

APPROVAL SHEET

ITEM	SK Broadband Bluetooth Remote
DESCRIPTION	AI2 sound max
PART NUMBER	BRM-SA01
RS MODEL	RD65B00
BUYER	SKB
DATE	2023.03.13
RCU VERSION	1.2
DOC VERSION	1.1

MAKER : REMOTE SOLUTION CO.,LTD.

Writer	EE	ME	Design	Software	Approval
					
2023.03.13	2023.03.13	2023.03.13	2023.03.13	2023.03.13	2023.03.13

DATE : 2023.03.13

REMOTE SOLUTION CO.,LTD.

FACTORY & HEAD OFFICE

92,CHOGOKRI, NAMMYUN, KIMCHON CITY, KYUNGBUK, KOREA

TEL : +82-54-420-4520

FAX : +82-54-420-4530

History

RCU Ver	Doc Ver	Date	Change Part	Description	Page
1.2	1.0	23.01.17	-	Initial	
	1.1	23.03.13	Mechanical	- Modified Number Keypad REASON FOR REPLACEMENT: QUALITY ISSUES OCCURRED DURING INITIAL MASS PRODUCTION, SO NUMBER KEYPAD QUALITY CONTROL POINT WAS ADDED	39-55

Product Design



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REFORM :			
DECISION : 2023.03.13		RD65B00	71

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1. Coverage : This product is manufactured as a remote solution and this specification applies to SK Broadband AI2/SMART3 STB remote control.

2. Product Specifications

2-1 Mechanical

2-1-1 Appearance

2-1-1-1 Button Locking No abnormality

2-1-1-2 There should be no abnormality in the adhesive state of the label.

2-1-1-3 There must be no abnormality in the printing status of the button and main body [bleeding, erasing, etc.]

2-1-1-4 Rubber No eccentricity or bias

2-1-1-5 No stick phenomenon due to rubber bias

2-1-1-6 There should be no sharp parts of the equipment

2-1-1-7 The print condition of the product must match the product specification (limit sample)

2-1-1-8 No other special

2-1-2 Decomposition Structure

2-1-2-1 After disassembling, check the internal parts to match the specifications (drawings)

2-1-2-2 After disassembly, there should be no abnormalities when checking the mixing of parts and soldering status.

2-1-2-3 There should be no touch of equipment and parts

2-1-2-4 When comparing with the parts list of the specification sheet, it must match the drawing (specification)

2-1-2-5 The printed contents of the PCB should match the drawings

2-1-2-6 Use the specified standard products for circuit parts.

2-1-2-7 Carbon contact part No flux

2-1-2-8 No lead foreign matter

2-1-2-9 No copper foil exposed in soldered area

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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 130g±20g(Small Key),Metal Dome 130g±20g (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 After connecting the battery connector, there should be no abnormality in electrical contact.

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.

Step difference: In case of battery cover type, the step difference should be less than 0.4mm.

However, only the overall length is measured during import inspection.

Product Size : 39mm*167mm*29.20mm

Weight : 70.0(±2)g (Lithium battery included)

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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		
			3.1V	3.7V	4.2V
Before leakage current pairing	Leave for 1 minute after power supply	Average	Less then 20uA	Less then 20uA	Less then 20uA
After leakage current pairing	Leave for 1 minute after power supply	Average	Less then 50uA	Less then 50uA	Less then 50uA
IR transmission	Power button 1 minute operation	Peak	Less then 70mA	Less then 0mA	Less then 70mA
RF transmission	HOME button 1 minute action	Peak	Less then 3mA	Less then 3mA	Less then 3mA
Buzzer	STB (using remote control finder)	Peak	OFF	Less then 65mA	Less then 65mA
Backlight	Movement of remote control angle more than 40°	Peak	OFF	Less then 10mA	Less then 10mA
Voice search	Voice search button	Peak	OFF	Less then 5.5mA	Less then 5.5mA

- For IR transmission, it was measured in a state where BLE pairing was not made (factory-first)

2-2-3 High Voltage : When input voltage of 4.3V to the battery terminal is input, there should be no abnormality in the operation of the remote control key.

When the USB (charge) terminal input voltage of 5.5V is input, there must be no abnormality in the operation of the remote control key.

2-2-4 IR LED Current(3.3ohm) : Over 300mA (2 Battery)

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2-2-5 Power Consumption : Less than 300mW (Battery terminal input voltage based on 3.7V)

2-2-6 Oscillation frequency : Input Voltage : D.C 3.7V (Power supply 3.7V)
: 40.00 Mhz $\pm$ 10ppm

2-2-7 Oscillation stop voltage: Less than 2.4V (based on Battery input terminal voltage)

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 3.0V ~ 4.3V

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

2-2-9-3 Operating stop voltage check on voltage descent from 4.2V

[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%

2-2-12 Battery Charging Time

2-2-12-1 When the battery is completely discharged (below 3.0V), the charging time is up to
3 hours

2-2-12-2 Battery charging should not have any problems within the temperature range of
0°C ~ 45°C.

2-2-12-3 Battery charging should be at least 300 charges and no problems with discharge cycles.

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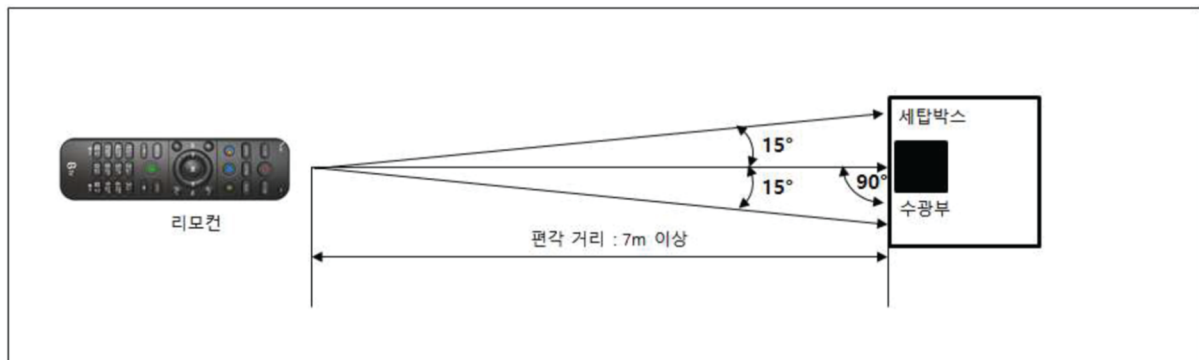
2-2-13 Operating distance and declination Operating distance:

2-2-13-1 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



2-2-13-2 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: 80dB ±10dB [Applied voltage 3.7V]

[Measured using STB's Remote Control Finder function, battery voltage is based on at least 3.7V]

(When measuring with 1KHz test Sound tone: 75 ± 6dB) [Accredited voltage 3.7V]

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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 High temperature operation test

3-2-1-1 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

3-2-2 Low-temperature operation test

3-2-2-1 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.

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

3-2-3-1 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.

3-2-4 temperature preservation test

3-2-4-1 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

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There should be no abnormality in function and appearance at the time of inspection

3-2-5 Cold storage test

3-2-5-1 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

3-2-6 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

3-2-7 Thermal shock test

3-2-7-1 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.

3-2-8 Vibration test

3-2-8-1 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.

3-2-9 Drop Test

3-2-9-1 Tested on Hardwood 6 times, once every 4 times [Dropping at 100cm after battery insertion]

3-2-9-1-1 No Top / Bottom Widening and Crack

3-2-9-1-2 There should be no stick phenomenon due to the rubber deviation.

3-2-9-1-3 There should be no other unusual phenomenon.

3-2-10 Static test

3-2-10-1 Place the R / C with the battery inserted on the copper plate and perform the static test

3-2-10-1-1 ± 10 kV : No problem in operation

3-2-10-1-2 ± 12 kV : No destruction

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4. Software Specification (1/15)

SKB Smart TV Control STB RCU Device Name : BRM_SA01_XXX *Remote Solution									
Position	No	Key	Code		Code		USB HID Usage Name		Description
			IR[NEC Simple repeat]	RF(BLE)	Page	Usage ID	Keyboard Page (0x07)	Consumer Page (0x0C)	
Key name	MODE1 CUSTOM 0x807F	MODE2 CUSTOM 0xF5A0	Page	Usage ID	Keyboard Page (0x07)	Consumer Page (0x0C)	Description	Description	Description
Side	1	외부입력	[0x01FE]+[0x0BF4]	[0x01FE]+[0x0BF4]					dedicated TV only key Default Samsung.LG [Source] Navi keys is working TV
Front	2	통합전원	TV 전원 + Btv 전원 + RCU VER	TV 전원 + Btv 전원 + RCU VER					order: TV 전원 + Btv 전원 + RCU VER * key press: TV 전원 * key release: Btv 전원 + RCU VER
	3	TV 전원	삼성 + LG	삼성 + LG					dedicated TV only key Default Samsung.LG
	4	스마트TV	삼성 + LG	삼성 + LG					dedicated TV only key Default Samsung.LG
	5	Google Assistant	0xD12E	0xD1E2	0x0C	0x0221		AC Search	See "HID Consumer Key code on ATT" of the "RF Protocol" sheet
	6	바로그기	0x58A7	0x587A	0x07	0x005800			
	7	홈	0x02FD	0x02DF	0x07	0x000200			order: HOME -> BRK -> BATT INFO(Key release)
	8	편성표	0x6D92	0x6D29	0x07	0x006D00			
	9	Btv 음량+	0x43BC	0x43CB	0x07	0x004300			Select [BTV volume] or [TV Volume] by slide switch on the right side - When select [Btv volume] : When 'Volume-' button is long pressed for more than 1 second, [Btv Volume-] is stopped and 'Mute' key code is transmitted.
	10	Btv 음량-	0x42BD	0x42DB	0x07	0x004200			- When select [TV volume] : Default Samsung, LG : Changed when setting TV key (iSet, TV Set, IR learning)
	11	TV 음량+	삼성 + LG	삼성 + LG					
	12	TV 음량-	삼성 + LG	삼성 + LG					
	13	▲(상)	0x49B6	0x496B	0x07	0x004900			
	14	▼(하)	0x4AB5	0x4A5B	0x07	0x004A00			
	15	◀(좌) / ▶(우) (선택/취소)	0x4BB4	0x4B4B	0x07	0x004B00			
	16	▶(우) / ▶(우) (선택/취소)	0x4CB3	0x4C3B	0x07	0x004C00			
	17	OK / (재설정/일시정지)	0x46B9	0x469B	0x0C	0x4100		Menu Pick	See "HID Consumer Key code on ATT" of the "RF Protocol" sheet
	18	채널 ▲	0x40BF	0x40FB	0x07	0x004000			
	19	채널 ▼	0x41BE	0x41EB	0x07	0x004100			
	20	이전	0x4EB1	0x4E1B	0x07	0x004E00			TV code output in Smart TV mode
	21	나가기	0x34CB	0x34BC	0x07	0x003400			TV code output in Smart TV mode
	22	마이크	0xD12E	0xD1E2	0x07	0x002300			See "HID Voice Search code on ATT" of the "RF Protocol" sheet
	23	◀(좌) / ▶(우) (선택/취소) / Red	0x609F	0x60F9	0x07	0x006000			
	24	▶(우) / ▶(우) (선택/취소) / Blue	0x639C	0x63C9	0x07	0x006300			
	25	1	0x21DE	0x21ED	0x07	0x002100			
	26	2	0x22DD	0x22DD	0x07	0x002200			
	27	3	0x23CD	0x23CD	0x07	0x002300			
	28	4	0x24DB	0x24BD	0x07	0x002400			
	29	5	0x25DA	0x25AD	0x07	0x002500			
	30	6	0x26D9	0x269D	0x07	0x002600			
	31	7	0x27D8	0x278D	0x07	0x002700			
	32	8	0x28D7	0x287D	0x07	0x002800			
	33	9	0x29D6	0x296D	0x07	0x002900			
	34	*/문자지움	0x2AD5	0x2A5D	0x07	0x002A00			
	35	0	0x20DF	0x20FD	0x07	0x002000			
	36	#문자번환	0x2BD4	0x2B4D	0x07	0x002B00			
	37	HotKey 1 (Reserved)	0x6996	0x6969	0x07	0x006900			Pre-reflection for future new services
	38	HotKey 2 (Reserved)	0x6A95	0x6A59	0x07	0x006A00			Pre-reflection for future new services
	39	HotKey 3 (Reserved)	0x6B94	0x6B49	0x07	0x006B00			Pre-reflection for future new services
특수 키 코드	40	Btv 전원	0x01FE	0x01EF	0x07	0x000100			Transmitted together when the [All Power] key is press. Transmit to IR or BT by changing IR/ST mode
	41	Mute	0x45BA	0x45AB	0x07	0x004500			- When select [Btv volume] : When 'Volume-' button is long pressed for more than 1 second, [Btv Volume-] is stopped and 'Mute' key code is transmitted.
	42	Normal Battery	0x3AC5	0x3A5C	0x07	0x003A00+0x00FFFF			
	43	Low Battery	0x3BC4	0x3B4C	0x07	0x003B00+0x00FFFF			
	44	Empty Battery	0x3CC3	0x3C3C	0x07	0x003C00+0x00FFFF			
	45	Break Data Code	0xFF00	0xFF00	0x07	0x00FFFF			IR [홈] only, BT: All Key
	46	RCU Ver#3	0xF3E0 ~ 0xF3E4						리모컨 제조사별 코드(RS) 0xF3E0~0xF3E4 : SA01(시그니처) * 하위 4비트 버전 코드 (0~4)
	47	Drag Up	0x8778	0x8787	0x07	0x008700+0x00FFFF			
	48	Drag Down	0x827D	0x82D7	0x07	0x008200+0x00FFFF			
	49	Drag Left	0x837C	0x83C7	0x07	0x008300+0x00FFFF			
	50	Drag Right	0x847B	0x84B7	0x07	0x008400+0x00FFFF			
	51	Btv control mode	0x6999	0x6999	0x07	0x006900			Code for switching BTV control mode
	52	Smart TV control mode	0x6798	0x6789	0x07	0x006700			Code for switching TV control mode
	53	Smart TV control mode noti	0x6897	0x6879	0x07	0x006800			Code to indicate that TV control mode is being used
	54	Battery Charging	0x6F90	0x6F09	0x07	0x006F00			Battery charging completion notification



기능	기능	키 조합	입력	비고
키 조합 기능	1	Unpairing	[*] + [홈]	3sec remove pairing information
	2	Re-Pairing	[*] + [배]	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)	그룹핑 번호키[1~9] + [스마트TV]	3sec setup your TV with CH+/- key in TV group
	6	IR Code Learn	[TV 전원] + [OK]	3sec
	7	Code Read Out	[스마트TV] + [외부입력]	3sec press [편성표] after entry setting mode
	8	IR Code 코드 전환	[*] + [9]	3sec Mode 1 <-> Mode 2
	9	Change BT-IR mode (BT)	[*] + [1]	3sec
	10	Change BT-IR mode (IR)	[*] + [2]	3sec
	11	Factory Default	[*] + [3]	3sec Not for User
	12	Buzzer Test	[*] + [4]	3sec stop buzzer when press any key
	13	Backlight On/Off	[*] + [5]	3sec On/Off toggle(Default: On), On: LED twice/Off: LED 4-times blink
	14	Drag Up	[*] + [UP]	Immediately
	15	Drag Down	[*] + [DOWN]	Immediately
	16	Drag Left	[*] + [LEFT]	Immediately see operation scenario
	17	Drag Right	[*] + [RIGHT]	Immediately
	18	Android Bugreport	[BACK] + [OK]	5sec

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SPECIFICATION

(TRANSMITTER REMOCON)

MODEL NO :

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4. Software Specification (2/15)

SKB 시그니처 RCU RF Protocol

1. BLE Device

RTL8762CCKF (Bluetooth v5.0: Single-Mode BLE)

2. BLE Profile & Service

GAP, GATT

HID over GATT Profile

~~Find Me Profile (call RCL4) ->~~ 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

~~SCPS(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 : 0x0005(SA01)

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)

20 44 41 xx xx xx (20 44 41 assigned by Remotesolution added)

~~00 13 78 xx xx xx (00 13 78 assigned by Movon)~~

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

6. Device Name

BRM_SA01_XXX (BLE)

B : B tv,

RM : RemoteSolution, MM : Movon, UE : UEI

XXX : MAC Address last 3 characters

7. Method of pairing

Just Works

8. Voice feature

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

ATVV: 134byte ADPCM (Details: "ATV Voice" Sheet, only BA03E)

9. HID protocol table

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

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1B	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Keycode	Usage ID	3byte	

Ex) When [Btv 전원] 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	0x1B	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	0x1B	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Payload	Reserved	0x00	1byte	
4		MIC Start	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	0x1B	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: 11.25ms	Minimum: 11.25ms	Minimum: 11.25ms
Maximum: 11.25ms	Maximum: 11.25ms	Maximum: 11.25ms
Slave Latency: 133	Slave Latency: 133	Slave Latency: 0
Supervision timeout: 10sec	Supervision timeout: 10sec	Supervision timeout: 10sec

13. Advertising interval

ADV when pairing			
		interval(min/max)	duration
Step1.	undirect	50ms	20s
Step2.	Standby state		
ADV_DIRECT when Reconnection			
		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	continuous (1.5s interval, 1 cycle)

*When inserting/removing a battery or connect charge cable:

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

* When reconnecting, 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 (Macro key)

BT release key code: 30ms

* continuous Key(generate during long press). Macro key(Key code sent automatically. Ex. 홈/Battery Info, 전원/Version In

* Based on 11.25ms interval, the following values apply: 300ms(303.75ms), 80ms(78.75ms), 30ms(33.75ms)

* In IR mode, it is necessary to secure sufficient gap between key code transmissions.

15. DIS(Device Information Service)

Property	Value	Value(ex. RS)
Serial Number String	Manufacturing date	20210819
Manufacturer Name String	Manufacturer	RemoteSolution Co.,LTD.
Model Number String	Model No	BRM_SA01
Firmware Revision String	F/W Revision	1.0
Software Revision String	Rom Patch Revision	1.0.552.8
Hardware Revision String	H/W Revision	1.0
System ID	IEEE 64bit ID(with OUI)	xxxxxxxxxxxxFF34AE14

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

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(TRANSMITTER REMOCON)

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4. Software Specification (3/15)

[i-SET Protocol]

* i-Set Service Class UUID : 0000FE0-0000-1000-8000-00805F9B34F8

* i-Set Command - UUID : 0000FE1-0000-1000-8000-00805F9B34F8

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 0x01: i-Set Start 0x02: STB screen off 0x03: STB screen on 0x04: i-Set Get TV code 0x05: Unpairing - Not implemented in STB. 0x06: i-Set Sync Disable 0x07: i-Set Sync Enable	1byte	

* i-Set Command Response - UUID : 0000FE1-0000-1000-8000-00805F9B34F8

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1b	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3		Result	0x00: NG 0x01: OK	1byte	
4	Payload	Error code Determined according to the check result, regardless of "Payload-Result".	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	1byte	
5		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 : 0000FE3-0000-1000-8000-00805F9B34F8

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	

* i-Set Key Notification - UUID : 0000FE3-0000-1000-8000-00805F9B34F8

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1b	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3		Device Type	0x00: STB 0x01: TV 0x02: Combination Device(STB + TV) 0x03 ~ 0xFF: RESERVED	1byte	
4	Payload	Physical Key	0x00: All Power - Device Type: 0x02 0x01: Power 0x02: Volume Up 0x03: Volume Down 0x04: Input(Source) 0x05: Up 0x06: Down 0x07: Left 0x08: Right 0x09: OK 0x0A: Previous 0x0B: Exit 0x0C: Smart TV Menu 0x0D: Btv 전용 Keys 0x0E ~ 0xFF: Reserved	1byte	
5		Function	0x00: TV Power Off 0x01: TV Power On 0x02 ~ 0x08: TV HDMI-1 ~ HDMI-7 0x09: TV Exit(Btv 제어 모드 변경) 0x0A ~ 0xFE: Reserved 0xFF: Normal	1byte	
6		IR State	0x00: IR Tx Fail 0x01: IR Tx Success 0x02: IR Learn	1byte	

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4. Software Specification (4/15)

SKB Android STB RCU Operation Scenarios

BT mode: BLE connected, IR mode: BLE disconnected

Bluetooth pairing scenario (BLE)

1. In the unpairing state, pressing any key(excluded key: TV전원/통합전원/TV음량+/-,외부입력) on the remote control will transmit the pairing start IR
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. When the audio BT is successfully paired with the remote control, LED Blink 5 times at 200ms (ON: 100ms, OFF: 100ms) cycle.
6. The remote controller ends Advertising after 20 seconds in BLE Advertising mode. And, Audio BT Discovery does not.
7. 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)

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 reset 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

Operation scenario when paired

1. TV key (TV전원 / TV음량+/- / 외부입력) operates irrespective of whether pairing is successful or not.
2. All other keys operate as BT. (But TV전원/통합전원/TV음량+/-,외부입력 key works only with IR)
3. In the case of BT disconnection in pairing state, all keys operate as IR.
 - 3-1. 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.
 - 1.1 During Key Press: Transmit TV power code (toggle, discret, learning)
 - When release key before transmitted 3-frame, It must be transmitted at least 3-frames.
 - 1.2 After Key release: Btv Power code -> RCU version code -> iSet HDMI Macro
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.

배터리 정보 전송 시나리오

1. Battery level transmission when the [home] key is pressed (in BT mode, BT / IR mode, IR code)
2. Detect voltage range: Min/Max Voltage divided into 3 levels (Empty / Low / Normal)
 - 2-1. Normal: 50% or more - green LED
 - 2-2. Low: 30% ~ 50% - red LED
 - 2-3. Empty: less then 30% - 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] 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.
 - (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. 3.1V or less: 0%
 - 5-2. 4.18V or higher: 100%
 - 5-3. The voltage between the above voltages is converted as a percentage.

RCU Battery charging sequence scenario

1. Battery charging (Charging cable connection status)
 - 1-1. less than 80% battery (Low/Empty) : Blinks Red LED (ON: 1000ms, OFF:1000ms)
 - 1-2. more than 80% battery (Normal) : Blinks Green LED (ON: 1000ms, OFF:1000ms)
2. Full Battery : Keeps the green LED on and transmits the battery charge completion key code (IR/BT).
3. When key is pressed/released
 - 3-1. When there is a key input, the LED stops charging indication (blinks/on) and operates as a normal scenario and transmits the keycode for that key.
 - 3-2. 5 seconds after the last key input, the LED is displayed as charging again (LED blinking/on).
4. If there is any operation while charging, the LED blinking according to the operation scenario is prioritized. (Example: When unpairing, LED blinks 5 times (250ms/250ms) If

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- Charging cable is removed: LED blinking/lighting stops and LED turns OFF
- When the battery charging cable is connected, the BLE IC becomes H/W reset (same as POR).
After completing H/W reset, it transmits the "Battery Charging" keycode (IR/BT) after 15 seconds (considering the Supervision Timeout time).

