEE	373
시네아이(DLT) -시네EYE	373
ZEPA	373
젠티뷰(ZENTVIEW)	356 373
FIDES	321 072
프리토스(FREETOSS)	321
CACC	072
제네시스(GENESIS)	321 355
이노스(INNOS)	072
스마트뷰(SMART VIEW)	418 072 467
이스트라(ESTRA)	419 351
COOCAA	353
티지엔컴퍼니(TG&Co.)	332 308
트루비(TRUVI)	419 420
IRIVER(드림어스)	072 420
유맥스(UMAX)	072 420
의영시스템(WOW TV)	357
앤티웍스(ANTWORKS)	330
현아이디어(HYNAEDA)	373
지스타(ZSTA)	373
타라엘씨디(TARALCD)	302
인켈(INKEL-SHERWOOD)	209 353 163 072 151 327 350 354 464
호리온(HORION)	419 072 467
NEXTBOOK	419
브라운슈거(BROWN SUGAR)	419
더하이텍(THEHITECH)	344
루브제(LUVZE)	373
브릴리언츠(BRILLIANT)	353
디포인트(DPOINT)	072
저스트인테크(JIT)	373
OIC코리아(OIC KOREA, PRISM KOREA)	302
델로라(DELORA)	467
브리드(VRID)	072
TNM	420 355 360 466
JAMOS	358
A MARK	092 154 193 206
AOC	193 404
AUDIOVOX	038

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16. TV Brand List (3/4)

Maker(Brand)Name	Code number (3 digit) List
CANDEL	150 081
CAMEL	366
CETRONIC	053
CHANGHONG	351
CITIZEN	050 052 092 150 163 081
CLASSIC	053
CONCERTO	150
CONTEC	053 135 157
CORONADO	092 154 206
CRAIG	053
CROWN	053 092
CURTIS MATHES	052 092 163
CXC	053
DAYTRON	092
DELL	410
DYNASTY	053
ELECTROHOME	038 092
EMERSON	359 026 038 053 092 111 135 154 206
FUNAI	053 359
FUJITSU	205 412
FUTURETECH	053
GE	042 167 037 049 067 071
GRUNDIG	401
HISENSE	368
HITACHI	377 009 023 024 025 083 097 098 150 139 206 376
HP	403
INFINITY	068
INSIGNIA	411
JBL	068
JCPENNY	052 092 089
JVC	058 066 092 070 071 321
KENWOOD	058 070 415
KIVI	420
KLOSS	082
KMC	092 154 206
KTV	053 092 154 250
LUXMAN	051 150
LXI	151 167 037 068 090
MAGNAVOX	001 150 154 167 037 068 206 185 081 082 085
MARANTZ	068 108
MATSUI	068
METZ	408 462
MGA	150
MITSUBISHI	074 075 076 105 150
MTC	052 150 163
NAD	090
NEC	005 014 042 105 150 151 152 413
NIKEI	053
ONKING	053
ONTEC	053
ONWA	053
ORION	111 101 072
PANASONIC	095 161 049 054 055 223 067 068 238 061 069 071 250
PENNEY	150 163 167
PHILCO	150 154 167 037 068 206 185 081 082 085
PHILIPS	026 066 120 150 154 167 203 037 068 206 236 178 185 081 082 085 086 087 312
PIONEER	002 003 027 097 367
PORTLAND	092 150 154 206
PROTON	032 092 122
QUASAR	049 067 071 250
RADIO SHACK	053 185 092
RCA	010 097 150 167 037 370
RUNCO	416
REALISTIC	053
SANYO	020 102 151
SCOTT	053 092

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16. TV Brand List (4/4)

Maker(Brand)Name	Code number (3 digit) List
SEARS	092 150 151 163 167 037 206 089 090
SHARP	001 062 063 064 065 092 208 206
SONY	048 060 059 058 057 056 207 115 194 147 070 139 045 046 080
SOUNDESIGN	053 081
SPECTRICON	193
SSS	053
SYLVANIA	051 150 167 185 037 068 081 082 085
TATUNG	049
TCL	334 009 369 376 460 461
TEAC	407
TECHNICS	095 071
TECHWOOD	150
TEKNIKA	053 092 150 154 163 165 052 206 081
THOMSON	409
TMK	150
TOSHIBA	021 052 105 163 088 151 089 090 091 093
TOTEVISION	092
UNIDEN	406
VICTOR	066
VIDTECH	150
VIEWSONIC	405
VIZIO	364
WARDS	092 150 154 167 185 037 068 071 206 085
WESTING HOUSE	038 014 402
YAMAHA	150
YUPITERUZENITH	053
ZENITH	050 084 072
ZONDA	193

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17. Grouping brand list(1/4)

