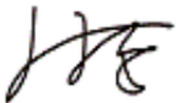


APPROVAL SHEET

ITEM	SK Broadband Bluetooth Remote
DESCRIPTION	AI2 STB
PART NUMBER	BRM-BT11
RS MODEL	RD12C00
BUYER	SKB
DATE	2020.12.29
RCU VERSION	1.4
DOC VERSION	1.2

MAKER : REMOTE SOLUTION CO.,LTD.

Writer	EE	ME	Design	Software	Approval
					
2020.12.29	2020.12.29	2020.12.29	2020.12.29	2020.12.29	2020.12.29

DATE : 2020.12.29

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RCU Ver	Doc Ver	Date	Change Part	Description	Page
1.1	1.0	20.07.23		Initial	
1.1	1.1	20.10.20	Design	- Buyer color matching - Rubber Silk Color Change(RS) - Back Label Change [OK] -> [▶II]	29~33
1.4	1.2	20.12.29	Design	Change the printing specification of the back label after applying the QR code	28~32
			Software	LED scenario was changed by Stuck key	9~18

Product Design



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INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	1
REFORM :		RD12C00	63
DECISION :			

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17	Grouping brand list	60~63

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

2. Product Specifications

2-1 Mechanical

2-1-1 Appearance

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

2-1-2 Decomposition Structure

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

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INSTITUTION : 2020.04.22	<u>SPECIFICATION</u> (TRANSMITTER REMOCON)	MODEL NO :	3
REFORM :		RD12C00	63
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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

Rubber Key : Less then 220g±30g (Small Key)

Rubber Key : Less then 250g±30g (Large Key)

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

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

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

2-1-4 Battery Specifications

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

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

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

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

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

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

2-1-5 Dimension

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

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

However, only the total length is measured during import inspection

Product Size : 48mm*175mm*23mm

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

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INSTITUTION : 2020.04.17	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	4
REFORM :		RD12C00	63
DECISION :			

2-2 Electrical properties

2-2-1 General Operating Test

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

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

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

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

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

2-2-2 Current consumption

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

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

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

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

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

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

2-2-8 All Key Operation Test

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

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

2-2-9 Decompression / Boost Operating Voltage

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

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

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

2-2-10 Contact resistance

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

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

2-2-11-1 Format : uPD6122

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

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

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INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	6
REFORM :			
DECISION :		RD12C00	75

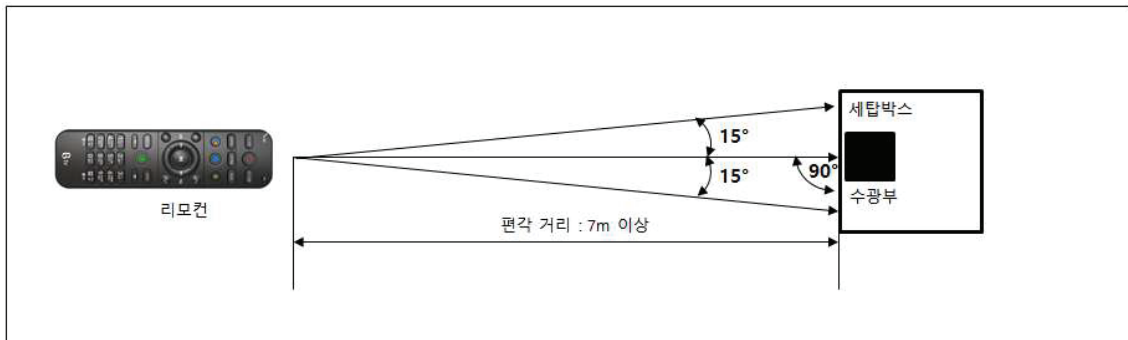
2-2-12 Operating distance and declination Operating distance:

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

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



2-2-13-2 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: 85dB ±10dB [Applied voltage 3.0V]
 (Measured using 1KHz test sound: 75±6dB)[Applied voltage 3.0V]

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INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	7
REFORM :		RD12C00	63
DECISION :			

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 1.6Kg with the eraser

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

3-1-2 Tape Test

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

3-1-3 Alcohol test

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

3-1-4 Coating property

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

3-2 Reliability Test

3-2-1 Load Life Test

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

3-2-2 High temperature operation test

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

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

3-2-3 Low-temperature operation test

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

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

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

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

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

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INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	8
REFORM :		RD12C00	63
DECISION :			

3-2-5 temperature preservation test

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

3-2-6 Cold storage test

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

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

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

3-2-8 Thermal shock test

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

3-2-8 Vibration test

- 3-2-8-1 Vibration frequency: 20Hz ~ 2000Hz ~ 20Hz / 1Cycle Exact width: 1.5 ~ 3mm, Peak acceleration: 20 minutes each in X, Y and Z directions
There should be no abnormality in examination

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 No defective energization due to spring deformation
3-2-9-1-3 There should be no stick phenomenon due to the rubber deviation.
3-2-9-1-4 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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INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	9
REFORM :			
DECISION :		RD12C00	63

4. Software Specification (1/10)

RCU Key code table

SKB AOSP STB RCU									
Device Name : BRM_BT11_XXX Remotedistribution									
Device Name : BMM_BT11_XXX Remotes									
Device Name : BUE_BT04_XXX Remotes									
Position	No	Key	Code				USB HID Usage Name		Description
			IR(NEC Simple repeat)		RF(BLE)		Keyboard Page (0x07)	Consumer Page (0x0C)	
		Key name	MODE1 CUSTOM 0x007F	MODE2 CUSTOM 0x05A0	Page	Usage ID			
Front	1	동영상원 [Main Power]	Btv power + TV power	Btv power + TV power					order: Btv power + SKB TV power+ VER+ SKB
	2	TV 전원[TV Power]	[0x02FD]+[0x08F7]	[0x02FD]+[0x08F7]					Dedicated TV only key Default Samsung LG
	3	Btv 전원 [Btv Power]	0x01FE	0x01EF	0x07	0x000100			only IR output sending IR or BT by R/BT mode changing
	4	채널가기	0x08A7	0x087A	0x07	0x005800			현재채널 -> 바로가기 변경 (Rev0.52)
	5	신호채널 [Favorite CH]	0x05A0	0x058A	0x07	0x005800			
	6	편성표 [Program]	0x05D2	0x05D9	0x07	0x005D00			
Side	7	외부입력 [Source]	[0x01FE]+[0x0BF4]	[0x01FE]+[0x0BF4]					Dedicated TV only key [Source] New keys is working TV
	8	조음기 [Mute]	0x05BA	0x05AB	0x07	0x004500			
	9	TV 음량+ [TV Vol+]	[0x07F8]+[0x02FD]	[0x07F8]+[0x02FD]					Dedicated TV only key Default Samsung LG
	10	TV 음량- [TV Vol-]	[0x08F4]+[0x03FC]	[0x08F4]+[0x03FC]					
Front	11	검색 [Search]	0x04F0	0x04F8	0x07	0x004F00			
	12	홈 [Home]	0x02FD	0x02DF	0x07	0x000200			order: HOME -> BRK+ BATT INFO
	13	Zem KIDS	0x05A6	0x056A	0x07	0x005900			바로가기 -> Zem KIDS 변경 (Rev0.52)
	14	음량+ [VOL+]	0x03BC	0x03CB	0x07	0x004300			
	15	음량- [VOL-]	0x02BD	0x02DB	0x07	0x004200			
	16	▲ [UP]	0x06B6	0x06B8	0x07	0x004A00			
	17	▼ [DOWN]	0x06B5	0x06B7	0x07	0x004A00			
	18	◀ [LEFT] / ▶ [RIGHT] (나비키)	0x06B4	0x06B8	0x07	0x004B00			
	19	▶ [RIGHT] / ◀ [LEFT] (나비키)	0x06B3	0x06CB	0x07	0x004C00			
	20	OK / (채널/정지/정지)	0x06B9	0x06B8	0x0C	0x0041			Menu Pick
	21	채널 + [CH+]	0x00BF	0x00FB	0x07	0x004000			See "HID Consumer Key code on ATT" in the RF Protocol sheet
	22	채널 - [CH-]	0x01BE	0x01EB	0x07	0x004100			
	23	이전 [Prev]	0x0EB1	0x0E1B	0x07	0x004E00			
	24	나가기 [Exit]	0x04CB	0x04BC	0x07	0x003400			
	25	마이크 [Mic]	0x012E	0x01E2	0x07	0x002300			See "HID voice search code" in RF Protocol sheet
	26	◀ ◀ [2x LEFT]	0x009F	0x009F	0x07	0x005000			
	27	▶ ▶ [2x RIGHT]	0x039C	0x03C8	0x07	0x008300			
	28	1	0x21DE	0x21ED	0x07	0x002100			
	29	2	0x22DD	0x22DD	0x07	0x002200			
	30	3	0x23DC	0x23DC	0x07	0x002300			
	31	4	0x24B8	0x24B8	0x07	0x002400			
	32	5	0x25DA	0x25AD	0x07	0x002500			
	33	6	0x26D9	0x26D8	0x07	0x002600			
	34	7	0x27D8	0x27D8	0x07	0x002700			
	35	8	0x28D7	0x28D7	0x07	0x002800			
	36	9	0x29DE	0x29ED	0x07	0x002900			
	37	* [존치자음] [Delete]	0x2AD5	0x2AD5	0x07	0x002A00			
	38	0	0x209F	0x20FD	0x07	0x002000			
	39	## [번번] [Change]	0x2BD4	0x2BD4	0x07	0x002B00			
Special Key Code	40	Normal Battery	0x3AC5	0x3AC5	0x07	0x003A00+0x00FFFF			
	41	Low Battery	0x3BC4	0x3BC4C	0x07	0x003B00+0x00FFFF			
	42	Empty Battery	0x3CC3	0x3CC3C	0x07	0x003C00+0x00FFFF			
	43	EarJack-Insert	0x3DC2	0x3DC2C	0x02	0x003D00+0x00FFFF			When the earphone jack is inserted(BT Connected)
	44	Break Data Code	0xFF00	0xFF00	0x07	0x00FFFF			IR: only Home key, BT: all keys
	45	RCU Ver#3	0xF310 - 0xF314	0xF310 - 0xF314	0x07	0x00F380 - 0x00F384 + 0x00FFFF			specific code by RCU manufacturer(RS) 0xF300-0xF30A: BT02 (UHD earphone1) 0xF310-0xF314: BT06 (UHD earphone2 - BLE) 0xF320-0xF324: BT03 (new Smart STB) 0xF330-0xF334: BT05 (surround STB) 0xF340-0xF344: BT07 (UHD earphone3 - BLE) 0xF350-0xF354: BT08 (AI STB - BLE) 0xF360-0xF364: BT09 (Kids RCU - BLE) 0xF370-0xF374: BA01(Android RCU - BLE) 0xF380-0xF384: BT10(AI 2 STB - BLE) 0xF3A0-0xF3A4: BT11(AI 2 STB - BLE) * lower 4bit is version code (0-A)
	46	RCU Ver#4	0xF4A0 - 0xF4A4	0xF4A0 - 0xF4A4	0x07	0x00F4A0 - 0x00F4A4 + 0x00FFFF			specific code by RCU manufacturer(Movcon) 0xF400-0xF40A: BT02 (UHD earphone1) 0xF410-0xF414: BT06 (UHD earphone2 - BLE) 0xF420-0xF424: BT03 (new Smart STB) 0xF430-0xF434: BT05 (surround STB) 0xF440-0xF444: BT07 (UHD earphone3 - BLE) 0xF450-0xF454: BT08 (AI STB - BLE) 0xF460-0xF464: BT09 (Kids RCU - BLE) 0xF470-0xF474: BA01(Android RCU - BLE) 0xF480-0xF484: BT10(AI 2 STB - BLE) 0xF4A0-0xF4A4: BT11(AI 2 STB - BLE) * lower 4bit is version code (0-A)
	47	RCU Ver#5	0xF510 - 0xF514	0xF510 - 0xF514	0x07	0x00F580 - 0x00F584 + 0x00FFFF			specific code by RCU manufacturer(UEI) 0xF500-0xF504: BT07 (UHD earphone3 - BLE) 0xF550-0xF554: BT08 (AI STB - BLE) 0xF560-0xF564: BT09 (Kids RCU - BLE) 0xF580-0xF584: SR01 (voice stick - BLE)
	48	Setup-Start	0x5AAB	0x5A8A	0x02	0x005A00+0x00FFFF			Start-setup-code BT07 is deleted
	49	Setup-Stop	0x5AAA	0x5AAA	0x02	0x005A00+0x00FFFF			Stop-setup-code BT07 is deleted
	50	Drag Up	0x8778	0x8787	0x07	0x008700+0x00FFFF			
	51	Drag Down	0x827D	0x82D7	0x07	0x008200+0x00FFFF			
	52	Drag Left	0x837C	0x83C7	0x07	0x008300+0x00FFFF			
	53	Drag Right	0x847B	0x84B7	0x07	0x008400+0x00FFFF			
	54	ends	0x857A - 0xFF00	0x85A7 - 0xFF00	0x07	0x008500+0x00FFFF			BT-press-three(RCU-lockends)
	55	unends	0x8679 - 0xFF00	0x86B7 - 0xFF00	0x07	0x008600+0x00FFFF			BT-press-three(RCU-unlockends)
	56	Locked Voice	0xD2D2	0xD2D2	0x07				If BLE is disconnected