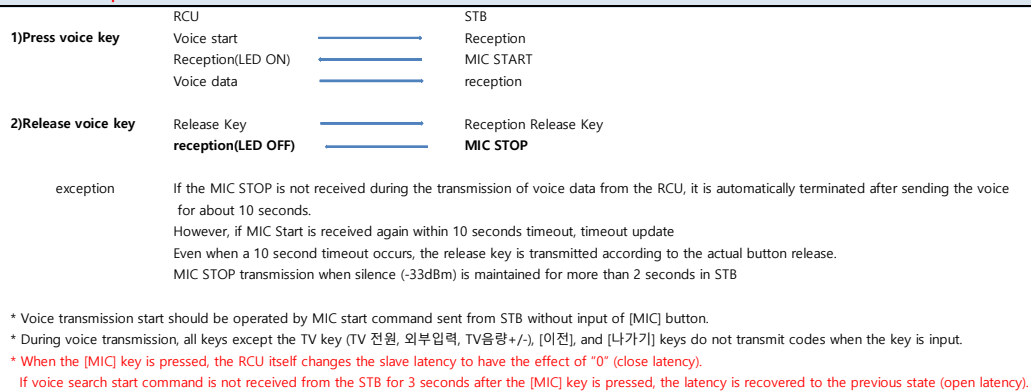
리모컨 Low Battery 동작 시나리오

- Low Voltage : 30% ~ 50% under
- RED LED ON when key code is transmitted at low voltage
- No change in BT / IR mode
- Block OTA update

리모컨 Empty Battery 동작 시나리오

- Empty Battery : less than 30%
- RED LED ON when key code is transmitted during empty voltage
- BT / IR mode maintenance
- 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
- Define the cut-off(Deep Sleep) entry level [V], and there is no action.
Ex) BT disconnection processing, IR, BT key blocking

Voice Transmission operation scenario



[OK],[FF/B] key operation scenario

- This is a function to quickly receive commands (eg, start voice search) delivered through a specific menu of the STB.
- When [OK], [FF/B] key is pressed, the RCU changes the slave latency to "0" (close latency) for 2 seconds.
 - After 2 seconds, the latency is restored to the previous state (open latency).

[Btv전원],[TV전원],[통합전원] key operation scenario

- This is a function to quickly receive STB Screen On/Off commands.
- When [Btv전원],[TV전원],[통합전원] key is pressed, the RCU changes to have the effect that the slave latency is "0" (close latency) for 2 seconds.
 - After 2 seconds, the latency is restored to the previous state (open latency).

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)
 - BLE mode operation
 - Includes all operation scenarios except IR mode operation.
 - Maintains mode information during POR / repair.

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4. Software Specification (6/15)

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 and Low battery condition

Buzzer sound output time: 1 minute

Abort when inputting any button. (Output when the button is input)

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)

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 모드

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 **40%** or higher.
 - STB shows a pop-up window indicating that OTA is impossible for other battery levels.
 - Before upgrade, turn off the back light.
2. When the OTA is upgraded, the GREEN LED turns on.
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_SA01_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

52,53,5F,52,44,36,35,41,
28,53,48,42,5F,42,52,4D,
5F,53,41,30,31,29,5F,53,
69,67,6E,61,74,75,72,65

* Remote control manufacturer information is

Address: 0x000002A00
Data Length: 8-bytes

Manufacturer	OTA Manufacturer Code (ASCII)
RemoteSolution	BRM SA01

* Remote control version information location in RCU f/w

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

F/W VERSION

[illegible]

<RemoteSolution>

<MOVON>

제조사 코드

TV Setup scenario

1. Manual setting

- 1-1. [스마트TV] + [외부입력] Press simultaneously for 3 seconds-> LED ON
- 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)
 - > the RCU transmits "Iset response data" to get the TV code from the STB.

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- TV Set type Field: 0x01: Manual(digit or autosearch) * 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 -> 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) -> the RCU transmits "Set response data" to get the TV code from the STB. - TV Set type Field: 0x01: Manual(digit or autosearch) * 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 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) -> the RCU transmits "Set response data" to get the TV code from the STB. - TV Set type Field: 0x01: Manual(digit or autosearch) * 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

- Mode 1-> Mode 2 switching
 - Press [*] + [9] keys simultaneously for 3 seconds
 - Completed after 4 LED Blinks (ON: 250ms, OFF: 250ms)
 - Mode 2-> Mode 1 switching
 - Press [*] + [9] keys simultaneously for 3 seconds
 - 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.
- Press [스마트TV] + [외부입력] key simultaneously for 3 seconds-> LED ON
 - Enter [원래메뉴] [편성표]-> LED OFF for about 1 second
 - 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
 - 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.

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4. Software Specification (8/15)

Back Light operating scenario

- Conditions for initial activation of BackLight
 - After factory default and initialization (*+3 button for 3 seconds or longer), Back Light is disabled
 - BackLight activated when BT pairing is complete.
 - ON condition
 - ON when remote pick-up
 - ON when Find me (buzzer) is running
 - ON time: It remains ON for 2 seconds, and OFF when there is no operation
 - 2 seconds extension when picking up before OFF
 - Voltage range: Low Battery or more
 - At a Empty battery, it does not turn on even if the pick up or buzzer operates.
- BackLight operating area according to RCU mode
- In Btv control mode, Enabled all area
 - In SmartTV control mode, Enable without only Number key area

* 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.

- When any key is pressed for 2 minutes, the code (IR / BT) transmission is stopped.
 - > In case of key combination in drag mode, code is stopped when pressed for 2 minutes.
- Link operation after entering Stuck Key mode
 - > RED LED ON(if all key release, LED OFF)
 - > Back light auto OFF, no reaction when pick up

* Find me should work.

BackLight manual ON/OFF setup

You can manually control the On / Off setting of the backlight.
Press [*] + [5] 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)

Android Bug Report

Set the Android Bug Report function.

Press the [이전] + [Play/Pause] keys simultaneously for 5 seconds

- > After 3 seconds of pressing the combination key, the LED will blink once (ON: 250ms, OFF: 250ms).
- > Bug Report starts after 2 seconds after 1 LED blink.
- [OK] After one key code transmission, the [BACK] key code is repeatedly transmitted every 300 ms.(BT)
- When all key released, transmit release code

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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REFORM :

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SPECIFICATION

(TRANSMITTER REMOCON)

MODEL NO :

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4. Software Specification (9/15)

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: 0x0007-> ISET_ERROR_CODE_INVALID_EDID_LENGTH

* Header information is wrong (first 8 digits of EDID data)

NG response code: 0x0004-> ISET_ERROR_CODE_INVALID_EDID_FORMAT

* When CheckSum is wrong

NG response code: 0x0002-> ISET_ERROR_CODE_CHKSUM_ERROR

* If HDMI OUI is wrong

NG response code: 0x0004-> ISET_ERROR_CODE_INVALID_EDID_FORMAT

* If "iSet command" is not defined(Check i-Set Command table in "RF Protocol" sheet)

NG response code: 0x0003-> ISET_ERROR_CODE_INVALID_COMMAND

1.5 If the validity check is completed without abnormality, proceed as follows.

1.5.1 When VID is "0"

* Send OK response code (0x0105-> 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 raw data 순서로 기재한다.
 * end mark
 */
const byte IR_TU_EDID_TABLE[] = {
    TU_VID(0x4C2D), TU_PID(0x960B), SET_NUM(341), // SAMSUNG(SAH) - LFD TV(국외 전광판/광고용)
    TU_VID(0x4C2D), TU_PID(0xFFFF), SET_NUM(226), // SAMSUNG(SAH)
    TU_VID(0x1E6D), TU_PID(0xFFFF), SET_NUM(227), // LG(LGS)
    TU_VID(0x2134), TU_PID(0xFFFF), SET_NUM(9), // HITACHI(HIT)
    TU_VID(0x20C3), TU_PID(0xFFFF), SET_NUM(66), // JVC(JVC)
    TU_VID(0x4D09), TU_PID(0xFFFF), SET_NUM(194), // SHW(SHW)
    TU_VID(0x2049), TU_PID(0xFFFF), SET_NUM(95), // PANASONIC(PNE)
    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 (0x0108-> 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 (0x0100-> 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.

If the VID & PID of the received EDID is already in the RCU

* Send OK response code (0x0106-> ISET_ERROR_CODE_IDENTICAL_VENDOR)

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 (0x0105-> 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)

After that, the STB sends EDID data to the remote control (always with or without change).

4. STB [통합전원] 버튼 동작에 따른 시나리오(BT connected 상태)

BT 가 연결된 상태에서 [통합전원] 버튼이 입력이 되면 현재 STB 전원 상태에 따라 TV 전원(토글, ON, OFF) 코드를 보낸다.

또한 STB OFF 에서 ON 되는 경우 HDMI 포트를 STB 으로 전환하기 위해 TV INPUT 코드를 3차례 반복해서 보낸다.

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.

Key action specifications

- Key push: iSet Key Noti(BT) -> TV power code(on/off or toggle) transmission

- Key release: STB power cord (BT/IR) transmission -> STB version code (IR) -> iSet Key Noti(BT) -> MACRO (TV INPUT)

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: iSet Key Noti(BT) -> TV power OFF code transmission -> STB power cord (BT/IR) transmission -> STB version code (IR)

STB power OFF status: iSet Key Noti(BT) -> TV power ON code transmission -> STB power cord (BT/IR) transmission -> STB version code (IR) -> iSet Key Noti(BT) -> MACRO (TV INPUT)

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4. Software Specification (10/15)

* MACRO output order

1. Send TV INPUT code 2 seconds after released [통합전원] Key

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)

* 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

iSet Key Noti(BT) -> TV power toggle code-> STB power cord (IR)-> 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.

* in BT disconnected : TV power ON code transmission -> STB power cord (BT/IR) transmission -> STB version code (IR)

5. 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.

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

5.1.1 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

5.1.2 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)

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

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

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

5.2.3 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.

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

6. i-Set Sync Disable/Enable Operation Scenario

This function enables/disables power and external input synchronization between STB and TV.

The command can be transmitted to the remote controller in any state of the STB.

6.1 i-Set Sync Disable(0x06)

When "iSet command 0x06" is received, the remote control disables the power and external input synchronization functions.

The deactivation state operates with the same logic as the manual setting of the TV.

- When entering the [통합전원] key, the TV power toggle code is transmitted regardless of the STB screen state.

- When entering the [통합전원] key, Block TV HDMI macro operation.

- In the STB OFF state, the TV HDMI discrete code is cut off when the [STB power] key is entered.

- If a new EDID is received in the disable state and updated to the TV tuning code, the synchronization function is activated by the remote control itself (if the TV is changed)

6.2 i-Set Sync Enable(0x07)

When iSet command 0x07 is received, the remote control activates power and external input synchronization.

7. i-Set Key Notification Operation Scenario

When entering a key defined below, the RCU sends an iSet Key notification code (for STB debugging purposes)

7.1 Defining a key

dedicated key: [통합전원], [셋톱전원], [TV전원], [TV 음량+], [TV 음량-], [외부입력]

After switching TV mode (using external input or smart TV key): 4-way key, [확인], [스마트TV], [이전], [나가기]

7.2 Key code packet: Check "i-Set Key Notification" table in "RF Protocol" sheet.

* Payload

Device Type(1-byte)	Physical Key(1-byte)	Function (1-byte)	IR State(1-byte)
---------------------	----------------------	-------------------	------------------

7.3 Key code transmission conditions(only BT connected)

It is transmitted only in the BT connected state, and is not transmitted in the BT disconnected state.

When a key is input, the i-Set key notification code is transmitted first (once), and then the assigned code is transmitted.

(EX: [통합전원] -> Right Picture)

8. Other

8.1 If TV manufacturer code is set manually after iSet setup

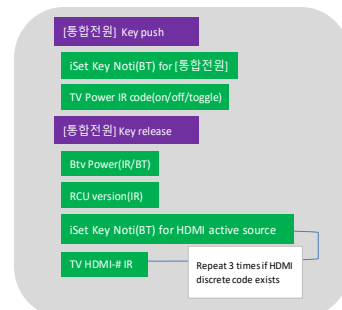
* iSet function disable: Operates regardless of STB power status.

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

8.3 If the STB Screen On/Off command is not received for 5 seconds after sending the [Btv 전원] code, the TV power transmits a toggle code when [통합전원] is input.

- That is, even if there is a TV on/off discrete code, the TV power is transmitted to the toggle because the STB power state is unknown.

- When the "Screen on/off" command is not sent: When the upgrade pop-up is exposed when entering Google Install Wizard or STB sleep mode.



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4. Software Specification (11/15)

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 - After 300ms, the HDMI discrete code (IR) of the tuned TV is transmitted 3 times - It is transmitted only when there is a discrete code in the state of BT connection and ISet synchronization. HDMI discrete code (IR) transmission interval is 1 second * 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: NIUGI, GA (BA03/BA03E), 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. 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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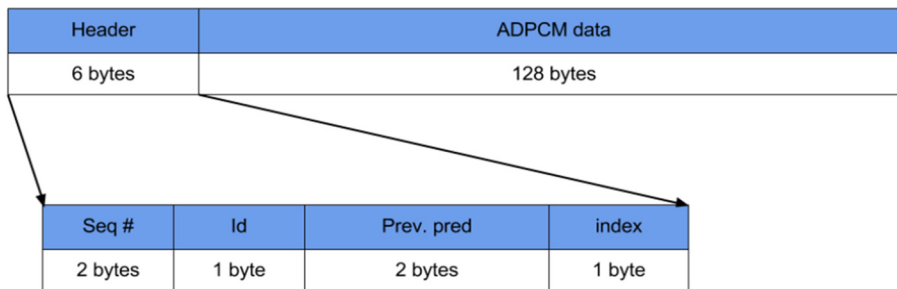
4. Software Specification (12/15)

Android TV Voice (Google Voice)

Type	Short-form	UUID	Properties
Service	ATVV_SERVICE_UUID	AB5E0001-5A21-4F05-BC7D-AF01F617B664	
Write Characteristic	ATVV_CHAR_TX	AB5E0002-5A21-4F05-BC7D-AF01F617B664	Write
Read Characteristic	ATVV_CHAR_RX	AB5E0003-5A21-4F05-BC7D-AF01F617B664	Notify
Control Characteristic	ATVV_CHAR_CTL	AB5E0004-5A21-4F05-BC7D-AF01F617B664	Notify

* VOICE_DATA - ATVV_CHAR_RX

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1B	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Att Value	Seq #	0x0000 ~ 0xFFFF	2byte	
4		Id	0x00 ~ 0xFF	1byte	
5		Prev pred	0x0000 ~ 0xFFFF	2byte	
6		Index	0x00 ~ 0xFF	1byte	
7		ADPCM Data	0x00 ~ 0xFF	128byte	



Header type	
Seq #	Sequence number of audio frame. Monotonically increasing until rollover.
Id	Remote control id. Will expand on this. [TODO]
Prev pred	Previous predicted ADPCM value
Index	Index into step size table

* AUDIO_STOP - ATVV_CHAR_CTL

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1B	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Att Value	Command	0x00	1byte	

* AUDIO_START - ATVV_CHAR_CTL

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1B	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Att Value	Command	0x04	1byte	

* DPAD_SELECT - ATVV_CHAR_CTL

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1B	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Att Value	Command	0x07	1byte	

* START_SEARCH - ATVV_CHAR_CTL

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1B	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Att Value	Command	0x08	1byte	

* AUDIO_SYNC - ATVV_CHAR_CTL : Not Implemented

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1B	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Att Value	Command	0x0A	1byte	
4		frame_num	0x0001 : exact frame number.	2byte	

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4. Software Specification (13/15)

* GET_CAPS_RESP - ATVV_CHAR_CTL

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1B	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Att Value	Command	0x0B	1byte	
4		version	0x0004 : (ver0.4)	2byte	
5		codecs_supported	0x0001 [0000_0001B]: ADPCM, 8khz/16bit (default) 0x0003 [0000_0011B]: ADPCM (8khz/16bit & 16khz/16bit) (future) 0x0005 [0000_0101B]: Opus and ADPCM 8khz/16bit 0x0007 [0000_0111B]: Opus and ADPCM (8khz/16bit & 16khz/16bit)	2byte	
6		bytes/frame	0x0086 (134 bytes, default) (future) DLE-dependent	2byte	
7		bytes/characteristic	0x0014 (20 bytes, default) (future) DLE-dependent	2byte	

* MIC_OPEN_ERROR - ATVV_CHAR_CTL

NUM	Field	Description	Values	Size	Direction
1	Opcode	Notification	0x1B	1byte	RCU -> STB
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Att Value	Command	0x0C	1byte	
4		error_code	0x0F01 : invalid codec 0x0F02 : Remote timed out waiting for Mic_open() 0x0F03 : Invalid State; already streaming audio	2byte	

* ATV_GET_CAPS - ATVV_CHAR_TX

NUM	Field	Description	Values	Size	Direction
1	Opcode	Write Request	0x12	1byte	STB -> RCU
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Att Value	Command	0x0A	1byte	
4		version	0x0005 : (ver0.5)	2byte	
5		codecs_supported	0x0001 [0000_0001B]: ADPCM, 8khz/16bit (default) 0x0003 [0000_0011B]: ADPCM (8khz/16bit & 16khz/16bit) (future) 0x0005 [0000_0101B]: Opus and ADPCM 8khz/16bit 0x0007 [0000_0111B]: Opus and ADPCM (8khz/16bit & 16khz/16bit)	2byte	

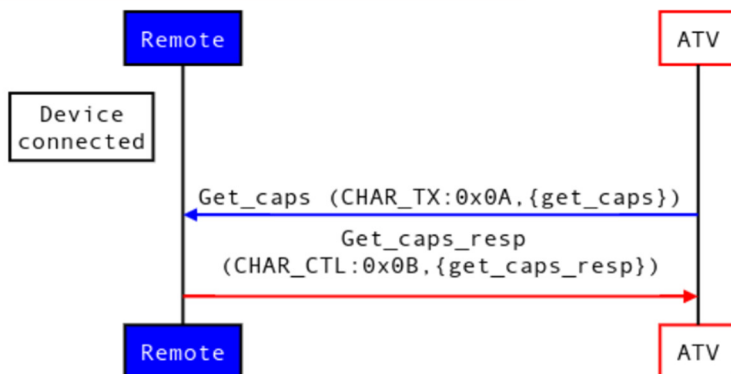
* ATV_MIC_OPEN - ATVV_CHAR_TX

NUM	Field	Description	Values	Size	Direction
1	Opcode	Write Request	0x12	1byte	STB -> RCU
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Att Value	Command	0x0C	1byte	
4		codec_used	0x0001 [0000_0001B]: ADPCM, 8khz/16bit (default) 0x0002 [0000_0010B]: ADPCM 16khz/16bit (future) 0x0004 [0000_0100B]: Opus	2byte	

* ATV_MIC_CLOSE - ATVV_CHAR_TX

NUM	Field	Description	Values	Size	Direction
1	Opcode	Write Request	0x12	1byte	STB -> RCU
2	Att Handle	Handle	0x0000 ~ 0xFFFF	2byte	
3	Att Value	Command	0x0D	1byte	

BLE Voice (ATV-Remote) Initilization

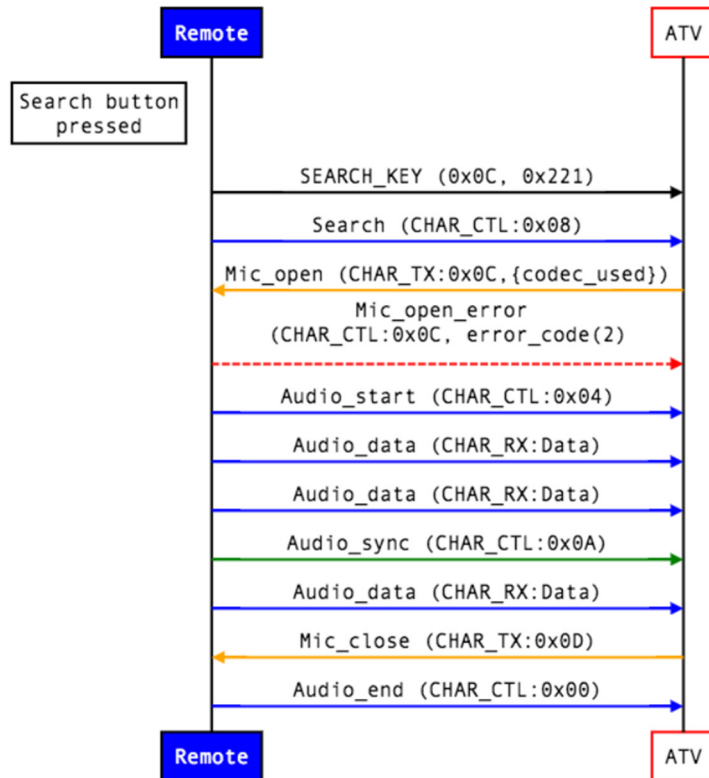


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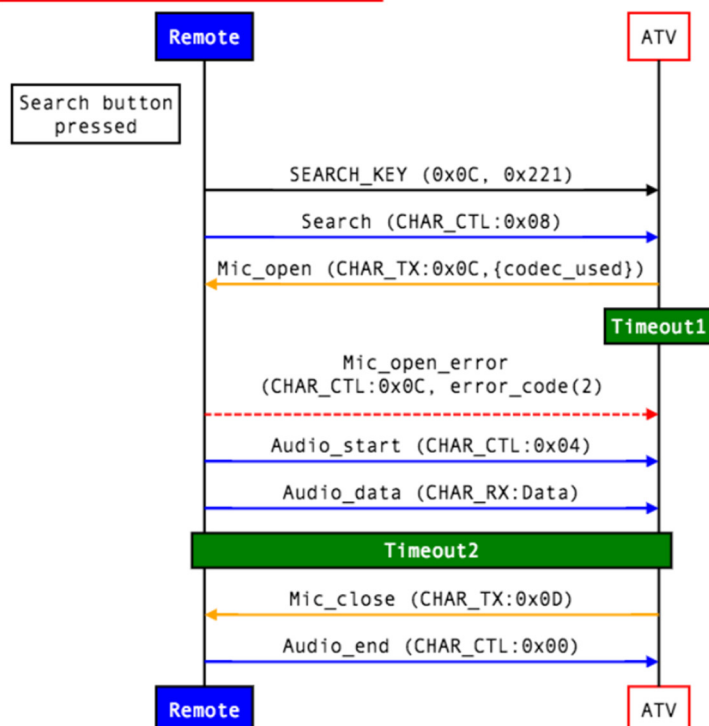
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4. Software Specification (14/15)

BLE Voice (ATV-Remote) Voice search



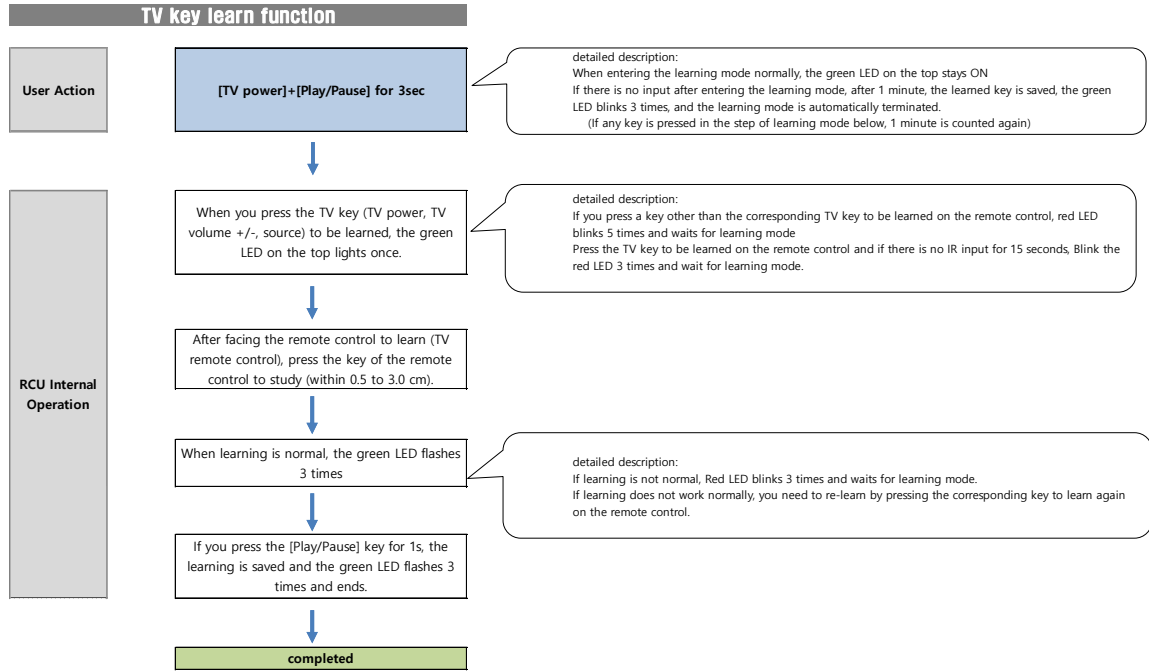
BLE Voice (ATV-Remote) Timeouts



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4. Software Specification (15/15)



* 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 at an

-> the RCU transmits "iSet response data" to get the TV code from the STB.