	Maker(Brand)Name	Code number (3 digit) List
GROUP 01	삼성(SAMSUNG)	226 163 218 215 212 206 167 191 162 181 037 183 178 185 232
		225 154 092 052 035 034 231 135 157 187 341 465
GROUP 02	엘지(LG,금성,GOLDSTAR)	227 236 206 192 186 193 175 178 185 224 201 092 183 003 002
		030 164 168 032 072 031 094 096 417
GROUP 03	대우(DAEWOO)	014 231 043 190 177 217 176 159 166 233 029 158 150 206 178
		185 216 165 169 156 152 155 151 228 195 153 170 188 198 038
		160 189 039 199 182 235 092 050 053 202 047 051 179 344 375
	대우루컴즈(DAEWOO LUCOMS)	420
		327 335 350 351 352 353 321
	아남(ANAM)	204 174 234 018 019 223 193 180 171 053 220 222 161 095 221
	이래전자(ERA)	210 211 122 158 049 054 055 069 099 302 357 374
	디지털 디바이스(DIGITAL DEVICE)	004 006 007 008 011 012 013
	디지털스트림테크놀로지(DIGITAL STREAM)	301 312
	삼보컴퓨터(TRIGEM COMPUTER)	351 360
	삼보컴퓨터(삼보컴퓨터)	332
	코리아데이터시스템(KDS)	033 073
	티디에스(TDS)	103
	트라이뷰(TRIVIEW)	302
	프리즘 테크놀로지(PRISM TECHNOLOGY)	303 355 072
	한국전자(KEC)	053 206
	현대아이티(현대이미지케스트)	022 017 107 108 309
	현우 맥 플러스(MCPLUS)	206
	유리프(HULIF)	104
	쿠메스전자(QUMES)	106
	다오코리아(DaoKorea)	304
	모뉴얼(Moneual) - 롯데마트	305 306 307 326
	드림뷰(DreamView) - 이마트	308 332
	노브랜드(No Brand) - 이마트	308 332 330 463 373 351
	일렉트로맨(ELECTROMAN) - 이마트	308
	제이엘통상(XPEER) - 홈플러스	321
	우성엔터프라이즈(WeCube) - 홈플러스	322
	티바(TIVA, 스피드테크놀로지)	324
	스카이미디아(Vishom)	325 330 336
	동양전자(DONGYANG)	068
	비티씨정보통신(BTC)	316
	씨마디지털(CIMADIGITEC)	318 319 072
	LS전자(LS ELECTRONICS)	313
	모티브씨엔씨(MOTV)	311
	시그마TV(SIGMACOM)	310
	유니크로(UNIKRO)	100 317
	보임틀(VOIMTLE)	304
	보림전자(BOLIM)	028 315 323
	삼인디스플레이(XSTIM)	104 320 329
	유투스(케이엘전자 UTUS)	314
	인디텍(VIEWPIA)	107
	재원전자(JAEWON)	333
	지피엔씨(GPNC)	327 306
	제노스미디어(ZENOS)	303 328
	제이아이케이솔루션(LEGRAND)	342
	파인포스(FINEFORCE)	306
	다불유시디(WCD)	331
	토마토디스플레이(TOMATO DISPLAY)	337 306 356
	넥스디지털(NEX)	338
	매직나라(MAGIC NARA)	332 339
	유니크컴퍼니(UNIQUE COMPANY)	340
	알파스캔(ALPHASCAN)	306 203 345
	야마카시(YAMAKASI, 바이텍코리아)	343 346 347 348 349
	자바씨엔씨(XAVVIO)	354
	티베라(TVERA)	355
	스카이워스(SKYWORTH)	353
	오리온정보통신(TOPSYNC)	351 330 357 306
	한스정보(HANSJUNGBO, HANS TOUCH)	356
	샤오미(XIAOMI)	361
	디스플레이파크(DISPLAY PARK)	072

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17. Grouping brand list(2/4)

	Maker(Brand)Name	Code number (3 digit) List
GROUP 04	스마트홈 일렉트로닉스 - 스마트라 (SMART HOME ELECTRONICS)	362 363 072 420
	주연테크(JOYON)	302 346 373
	대유위니아(WINIADAEWOO, WINIADIMCHAE)	338
	아낙(ANAC)	345
	매직뷰(MAGICVU)	355
	모넥스(MONEX)	302
	엘디케이(LDK)	321 206
	와사비망고(WASABIMANGO)	072
	하이메이드(HIMADE)	072 072
	인트로스(INTROS)	072 355
	삼화디스플레이(SAMHWA)	072
	JAMOS	358
	CAMEL	366
	아도니스(ADONIS)	355
	큐닉스(QNIX)	370 371 372
	와이드뷰 (WIDE VU)	373 360
	벡셀 (BEXEL)	350
	폴라로이드 (POLAROID)	072
	클라인즈 (KLEINZ)	373
	아인츠 (IEINZ)	373
	티바스타 (TVSTAR)	355
	더함 TV (THEHAM)	072
	이엔티비 (ENTV)	374
	MOZEE	373
	시네아이(DLT) -시네EYE	373
	ZEPA	373
	젠티뷰(ZENTVIEW)	356 373
	FIDES	321 072
	프리토스 (FREETOSS)	321
	CACC	072
	제네시스 (GENESIS)	321 355
	이노스 (INNOS)	072
	한성(HANSUNG)	378 414 420
	스마트뷰 (SMART VIEW)	418 072 467
	이스트라(ESTRA)	419 351
	COOCAA	353
	타지엔컴퍼니(TG&Co.)	332 308
	트루비(TRUVI)	419 420
	IRIVER(드림어스)	072 420
	유맥스(UMAX)	072 420
	의영시스템	357
	엔트웍스(ANTWORKS)	330
	현아이디어(HYUNIDEA)	373
	지스타(ZSTA)	373
	타라엘씨디(TARALCD)	302
	호리온(HORION)	419 072 467
	NEXTBOOK	419
	브라운슈거(BROWN SUGAR)	419
	더하이텍(THEHITECH)	344
	루브제(LUVZE)	373
	브릴리언츠(BRILLIANT)	353
	디포인트(DPOINT)	072
	저스트인테크(JIT)	373
	OIC코리아(OIC KOREA, PRISM KOREA)	302
	델로라(DELORA)	467
	브리드(VRID)	072
	TNM	420 355 360 466
GROUP 05	SONY	048 060 059 058 057 056 207 115 194 147 070 139 045 046 080
	PANASONIC	095 161 049 054 055 223 067 068 238 061 069 071 250
	NEC	005 014 042 105 150 151 152 413
	JVC	058 066 092 070 071 321
	SANYO	020 102 151
	PIONEER	002 003 027 097 367
	FUJITSU	205 412
	SHARP	001 062 063 064 065 092 208 206