	Function	Key combination	Press time	Description
Setting mode	1	Unpairing	[*] + [Home]	3sec remove pairing information
	2	Re-Pairing	[*] + [H]	3sec try pairing after removing pairing information
	3	TV Set (Manual)	[B tv power] + [Source]	3sec setup your TV with the numbering keys
	4	TV Set (Auto Search)	[B tv power] + [Source]	3sec setup your TV using CH+/- key
	5	TV Set(Grouping)	[T-8] + [B tv power]	3sec setup your TV with CH+/- key in TV group
	6	IR Code Learn	[TV power] + [OK]	3sec BT0007 is not supported
	7	Code Read Out	[B tv power] + [Source]	3sec press [All menu] after entry setting mode
	8	Change IR Code mode	[*] + [B]	3sec Mode 1 -> Mode 2
	9	Change BT-IR mode (BT)	[*] + [T]	3sec
	10	Change BT-IR mode (IR)	[*] + [2]	3sec Not-allowed-pairing(skip-pairing)
	11	Factory Default	[*] + [3]	3sec
	12	Buzzer Test	[*] + [4]	3sec stop buzzer when press any key
	13	Drag Up	[*] + [UP]	Immediately
	14	Drag Down	[*] + [DOWN]	Immediately
	15	Drag Left	[*] + [LEFT]	Immediately
	16	Drag Right	[*] + [RIGHT]	Immediately
	17	RCU-lock/unlock	[BT]	3sec
	18	Backlight On/Off	[*] + [5]	3sec On/Off toggle(Default: On). On: LED twice/Off: LED 4-times blink
	19	Android-Support	[BACK] + [OK]	3sec BACK is IR code, OK is BLE code, after 3sec LED blink 1 time

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INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	11
REFORM :		RD12C00	63
DECISION :			

4. Software Specification (3/10)

SKB Android STB RCU Operation Scenarios

BT mode: BLE connected, IR mode: BLE disconnected

Bluetooth pairing scenario (BLE + A2DP) - In the unpairing state, pressing the voice search key on the remote control will transmit the pairing start IR code. Or, when the ear jack is inserted (battery voltage >= 2.4V), it transmits the pairing IR code. - After transmitting the IR code, the remote control enters Advertising Mode and switches to the pairing mode. - 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) - When the IR Trigger Code is received from the STB, it searches for Bluetooth devices and tries to pair with the remote control BLE. After BT pairing is completed, CSR8630 (after Audio BT) of the remote controller enters Discovery Mode and switches to pairing mode. After pairing BT in STB, search for additional Bluetooth devices and try to pair with Audio BT. - When the audio BT is successfully paired with the remote control, LED Blink 5 times at 200ms (ON: 100ms, OFF: 100ms) cycle. - The remote controller ends Advertising after 20 seconds in BLE Advertising mode. And, Audio BT Discovery does not. After 20 seconds in the Audio BT Discovery mode, the Discovery mode is terminated, and BT Unpair is completed and the pairing scenario end - LED OFF when pairing fails
Bluetooth pairing reset (Unpairing) scenario - Press the [*] + [Home] keys for 3 seconds - When BT Unpair is completed normally, LED blinks 5 times quickly (ON: 100ms, OFF: 100ms) → When BT Unpair is completed normally, Power Off Audio BT. → Audio stream if connected, disconnect and proceed with Unpair.
Bluetooth re-pairing scenario - Press the [*] + [#] keys for 3 seconds - Bluetooth pairing reset (Unpairing) operation in progress - Bluetooth pairing operation in progress (regardless of the existing pairing)
Operation scenario when not paired - Regardless of whether pairing is successful, all keys except voice search key operate as IR. - Attempt pairing when performing the following operation. - Voice search key input - Enter [*] + [#] for 3sec Insert ear jack (battery voltage >= 2.4V)
Operation scenario when paired - TV key (TV power / TV volume / external input) operates irrespective of whether pairing is successful or not. The integrated power key is operated by IR (B tv + TV). B tv power key operates by IR. - All other keys operate as BT. (But TV power / volume / external input key works only with IR) - In the case of BT disconnection in pairing state, all keys operate as IR.
All power operation scenario - When the [Integrated Power] button is input, it is output in the following order. Btv power cord -> TV power cord (toggle, discrete, learning) -> RCU version code -> iSet Macro (optional) - TV power cord classification - Toggle: When the TV power cord is toggled during manual setting or iSet setting - Discrete: When the TV power cord is discrete by the iSet setting - IR learning: In case of learning IR on the [TV power] button - iSet Macro - Output when iSet is set and external input code is discrete code * If iSet is interlocked, see Section 4 of the "iSet Operation Scenario" sheet. - When iSet is not set - BTV Power Code -> Break Code -> TV Code -> RCU Ver Code RCU ver information can be transmitted by DIS (Device Information Service). RCU Ver code is reviewed for deletion (TBD). - Default TV Code: Samsung, LG batch code transmission - When setting iSet - BTV Power Code -> RCU Ver Code -> iSet linkage operation -> iSet TV power supply code (ON or OFF) RCU ver information can be transmitted by DIS (Device Information Service). RCU Ver code is reviewed for deletion (TBD). - Determine if a trigger code is required for iS operation (TBD) - Send TV Code when BT connection is disconnected Code output sequence: BTV power -> RCU ver -> iS TV power (toggle) - Even when changing from BT mode to IR mode, iSet linkage operation - DIS is not used in the integrated power supply scenario, and will be used for other purposes (compared to ota version) in the future. - When the TV is powered by IR learning - Use the last set setting. - Ex) If IR learning is done at the end, the value is also used for integrated power supply. iSet MACRO is not used.
Battery information transmission scenario - Battery level transmission when the home button is input (in BT mode, BT / IR mode, IR code) - Detect voltage range: 1.8V ~ 3.2V divided into 3 levels (Empty / Low / Normal) - Normal: 2.4V or more-green LED - Low: More than 2.2V ~ less than 2.4V-red LED - Empty: less than 2.2V-red LED - Battery level transmission when BT Connect (Pairing or Reconnecting) - Battery level means key code (Normal, Low, Empty) - After RCU booting, after about 40ms after any key release, transmit the battery status (3 step code). - However, the integrated power, TV power, TV volume +/-, TV external input, home, microphone, GA (BA02) keys are excluded from this operation. - Battery information is not transmitted for key release that occurs after entering pairing mode. - 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.) - 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. - Battery voltage should be transmitted in level [%] and follow BAS specification. 1.8 V or less: 0% 3.2V or higher: 100% - The voltage between the above voltages is converted as a percentage.

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4. Software Specification (4/10)

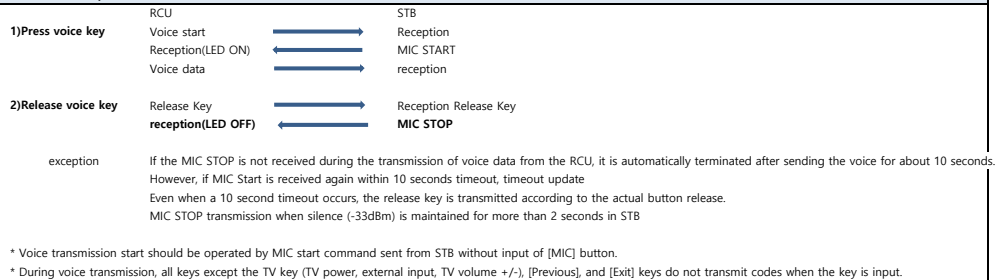
RCU Low Battery operation scenario

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

RCU Empty Battery operation scenario

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

Voice Transmission operation scenario



Drag Mode

1. * When the 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

2. When any one key is released after key combination, code transmission stops without sending break code.
3. When drag key combination again, send the corresponding key code (drag mode up / down / left / right)

BLE/IR Mode change operation scenario

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

Find me(Call RCU) operation scenario

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

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.

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4. Software Specification (5/10)

OTA mode

- When requesting the battery level (BAS) of the OTA app, the remote control sends the battery level [%] value to the STB.
 - STB executes OTA only when the battery level of the remote control is 2.4V or higher.
 - STB shows a pop-up window indicating that OTA is impossible for other battery levels.
 - ~~Before upgrading, stop the audio stream.~~
 - Before upgrade, turn off the back light.
- When the OTA is upgraded, the GREEN LED turns on.
 - ~~Blink time may change later~~
- 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)
- The OTA upgrade image is divided into app code and patch code.
 - App code image file name definition by manufacturer
 - * RS: BRM_BT11_Vxx_YYYYMMDD.bin
 - * MOVON: BMM_BT11_Vxx_YYYYMMDD.bin
 - Define patch code image file name (common to manufacturer)
 - * RTL_Bee2_Patch_Vxx.xx.bin
- OTA image creation uses Realtek MP_PackTool.

* OTA AES256 key define by remote control manufacturer

RS

0x52,0x53,0x5f,0x52,0x44,0x31,0x32,0x43,
0x28,0x53,0x4b,0x42,0x5f,0x42,0x52,0x4d,
0x5f,0x42,0x54,0x31,0x31,0x29,0x5f,0x41,
0x49,0x32,0x5f,0x53,0x54,0x42,0x5f,0x58

MOVON

0x4D, 0x4F, 0x56, 0x4F, 0x4E, 0x20, 0x53, 0x4B,
0x42, 0x20, 0x52, 0x43, 0x55, 0x20, 0x42, 0x54,
0x31, 0x31, 0x97, 0x0D, 0x8E, 0xEF, 0x0C, 0xD3,
0xD1, 0x11, 0xF6, 0x8E, 0x10, 0x60, 0xF8, 0x1A

* Remote control manufacturer information location

Address: 0x00002A00
Data Length: 8-bytes

Manufacturer	OTA Manufacturer Code (ASCII)
RemoteSolution	BRM_BT11
Movon	BMM_BT11

* Remote control version information location in RCU f/w

Address: 0x00002908
Data Length: 4-bytes
- It is possible to obtain version information of images loaded from the OTA

F/W VERSION

Offset(h)

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

00000290 00 00 00 00 00 00 00 00 51 00 00 00 52 43 55 5Fa...RCU_

000002A0 42 52 4D 5F 42 54 31 31 00 00 00 00 00 00 00 00 BRM_BT11.....

000002B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

000002C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

000002D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Offset(h)

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

00000290 00 00 00 00 00 00 00 00 01 D0 04 58 00 00 00 00B.X....

000002A0 42 4D 4D 5F 42 54 31 31 00 00 00 00 00 00 00 00 BMM_BT11.....

000002B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

000002C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

000002D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

<리모트솔루션>

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제조사 코드

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4. Software Specification (6/10)

TV Setup scenario
1. Manual setting 1-1. [Btv power] + [External input] Press simultaneously for 3 seconds-> LED ON → TV start code transmission 1-2. 3-digit numeric button input (LED OFF when key input, LED ON when key release) -> When the 3 digits entered are in the IR DB, the power off code of 3-Frame is transmitted, otherwise, the RED (regardless of battery level) LED is ON for 1 second and then the GREEN LED is ON. -> However, when 0,0,0 is input, it is set as default (Samsung, LG) and at the same time, 3 times of LED Blink (ON: 250ms, OFF: 250ms), then the setting mode ends. -> 1-2 ~ 1-3 can be repeated 1-3. Enter the [OK] key to complete the setting. At this time, LED 3 times Blink (ON: 250ms, OFF: 250ms) → TV termination code transmission * Keys that can be entered except for numeric keys during manual setting -> [TV power] key: Sends a TV power off code 3 frame corresponding to a 3-digit number when input. -> [CH +/-] 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. [Btv power] + [External input] Press simultaneously for 3 seconds-> LED ON -> TV start code transmission 2-2. Enter the [CH +] or [CH-] button. -> Power off code transmission of 3-Frame (LED is OFF during code transmission, and remains ON when transmission is completed) -> [CH +]: Power off code transmission of the next setting number -> [CH-]: 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 [OK] key to complete the setting. At this time, LED 3 times Blink (ON: 250ms, OFF: 250ms) → TV termination code transmission * Searchable keys except [CH +] and [CH-] -> [TV power] 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. [Btv power] + Press one of [1] ~ [9] keys simultaneously for 3 seconds-> LED ON → TV start code transmission 3-2. Enter the [CH +] or [CH-] button. -> Power-off code transmission of 3-Frame (LED is turned off during code transmission and keeps ON when transmission is completed) -> [CH +]: Power off code transmission of the next setting number -> [CH-]: 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 [OK] key to complete the setting. At this time, LED 3 times Blink (ON: 250ms, OFF: 250ms) → TV termination code transmission * Searchable keys except [CH +] and [CH-] -> [TV power] 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.

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4. Software Specification (7/10)

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 number set on the TV.

- Press [Btv power] + [External input] key simultaneously for 3 seconds-> LED ON
→ ~~TV start code transmission~~
- Enter ~~(All Menu)~~[Program]-> 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.

Back Light operating scenario

- ON condition
 - ON when remote pick-up or buzzer operation
 - ON when any key is input during audio playback (B / light is not ON when picked up)
If key input continues, enters OFF mode after 2 seconds
 - OFF when Find me (buzzer) is running (must be OFF even when ON)
- 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: 2.4V or more
-At a voltage less than 2.4V, it does not turn on even if the pick up or buzzer operates.

* Detailed specifications: see "Backlight" tab

Stuck Key

If any key is pressed for a certain period of time, code transmission is restricted to reduce battery consumption.

- When any key is pressed for 2 minutes, the code (IR / BT) transmission is stopped.
→ ~~When QS interlock key is input, code transmission stops after 30 seconds.~~
→ In case of key combination in drag mode, code is stopped when pressed for 2 minutes.
- Link operation after entering Stuck Key mode
→ ~~LED OFF RED RED ON(OFF when all keys are released)~~
→ Back light auto OFF, no reaction when pick up
→ ~~Automatic shutdown when A2DP working~~
→ ~~No operation when inserting ear jack~~

* Find me should work.

BackLight manual ON/OFF setup

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

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4. Software Specification (8/10)

iSet operation scenario

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

1. Scenario after pairing

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

EDID TABLE example

```
/*=====
 * Table structure
 * vid[2], pid[2], set_no[2]          // ; VID & PID 는 EDID raw data 순서로 기재한다.
 * end mark
 *=====
const byte IR_TV_EDID_TABLE[] = {
    TU_VID(0x4C2D), TU_PID(0x960B), SET_NUM(341), // SAMSUNG(SAM) - LFD TV(옥외 전광판/광고용)
    TU_VID(0x4C2D), TU_PID(0xFFFF), SET_NUM(226), // SAMSUNG(SAM)
    TU_VID(0x1E6D), TU_PID(0xFFFF), SET_NUM(227), // LG(LGSH)
    TU_VID(0x2134), TU_PID(0xFFFF), SET_NUM(9), // HITACHI(HIT)
    TU_VID(0x2AC3), TU_PID(0xFFFF), SET_NUM(66), // JUC(JUC)
    TU_VID(0x4D09), TU_PID(0xFFFF), SET_NUM(194), // SONY(SNY)
    TU_VID(0x34A9), TU_PID(0xFFFF), SET_NUM(95), // PANASONIC(HEI)
    TU_VID(0x5262), TU_PID(0xFFFF), SET_NUM(21), // TOSHIBA(TSB)
};
```

In the table above, if SET_NUM is not in F / W

 - * Send OK response code (0x0008-> ISET_ERROR_CODE_UNKNOWN_DEVICE).
 - * Save the VID, PID, and HDMI port numbers in NVM (optional) and exit iSet.