- TV Set type Field: 0x02: IR Learning

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5. Part List

5.1 Mechanical List

No.	Part Name	Spec	Q'ty	Maker	비고
1	Mid Case	PC/ABS, NH1017D, K21441 (B/K)	1	일상전자	
2	Bottom Cover	ABS, HF380, 9001(B/K), Black Spray, Silk2, Urethane Coating	1	일상전자	
3	IR Window	PC, 1220R, 40697B(D/R)	1	일상전자	
4	Power Knob	ABS, HF380, 9001(B/K), Black Spray,, Silk1, Soft Coating	1	일상전자	
5	Back Exit Knob	PC, 1220, Clear,, Black Spray, White Spray, Silk2, Laser, Soft Coating	1	일상전자	
6	Navi Button	PC, 1220, Clear, Black Spray, White Spray, Laser, Soft Coating	1	일상전자	
7	Play/Pause Button	PC, 1220, Clear, Black Spray, White Spray, Laser, Soft Coating	1	일상전자	
8	Side Button	ABS, HF380, 9001(B/K), Black Spray, Silk1, Urethane Coating	1	일상전자	
9	Slide Button	ABS, HF380, 9001(B/K), Black Spray,, Urethane Coating	1	일상전자	
10	Tilt Key-L	ABS, HF380, 9001(B/K), Black Spray,, Soft Coating	1	일상전자	
11	Tilt Key-R	ABS, HF380, 9001(B/K), Black Spray,, Soft Coating	1	일상전자	
12	Indicator LED	PC, LD7800, W1020J(Milky)	1	일상전자	
13	Rubber Keypad	SILICONE, COLOR1(CLEAR), Silk5, Spray2, Laser, Soft Coating	1	UNICON	
14	Number keypad	SILICONE, COLOR1(CLEAR), Silk1, Spray1, Laser, Urethane Coating	1	UNICON	
15	Metal Dome Sheet	Φ4DR 130G 21Key, Φ5DR, 130G, 12Key	1	Leading Stars	
16	Pe Bag	PE BAG, 80X220X0.08T	0.0166	Geona Tech	
17	Carton Box	553*415*282 (60EA/1Box)	1	대흥포장	
18	Back Label	BOPP,30X42,SILK2	1	탐인쇄	
19	Pass Label	ART PAPER,15X30,SILK2	1	탐인쇄	
20	Protect Tape	TAPE, RB50	1	제이앤티	
21	Battery Foam Tape	18X18X0.3, Foam Double Tape	1	제이앤티	
22	Manual	80 Vellum Paper, 220X145, Offset 4 Color	1	아침인쇄	
23	Mini Manual	ART-R 80G, 37X60,SILK2	1	용일프린팅	

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5.2 Electronical Part List

Item	Components Name	Components Spec'	Quantity	Reference	Manufacturer
	Antenna SMD	ANTENNA CHIP, ACA3216A1CCS	1	ANT1	Inpaq
	Buzzer SMD	BUZZER SMD, BM9027S BUZZER SMD, HR-9027BT3S2 BUZZER SMD, KDM-09D-3V BUZZER SMD, BMY-2703	1	BZ1	FHD Bosan HS Tech
	FPC Connector	FPC CON, THD0509-20CL-GF(20PIN) FPC CON, FC42-S20FMA-1H(20PIN)	2	CON2,CON3	Yeonho, IRIS, Molex, Jinglai
	USB C Type Connector	Z-CF061SLB12R-A-68	1	CON4	ZDT
	Wire to Board Connector	WIRE TO B CON SMD, 12505WS-02P	1	P1	Yeonho, IRIS, Molex, Jinglai
	Analog Microphone SMD	MIC, ZTS6111(TOP) MEMS MIC, ZTS6211E (TOP)	1	MIC1	Zitek, Sanico, Knowles, BSE
	FET N-CH	FET N-CH, 2KK5009(SOT23) FET N-CH, L2N7002SLT1G(SOT23) FET N-CH, 2N7002K(SOT23) FET N-CH, PJA3430(SOT-23) FET N-CH, MMBT7002K(SOT23)	6	Q1,Q2,Q3,Q10,Q11,Q13	Kexin, PANJIT, KEC, Semtech Diodes, Onsemi, Fairchild, UTC Vishay, First silicon,Galaxy
	Transistor Chip	MMBTSD123(SOT23) TRANSISTOR NPN, KST8050(SOT23) TRANSISTOR NPN, FTC8050H(SOT23) TRANSISTOR NPN, FTC8050H(SOT23) TRANSISTOR NPN, SS8050(SOT23)	7	Q4,Q5,Q6,Q7,Q8,Q9,Q12	Kexin, PANJIT, KEC, Semtech Diodes, Onsemi, Fairchild, UTC Vishay, First silicon,Galaxy
	Schottky Diode Chip	SCHOTTKY DIODE, 1KK2104(SOD123) SCHOTTKY DIODE, MBR0540W-HAF(SOD123FL) SCHOTTKY DIODE, MBR0540T1-D(SOD123) SCHOTTKY DIODE, MBR0540(SOD123)	1	D1	Kexin, PANJIT, KEC, Semtech Diodes, Onsemi, Fairchild, UTC Vishay, First silicon,Galaxy
	Switching Diode Chip	SWITCHING DIODE, 1N4148WS(SOD323)	1	D2	
	Diode TVS	TVS DIODE, SMF5.0A(SOD123F)	1	D3	
	IR LED SMD	IR LED SMD, BIR-HMC33M-TRC-SIDE(30DEG) IR26-61C-L510-R-2G	1	IR1	BriteLED Everlight
	RGB LED SMD	YLS191/RGB/21/06A-C	1	LED1	Orient
	White LED SMD	LED, ORH-W46A-W(WHITE,W7,W8V27,V28) 19-213AUD-S5212-TR8 BL-HZ336G-EH54	10	LED2,LED3,LED4,LED5,LED6,LED7,LED8,LED9,LED10,LED11	Orient Everlight BriteLED
	White LED SMD	LC-S01-WB-B22H (Side View) 27-21-T1D-KPQHY-3C	4	LED14,LED15,LED16,LED17	GMA Everlight
	Photo Transistor SMD	PHOTO TRANSISTOR, PT12-21B-TR8(SMD,R/A)	1	PT1	Everlight
	Tact Switch SMD	TS24ZJ 180gf	1	SW1	
	Slide Switch SMD	MKS12C02 MINI	1	SW2	Foxeco, ALPS, EASTERN, SHOUHAN
	Inductor Chip	INDUCTOR, 3.3NH,±0.3NH,1005	1	L2	
	Inductor Chip	INDUCTOR, 3.9NH,±0.3NH,1005	1	C3	
	Power Inductor Chip	POWER INDUCTOR, PCLS2012-2R2M(2.2UH,1A)	1	L3	Murata, TDK, Sunlord, INPAQ
	Power Inductor Chip	POWER INDUCTOR, WIP252010P-2R2MLS(2.2UH)	1	L4	MAXECHO, Samsung, Chilisn Fenghua, Pikcor, Darfon
	Ceramic Capacitor Chip	MLCC, 1.2PF,NP0,±0.25PF,1005	2	C5,C6	
	Ceramic Capacitor Chip	MLCC, 22PF,C0G,±5%,1005	4	C2,C55,C56,C57	
	Ceramic Capacitor Chip	MLCC, 100PF,C0G,±5%,1005	1	C29	
	Ceramic Capacitor Chip	MLCC, 150PF,X7R,±10%,1005	1	C28	MURATA, TDK, Samsung, YAGEO
	Ceramic Capacitor Chip	MLCC, 100NF,10V,X7R,±10%,1005	19	C7,C8,C9,C10,C11,C18,C19,C21,C23,C24,C25,C30,C31,C32,C39,C45,C46,C52,C54	Taiyo-uden, WAL SIN, Darfon samhwa, AVX, Kyocera, KEMET
	Ceramic Capacitor Chip	MLCC, 1UF,X5R,±10%,1005	12	C1,C12,C15,C17,C20,C22,C35,C36,C42,C43,C47,C48	Eyang, Fenghua, NIC Componets Pikcor, LRC
	Ceramic Capacitor Chip	MLCC, 4.7UF,X5R,±20%,1005	5	C13,C16,C44,C49,C51	
	Ceramic Capacitor Chip	MLCC, 10UF,10V,X5R,±10%,1608	4	C14,C26,C27,C50	
	Ceramic Capacitor Chip	MLCC, 22UF,6.3V,X5R,±20%,1608	3	C33,C38,C41	
	Resistor Chip	RESISTOR CHIP, 0 OHM,1/8W,±5%,2012	2	R24,R82	
	Resistor Chip	RESISTOR CHIP, 0 OHM,1/16W,±5%,1005	1	L1,R88	
	Resistor Chip	RESISTOR CHIP, 2 OHM,1/16W,±5%,1005	1	R1	
	Resistor Chip	RESISTOR CHIP, 3.3 OHM,1/10W,±5%,1608	1	R22	
	Resistor Chip	RESISTOR CHIP, 10 OHM,1/16W,±5%,1005	1	R2	
	Resistor Chip	RESISTOR CHIP, 100 OHM,1/16W,±5%,1005	4	R60,R61,R84,R85	
	Resistor Chip	RESISTOR CHIP, 150 OHM,1/16W,±5%,1005	4	R73,R74,R75,R76	
	Resistor Chip	RESISTOR CHIP, 300 OHM,1/16W,±5%,1005	10	R9,R42,R43,R44,R45,R46,R47,R48,R49	
	Resistor Chip	RESISTOR CHIP, 470 OHM,1/16W,±5%,1005	10	R16,R18,R20,R31,R35,R36,R37,R52,R57,R79	
	Resistor Chip	RESISTOR CHIP, 560 OHM,1/16W,±1%,1005	2	R41,R65	
	Resistor Chip	RESISTOR CHIP, 680 OHM,1/16W,±1%,1005	1	R40	ABCO, YAGEO, TYCO, Cosmetech
	Resistor Chip	RESISTOR CHIP, 1K OHM,1/16W,±5%,1005	1	R30	Samsung, ROHM, TA-I, WAL SIN
	Resistor Chip	RESISTOR CHIP, 2.7K OHM,1/16W,±5%,1005	1	R15	PILKCOR, Fenghua, AVX, Murata
	Resistor Chip	RESISTOR CHIP, 4.7K OHM,1/16W,±5%,1005	3	R3,R4,R13	TDK, Taiyouden, Darfon, Eyang KEMET, Kyocera, NIC Dampenets
	Resistor Chip	RESISTOR CHIP, 5.1K OHM,1/16W,±1%,1005	2	R66,R67	
	Resistor Chip	RESISTOR CHIP, 10K OHM,1/16W,±5%,1005	5	R8,R23,R26,R69,R71	
	Resistor Chip	RESISTOR CHIP, 18K OHM,1/16W,±1%,1005	1	R14	
	Resistor Chip	RESISTOR CHIP, 33K OHM,1/16W,±5%,1005	1	R34	
	Resistor Chip	RESISTOR CHIP, 47K OHM,1/16W,±1%,1005	5	R25,R29,R72,R81,R83	
	Resistor Chip	RESISTOR CHIP, 82K OHM,1/16W,±5%,1005	3	R27,R62,R63	
	Resistor Chip	RESISTOR CHIP, 100K OHM,1/16W,±5%,1005	13	R17,R19,R21,R32,R33,R38,R39,R53,R58,R59,R68,R80,R89	
	Resistor Chip	RESISTOR CHIP, 220K OHM,1/16W,±1%,1005	1	R70	
	Resistor Chip	RESISTOR CHIP, 240K OHM,1/16W,±1%,1005	1	R54	
	Resistor Chip	RESISTOR CHIP, 820K OHM,1/16W,±1%,1005	2	R28,R55	
	THERMISTOR CHIP	THERMISTOR CHIP, TSM0B103F3381RZ	1	R64	THINKING ELECTRONICS
	Bluetooth IC	BLUETOOTH IC, RTL8762CKF(QFN48)	1	U1	Realtek
	Accelerometer IC	ACCELEROMETER IC, DA218B(LGA12)	1	U3	MiraMEMS
	Battery Charger IC	BAT CHARGER, BQ25101YFPR(DSBGA)	1	U6	TI
	Step Down Converter IC	DC-DC IC, TPS62840YBGR(DSBGA)	1	U7	TI
	Crystal SMD	X-TAL SMD, 40MHZ,7R40000002_S1,2016 X-TAL SMD, 40MHZ,±10PPM,9PF,2016	1	X1	TXC, H&S, Sunny
	Li-Polymer Battery	YJ 602535-485mAh	1		YJ Power
	PCB	PCB, RD65A(FR-4,1.2T,4L,OSP,CARBON)	1		GE, SSSG, JSL, PENG YU

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(TRANSMITTER REMOCON)

MODEL NO :

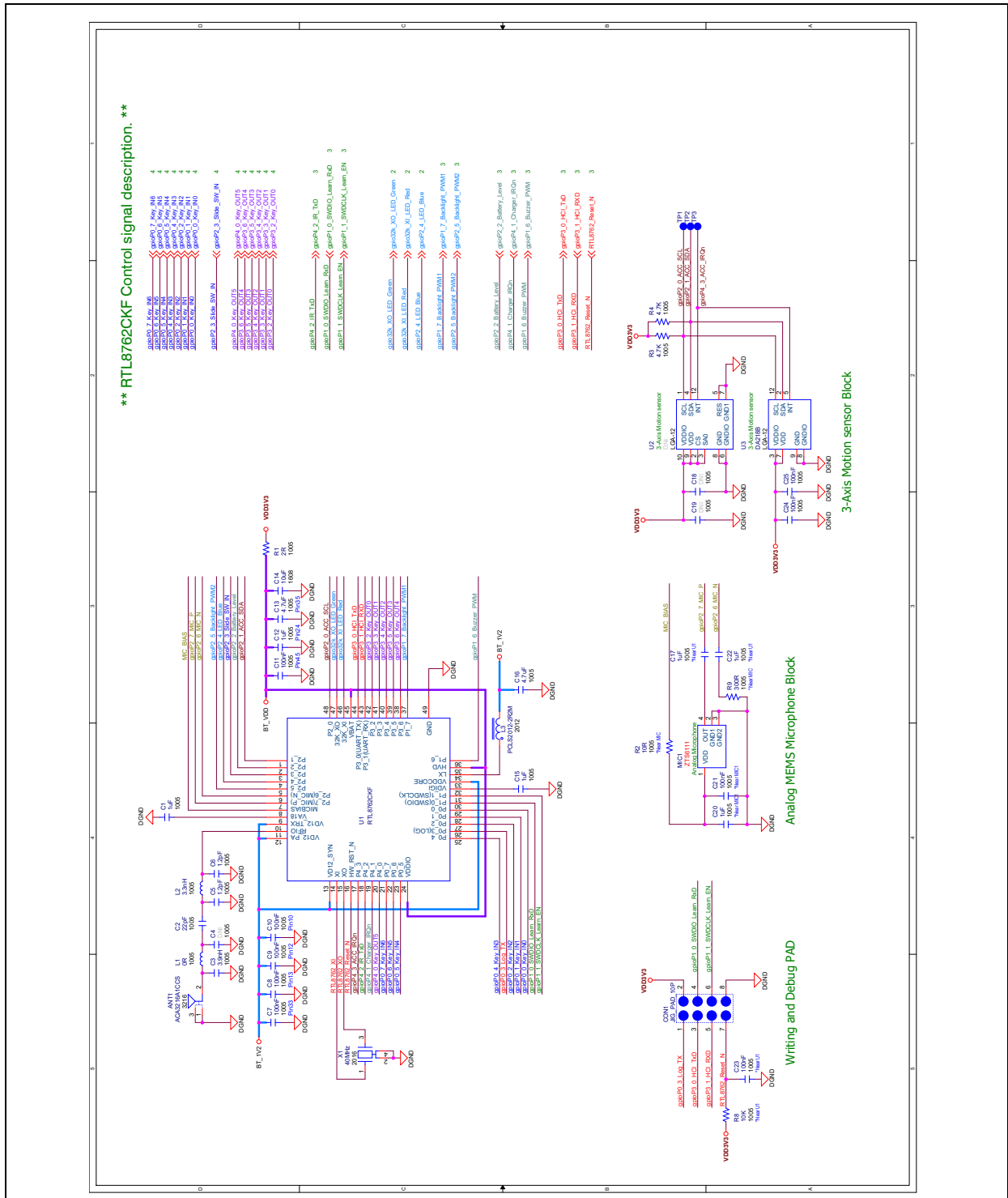
RD65B00

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6. Schematics

6.1 Bluetooth smart PART



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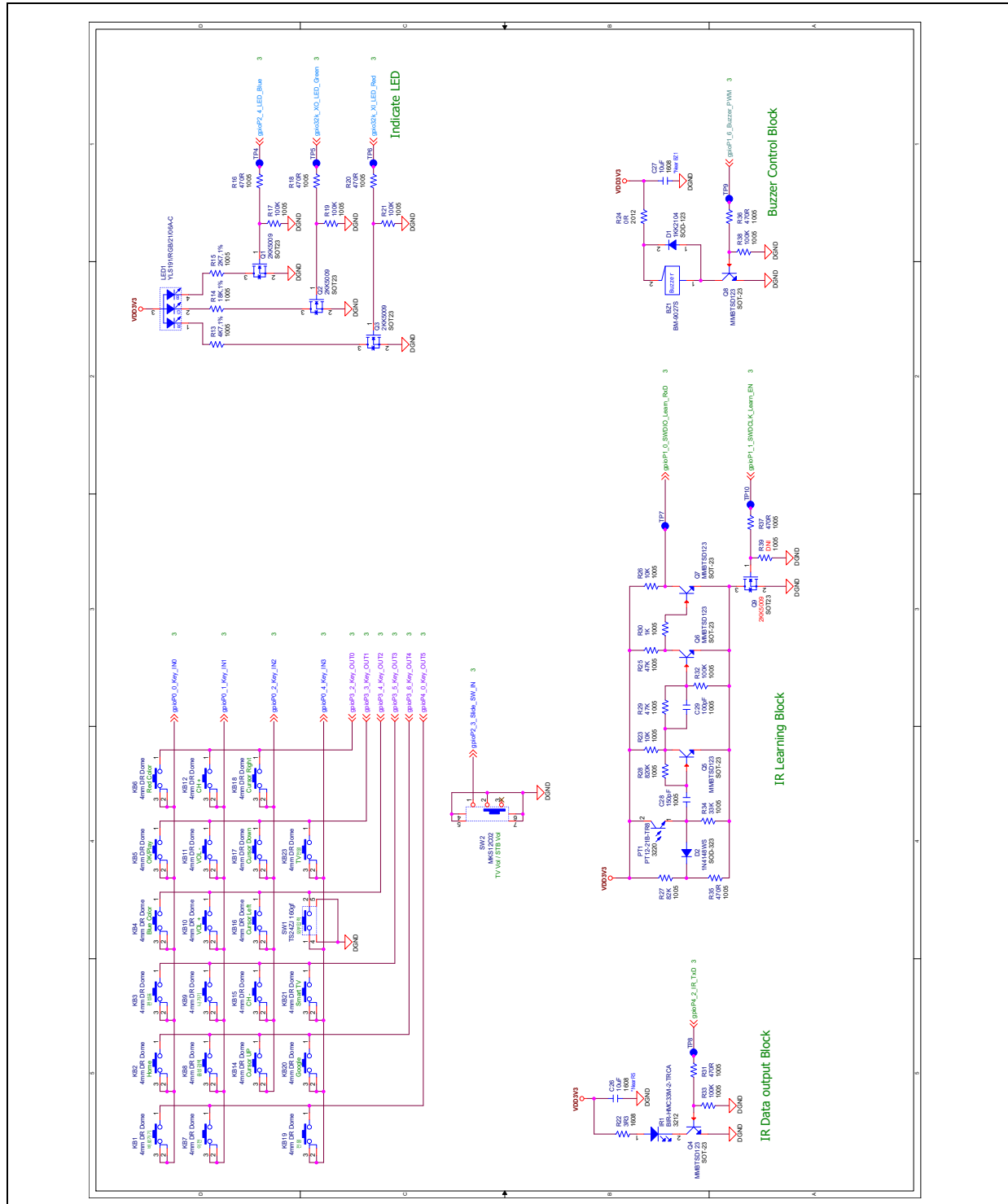
MODEL NO :