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17. Grouping brand list(3/4)

	Maker(Brand)Name	Code number (3 digit) List
GROUP 06	HITACHI	377 009 023 024 025 083 097 098 150 139 206 376
	HP	403
	TOSHIBA	021 052 105 163 088 151 089 090 091 093
	mitsubishi	074 075 076 105 150
GROUP 07	PHILIPS	026 066 120 150 154 167 203 037 068 206 236 178 185 081 082
	하이얼(HAIER)	085 086 087 312
	HISENSE	033 077 078 302 333 345
	ZENITH	368
	CANDEL	050 084 072
	EMERSON	150 081
	GE	359 026 038 053 092 111 135 154 206
	GRUNDIG	042 167 037 049 067 071
	MAGNAVOX	401
	A MARK	001 150 154 167 037 068 206 185 081 082 085
GROUP 08	PENNEY	092 154 193 206
	에이텍(ATEC)	150 163 167
	3S DIGITAL	031
	뉴컴월드(NEWCOMMWORLD)	028
	디지털 싸이노스(DIGIAL CYNOS)	219
	새천원자(SAECHAN)	016
	AOC	028 041 044
	AUDIOVOX	193 404
	CETRONIC	038
	CHANGHONG	053
	CITIZEN	351
	CLASSIC	050 052 092 150 163 081
	CONCERTO	053
	CONTEC	150
	CORONADO	053 135 157
	CRAIG	092 154 206
	CROWN	053
	CURTIS MATHES	053 092
	CXC	052 092 163
	DAYTRON	053
	DELL	092
	DYNASTY	410
	덱트론(DECTRON)	053
	디보스(DIBOSS)	033
	ELECTROHOME	015 109
	FUNAI	038 092
	FUTURETECH	053 359
	INFINITY	053
	INKEL	068
	INSIGNIA	209 353 163 072 151 327 350 354 464
	JBL	411
	JCPENNY	068
	KENWOOD	052 092 089
	KIVI	058 070 415
	KLOSS	420
	KMC	082
	KTV	092 154 206
	LUXMAN	053 092 154 250
	LXI	051 150
	MARANTZ	151 167 037 068 090
	MATSUI	068 108
	METZ	068
	MGA	408 462
	MITC	150
	NAD	052 150 163
	NIKEI	090
	ONKING	053
	ONTEC	053
	ONWA	053

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17. Grouping brand list(4/4)

	Maker(Brand)Name	Code number (3 digit) List
GROUP 09	ORION	111 101 072
	PHILCO	150 154 167 037 068 206 185 081 082 085
	PORTLAND	092 150 154 206
	PROTON	032 092 122
	QUASAR	049 067 071 250
	RADIO SHACK	053 185 092
	RCA	010 097 150 167 037 370
	RUNCO	416
	REALISTIC	053
	SCOTT	053 092
	SEARS	092 150 151 163 167 037 206 089 090
	SOUNDESIGN	053 081
	SPECTRICON	193
	SSS	053
	SYLVANIA	051 150 167 185 037 068 081 082 085
	TATUNG	049
	TCL	334 009 369 376 460 461
	TEAC	407
	TECHNICS	095 071
	TECHWOOD	150
	TEKNIKA	053 092 150 154 163 165 052 206 081
	THOMSON	409
	TMK	150
	TOTEVISION	092
	UNIDEN	406
	VICTOR	066
	VIDTECH	150
	VIEWSONIC	405
	VIZIO	364
	WARDS	092 150 154 167 185 037 068 071 206 085
	WESTING HOUSE	038 014 402
	YAMAHA	150
	YUPITERUZENITH	053
	ZONDA	193