In the table above, if SET_NUM is within F / W

 - * Send OK response code (0x0000-> ISET_ERROR_NONE).
 - * VID, PID, and HDMI port numbers are stored in NVM.
 - * LED 3 times Blink (ON: 100ms, OFF: 100ms) and iSet is finished.

Note: The code of this setting number is used for power and external input synchronization between STB & TV.
 - 1.5.3 When VID and PID are not searched in EDID TABLE
 - * Send OK response code (0x0005-> ISET_ERROR_CODE_UNKNOWN_VENDOR).
 - * Save VID, PID, HDMI port number in NVM and exit iSet.
 - 1.6 The TV field (3-byte) of the response code is described in detail in Section 6 below.

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

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

3. Scenario after BT reconnection

After the BT reconnects, the STB sends STB power status information to the remote control as in section 1.1 above.

- * STB power OFF state: STB screen off command (0x02)
- * STB power ON state: STB screen on command (0x03)

—If the change of EDID is confirmed, follow item 2 above.

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

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4. Software Specification (9/10)

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

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

4.1 Enter the [All Power] button

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

4.1.1 When the TV power Discrete code (ON, OFF) is present, send the TV power cord as follows according to the STB power state.

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

* MACRO output order

1. Send TV INPUT code 2 seconds after inputting [integrated power]

2. Send TV INPUT code 3 seconds after above 1

3. Transmit and terminate the TV INPUT code 5 seconds after the above 2

* Macro output is available only when the TV INPUT code is discrete (no output when there is no discrete code)

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

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

4.1.2 Discrete code does not exist

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

4.2 STB screen ON / OFF command reception

Save screen status information from STB

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

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

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

5.1 [Btv Power] button input

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

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

-No TV INPUT code transmission

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

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

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

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

TV Type: 0x00

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

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

Example 1: User manually tuned 350 times

TV Type: 0x01

TV Code: 0x015E (320)

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

TV Type: 0x02

TV Code: 0x015E (320)

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

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

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

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

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

7. 기타

7. Other

7.1 If TV manufacturer code is set manually after iSet setup

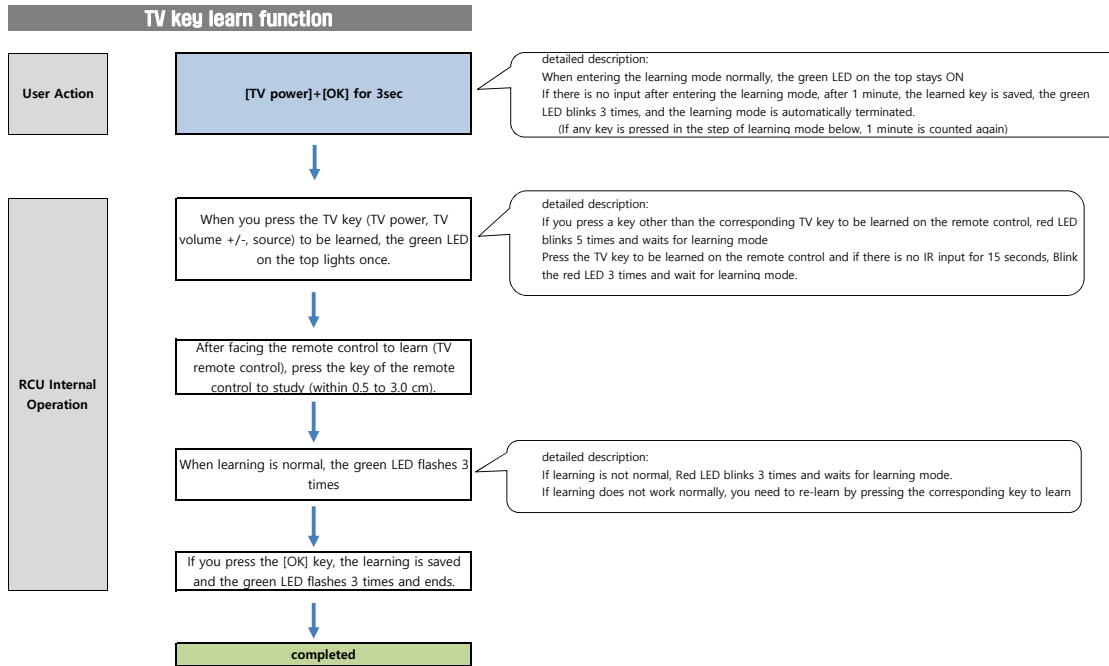
* iSet function disable: Operates regardless of STB power status.

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

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INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	18
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4. Software Specification (10/10)



* However, when low battery (v2.4 or less), flashing of green LED is replaced with red

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5. Part List

5.1 Mechanical List

No.	Part Name	Spec	Q'ty	Maker	비고
1	TOP CASE	ABS HF-0680, K21383(BLACK), SILK1	1	일상전자	
2	BOTTOM COVER	ABS HF-0680, K21383(BLACK)	1	일상전자	
3	BATTERY COVER	ABS HF-0680, K21383(BLACK)	1	일상전자	
4	IR WINDOW	PC SC-1220R, 40697 B(D/RED)	1	일상전자	
5	CH VOL KNOB	ABS HF-0680, K21383(BLACK), SILK1	1	일상전자	
6	INDICATOR LED	PC LD7800, W1020J(MIKY) / TP-1020, LDW542(MILKY)	1	일상전자	
7	SIDE KEY MUTE	ABS HF-0680, K21383(BLACK), SILK1	1	일상전자	
8	SIDE KEY VOLUME	ABS HF-0680, K21383(BLACK), SILK1	1	일상전자	
9	RUBBER KEYPAD	SILICONE, COLOR2(CLEAR, YELLOW), SILK4, SPRAY2, LASER, SF COATING	1	RS HK TAESUNG	
10	METAL DOME SHEET	Φ5DR, 130G, 35KEY	1	제이앤티텍	
11	(+)SPRING	SUS 304 NI-CO Φ0.6	1	대성하이텍	
12	(-)SPRING	SUS 304 NI-CO Φ0.6	1	대성하이텍	
13	COMMON SPRING	SUS 304 NI-CO Φ0.6	1	신광스프링	
14	MESH	MESH, RC56,0.05T	1	M.S International	
15	PE BAG	80X265X0.08T, RECYCLE MARK	1	건아테크	
16	CARTON BOX	553*415*282 (80EA/1Box)	0.0125	대흥포장	
17	BACK LABEL	BOPP,30X42,SILK2	1	탐인쇄	
18	MANUAL	SMILAR PAPER,250X170	1	아침인쇄	
19	LABEL	ART PAPER, 16X4	1	탐인쇄	
20	PASS LABEL	ART PAPER,15X30,SILK2	1	탐인쇄	
21	TAPE	TAPE, RB50	1	제이앤티텍	
22	Alkaline Battery	ALKALINE BATTERY, 1.5V LR6, AA	2	HUATAI BEXEL ROCKET DURACELL	

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5.2 Electronical Part List

NO	Components Name	Components Spec	Manufacturer	Quantity	Reference
1	Antenna Chip	ACA3216A1CCS	Inpaq	1	ANT1
2	Buzzer SMD	BM9027S HR-9027BT3S2 KDM-09D-3V BMY-2703	FHD Bosan HS Tech	1	BZ1
3	Electrolytic Capacitor SMD	47UF,16V,±20%,5053	Samhwa Samyoung	1	CE1
4	Ceramic Capacitor Chip	1.2PF,NP0,±0.25PF,1005	MURATA	2	C5,C6
5	Ceramic Capacitor Chip	22PF,C0G,±5%,1005	TDK	1	C2
6	Ceramic Capacitor Chip	100PF,C0G,±5%,1005	Samsung YAGEO	1	C28
7	Ceramic Capacitor Chip	150PF,X7R,±10%,1005	Taiyo-uden	1	C27
8	Ceramic Capacitor Chip	10NF,X5R,±10%,1005	Darfon samhwa	1	C34
9	Ceramic Capacitor Chip	100NF,10V,X7R,±10%,1005	AVX	11	C7,C8,C9,C10,C11,C12,C21,C23,C25,C30,C31
10	Ceramic Capacitor Chip	1UF,X5R,±10%,1005	KYOCERA KEMET	6	C1,C17,C19,C20,C22,C24
11	Ceramic Capacitor Chip	2.2UF,X5R,±10%,1005	Eyang Fenghua	1	C18
12	Ceramic Capacitor Chip	4.7UF,6.3V,X5R,±20%,1005	NIC Compenets	2	C13,C36
13	Ceramic Capacitor Chip	10UF,6.3V,X5R,±20%,1005	Pilkcor LRC	6	C14,C26,C29,C32,C33,C35
14	Switching Diode Chip	1N4148WS(SOD323)	KEXIN LRC	1	D1
15	Schottky Chip	1KK2104(SOD123) MBR0540W-HAF(SOD123FL) MBR0540T1-D(SOD123) MBR0540(SOD123)	PANJIT KEC IMS Semtech Diodes Onsemi Fairchild	1	D2
16	NPN Transistor Chip	MMBTSD123(SOT23) STD123S(SOT23)	UTC Vishay First silicon	7	Q1,Q2,Q3,Q4,Q5,Q6,Q7
17	IR LED SMD	BIR-HMC33M-TRC-SIDE(30DEG)		1	IR1
18	Dual LED Chip	BL-HGEJE36HTRB(RED/YG,15,1612) 19-226-R6G7C-A03-2T(R/G,1612)	Bright LED Everight Hong-Li	1	LED1
19	White LED	BL-HZ336G-L8-TRB(WHITE,T4-4J,1608) 19-217UTD/S759/TR8(WHITE,C,1608)	Inhere GMA	18	LED2,LED3,LED4,LED5,LED6,LED8,LED9,LED11, LED12,LED13,LED14,LED16,LED17,LED18,LED21, LED22,LED23,LED24
20	Inductor Chip	3.3NH,±0.3NH,1005	Murata TDK	1	L2
21	Inductor Chip	3.6NH,±0.3NH,1005	Sunlord INPAQ MAXECHO	1	C34
22	Power Inductor Chip	4.7UH,±20%,750MA,2012	Samsung Chilisin	1	L3
23	Power Inductor Chip	10UH,±10%,2012	Pilkcor Darfon	1	L4
24	Analog Microphone SMD	ZTS6151 AOS3729A-R38-NTM	Zillitek Sanico	1	MIC1
25	Tact Switch SMD	PTS099160(1.6N,R/A) SKRTLAE010(1.6N,R/A)	Foxeco ALPS EASTERN	4	KB15,KB22,KB28,KB34
26	Photo Transistor Chip	PT12-21B-TR8(SMD,R/A) BPT-HPG33A-TRB	Bright LED Everight	1	PT1
27	Resistor Chip	0 OHM,1/16W,±5%,1005		4	R1,L1,FB1,R4
28	Resistor Chip	2 OHM,1/10W,±5%,1608		2	R52,R17
29	Resistor Chip	180 OHM,1/16W,±5%,1005	ABCO YAGEO	1	R30
30	Resistor Chip	270 OHM,1/16W,±5%,1005	TYCO	5	R41,R46,R47,R48,R49
31	Resistor Chip	300 OHM,1/16W,±5%,1005	Cosmetech	1	R9
32	Resistor Chip	330 OHM,1/16W,±5%,1005	Samsung ROHM	5	R31,R33,R34,R42,R43
33	Resistor Chip	470 OHM,1/16W,±5%,1005	TA-I WALSIN	7	R7,R20,R21,R22,R23,R50,R53
34	Resistor Chip	560 OHM,1/16W,±1%,1005	PILKCOR	7	R27,R28,R29,R36,R37,R38,R39
35	Resistor Chip	1K OHM,1/16W,±5%,1005	Fenghua AVX	2	R5,R16
36	Resistor Chip	4.7K OHM,1/16W,±5%,1005	Murata TDK	2	R2,R3
37	Resistor Chip	10K OHM,1/16W,±5%,1005	Taiyouden	3	R8,R10,R12
38	Resistor Chip	33K OHM,1/16W,±5%,1005	Darfon	1	R19
39	Resistor Chip	47K OHM,1/16W,±5%,1005	Eyang	2	R11,R15
40	Resistor Chip	82K OHM,1/16W,±5%,1005	KEMET	1	R13
41	Resistor Chip	100K OHM,1/16W,±5%,1005	KYOCERA NIC Compenets	6	R18,R24,R25,R26,R51,R54
42	Resistor Chip	820K OHM,1/16W,±5%,1005		1	R14
43	Bluetooth IC	BLUETOOTH IC, RTL8762CKF(QFN48)	Realtek	100	U1
44	Accelerometer IC	LIS2DE12TR(LGA-12) STK8BA57	STM Sensortek	100	U2
45	Boost Converter IC	SYV7070 IM8132S TPS61097A-33DBVR	SILERGY TI IMS	100	U3
46	Crystal SMD	X-TAL SMD, 40MHZ,7R40000002_S1,2016	TXC H&S	1	X1
47	PCB	PCB, RD12C,D(FR-4,1.2T,4L,OSP,CARBON)	GE SSSG JSL PENG YU	1	

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(TRANSMITTER REMOCON)

MODEL NO :