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6.2 Keys / IR Learning / IR TxD / Buzzer PART



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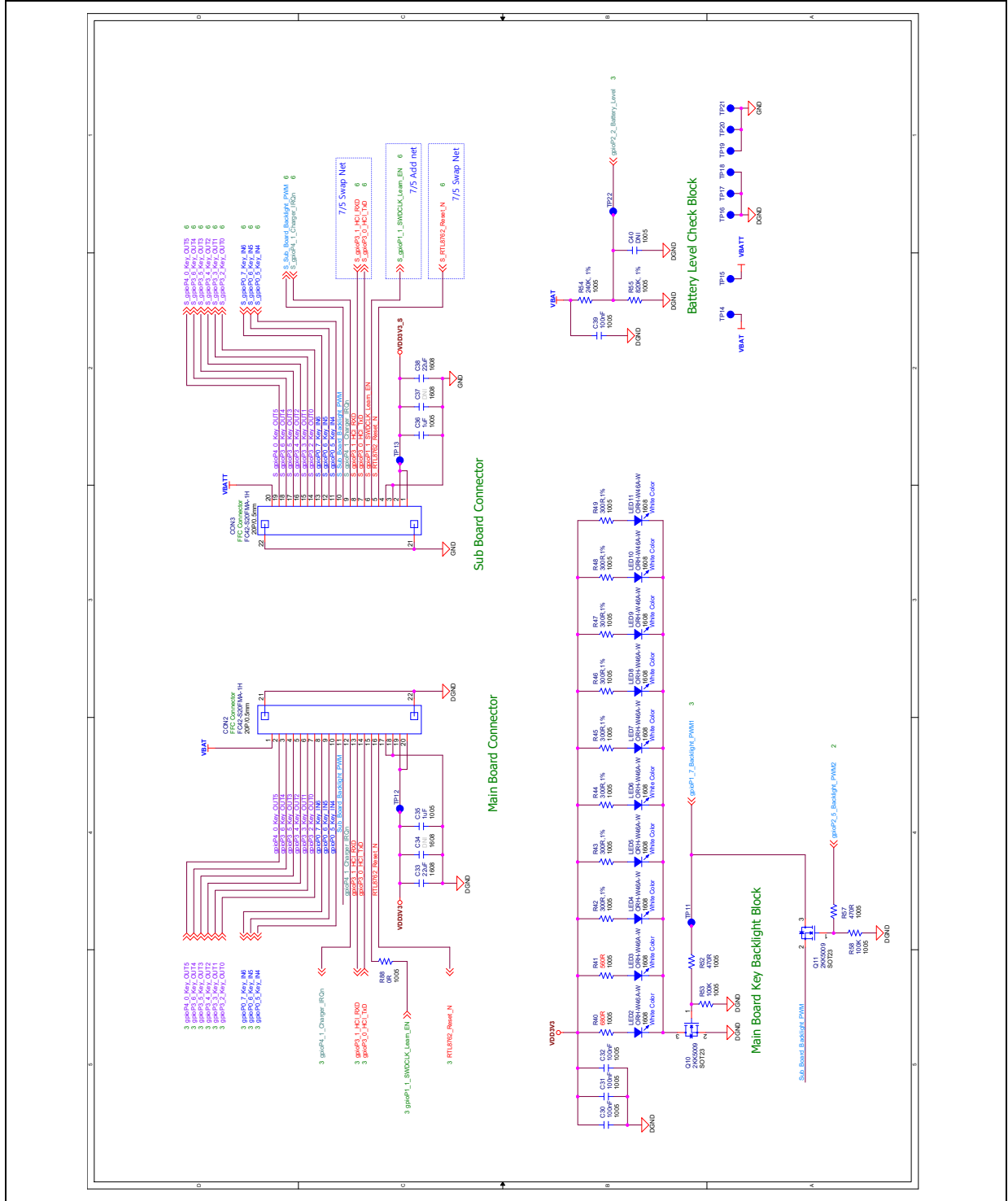
MODEL NO :

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6.3 FFC Connector / Backlight



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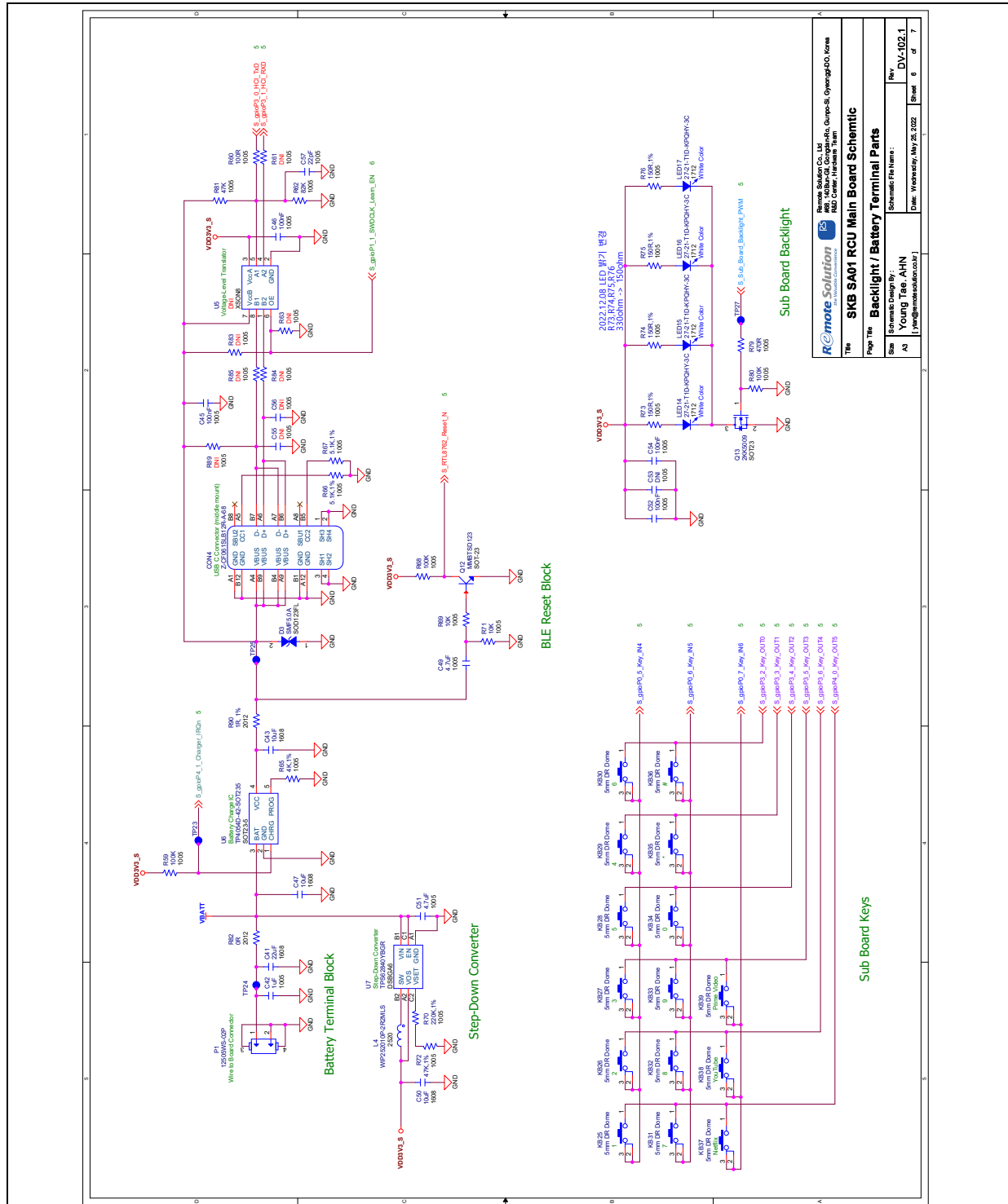
MODEL NO :

RD65B00

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6.4 Backlight / Battery Terminal Part

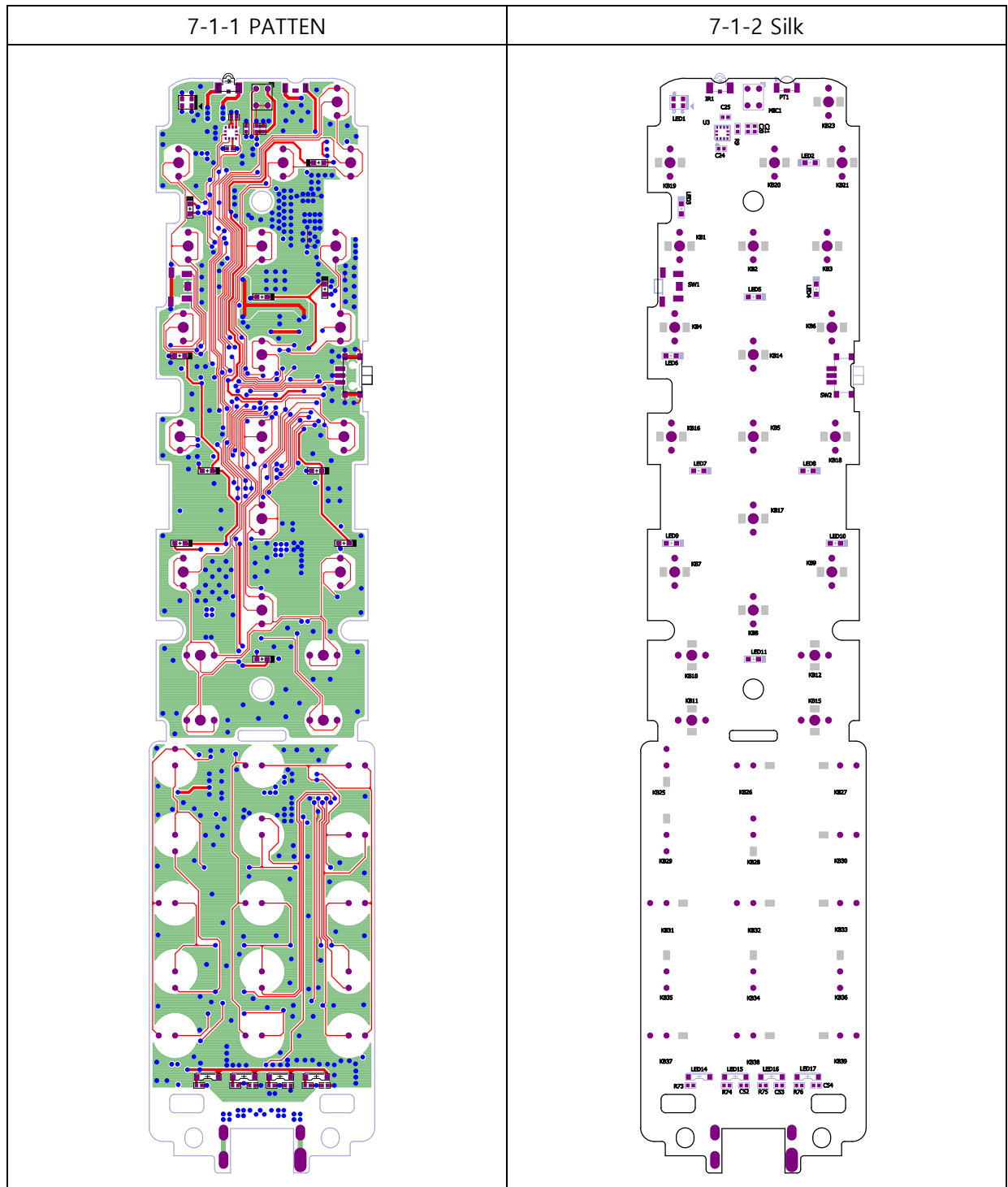


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7. PCB Diagram

7.1 TOP PCB (1/3)



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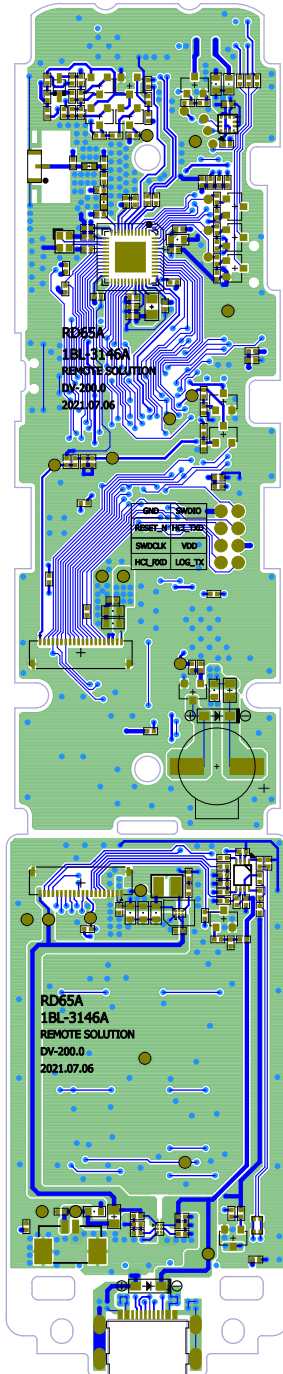
RD65B00

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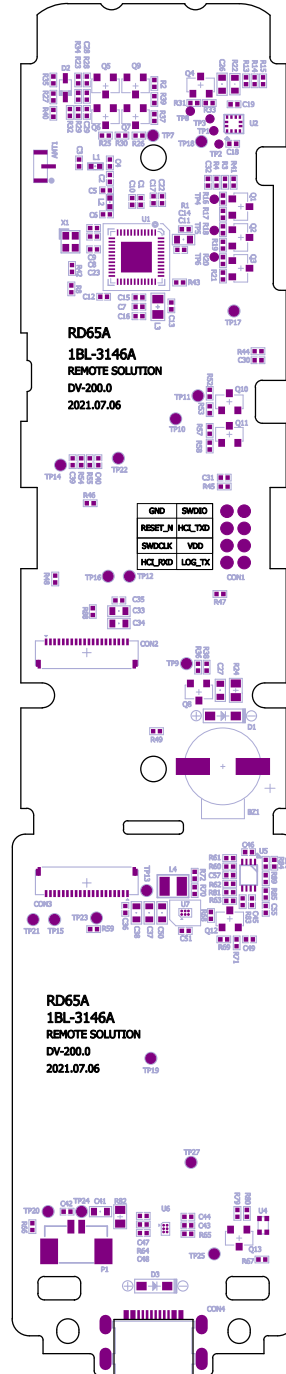
71

7.2 BOTTOM PCB (2/3)

7-1-3 PATTEN



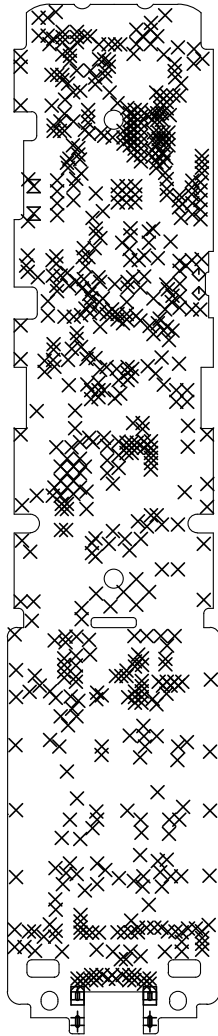
7-1-4 Silk



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7.3 MAIN PCB (3/3)

7-1-5 Drill Chart	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 - 33.0_mm x 168.8mm Array – 160.2_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-3146A																														
<table><tr><th>SIZE</th><th>QTY</th><th>SYM</th><th>PLATED</th><th>TOL</th></tr><tr><td>0.6 x 1.8</td><td>2</td><td>+</td><td>YES</td><td>+/-0.0</td></tr><tr><td>0.3</td><td>626</td><td>×</td><td>YES</td><td>+/-0.0</td></tr><tr><td>0.6 x 1.4</td><td>2</td><td>□</td><td>YES</td><td>+/-0.0</td></tr><tr><td>0.9</td><td>2</td><td>◇</td><td>NO</td><td>+/-0.0</td></tr><tr><td>0.9</td><td>2</td><td>⊗</td><td>YES</td><td>+/-0.0</td></tr></table>	SIZE	QTY	SYM	PLATED	TOL	0.6 x 1.8	2	+	YES	+/-0.0	0.3	626	×	YES	+/-0.0	0.6 x 1.4	2	□	YES	+/-0.0	0.9	2	◇	NO	+/-0.0	0.9	2	⊗	YES	+/-0.0	
SIZE	QTY	SYM	PLATED	TOL																											
0.6 x 1.8	2	+	YES	+/-0.0																											
0.3	626	×	YES	+/-0.0																											
0.6 x 1.4	2	□	YES	+/-0.0																											
0.9	2	◇	NO	+/-0.0																											
0.9	2	⊗	YES	+/-0.0																											

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SPECIFICATION

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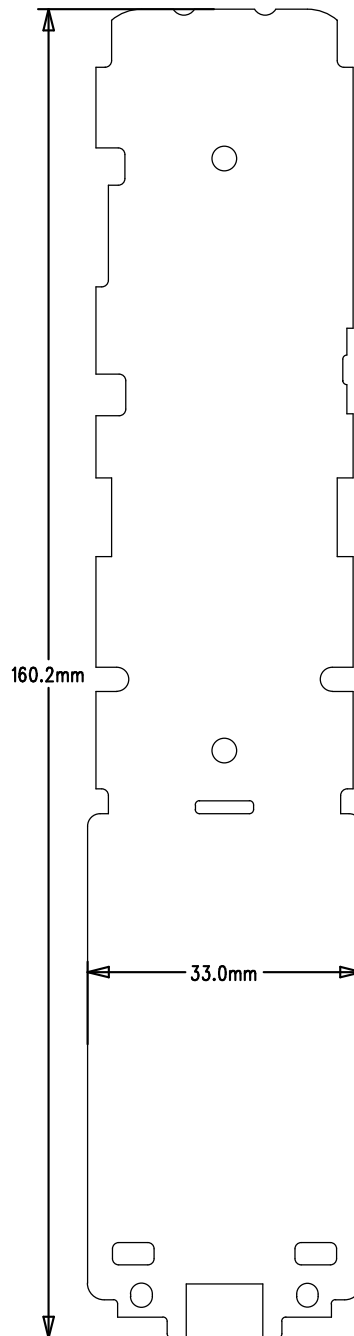
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8. PCB Outline Specification – Main PCB



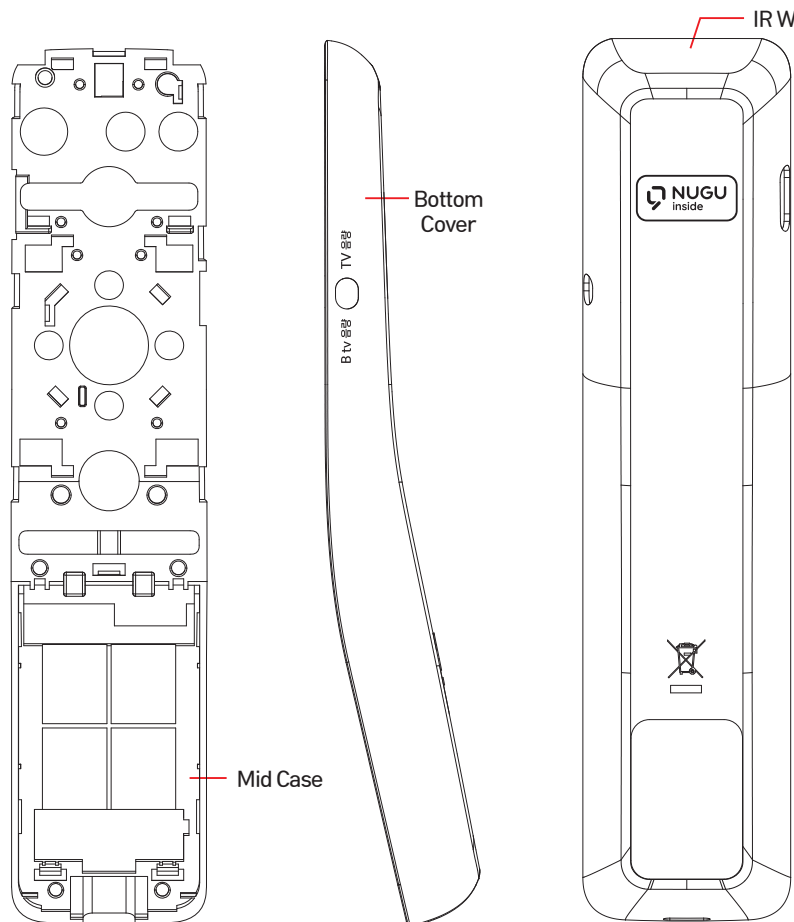
RD65A SKB Signature-070 – Thu Jul 08 10:22:24 2021

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9. Design & Mechanical Specification