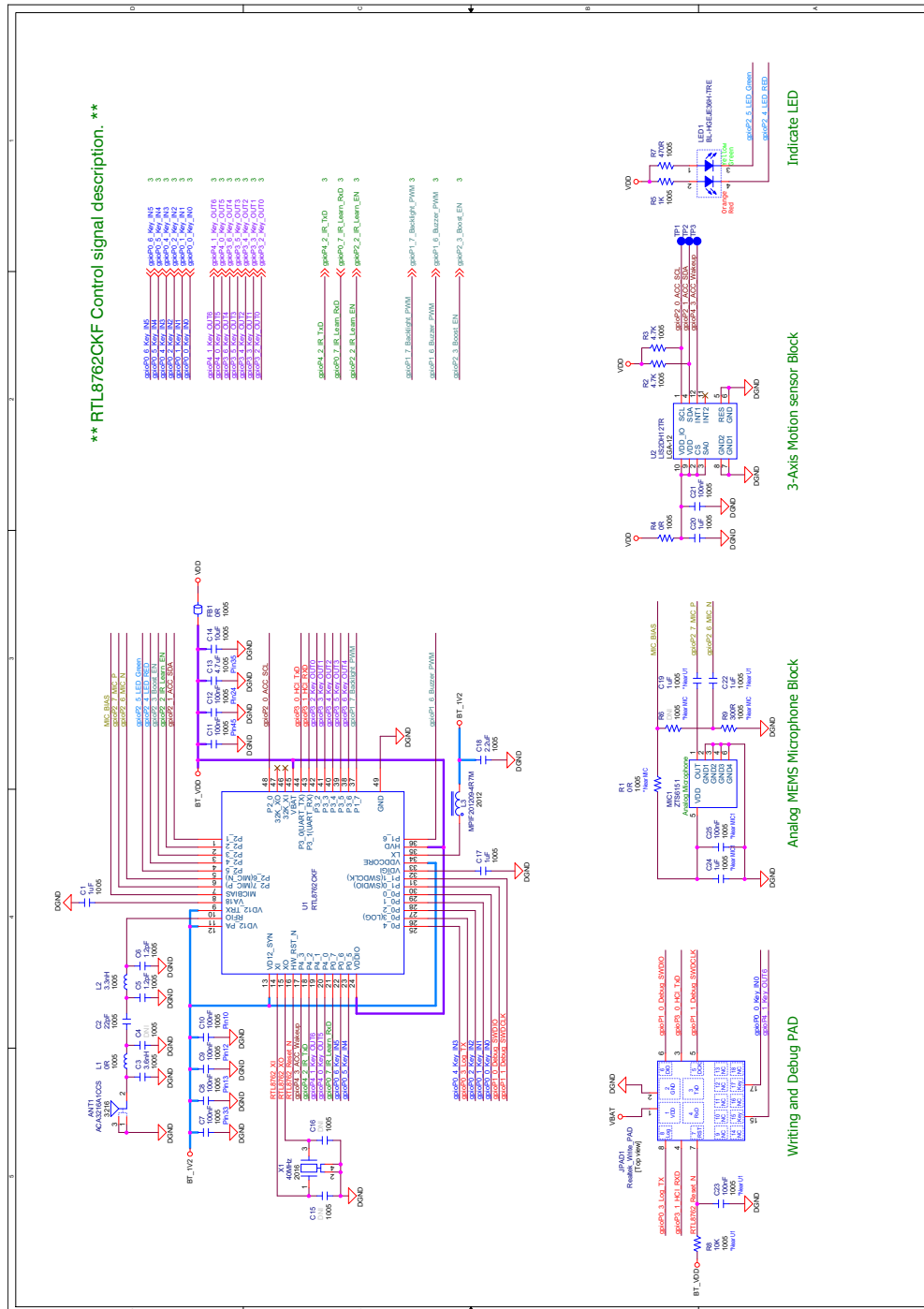
RD12C00

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6. Schematics

6.1 Bluetooth smart PART



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(TRANSMITTER REMOCON)

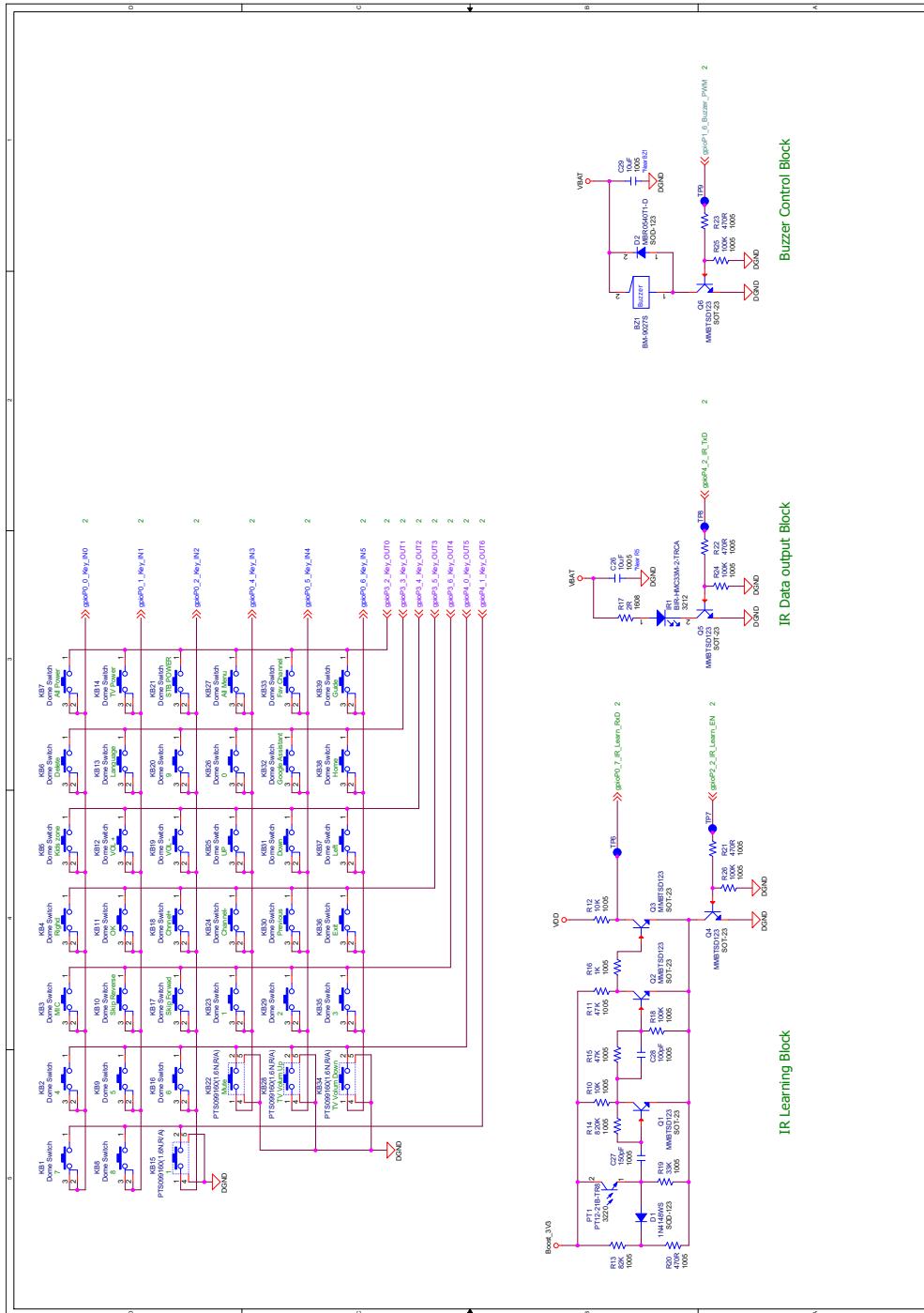
MODEL NO :

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6.2 Keys / IR Learning / IR TxD / Buzzer PART



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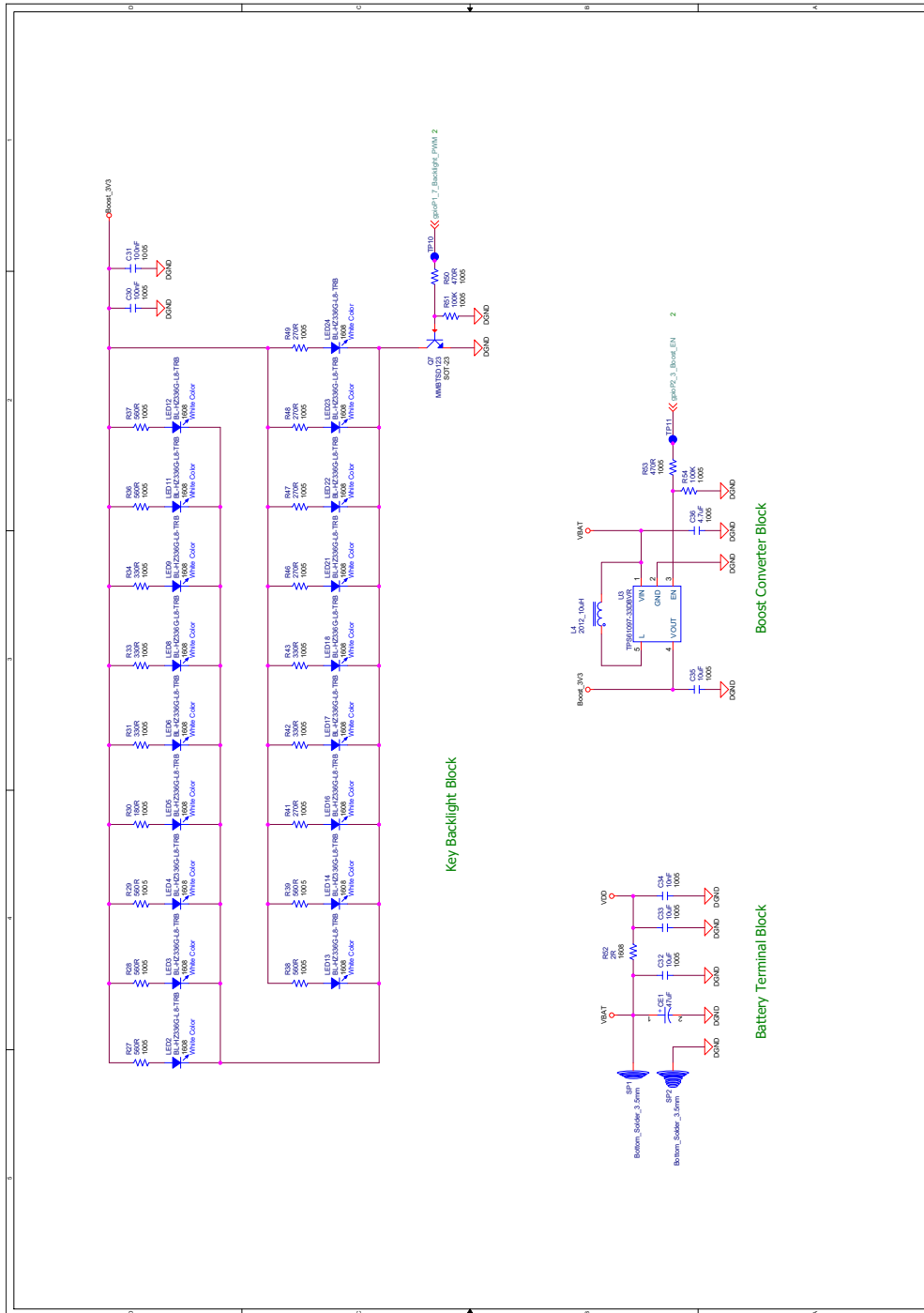
MODEL NO :

RD12C00

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6.3 Backlight / Battery Terminal Part

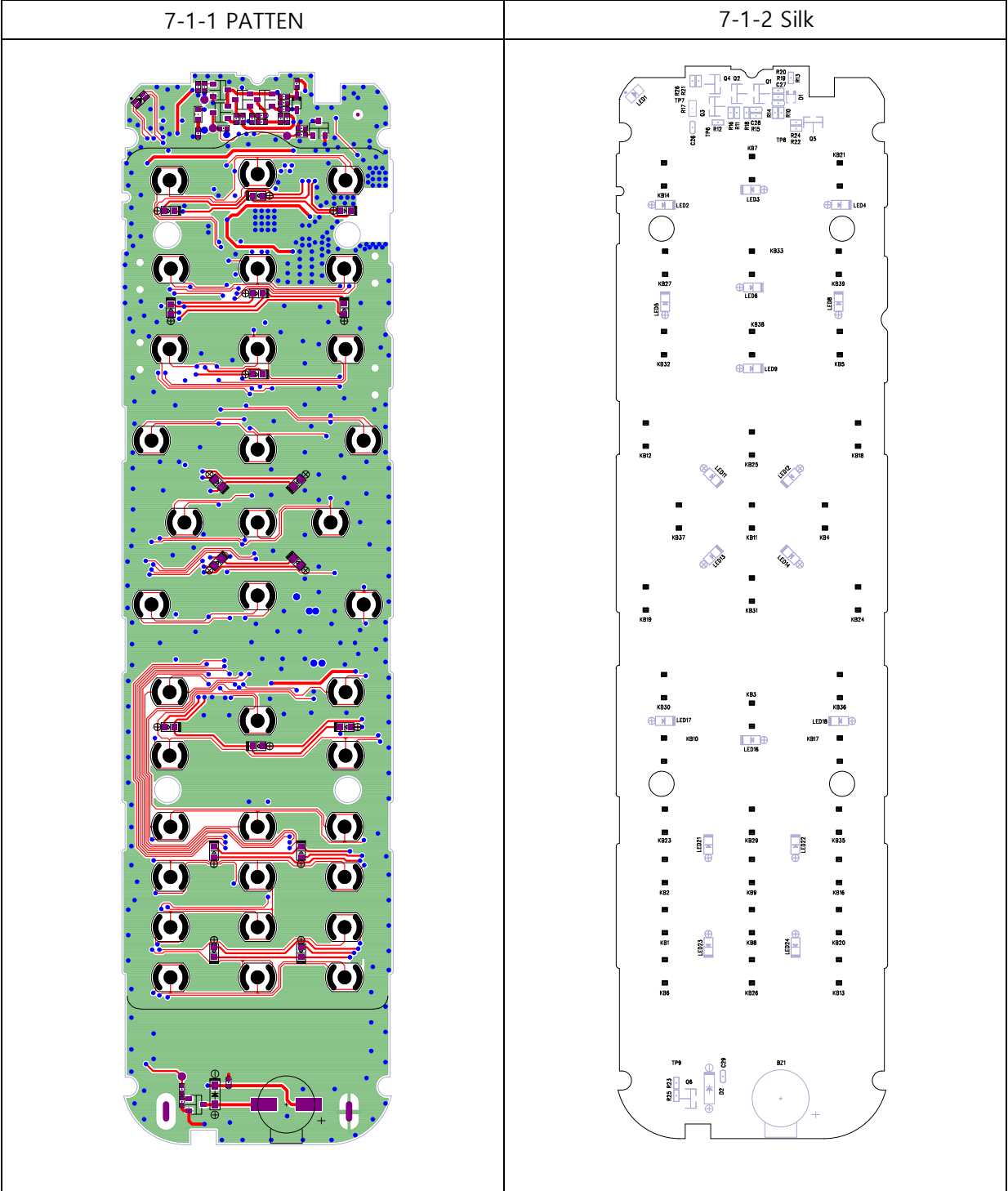


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7. PCB Diagram

7.1 TOP PCB (1/3)



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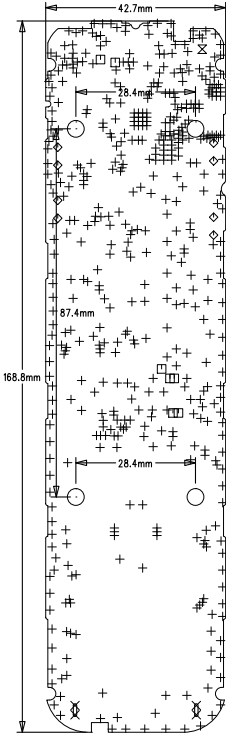
7.2 BOTTOM PCB(2/3)

7-1-3 PATTERN	7-1-4 Silk

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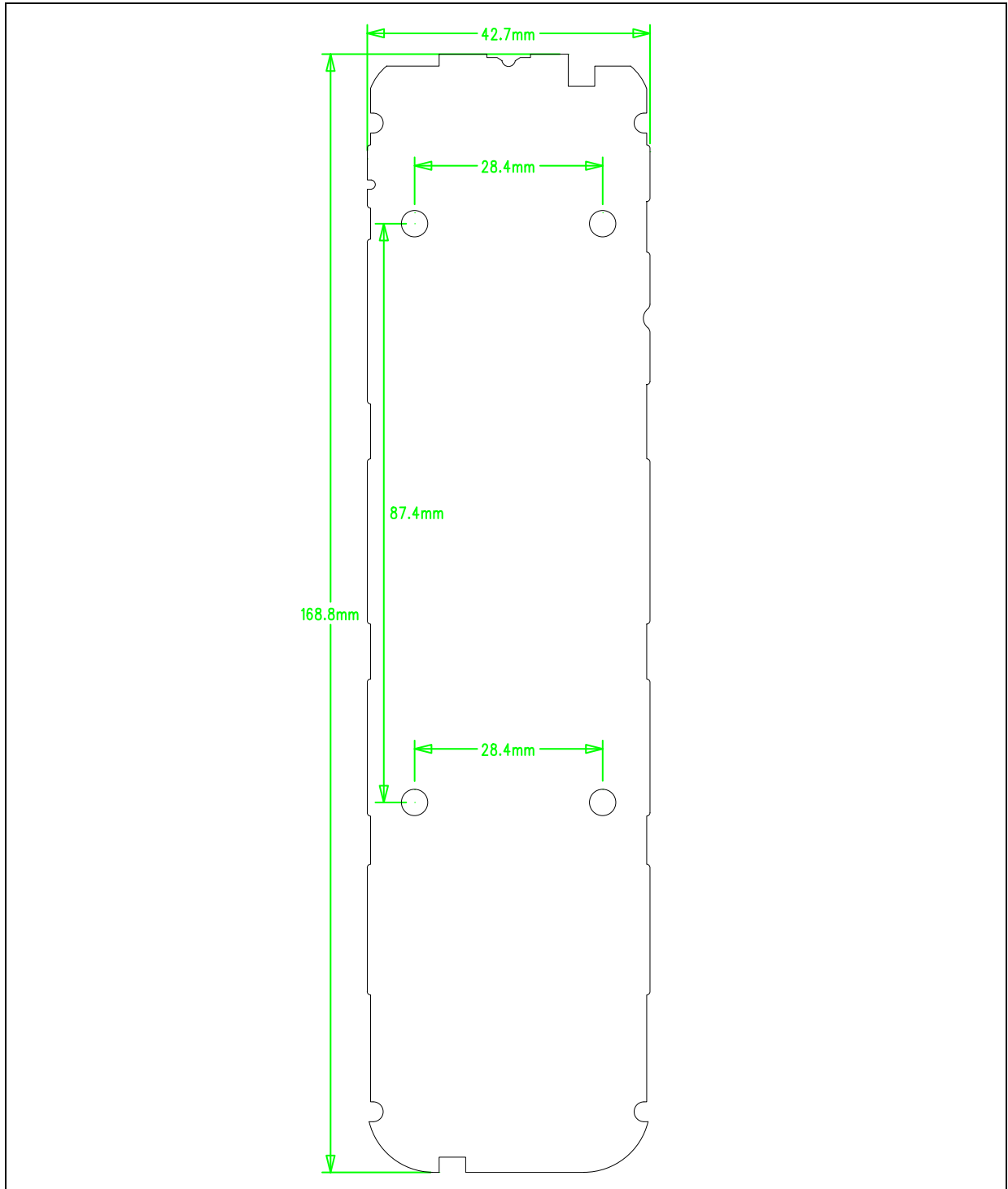
7.3 MAIN PCB (3/3)

7-1-5 Drill Chart	7-1-6 Main PCB SPEC																														
 <table><thead><tr><th>SIZE</th><th>QTY</th><th>SYM</th><th>PLATED</th><th>TOL</th></tr></thead><tbody><tr><td>0.3</td><td>504</td><td>+</td><td>YES</td><td>+/-0.0</td></tr><tr><td>0.8 x 3</td><td>2</td><td>⊗</td><td>YES</td><td>+/-0.0</td></tr><tr><td>0.5</td><td>7</td><td>□</td><td>YES</td><td>+/-0.0</td></tr><tr><td>0.8</td><td>8</td><td>◇</td><td>NO</td><td>+/-0.0</td></tr><tr><td>0.5</td><td>1</td><td>⊗</td><td>NO</td><td>+/-0.0</td></tr></tbody></table>	SIZE	QTY	SYM	PLATED	TOL	0.3	504	+	YES	+/-0.0	0.8 x 3	2	⊗	YES	+/-0.0	0.5	7	□	YES	+/-0.0	0.8	8	◇	NO	+/-0.0	0.5	1	⊗	NO	+/-0.0	1) PCB Material : FR4, 4-Layer 2) PCB Thickness : 1.2T 3) Copper Foil Thickness : - Out Layer 0.5 OZ - Inner Layer 0.5 OZ 4) PCB Size Single - 42.7_mm x 168.8mm Array - 221.5_mm x _188.8_mm (5 In 1) 5) SilkScreen Color : White 6) PSR Ink Color : Green 7) Surface : OSP 8) Dome Key : Carbon 9) PCB Version : 1BL-3096C
SIZE	QTY	SYM	PLATED	TOL																											
0.3	504	+	YES	+/-0.0																											
0.8 x 3	2	⊗	YES	+/-0.0																											
0.5	7	□	YES	+/-0.0																											
0.8	8	◇	NO	+/-0.0																											
0.5	1	⊗	NO	+/-0.0																											

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8. PCB Outline Specification – Main PCB

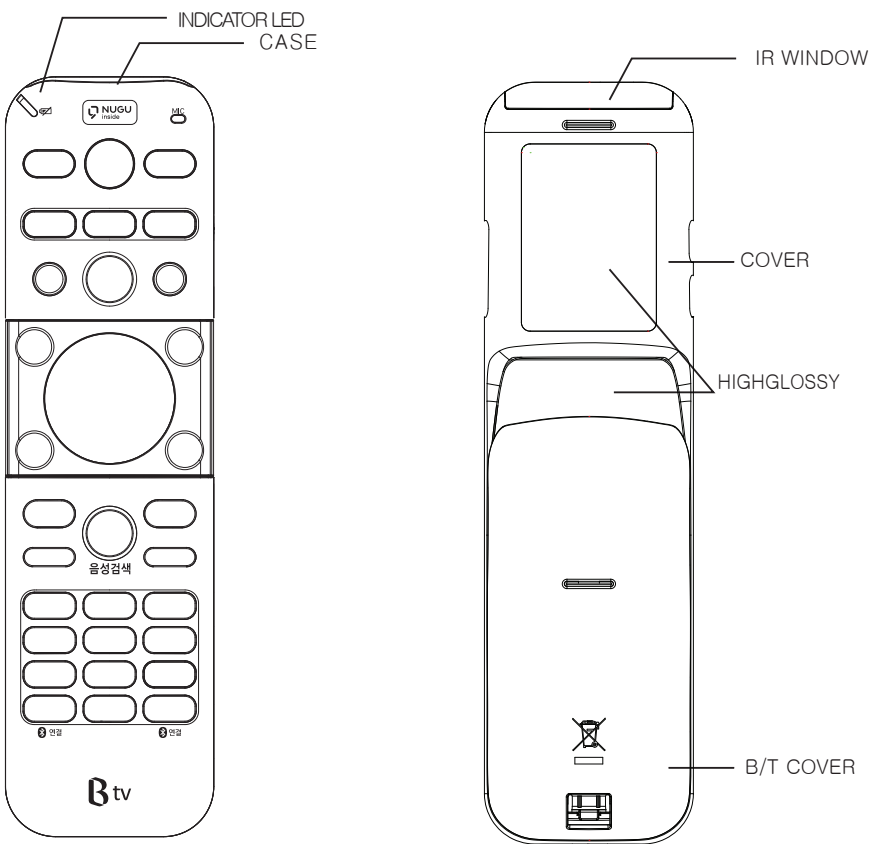


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INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 28	63
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9. Design & Mechanical Specification

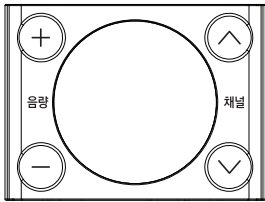
9. Design (1/5) – Mold

DESIGN SPECIFICATION		Model : RD12C00
 INDICATOR LED CASE IR WINDOW COVER HIGHGLOSSY B/T COVER Btv		
1. MOLD		
1.1 MOLD COLOR * CASE, B/T COVER : ABS, HF-0680, K21383(Black), TEXTURE * COVER : ABS, HF-0680, K21383(Black), TEXTURE & HIGH GROSSY * IR WINDOW : PC, SC-1220R, 40697B(D/Red), HIGH GROSSY 1.2 SILK COLOR * COOLGREY 3C		

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INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 29	63
REFORM :			
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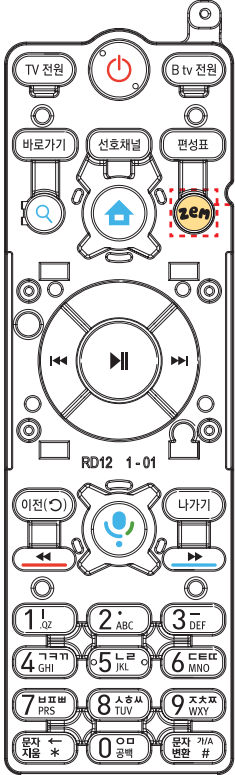
9. Design (2/5) – KNOB

DESIGN SPECIFICATION		Model : RD12C00
 CH/VOL KNOB  SIDE KNOB		
2.KNOB		
2.1 MOLD COLOR * ABS, HF-0680, K21383(Black), TEXTURE		2.2 SILK COLOR * COOLGREY 3C

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INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 30	63
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9. Design (3/5) – RUBBER

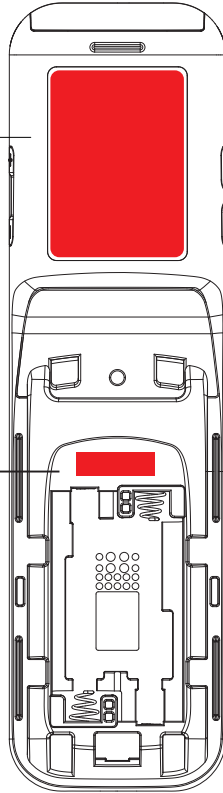
DESIGN SPECIFICATION		Model : RD12C00
 RD12 1-01	3.1.1	P/T 7619C(RED)  P/T 7724C(GREEN)  P/T 660C(BLUE)  BLACK  TV 전원  B tv 전원  바로가기  신호채널  편성표    이전(◁)  나가기   1. 123 2. ABC 3. DEF 4. GHI 5. JKL 6. MNO 7. PRS 8. TUV 9. WXY 문자 ← 0 공백 → 문자 가/A 자음 * 공백 * 변환 # ALL BACK LIGHTING
	COOLGREY 3C	(LASER)
3.RUBBER		
3.1 RUBBER COLOR 3.1.1 P/T 1205C 3.1.2 OTHER TRANSLUCENCE WHITE		3.2 SPRAY & SILK COLOR COOLGREY 3C SPRAY SILK-7619C,7724C,660C,BLACK BLACK SPRAY LASER ETCHING SOFT COATING

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INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 31	63
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9. Design (4/5) – LABEL

DESIGN SPECIFICATION
Model : RD12C00



리모컨 동작이 안될 때
1. 빨간LED가 켜지면 배터리를 교체해 주세요.
2. 셋톱박스 뒤 전원을 껐다 다시 켜 주세요.
3. 리모컨을 재연결해 주세요.
리모컨 [A]+[B]를 동시에 3초간 누르면 녹색LED가 깜빡이면서 리모컨이 재연결 됩니다.