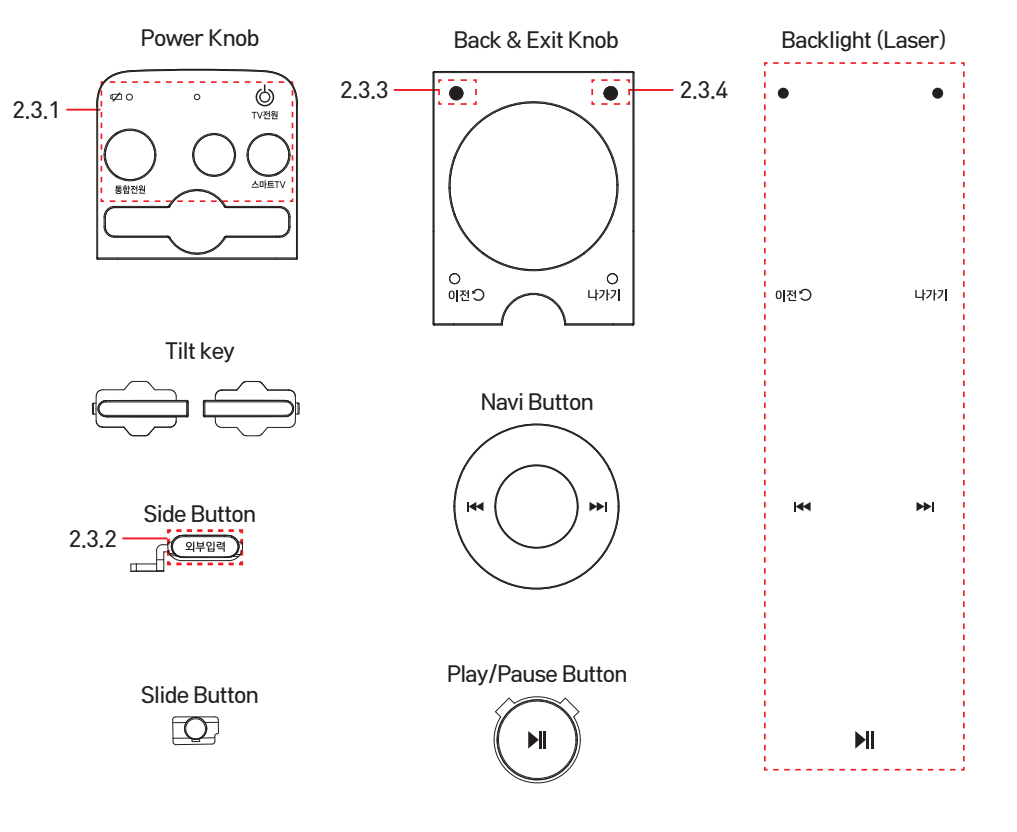
9. Design (1/5) – Mold

DESIGN SPECIFICATION Model : RD65B00 	
1.MOLD 1.1 MOLD COLOR * Mid Case : PC/ABS, NH1017D, K21441(Black) * Bottom Cover : ABS, HF380, 9001(Black) * IR Window : PC, D/Red 1.2 SPRAY COLOR * Bottom Cover : Black, Urethane Coating (Matte) 1.3 SILK COLOR * Coolgray 5C	

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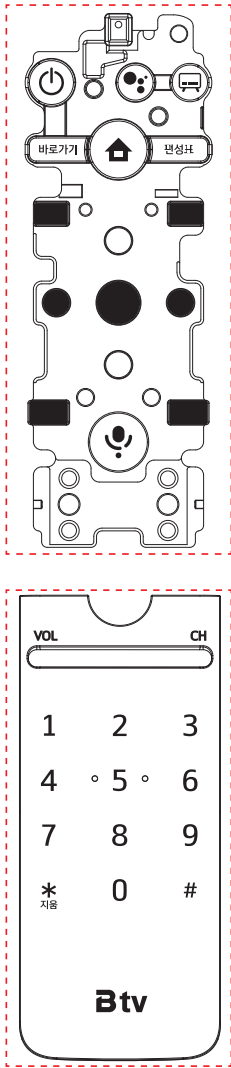
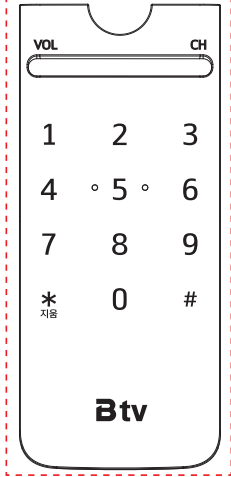
9. Design (2/5) – KNOB

DESIGN SPECIFICATION		Model : RD65B00
		
2.KNOB 2.1 MOLD COLOR * Power, Tilt, Side, Slide : ABS, HF380, 9001(Black) * Back & Exit, Navi, Play/Pause : PC, 1220(Clear) 2.2 SPRAY COLOR * Power, Tilt : Black, SF Coating (Matte) * Back & Exit, Navi, Play/Pause : White, Black, SF Coating (Matte) * Side, Slide : Black, Urethane Coating (Matte) 2.3 LASER ETCHING * Back & Exit, Navi, Play/Pause 2.4 SILK COLOR 2.3.1 White 2.3.2 Coolgray 5C 2.3.3 P/T 7619C (Red) 2.3.4 P/T 660C (Blue)		

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9. Design (3/5) – RUBBER

DESIGN SPECIFICATION		Model : RD65B00
	3.2.1  3.2.2  3.2.3  3.2.4 	3.2.1  3.2.2  3.2.3  3.2.4  LASER
	3.3.3  3.3.4 	LASER (CLEAR VIEW) LASER
3.3.4 	3.2.5  3.2.6 	3.2.5  3.2.6  LASER (HIDDEN)
3.RUBBER		
3.1 RUBBER COLOR * TRANSLUCENCE WHITE	3.2 SILK COLOR 3.2.1 P/T 7619C 3.2.2 P/T 7724C 3.2.3 P/T 123C 3.2.4 P/T 660C 3.2.5 WHITE 3.2.6 COOLGRAY 7C	3.3 SPRAY COLOR 3.3.1 WHITE 3.3.2 BLACK 3.3.3 SOFT COAT FINISH 3.3.4 HARD(PU) COAT FINISH

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9. Design (4/5) – LABEL

DESIGN SPECIFICATION		Model : RD65B00
Mini Manual SCALE 100% BACK Back Label SCALE 150% 5.1 Material : Art removable 80g 5.2 Size : 37 X 60mm(±0.1mm) 5.3 Silk Color : D/Gray(K90), Orange(M66, Y97) 5.4 Punching 1EA		
4.BACK LABEL	5.MINI MANUAL	
4.1 Material : White Bopp 4.2 Size : 29 X 20mm(±0.1mm) 4.3 Silk Color : Black, P/T 360C 4.4 Coating : Matte Laminating		

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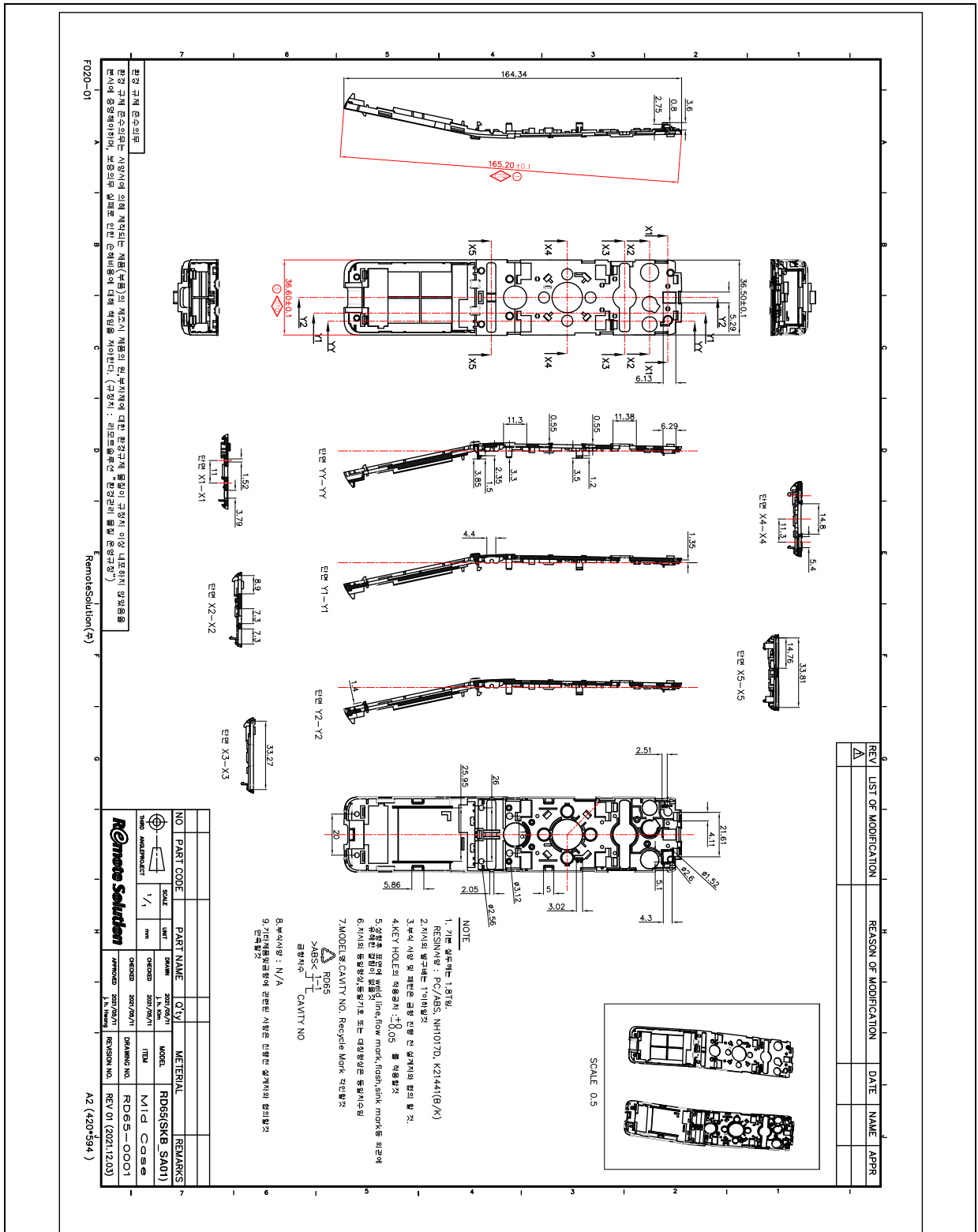
9. Design (5/5) – MANUAL

DESIGN SPECIFICATION	Model : RD65B00
Passed Label	
RS PASSED KWONY B	
간단한 문제 해결하기 ※ 아래 방법으로 문제가 해결되지 않으면 고객센터로 문의해 주십시오. (고객센터 1206) • 리모컨 작동이 정상이 아닙니다? • 배터리 교환을 확인해 주십시오. (배터리가 부족 등해 발생할 수 있는 다양한 원인이 있습니다. 배터리가 완전히 충전되어 있는지, 배터리를 올바르게 삽입했는지, 배터리를 올바르게 닫았는지 확인하십시오.) • 리모컨이 작동하지 않습니까? • SK Broadband 리모컨은 - 리모컨이 작동할 때만 작동합니다. (리모컨이 작동할 때만 작동합니다.) • 리모컨이 작동하지 않습니까? • 리모컨이 작동하지 않습니까? • 리모컨이 작동하지 않습니까? 간단한 문제 해결하기 ※ 아래 방법으로 문제가 해결되지 않으면 고객센터로 문의해 주십시오. (고객센터 1206) • 리모컨 작동이 정상이 아닙니다? • 배터리 교환을 확인해 주십시오. (배터리가 부족 등해 발생할 수 있는 다양한 원인이 있습니다. 배터리가 완전히 충전되어 있는지, 배터리를 올바르게 삽입했는지, 배터리를 올바르게 닫았는지 확인하십시오.) • 리모컨이 작동하지 않습니까? • SK Broadband 리모컨은 - 리모컨이 작동할 때만 작동합니다. (리모컨이 작동할 때만 작동합니다.) • 리모컨이 작동하지 않습니까? • 리모컨이 작동하지 않습니까? 리모컨 작동이 정상이 아닙니다? • 배터리 교환을 확인해 주십시오. (배터리가 부족 등해 발생할 수 있는 다양한 원인이 있습니다. 배터리가 완전히 충전되어 있는지, 배터리를 올바르게 삽입했는지, 배터리를 올바르게 닫았는지 확인하십시오.) • 리모컨이 작동하지 않습니까? • SK Broadband 리모컨은 - 리모컨이 작동할 때만 작동합니다. (리모컨이 작동할 때만 작동합니다.) • 리모컨이 작동하지 않습니까? • 리모컨이 작동하지 않습니까? 리모컨 작동이 정상이 아닙니다? • 배터리 교환을 확인해 주십시오. 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REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	39
REFORM :			
DECISION : 2023.03.13		RD65B00	71

10. Mechanical Spec(1/17) – Mid Case



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17

REFORM :

DECISION : 2023.03.13

SPECIFICATION

(TRANSMITTER REMOCON)

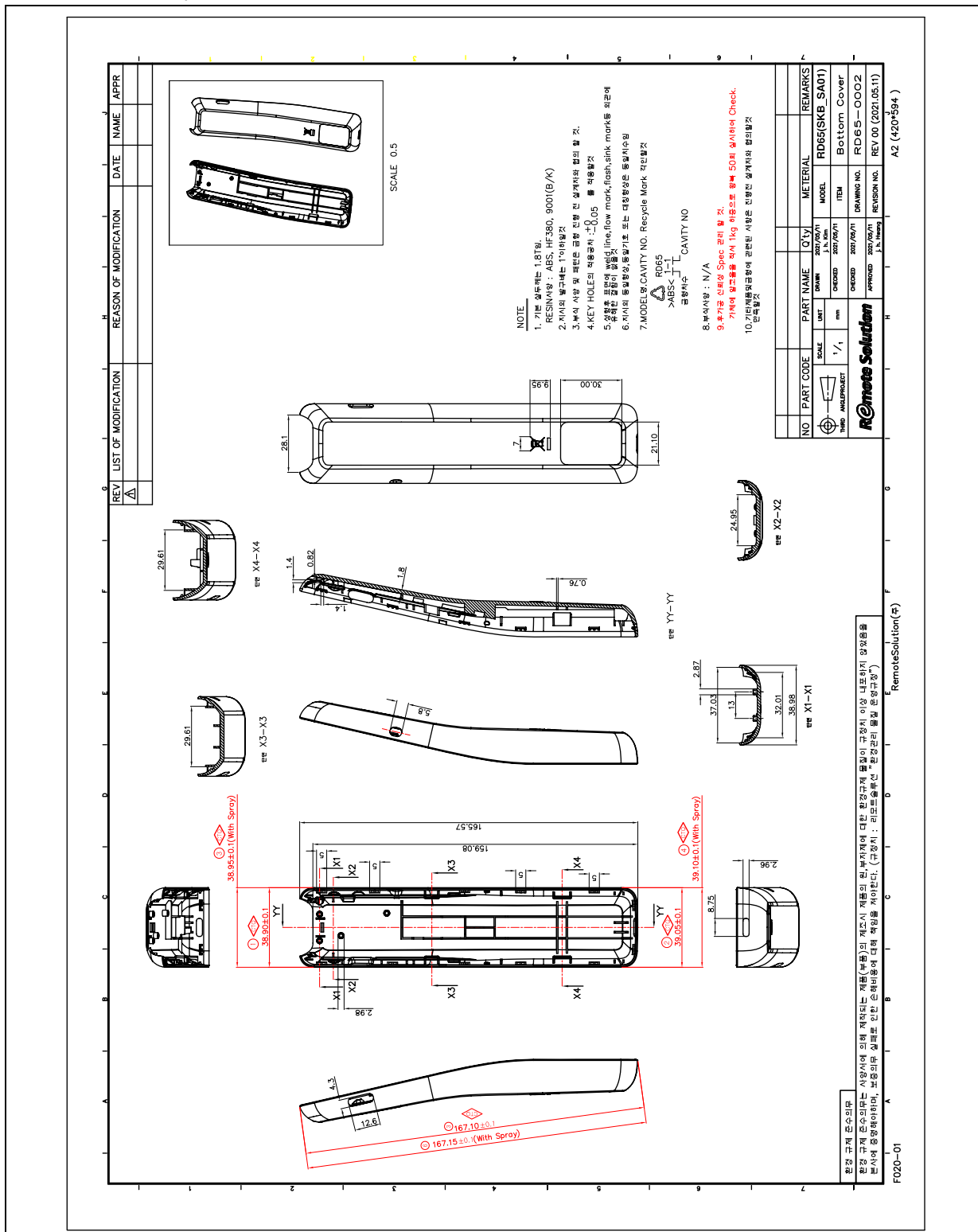
MODEL NO :

RD65B00

40

71

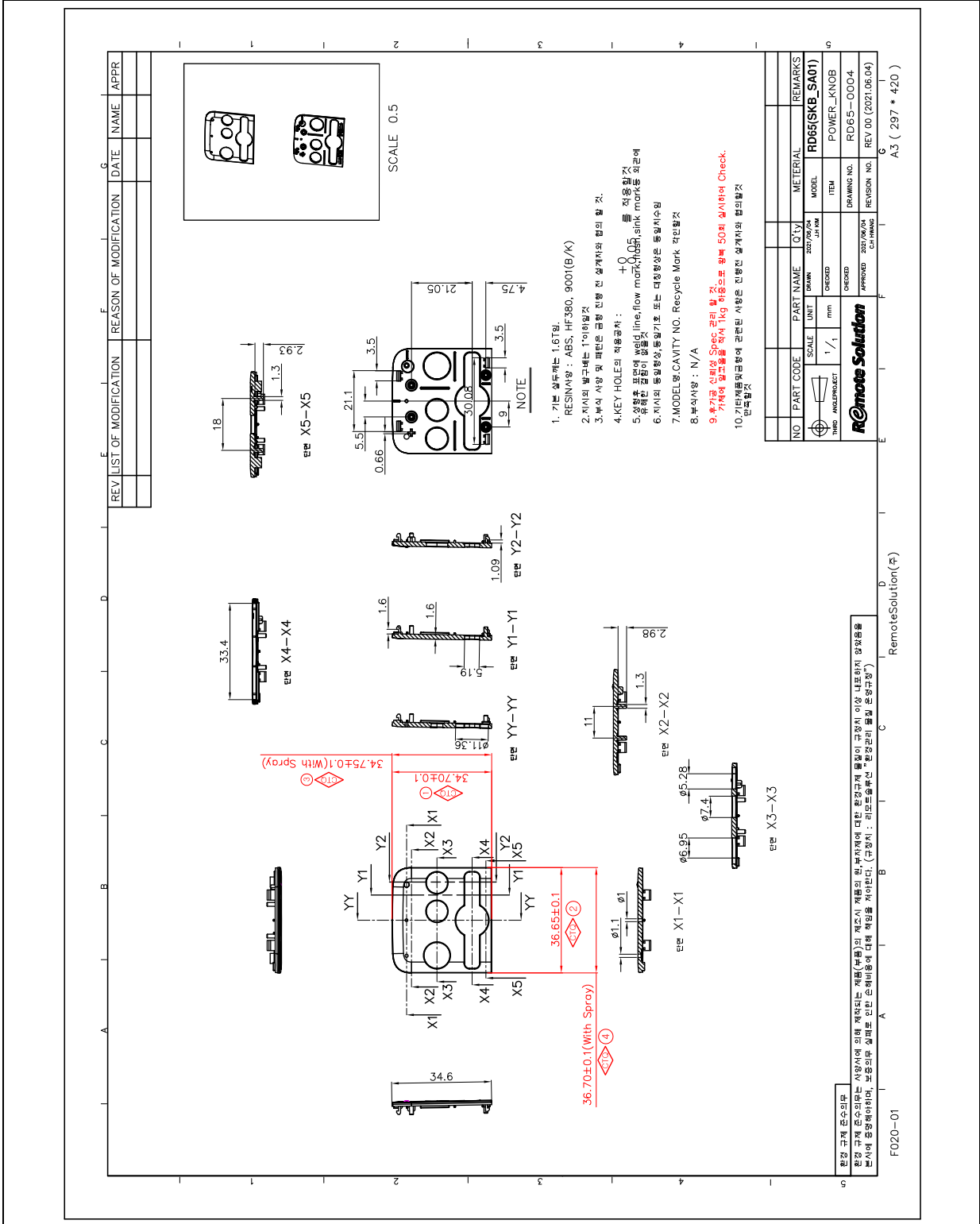
10. Mechanical Spec(2/17) – BOTTOM COVER



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	<u>SPECIFICATION</u> (TRANSMITTER REMOCON)	MODEL NO :	42
REFORM :			
DECISION : 2023.03.13		RD65B00	71

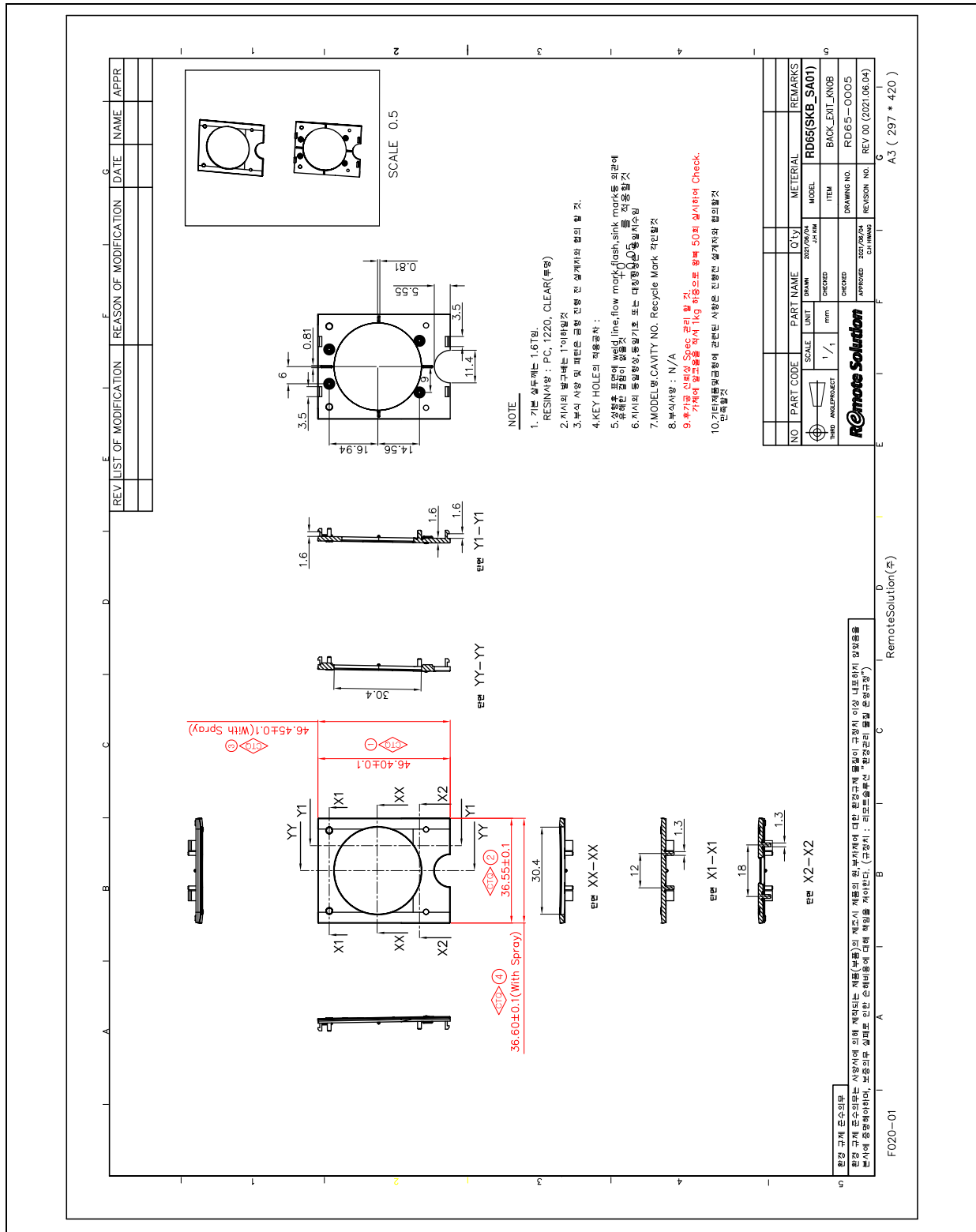
10. Mechanical Spec(4/17) – Power Konb



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	43
REFORM :			
DECISION : 2023.03.13		RD65B00	71

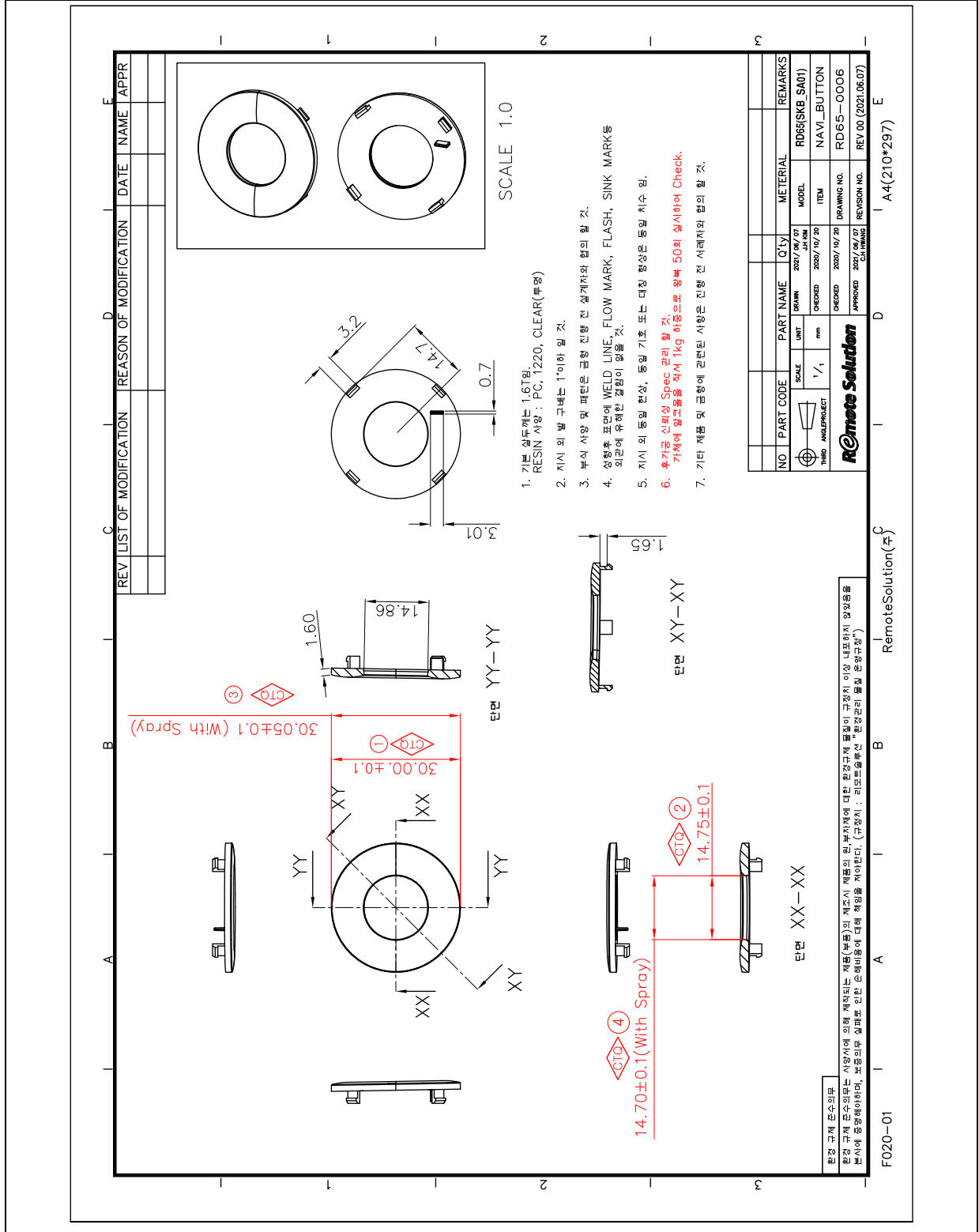
10. Mechanical Spec(5/17) – Back Exit Knob



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	44
REFORM :			
DECISION : 2023.03.13		RD65B00	71

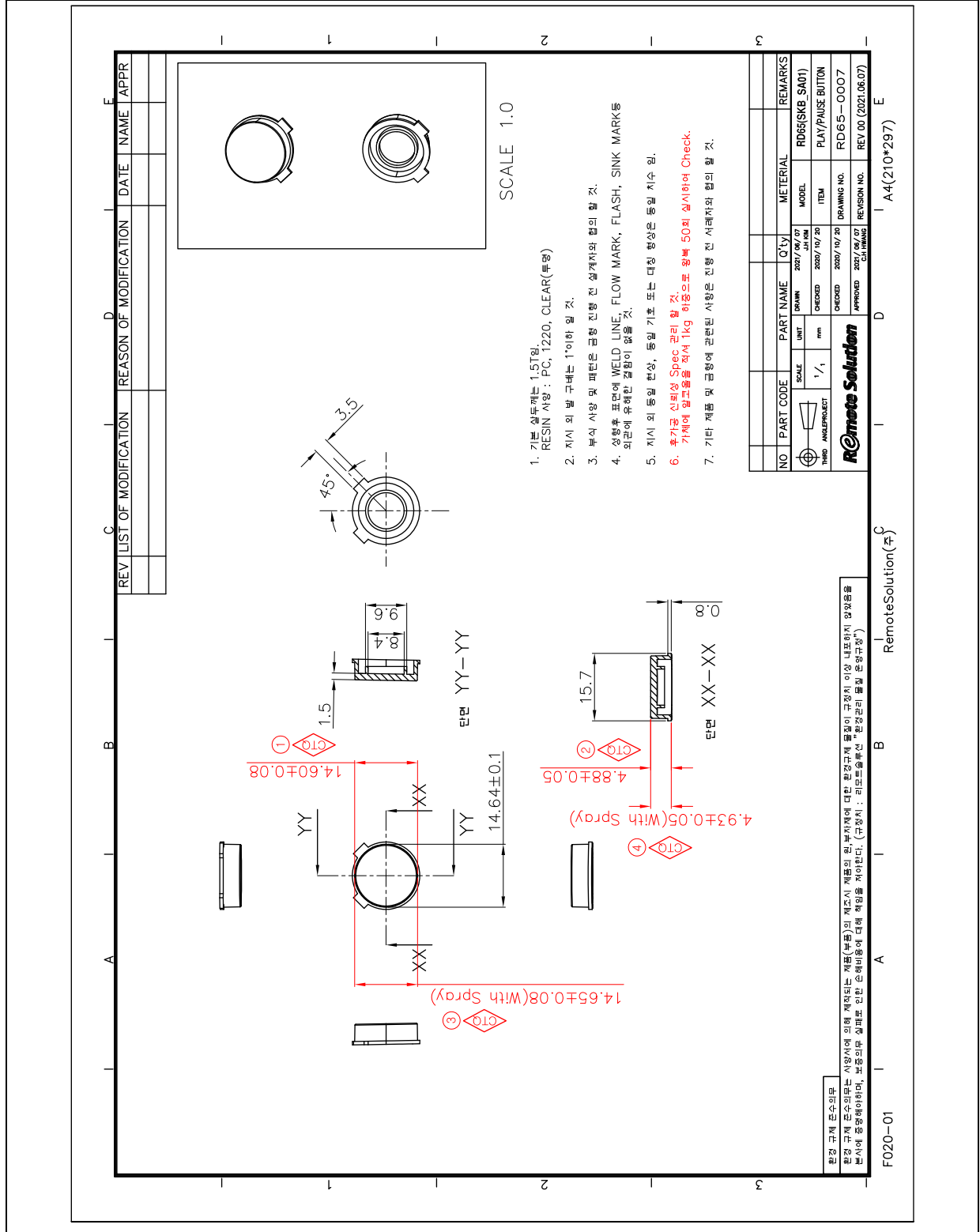
10. Mechanical Spec(6/17) – Navi Button



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	45
REFORM :			
DECISION : 2023.03.13		RD65B00	71

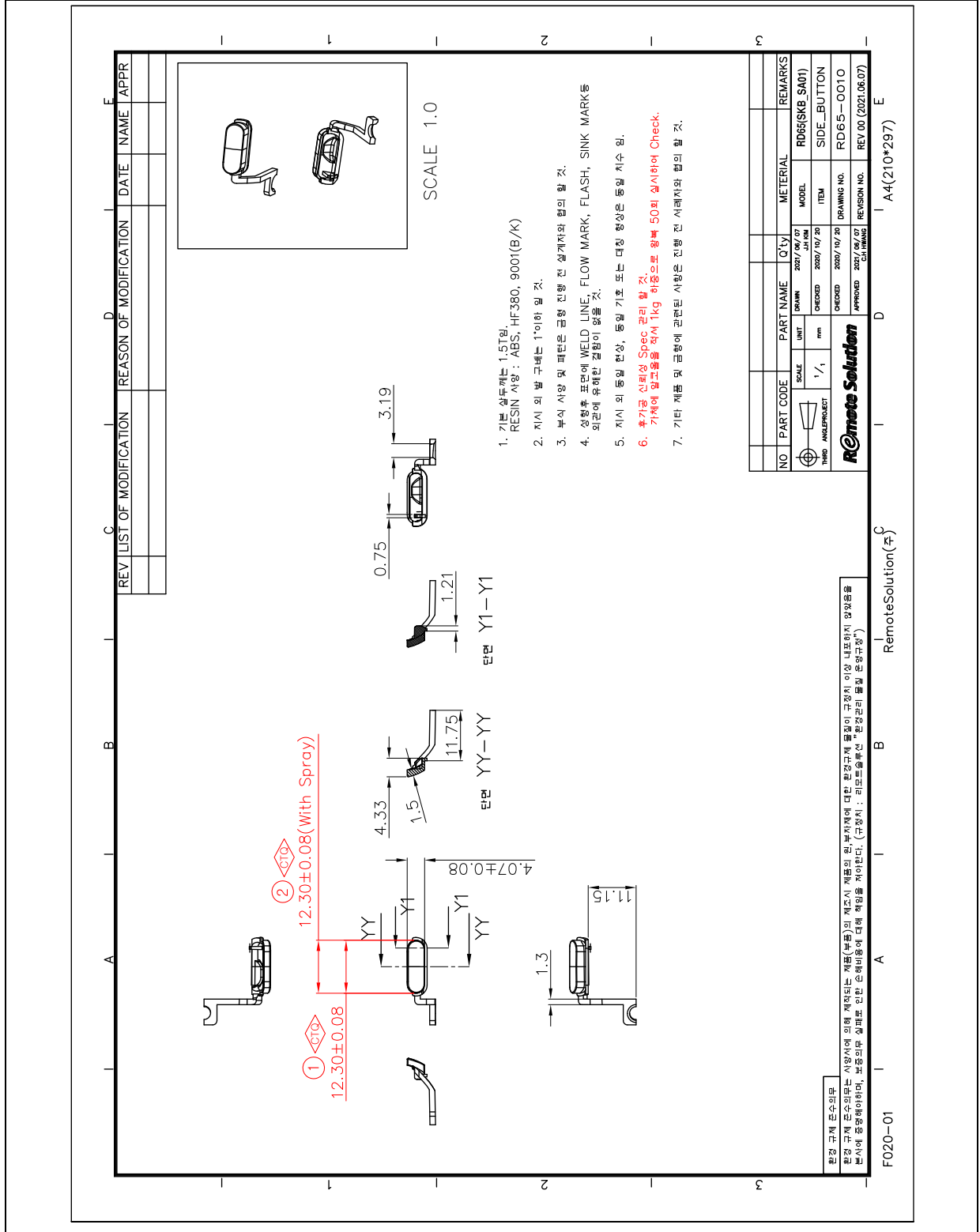
10. Mechanical Spec(7/17) – Play Pause Button



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	46 71
REFORM :			
DECISION : 2023.03.13		RD65B00	

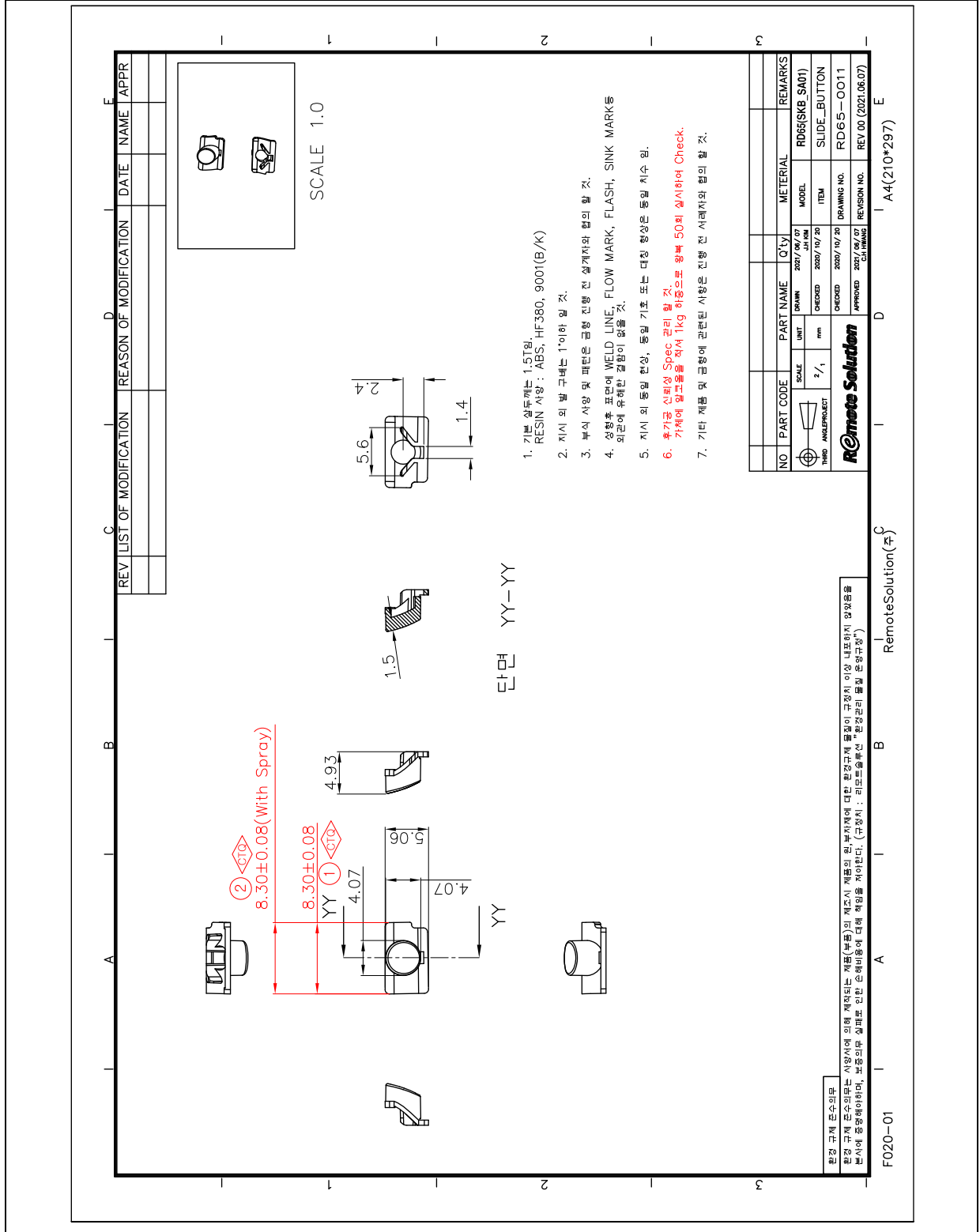
10. Mechanical Spec(8/17) – Side Button



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	47
REFORM :			
DECISION : 2023.03.13		RD65B00	71

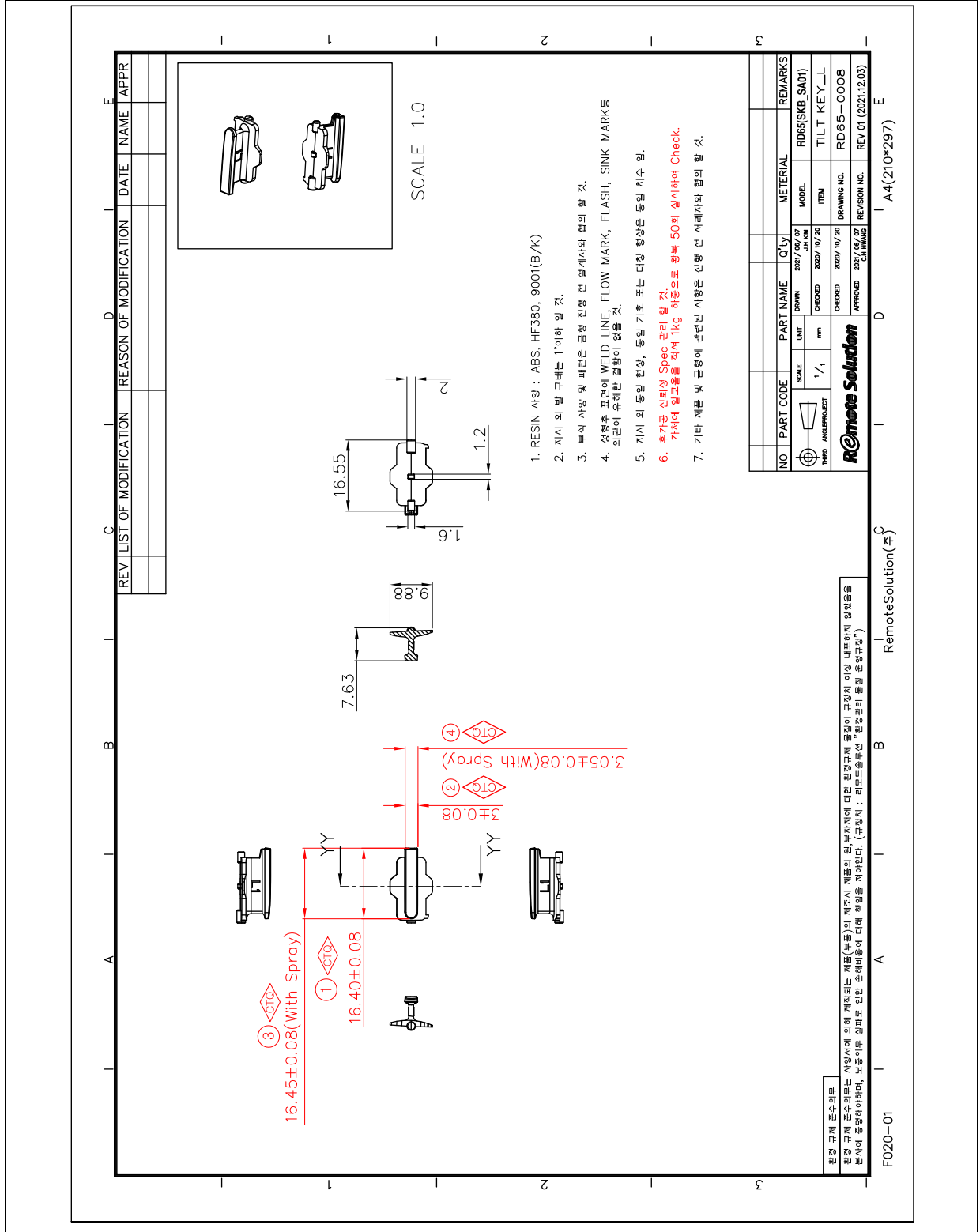
10. Mechanical Spec(9/17) – Slide Button



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	48
REFORM :			
DECISION : 2023.03.13		RD65B00	71