TV볼륨/전원이 안될 때
TV전원 ON : [B tv전원] + [외부입력] 동시에 3초간 누름 - 녹색LED가 켜지면 [채널A]를 TV가 꺼질 때 까지 누름 - TV가 꺼지면 [M]를 눌러 종료

B tv 이용가이드 보기

호환셋톱박스
UHD 1,2,3,4 / AI 1,2
모델명 BRM-BT11

공급원: SK브로드밴드 / 제조원: 리모트솔루션(주)
No. R-RMB-RD12 Made In Korea
해당 무선설비는 운용 중 전파혼신 가능성이 있습니다.

SCALE 150%

VX.X YYYY.MM.DD

Version No.
(Changeable)
Date of Manufacture
(Changeable)

4. BACK LABEL

4.1 Material : White Bopp
4.2 Size : 30 X 42mm(±0.1mm)
4.3 Silk Color : Black, 422C
4.4 Coating : Matte Laminating

5. VERSION LABEL

5.1 Material : Art Paper
5.2 Size : 16 X 4mm(±0.1mm)
5.3 Silk Color : Black

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 32	63
REFORM :		RD12C00	
DECISION :			

9. Design (5/5) – MANUAL

DESIGN SPECIFICATION		Model : RD12C00	
Passed Label			
RS PASSED KWONYB			
일반형 원격 제품화하기 ● 제품 설명으로 설명이 필요한 모든 구성요소의 명칭을 수록함 (구성요소 10개) ● 제품명, 제품명			

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22

REFORM :

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SPECIFICATION

(TRANSMITTER REMOCON)

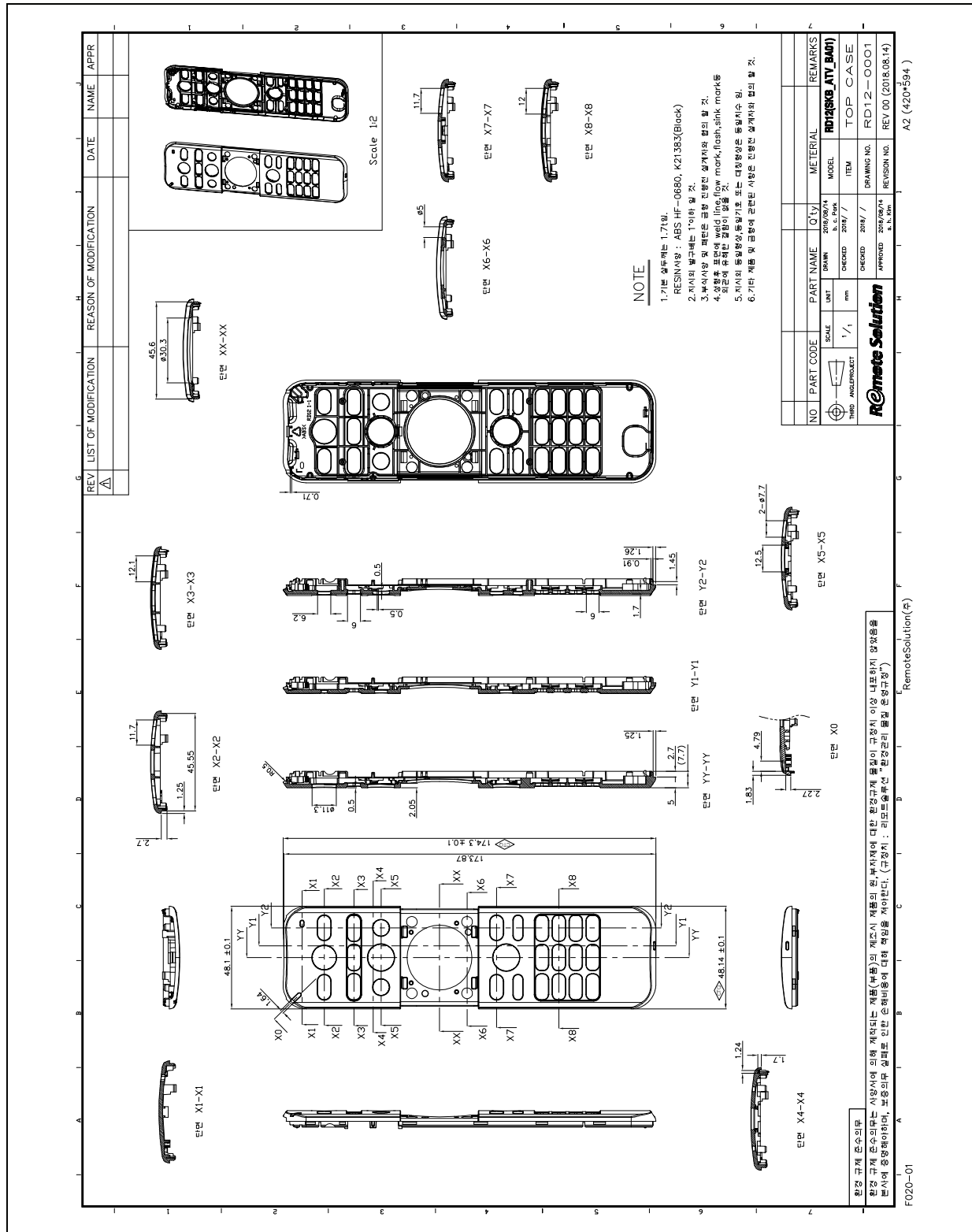
MODEL NO :

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10. Mechanical Spec (1/15) – TOP CASE



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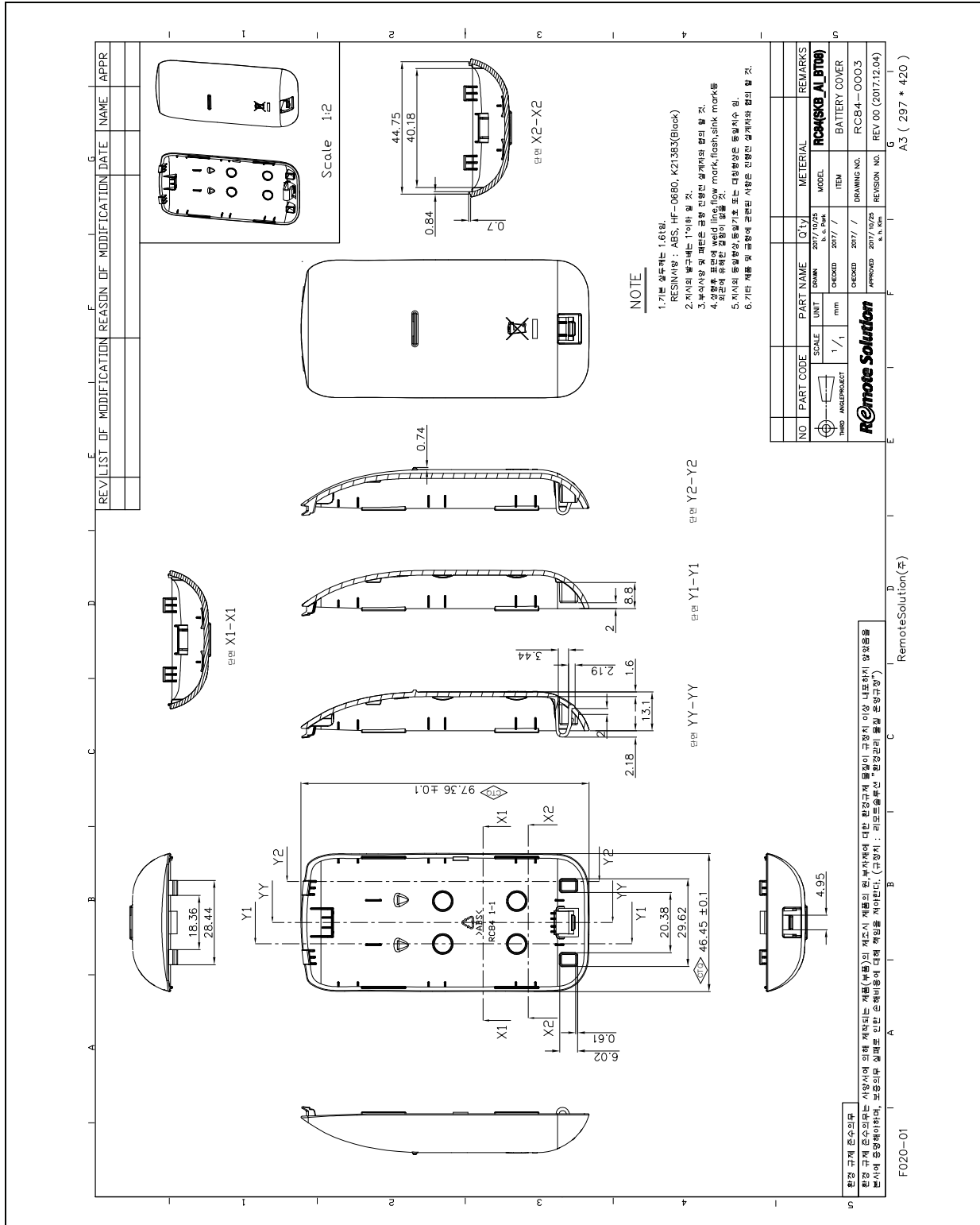
MODEL NO :

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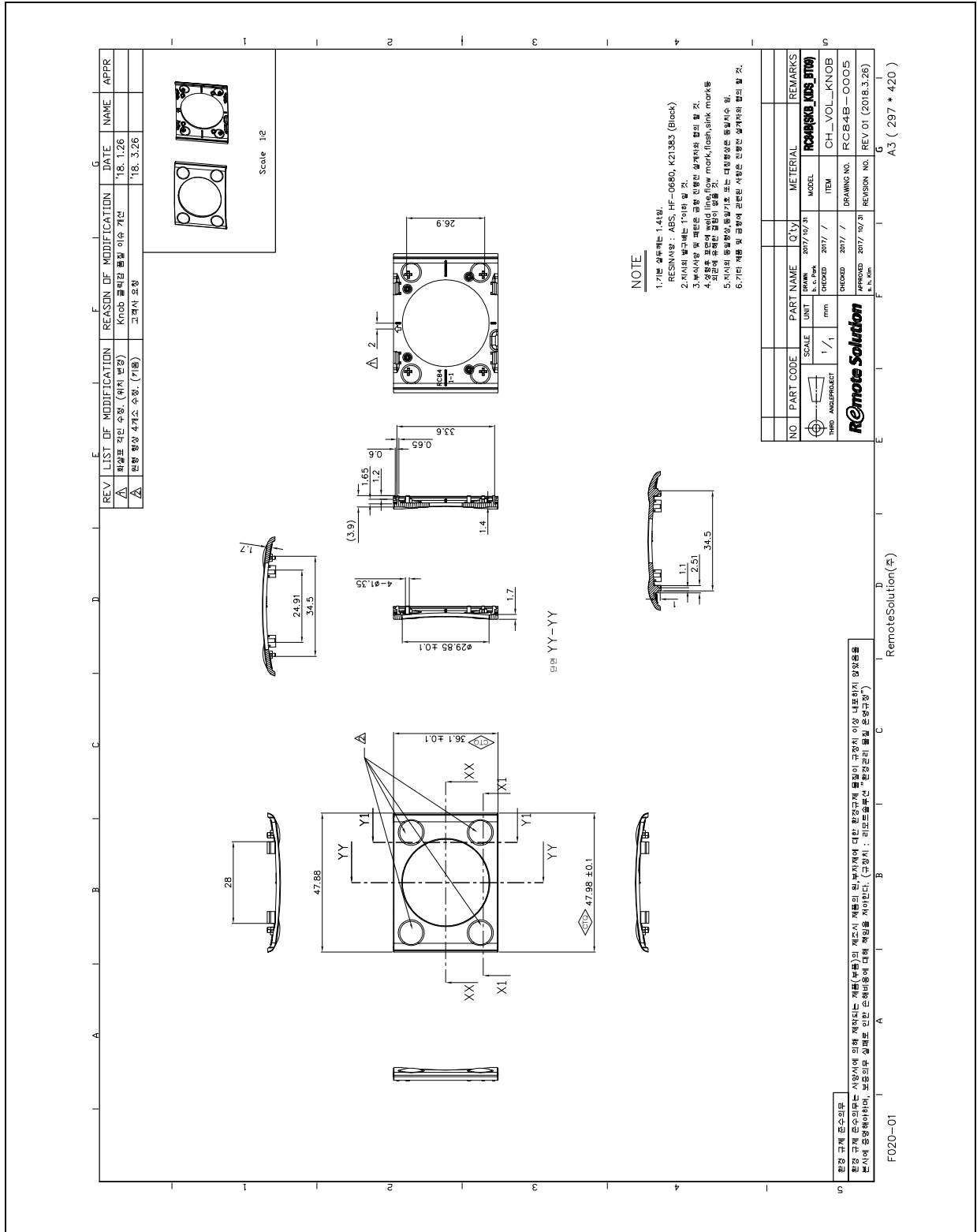
10. Mechanical Spec (3/15) – BATTERY COVER



REMOTE SOLUTION CO., LTD.

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



REMOTE SOLUTION CO., LTD.