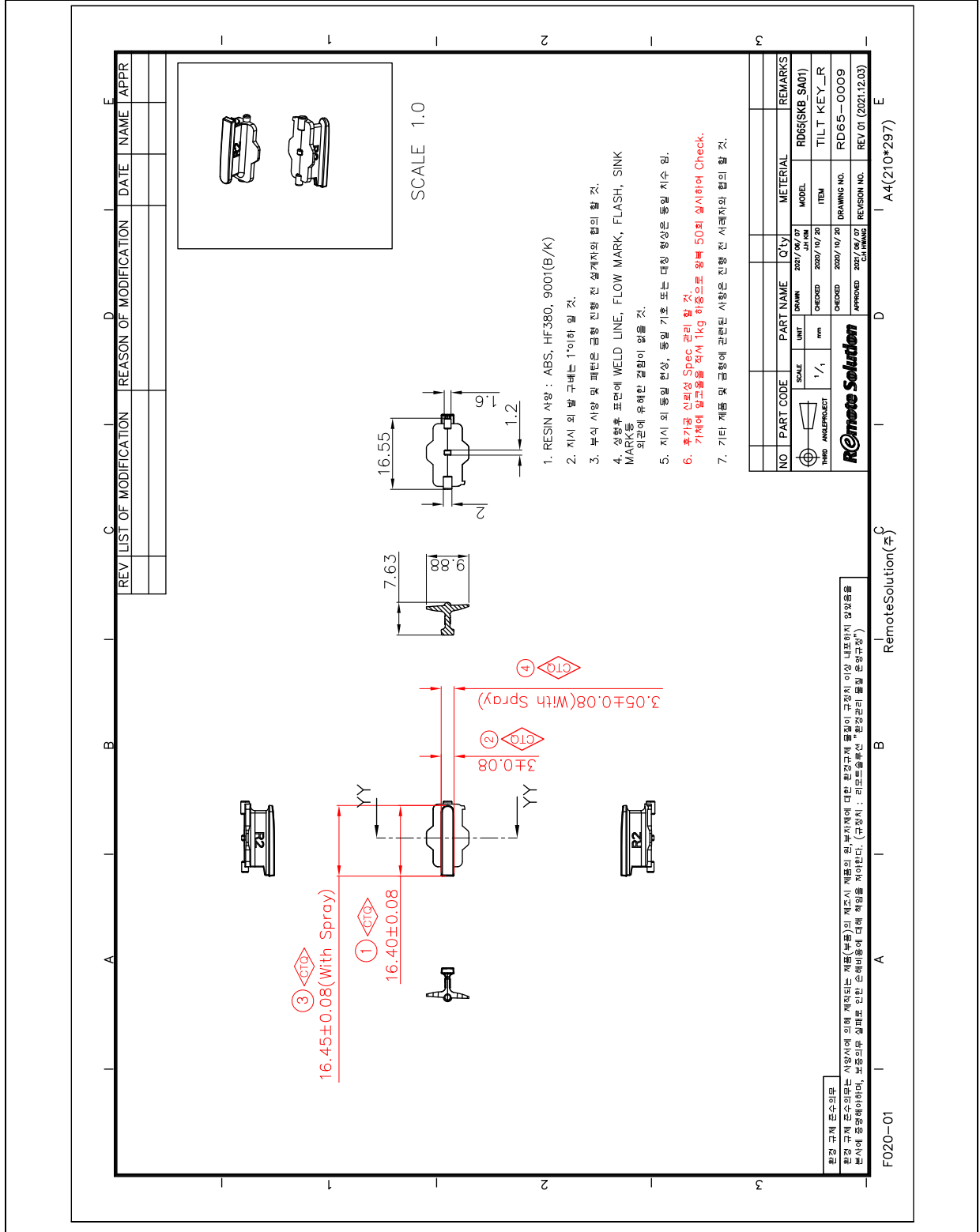
10. Mechanical Spec(10/17) – Tilt Key(L)



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	49
REFORM :			
DECISION : 2023.03.13		RD65B00	71

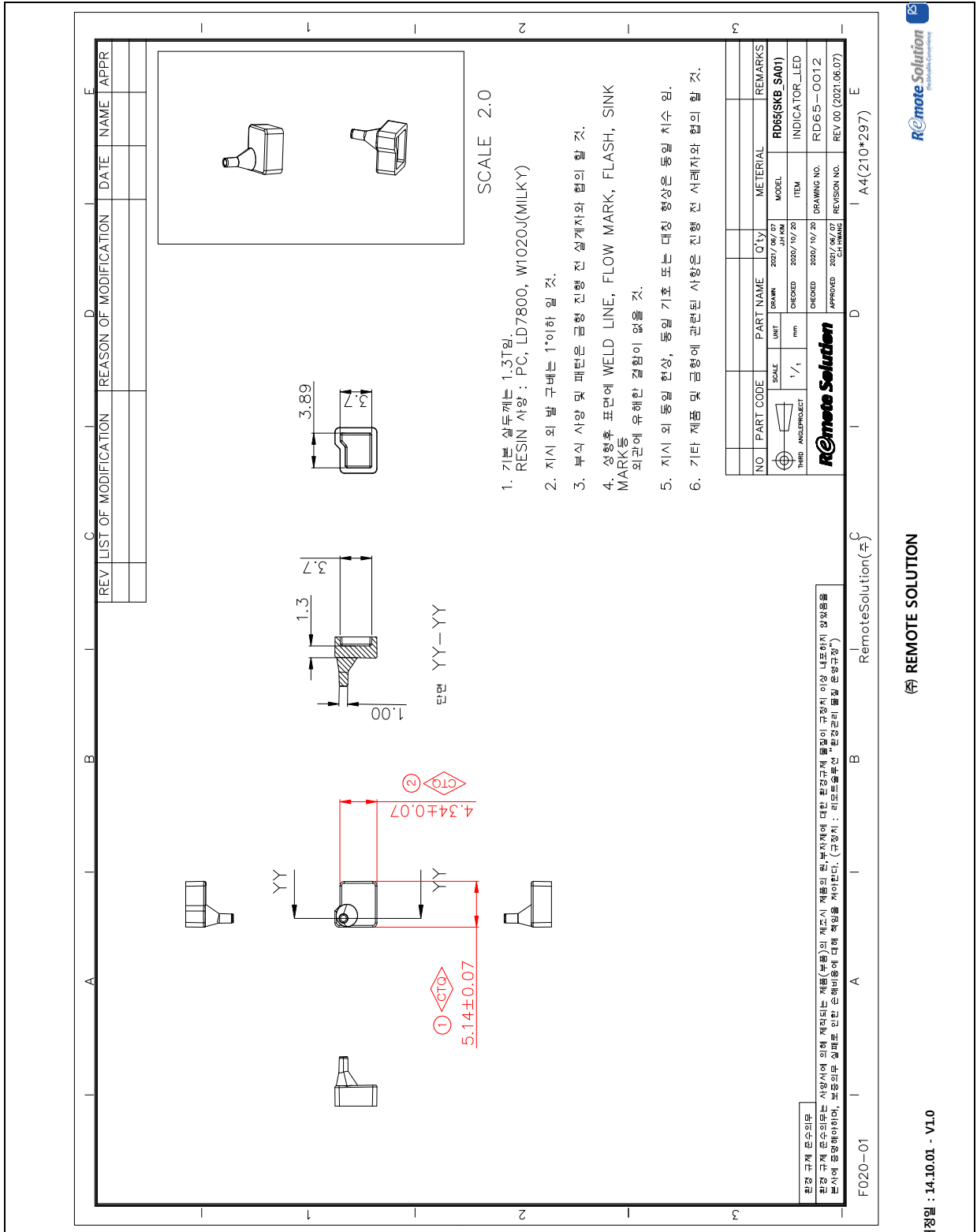
10. Mechanical Spec(11/17) – Tilt Key(R)



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	50
REFORM :			
DECISION : 2023.03.13		RD65B00	71

10. Mechanical Spec(12/17) – Indicator LED



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17

REFORM :

DECISION : 2023.03.13

SPECIFICATION

(TRANSMITTER REMOCON)

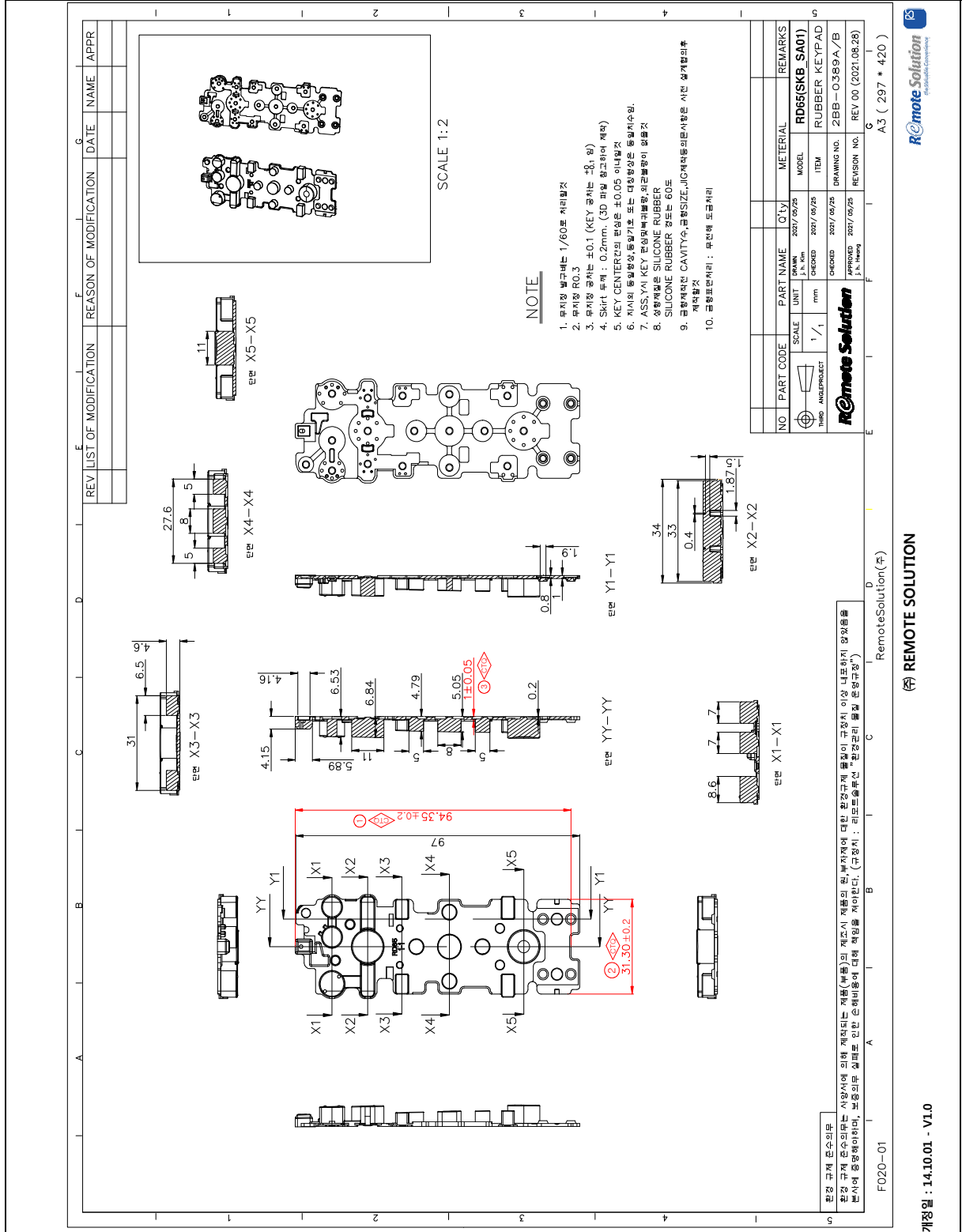
MODEL NO :

RD65B00

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10. Mechanical Spec(13/17) – Rubber Keypad



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	<u>SPECIFICATION</u> (TRANSMITTER REMOCON)	MODEL NO :	52
REFORM :			
DECISION : 2023.03.13		RD65B00	71

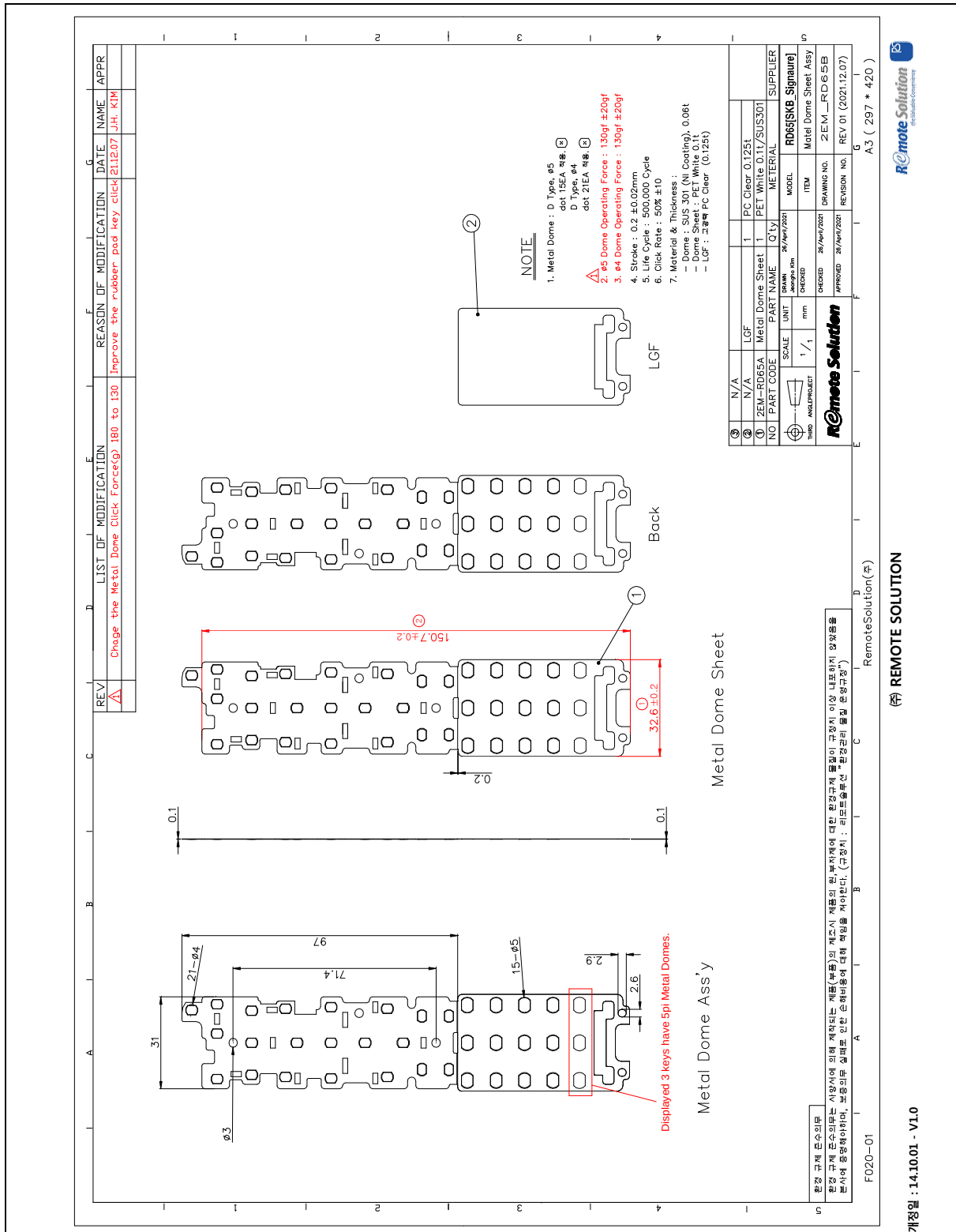
10. Mechanical Spec(14/17) – Number Keypad

[illegible]

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	53
REFORM :			
DECISION : 2023.03.13		RD65B00	71

10. Mechanical Spec(15/17) – Metal Dome Sheet



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	55
REFORM :			
DECISION : 2023.03.13		RD65B00	71

10. Mechanical Spec(17/17) - PE BAG

NO	MODEL	TITLE		MATERIAL	FINISH
1					

COLOR : BLACK

NOTE

1. 도면 치수로 관리 할 것.
2. 재료 : PE 0.08t 투명

△				
ISSUE NO	MM/DD/YY	SIGNATURE	CHANGE NO	CHANGE CONTENTS

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SCALE UNIT

N / S mm

DRAWN 2021/09/03
s. h. Kim

CHECKED

DRAWN 2021/09/03
c. h. Hwang

PE BAG

SKB HEB(RD54K)

7PP-0085T

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	56
REFORM :			
DECISION : 2023.03.13		RD65B00	71

11. Packaging Specification

10-1 MATERIAL : CARTON

10-2 SIZE : 450 (L)* 385 (W)* 225 (H) (Out Side)

10-3 QUANTITY : 60EA

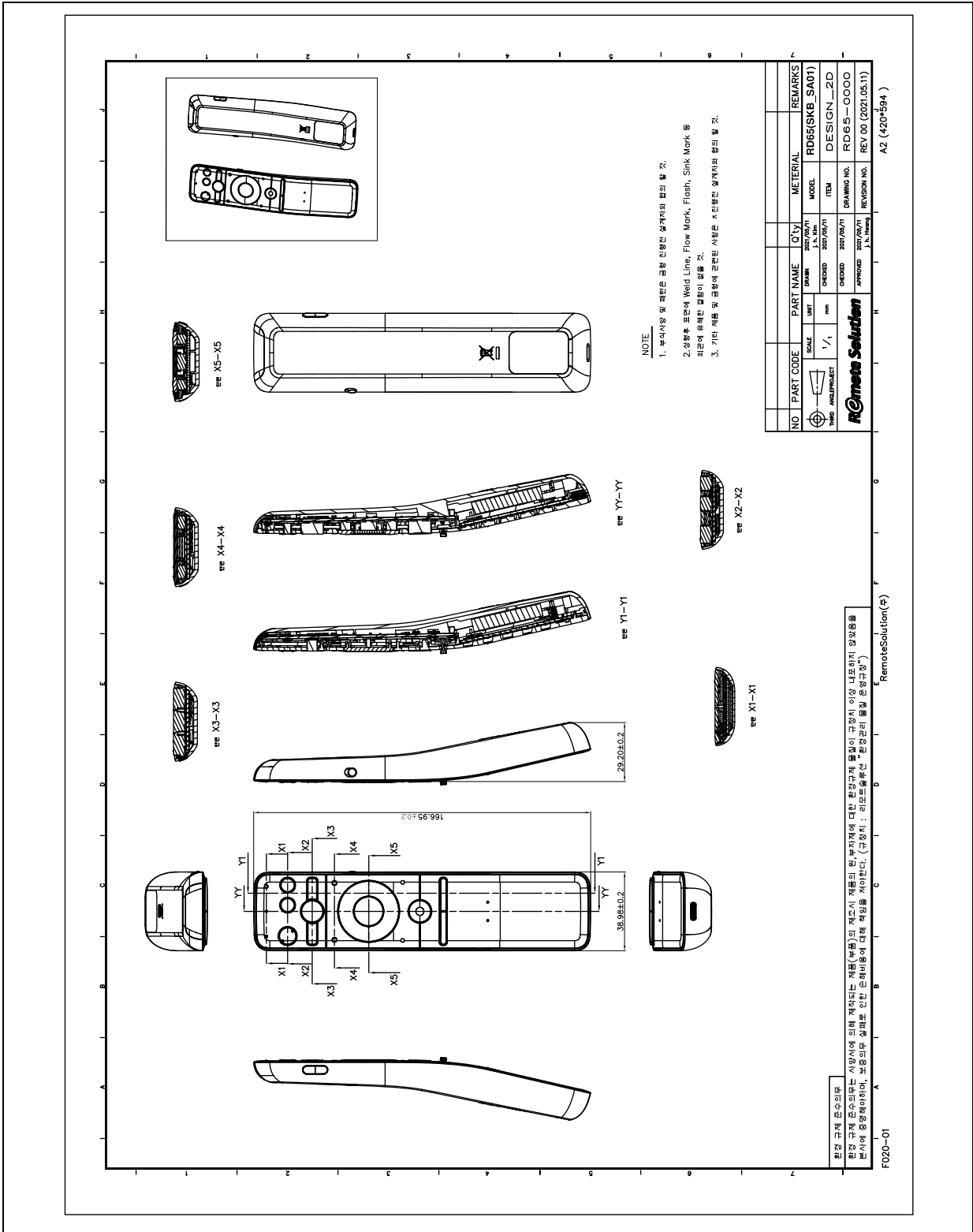
1. Configuration Table : ① ② ③ ④ ⑤ <table border="1"> <tr> <th>Configuration</th> <th>①</th> <th>②</th> <th>③</th> <th>④</th> <th>⑤</th> </tr> <tr> <td>Weight(g/m²)</td> <td>SK180</td> <td>S125</td> <td>S125</td> <td>S125</td> <td>A180</td> </tr> </table>		Configuration	①	②	③	④	⑤	Weight(g/m ²)	SK180	S125	S125	S125	A180	2. Configuration Table : ① ② ③ ④ ⑤ <table border="1"> <tr> <th>Configuration</th> <th>①</th> <th>②</th> <th>③</th> <th>④</th> <th>⑤</th> </tr> <tr> <td>Weight(g/m²)</td> <td>A180</td> <td>S125</td> <td>S125</td> <td>S125</td> <td>A180</td> </tr> </table>		Configuration	①	②	③	④	⑤	Weight(g/m ²)	A180	S125	S125	S125	A180
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Weight(g/m ²)	A180	S125	S125	S125	A180																						
F020-01		RD65B00																									

REV LIST OF MODIFICATION <table border="1"> <tr> <th>REV</th> <th>LIST OF MODIFICATION</th> <th>REASON OF MODIFICATION</th> <th>DATE</th> <th>NAME</th> <th>APPR</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		REV	LIST OF MODIFICATION	REASON OF MODIFICATION	DATE	NAME	APPR							BOX CARTONE <table border="1"> <tr> <th>NO</th> <th>PART CODE</th> <th>PART NAME</th> <th>Q'ty</th> <th>MATERIAL</th> <th>SPEC</th> <th>REMARKS</th> </tr> <tr> <td>1</td> <td>BOX CARTONE</td> <td>BOX CARTONE</td> <td>1</td> <td>450*385*225</td> <td>OUT SIZE</td> <td> </td> </tr> </table>		NO	PART CODE	PART NAME	Q'ty	MATERIAL	SPEC	REMARKS	1	BOX CARTONE	BOX CARTONE	1	450*385*225	OUT SIZE	
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F020-01		RD65B00																											

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	57
REFORM :			
DECISION : 2023.03.13		RD65B00	71

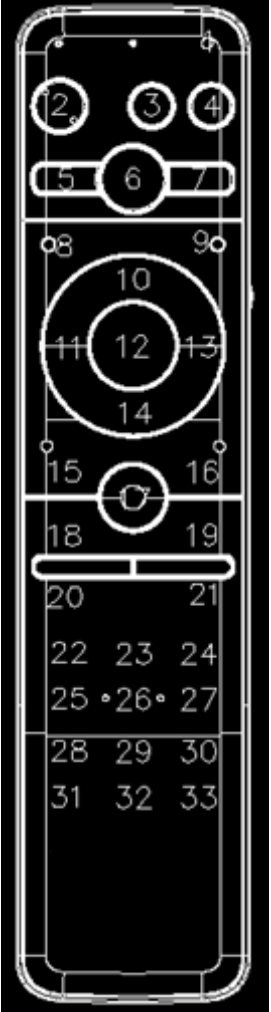
12. Assembling Specification



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	58
REFORM :			
DECISION : 2023.03.13		RD65B00	71