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SPECIFICATION

(TRANSMITTER REMOCON)

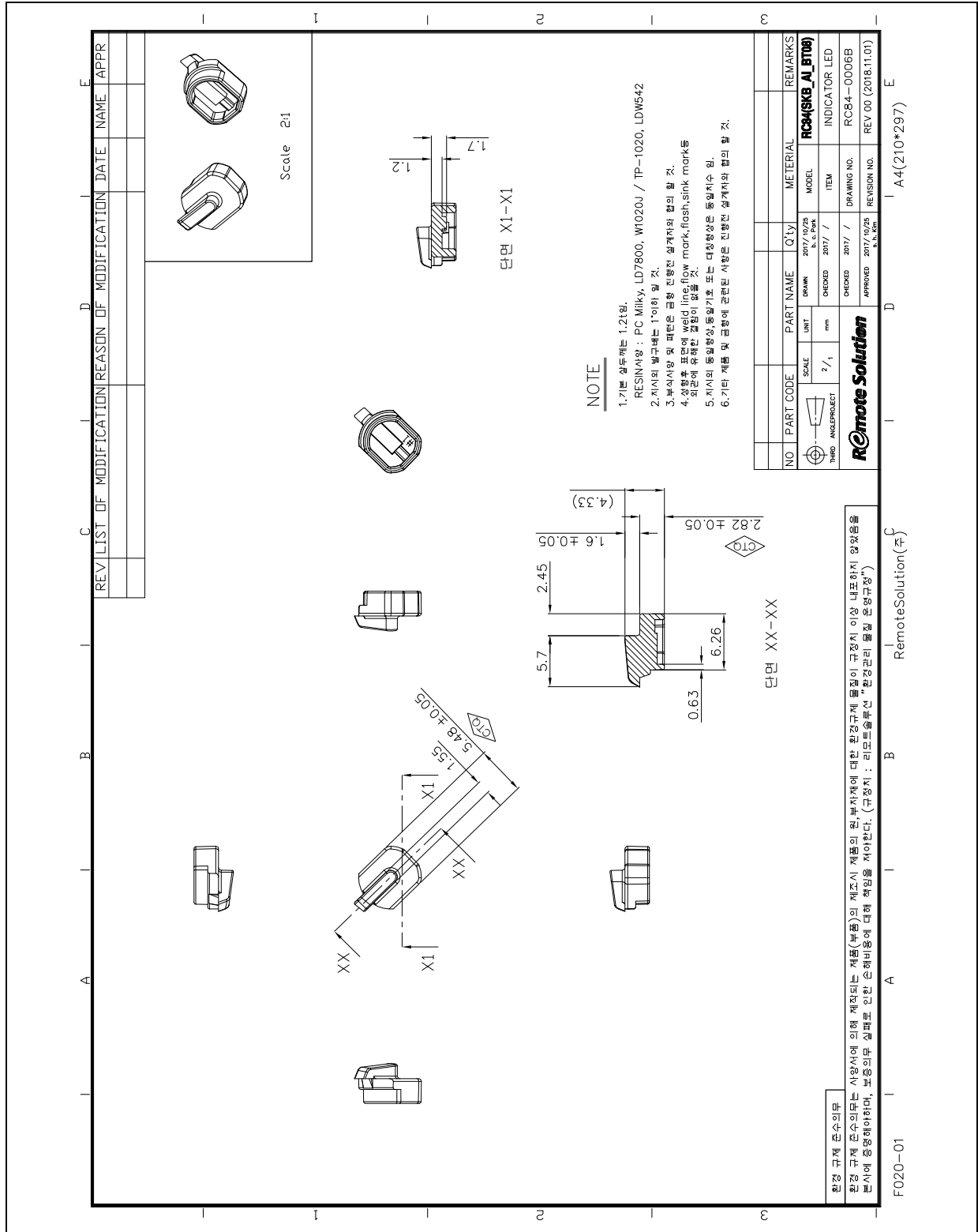
MODEL NO :

RD12C00

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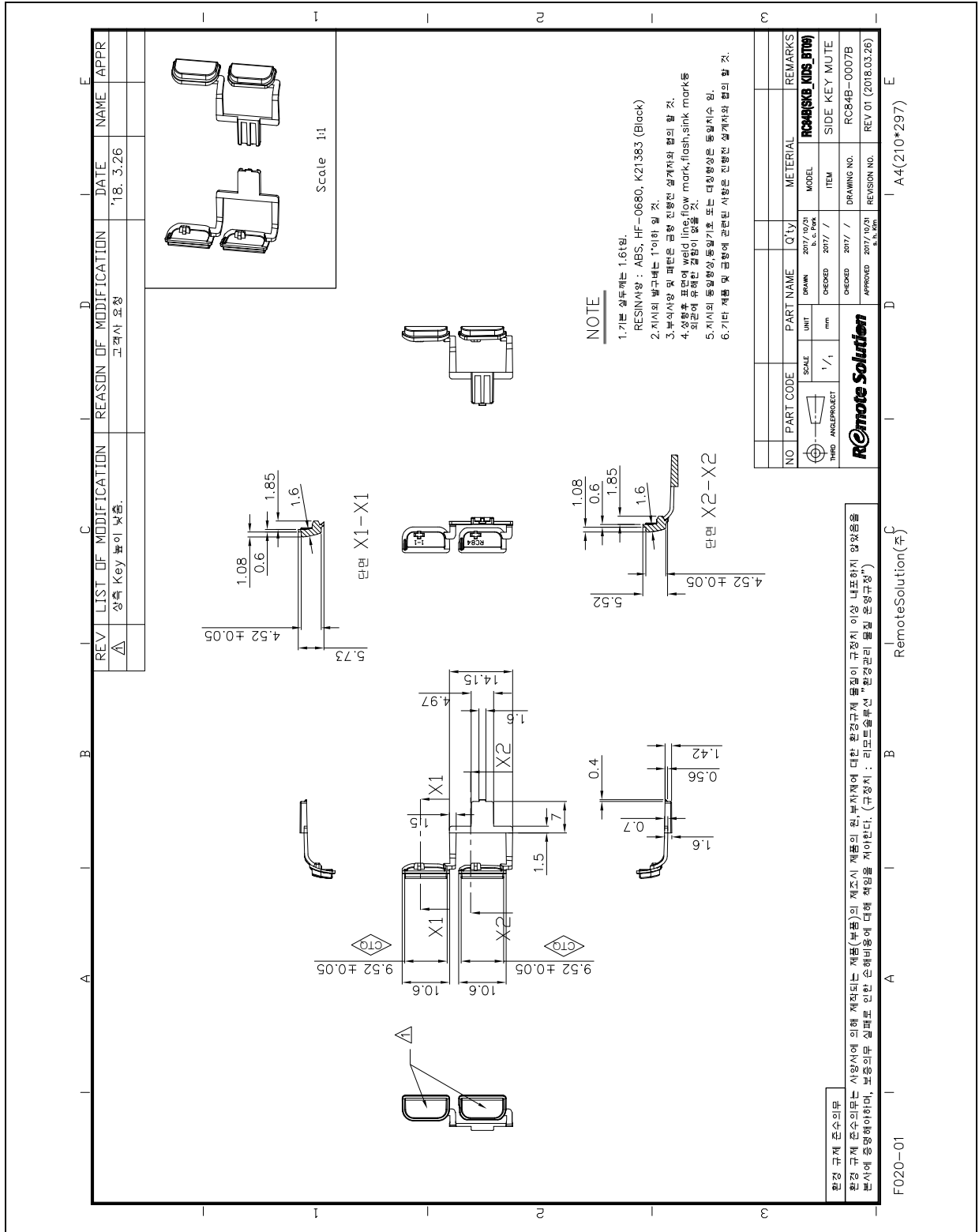
10. Mechanical Spec (6/15) – INDICATOR LED



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 39	63
REFORM :			
DECISION :		RD12C00	

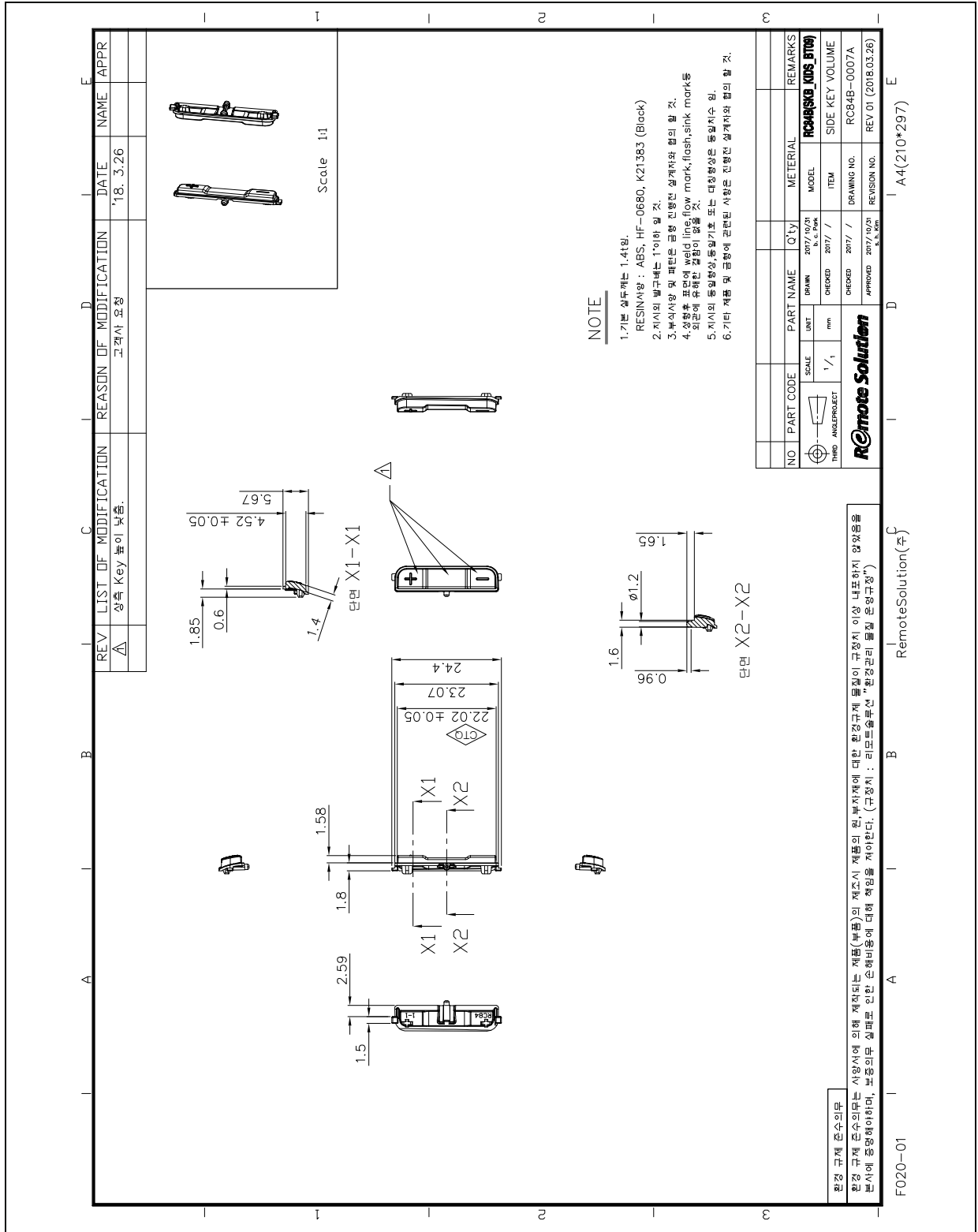
10. Mechanical Spec (7/15) – SIDE KEY MUTE



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 40	63
REFORM :		RD12C00	
DECISION :			

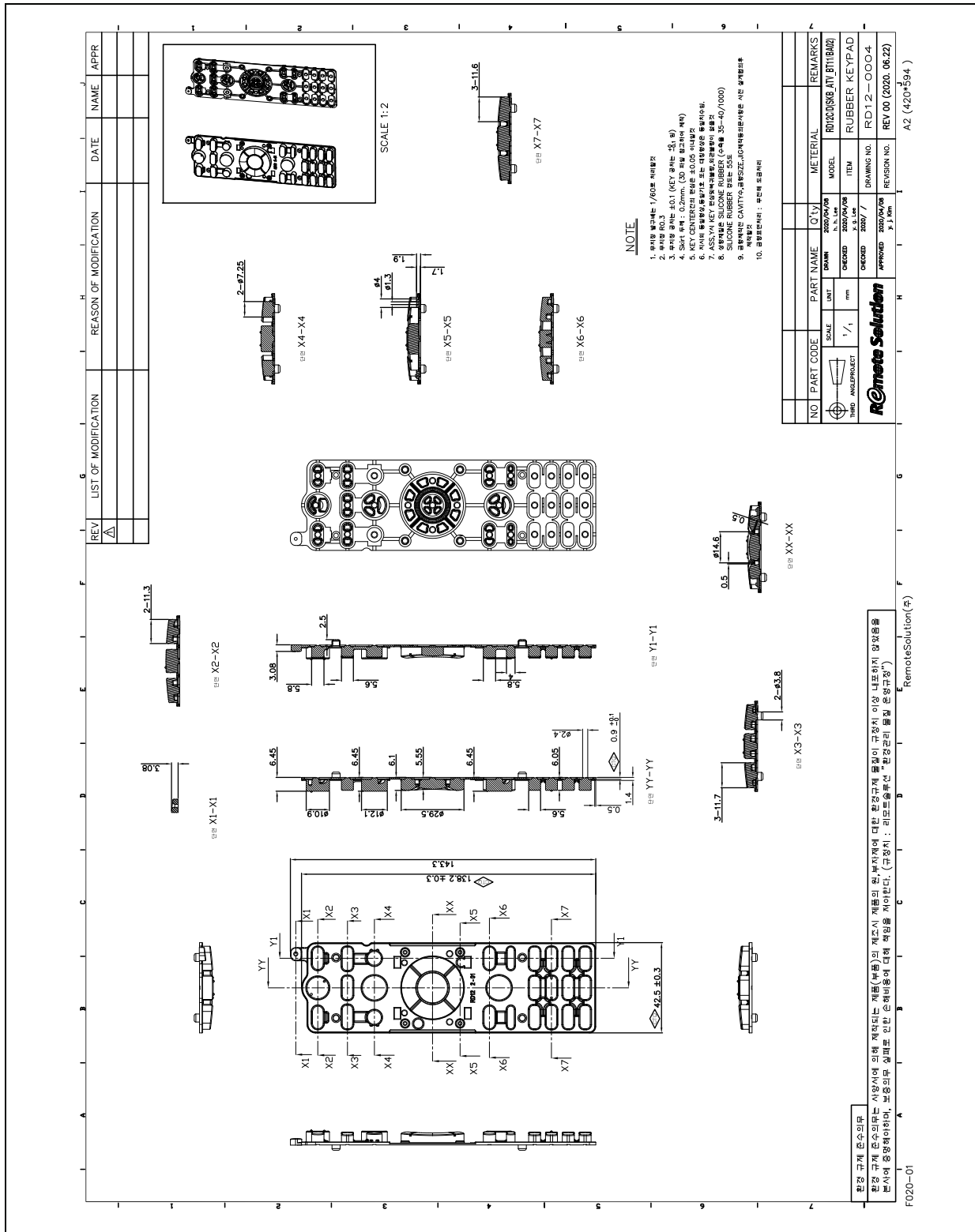
10. Mechanical Spec (8/15) – SIDE KEY VOLUME



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	<u>SPECIFICATION</u> (TRANSMITTER REMOCON)	MODEL NO :	41
REFORM :			
DECISION :		RD12C00	63

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



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	42
REFORM :		RD12C00	
DECISION :			

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

REV	LIST OF MODIFICATION	REASON OF MODIFICATION	DATE	NAME	APPR

[Roll 방향 'A']

[Roll 방향 'B']

< Roll 작업시 Dome Sheet 방향 및 Roll Size >

1. Roll 지면 내장은 Ø150mm이고, Dome Sheet 겹은 외곽이 Ø400mm를 넘지 않아야 함.

2. Roll 작업시 Dome Sheet 수량은 5,000매를 기준 함.

3. Roll 작업시 Dome Sheet의 방향은 IR LED 기준 'A' 방향으로 정함.

단, SMD 진행 방향에 따라 관련 부분과 협의하여 정함.