13. Rubber Tension Test

	NO.	Tension	Return	NO.	Tension	Return
	1	440	245	25	140	110
	2	230	120	26	150	120
	3	260	130	27	140	110
	4	230	115	28	130	100
	5	240	124	29	150	120
	6	250	130	30	140	110
	7	230	130	31	130	100
	8	230	120	32	140	110
	9	245	130	33	150	110
	10	310	180			
	11	330	200			
	12	240	120			
	13	330	210			
	14	310	180			
	15	220	130			
	16	220	120			
	17	230	120			
	18	180	80			
	19	180	90			
	20	150	130			
	21	140	120			
	22	130	110			
	23	140	120			
	24	150	110			
	Tension Spec :		TV 전원 키 : 440 ± 30gr			
			상단부 키 : 220 ± 30gr			
			Navi 키 : 310 ± 30gr			
			Tilt 키 : 180 ± 30gr			
			하단부 키 : 140 ± 30gr			

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	59
REFORM :			
DECISION : 2023.03.13		RD65B00	71

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

Customer	SKB		Process Flow Diagram			Document No	RS-20210113-01		Sign	김유동	
Product	SIGNATURE					Date	2021.09.07		Review	김유동	
Model	RD65A					Part	SMD		Approval	김유동	
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 Prin	.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		

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REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	60
REFORM :			
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14.Manufacturing Process Flow Chart(2/3) - PBA

Customer	SKB	Process Flow Diagram				Document No	RS-20210113-01	Sign	김유동	
Product	SIGNATURE					Date	2021.09.07	Review	김유동	
Model	RD65A					Part	PBA	Approval	김유동	
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 부착	Firmware Download	FFC Cable insert	leakage current test	PCB top/bottom separation				
Content		.Dome Sheet 부착	. Writing	.Upper/Bottom PCB lif	.leakage current test . Leaving state after power on	. PCB top/bottom separation . FFC cable is connected to the lower PCB				
Machine		.Dome Sheet jig	. Writing JIG, PC	. Pincette	.Multimeter (current measurement)					
Tools			. MastC							
Inspection Machine										
Focused Management Item		.Dome Sheet Attachment Check	. check sum	. Insertion direction caution	.Max 20uA					

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REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	61
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14. Manufacturing Process Flow Chart (3/3) – Assembly

Customer	SKB	Process Flow Diagram				Document No	RS-20210113-01	Sign	김유동	
Product	SIGNATURE					Date	2021.09.07	Review	김유동	
Model	RD65A					Part	Assembly	Approval	김유동	
No.	Revision date	Content			Check	No.	Revision date	Content		Check
Process No		01	02	03	04	05	06	07	08	
Processes	Outsourcing									
	MAIN									
	SUB									
	Personnel									
Process		Top Assy Assembly	Bottom Assy	Bottom Assy + Side key	Top Assy + PBA bottom	Top Assy + Rubber PAD	Top Assy + key 2 types	Battery attached	Top Assy + Rubber Key + PBA	
Content		. Mid case . Power Knob . Exit & Back knob . NavKey . 4 types of assembly	. Bottom cover . IR Window conclusion	. Bottom Assy . Mute key . Vol Slide knob	. Top Assy . PBA bottom . FFC cable connected	. Top Assy . Rubber PAD(bottom)	. Top Assy . Play/Pause key . Tilt Key 2 types	. Foam Tape attached to the battery . Inside the PCB Silk Box Attach . Battery connector connection	. Rubber sealed on Top Assy . Seating on top of PBA . Connect FFC Cable	
Machine										
Tools										
Inspection Machine										
Focused Management Item		. Check for scratches and foreign substances	. settled state	. settled state		. settled state	. fastening state	. Visual inspection		
Process No		09	10	11						
Process	Outsourcing									
	MAIN									
	SUB									
	Personnel									
Process		Top Assy + Bottom Assy	Enter test mode	IR Test	function test	Visual inspection	packaging			
Content		. Assembly	. 7, 9, 8, 8 Key Input . LED blinking check . Check the buzzer	. IR code check . Backlight inspection . Side Key Separate Inspection	. Insert USB . Voice test . RF Pairing	. foreign body, scratch	. Back label attached . Pebag Packaging . Carton box			
Machine		. Assembly JIG			. 4-in-1	. Functional inspection jig, PC				
Tools										
Inspection Machine										
Focused Management Item		. Confirmation of safety bar application	. Test mode entry							

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REMOTE SOLUTION CO., LTD.

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MODEL NO :

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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 : 2021.07.15								
☐	Model	SK Broadband AI2/SMART3 STB용 [BRM-SA01]											A P P R O V A L	made	review	admit					
☐	Part Number	RD65A00 (SIGNATURE)																			
☐	CFT	PM(DW Kim), RAD(JH Kim, YT Ahn, H Hong, CH Kim), Prod.(JS Kang,KH Noh), Prod. Tech(RK Kim, YD Kim) QC(SG Son, SM Kim), Purchase(SJ Woo), Sale(GH Lee)																			
MP						2021.07.15	Initial preparation							7/15	-	-	7/15				
VENDOR CODE												Customer technical acknowledge/date (when required):						Other admit/date (when required)			
No.	Process	Equipment	Manage the project			special feat	Management Criteria				Division		Corrective Action	Remark							
			NO	Products	Process		Standard	How to check	Cycle	Management Plan	PD	QC									
10	Raw material inventory		1	Raw materials	Supplier (warehouse)	Vendor input															
	Incoming inspection	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	EA 1000A III	6	Raw materials	Harmful material inspection	Hazardous substances management benchmark	measurement Data	Once a week	Hazardous substances management			Isolation, return money, Issuance of									
51	Prevention of static electricity	A material cart	1	Raw materials	FIFO	Confirm materials specifications FIFO management	Now product labeling	Every Lot	ERP PIQ(SAP)			Isolation, return money									
52	Stirring solder cream	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 replace									
			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								
30	Supplying PCB	Solder cream	3	Solder cream	Leaving room temperature	25±5℃, 2Hr (Food_proof)	Timer	Before using	Management register of Stock and Delivery			Reset, Adjustment									
			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), Maintain a constant temperature device (HTC-1380)	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									
			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									
			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/2Hrs.)	Check Equipment	once in 5 times	Equipment			Manual cleaning									
60	SMD components patch	Chip Mount	1	SMD components	Nozzle pressure	Air : 0.45 ~ 0.55 lb Nozzle : -80 ±10 mmHg	Pressure gauge	1time/daily	Equipment work sheet			Reset, Adjustment									
			2	SMD components	PMC specification is consistent	Feeder List (MONITOR) *To prevent the mixing system	Visual inspection	When the model changes	Record the account			Reset, Adjustment									
			3	SMD components	Part a Pick up location	5~25% of component area	Equipment to confirm	When the model changes	Equipment work sheet			Reset, Adjustment									
			4	SMD components	Air/Nozzle pressure	Air : 4.5 ~ 5.5 lb Nozzle : -100 ±10 mmHg	Pressure gauge	1 time/ monthly	equipment work sheet			Reset, Adjustment									
			5	SMD components	Part a Pick up location	5~25% of component area	Equipment to confirm	When the model changes	equipment work sheet			Reset, Adjustment									
70	Reflow Soldering	Relflow Soldering	1	SMD products	Preheat interval	Temperature : 150 ~ 200℃	Preheating temperature Check	1time/ daily	Reflow Profile			From the set parameters									
						Soldering time : 90 ~ 130sec	Preheating temperature Check	1time/ daily	Reflow Profile			From the set parameters									
			2	SMD products	Soldering	Temperature : 200℃ 이상 (peak: 235~250℃) - PCB 1.2t / FR-4	Profile Check	1time/ daily	Reflow Profile			From the set parameters									
80	PCB Out	SMB-220	1	SMD products	cool down	PCB finishing Impeded (not allowed)	Visual inspection	All	equipment			From the set parameters									
90	visual Inspection	Lupe, Visual	1	SMD products	Confirm the part soldering condition	Interpolation, not advanced - part control within 1/3 of the scope of the	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									
100	Attaching Metal Dome	MetalDome sheet M/C	1	Raw Materials	Attaching Metal Dome sheet	Adhesion shall be good.	Equipment	All	work sheet			Identification, Isolation, Repair									

REMOTE SOLUTION CO., LTD.

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(TRANSMITTER REMOCON)

MODEL NO :

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15. Manufacturing Controlplan (2/2)

No.	PROCESS SUB-MAN	Process	Equipment	Manage the project		Special feat	Management Criteria				Division		Corrective Action	Remark
				NO	Products		Standard	How to check	Cycle	Management Plan	PD	QC		
110		Realtek IC Writing	Writing M/C	1	Main PCBA	Realtek IC Writing (RTL8762CKF)	Writing(Programming) should be fine - RS / Test Program	Equipment	All	work sheet	○		Identification, Isolation, Repair	
120		Cable Connecting	Handwork	1	PCB Assy	FFC Cable Inserting	Close-up insertion and direction warning.	Visual Inspection	All	work sheet	○		Identification, Isolation, Repair	
130		Leakage current Inspection	Function Test M/C	1	PCB Assy	Leakage current inspection	Current should be fine (satisfied with the spec)	Equipment	All	work sheet	○		Identification, Isolation, Repair	
140		PCB Cutting	Handwork	1	PCB Assy	PCB separation	Separate the top and bottom of the PCB. Connect the FFC cable to the bottom of the PCB.	Visual Inspection	All	work sheet	○		Identification, Isolation, Repair	
S4		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	nonconfirming	Nonconforming Process checklist	○		Re-test after repair, scrap	
150		Top Case Assembly	Handwork	1	Top Assy	Top Case + Power Knob+Exit/Back+Nav key	No scratches or debris. The seating condition should be good.	visually	All	work sheet	○		Isolation, Repair	
160		Bottom Case Assembly	Handwork	1	Bottom Assy	Bottom case + IR Window	Tightening (The seating condition should be good.)	visually	All	work sheet	○		Isolation, Repair	
				2	Bottom Assy	Bottom Assy + Side key, Mute key, Vol slide knob	No scratches or debris. The seating condition should be good.	visually	All	work sheet	○		Isolation, Repair	
170		Top Assembly	Handwork	1	Top Assy	Top Assy + Bottom PCBA	No scratches or debris. The seating condition should be good.	visually	All	work sheet	○		Isolation, Repair	
				2	Top Assy	Top Assy + Rubber Pad(Lower)	No scratches or debris. The seating condition should be good.	visually	All	work sheet	○		Isolation, Repair	
				3	Top Assy	Top Assy + Function Key(Play/Pause, Tilt)	No scratches or debris. The seating condition should be good.	visually	All	work sheet	○		Isolation, Repair	
180		Battery Attaching	Handwork	1	Battery	Battery + Foam tape, PCBA(Lower)	Attached it in place. Connectors are fastened.	visually	All	work sheet	○		Isolation, Repair	
190		Top Assembly	Handwork	1	Rubber	Top Assy + Rubber PCBA(upper)	The seating condition should be good.	visually	All	work sheet	○		Isolation, Repair	
200		Assembling	Assembly JIG	1	Top Assy, Bottom	Assembling, Top Case Assy + Bottom Cover	There should be no deviations, gaps or gaps. Check the filter combination. After the provisional match, the full match	visually	All	work sheet	○		Isolation, Repair	
210		IR Operating Inspection	4IN1 Inspection JIG	1	Finished	IR operation inspection. 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	
220		RF Operating Inspection	RF Inspection JIG	1	Finished Barcode	Connecting USB Voice RF operation	Check pairing status and buzzer sound. Check RSSI value, SW, FW version. Voice and leakage current check. Battery Voltage check. Version label (manufacture date).	Visually	All	work sheet	○		Containment, repair	
230		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	
240		Product packing	Handwork	1	finished	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	Visually	Box	work sheet Barcode label	○		Containment, repair	
S5		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	
250		OQC	Pairing Dongle, Inspection P/G, JIG, Power Supply, Current meter, Lupe	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 n=5, c=0	Standard document of test, Inspection Manual	○		Sorting, Rework, Releasing nonconforming	
				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. battery 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 dirt, Cold sold, Solderless, Foreign substances inside, There should be no missing parts, Crack	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	
S6		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 2.0	2022.9.30 오리온정보통신(TOPSYNC), ORION 브랜드 설정번호 통합
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)	227 236 206 192 186 193 175 178 185 224 201 092 183 003 002 030 164 168 032 072 031 094 096 417 470
대우(DAEWOO)	014 231 043 190 177 217 176 159 166 233 029 158 150 206 178 185 216 165 169 156 152 155 151 228 195 153 170 188 198 038 160 189 039 199 182 235 092 050 053 202 047 051 179 344 375 420 357
대우루컴즈(DAEWOO LUCOMS)	327 335 350 351 352 353 321
아남(ANAM)	204 174 234 018 019 223 193 180 171 053 220 222 161 095 221 210 211 122 158 049 054 055 069 099 302 357 374 468
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
새천전자(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
뉴컴월드(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
스카이미디어(Vishom)	325 330 336
동양전자(DONGYANG)	068
비티씨정보통신(BTC)	316
씨마디지털텍(CIMADIGITEC)	318 319 072
LS전자(LS ELECTRONICS)	313
모티브씨엔씨(MOTV)	311 378 355
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
지피엔씨(GPNC)	327 306
제노스미디어(ZENOS)	303 328
제이아이케이이슬루션(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
야마카시(YAMAKASI, 바이텍코리아)	343 346 347 348 349
자비오씨엔씨(XAVVIO)	354
티베라(TVERA)	355

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16. TV Brand List (2/4)

스카이워스(SKYWORTH)	353
오리온정보통신(TOPSYNC)	351 330 357 306 111 101 072
오리온(ORION)	
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
대유위니아(WINIADAEWOO, WINIADIMCH)	338
아낙(ANAC)	345
매직뷰(MAGICVU)	355
모넥스(MONEX)	302
엘디케이(LDK)	321 206
와사비망고(WASABIMANGO)	072 419
하이메이드(HIMADE)	072
인트로스(INTROS)	072 355
삼화디스플레이(SAMHWA)	072
아도니스 (ADONIS)	355
큐닉스 (QNIX)	370 371 372
와이드뷰 (WIDE VU)	373 360
벡셀 (BEXEL)	350 462
폴라로이드 (POLAROID)	072
클라인즈 (KLEINZ)	373
아인즈 (IEINZ)	373
티비스타 (TVSTAR)	355
더함 TV (THEHAM)	072 351
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)	072 378
스마트뷰 (SMART VIEW)	418 072 467
이스트라(ESTRA)	419 351
COOCA	353
티지엔컴퍼니(TG&Co.)	332 308
트루비(TRUVI)	419 420
IRIVER(드림어스)	072 420
유맥스(UMAX)	072 420
의영시스템(WOW TV)	357
앤티웍스(ANTWORKS)	330 357
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	420 355 360 466 378
살루스(SALUS)	462 072
라익미(LIKEME)	373 378
리베로(LIBERO)	072
아티브(ARTIVE)	466 467
시티브TV(SEETIVE)	466 467 378
세이키(SEIKI)	378
KONKA	072
APEX	378
스마트에버(SMARTEVER)	420
엠제이(MJ)	378

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16. TV Brand List (3/4)

신일전자(SHINIL)	420
중앙디스플레이(JADISPLAY)	072
해커씨앤씨(HACKER)	072
LNP	041
디지털맥스(DIGITALMAX)	462 378
PICO	468
티베스트(TVEST)	469
에이스(ACE GLOBAL)	357
와이드테크(WIDE TECH)	360 357
고렘 프리뷰(FREEVIEW)	378
선루트(SUNROOT)	378
엠베스텍(MBESTEK)	072
이도디스플레이(YIDO DISPLAY)	420
아이사(DAM_TECH_TV)	373 378
지브라(ZVERA)	373
베이직스(BASICS)	467
포유디지털(아이뮤즈) -FOR YOU DIGITAL	338
마크비전(MARK VISION)	420
리플렉스(REFLEX)	348 420
리치웰(COMODOTV -RICHWELL)	072
델리파스(DELEPHAS)	420
써밋타비(SUMMITV)	373
포스픽(POSPIC)	420 355
에스지(SG)	373
엘카이(LKAUI)	357 360
JAMOS	358
A MARK	092 154 193 206
AOC	193 404
AUDIOVOX	038
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

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16. TV Brand List (4/4)

METZ	408 462 353
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
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
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
		030 164 168 032 072 031 094 096 417 470
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)	420 357
		327 335 350 351 352 353 321
GROUP 04	아남(ANAM)	204 174 234 018 019 223 193 180 171 053 220 222 161 095 221
	이레전자(ERAЕ)	210 211 122 158 049 054 055 069 099 302 357 374 468
	디지털 디바이스(DIGITAL DEVICE)	004 006 007 008 011 012 013
	디지털스트림테크놀로지(DIGITAL STREAM)	301 312
	삼보컴퓨터(TRIGEM COMPUTER)	351 360
	코리아데이터시스템스(KDS)	332
	티디에스(TDS)	033 073
	트라이뷰(TRIVIEW)	103
	프리즘 테크놀로지(PRISM TECHNOLOGY)	302
	한국전자(KEC)	303 355 072
	현대아이티(현대이미지퀘스트)	053 206
	현우 맥 플러스(MCPLUS)	022 017 107 108 309
	휴리프(HULIF)	206
	쿠메스전자(QUMES)	104
	다오코리아(DaoKorea)	106
	모뉴엘(Moneual) - 롯데마트	304
	드림뷰(DreamView) - 이마트	305 306 307 326
	노브랜드(No Brand) - 이마트	308 332
	일렉트로맨(ELECTROMAN) - 이마트	308 332 330 463 373 351
	제이엘통상(XPEER) - 홈플러스	308
	우성엔터프라이즈(WeCube) - 홈플러스	321
	티바(TIVA, 스피드테크놀로지)	322
	스카이미디아(Vishorn)	324
	동양전자(DONGYANG)	325 330 336
	비티씨정보통신(BTC)	068
	씨마디지털(CIMADIGITEC)	316
	LS전자(LS ELECTRONICS)	318 319 072
	모티브씨엔씨(MOTV)	313
	시그마TV(SIGMACOM)	311 378 355
	유니크로(UNIKRO)	310
	보임틀(VOIMTLE)	100 317
	보림전자(BOLIM)	304
	삼인디스플레이(XSTIM)	028 315 323
	유투스(케이엘전자 UTUS)	104 320 329
	인디텍(VIEWPIA)	314
	재원전자(JAEWON)	107
	지파엔씨(GPNC)	333
	제노스미디어(ZENOS)	327 306
	제이아이케이솔루션(LEGRAND)	303 328
	파인포스(FINEFORCE)	342
	더블유시디(WCD)	306
	토마토디스플레이(TOMATO DISPLAY)	331
	넥스디지탈(NEX)	337 306 356
	매직나라(MAGIC NARA)	338
	유니크컴퍼니(UNIQUE COMPANY)	332 339
	알파스캔(ALPHASCAN)	340
	야마카시(YAMAKASI, 바이텍코리아)	306 203 345
	자비오씨엔씨(XAVVIO)	343 346 347 348 349
	티베라(TVERA)	354
	스카이워스(SKYWORTH)	355
	오리온정보통신(TOPSYNC)	353
	오리온(ORION)	351 330 357 306 111 101 072
	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
	대유위니아(WINIADAEWOO, WINIADIMCH)	338
	아낙(ANAC)	345
	매직뷰(MAGICVU)	355

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17. Grouping brand list(2/4)

모넥스(MONEX)	302
엘디케이(LDK)	321 206
와사비망고(WASABIMANGO)	072
하이메이드(HIMADE)	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
백셀 (BEXEL)	350 462
폴라로이드 (POLAROID)	072
클라인즈 (KLEINZ)	373
아인즈 (IENZ)	373
티비스타 (TVSTAR)	355
더함 TV (THEHAM)	072 351
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)	072 378
한성(HANSUNG)	378 414 420
스마트뷰 (SMART VIEW)	418 072 467
이스트라(ESTRA)	419 351
COOCOA	353
티지엔컴퍼니(TG&Co.)	332 308
트루비(TRUVI)	419 420
IRIVER(드림어스)	072 420
유맥스(UMAX)	072 420
의영시스템	357
앤티웍스(ANTWORKS)	330 357
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	420 355 360 466 378
살루스(SALUS)	462 072
라익미(LIKEME)	373 378
리베로(LIBERO)	072
아티브(ARTIVE)	466 467
시티브TV(SEETIVE)	466 467 378
세이키(SEIKI)	378
KONKA	072
APEX	378
스마트에버(SMARTEVER)	420
엠제이(MJ)	378
신일전자(SHINIL)	420
중앙디스플레이(JADISPLAY)	072
해커씨앤씨(HACKER)	072
LNP	041
디지털맥스(DIGITALMAX)	462 378
PICO	468
티베스트(TVEST)	469
에이스(ACE GLOBAL)	357
와이드테크(WIDE TECH)	360 357
고렘 프리뷰(FREEVIEW)	378
선루트(SUNROOT)	378
엠베스텍(MBESTEK)	072

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17. Grouping brand list(3/4)

	이도 디스플레이(YIDO DISPLAY)	420
	아이사(DAM_TECH_TV)	373 378
	지브라(ZVERA)	373
	베이직스(BASICS)	467
	포유디지털(아이뮤즈) -FOR YOU DIGITAL	338
	마크비전(MARK VISION)	420
	리플렉스(REFLEX)	348 420
	라치웰(COMODOTV -RICHWELL)	072
	델리파스(DELEPHAS)	420
	써밋티비(SUMMITV)	373
	포스픽(POSPIC)	420 355
	에스지(SG)	373
	엘카이(LKAUI)	357 360
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
GROUP 06	SHARP	001 062 063 064 065 092 208 206
	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
	PENNEY	092 154 193 206
GROUP 08	에이텍(ATEC)	150 163 167
	3S DIGITAL	031
	뉴콤월드(NEWCOMMWORLD)	028
	디지털 싸이노스(DIGIAL CYNOS)	219
	새천전자(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	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
	덱트론(DECTRON)	033
	디보스(DIBOSS)	015 109
	ELECTROHOME	038 092
	FUNAI	053 359
	FUTURETECH	053
	INFINITY	068
	INKEL	209 353 163 072 151 327 350 354 464
	INSIGNIA	411
	JBL	068
	JCPENNY	052 092 089
	KENWOOD	058 070 415

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2023.02.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	71
REFORM :			
DECISION : 2023.03.13		RD65B00	71

17. Grouping brand list(3/4)

GROUP 09	KIVI	420
	KLOSS	082
	KMC	092 154 206
	KTV	053 092 154 250
	LUXMAN	051 150
	LXI	151 167 037 068 090
	MARANTZ	068 108
	MATSUI	068
	METZ	408 462 353
	MGA	150
	MTC	052 150 163
	NAD	090
	NIKEI	053
	ONKING	053
	ONTEC	053
	ONWA	053
	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