NOTE

1. Metal Dome : DR Type, Ø5 dot 5EA 적용.
2. Operating Force : 130gf ± 20gf (50%)
3. Material & Thickness : SUS 301 (N Coating), 0.06t
4. Stroke : 0.22 ± 0.02mm
5. Life Cycle : 500,000 Cycle
6. Click Rate : 50% ± 10

배면

전면

NO	PART CODE	PART NAME	Q'ty	MATERIAL	REMARKS

RemoteSolution(≠)

A3 (297 * 420)

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 43	63
REFORM :			
DECISION :		RD12C00	

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

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

종 류	압 축 SPRING	총 권 수	2.25 권
재 질	SUS304-WPB NI-CO	권 방 향	우
선 경	Ø0.6	자유장 길이	1.2±0.2

NOTE

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

환경 규제 준수 의무

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

NO	PART CODE	PART NAME	Q'ty	MATERIAL	REMARKS

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

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 44	63
REFORM :			
DECISION :		RD12C00	

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

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

종 류	압 축 SPRING	총 권 수	4.25 권
재 질	SUS304-WPB NI-C□	권 방 향	좌
선 경	Ø0.6	자유장 길이	8 ± 0.2

NOTE

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

환경 규제 준수 의무

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

NO	PART CODE	PART NAME	Q'ty	MATERIAL	REMARKS

SCALE 2/1

UNIT mm

DRAWN 2017/10/19
b. c. Park

CHECKED 2017/10/19
s. b. Lim

CHECKED 2017/10/19

APPROVED 2017/10/19
s. h. Kim

(-)SPRING

RC84(SKB_AI_BT08)

2SM-RC84

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 45	63
REFORM :		RD12C00	
DECISION :			

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

NO	MODEL	TITLE	MATERIAL	FINISH	REMARK
1					
2					

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

NOTE

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

환경 규제 준수 의무

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

NO	PART CODE	PART NAME	Q'ty	MATERIAL	REMARKS

SCALE 2/1

UNIT mm

DRAWN 2015/06/01 b. c. Park

CHECKED 2015/06/01 s. b. Lim

CHECKED 2015/06/01

APPROVED 2015/06/01 b. c. Kim

COMMON SPRING

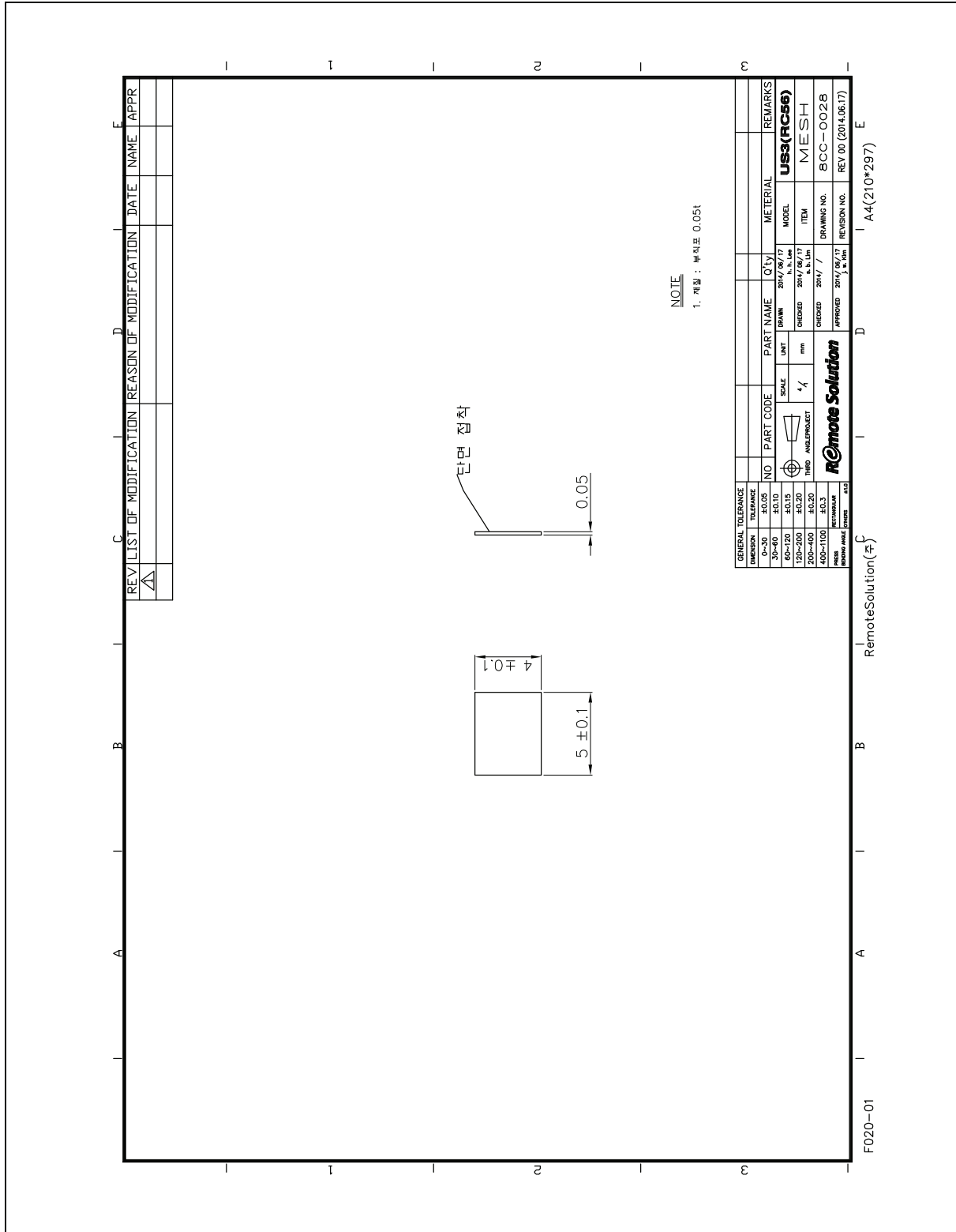
RC65(SK_B_Smart)

2SC-RC65

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	46
REFORM :		RD12C00	
DECISION :			

10. Mechanical Spec (14/15) – MESH



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 47	63
REFORM :			
DECISION :		RD12C00	

10. Mechanical Spec (15/15) PE BAG

NO	MODEL	TITLE	MATERIAL	FINISH
1				

COLOR : BLACK

NOTE

1. 도면 치수로 관리 할 것.
2. 재료 : PE 0.05t 투명

△	ISSUE NO	MM/DD/YY	SIGNATURE	GHANGE NO	CHANGE CONTENTS
	SCALE	UNIT	DRAWN	2014/12/10	PE BAG CJ(RC60) 7PP-0052T
			N / S	mm	
	DRAWN			2014/12/10	
				j. w. Kim	

REMOTE SOLUTION CO., LTD.

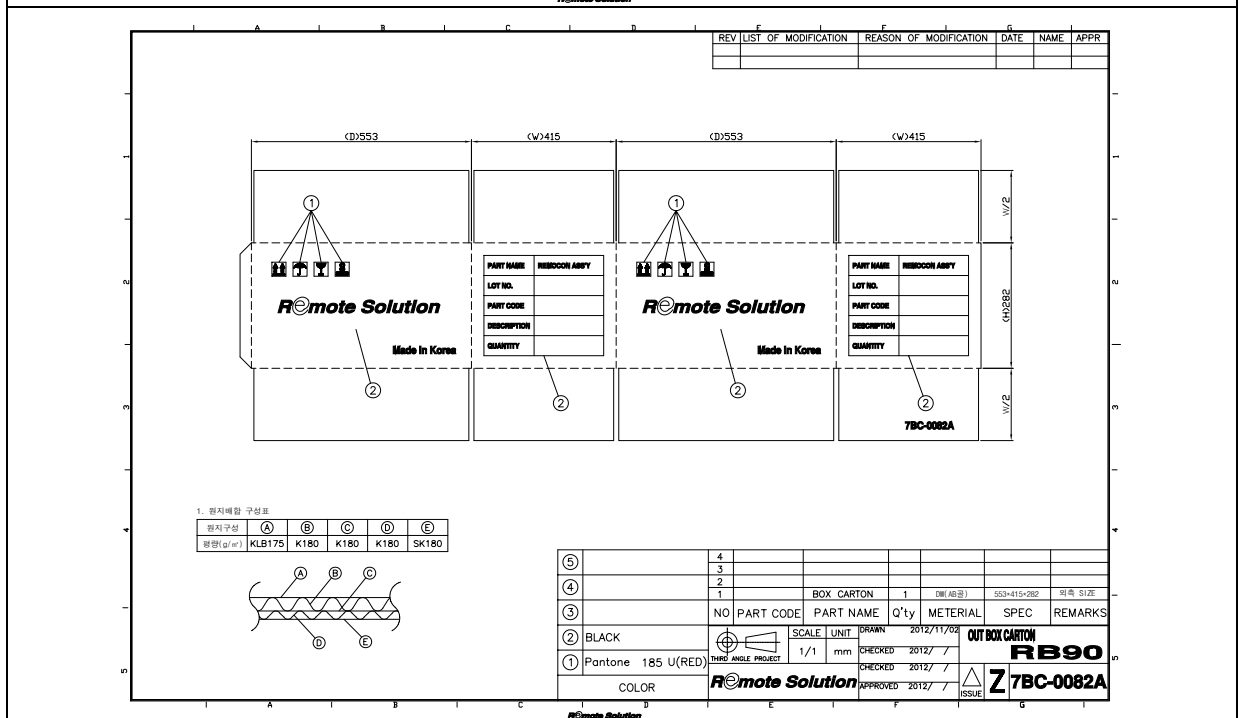
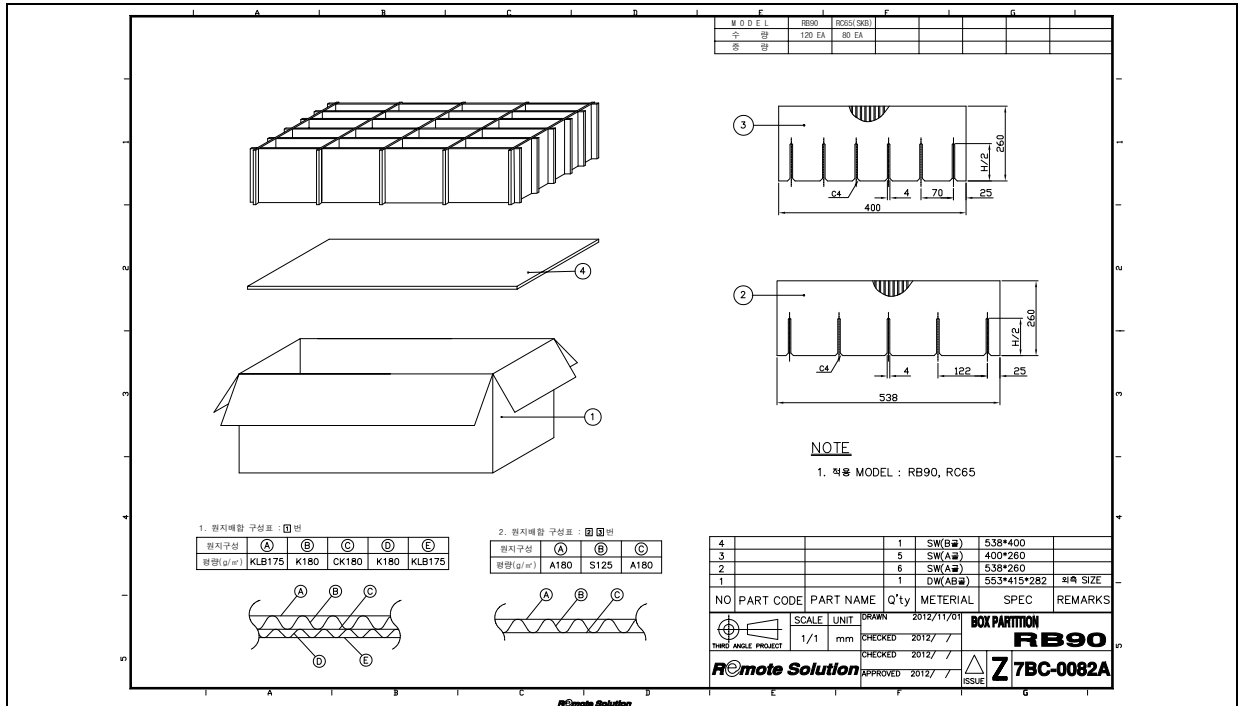
INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	48
REFORM :			
DECISION :		RD12C00	63

11. Packaging Specification

10-1 MATERIAL : CARTON

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

10-3 QUANTITY : 80EA



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22

REFORM :

DECISION :

SPECIFICATION

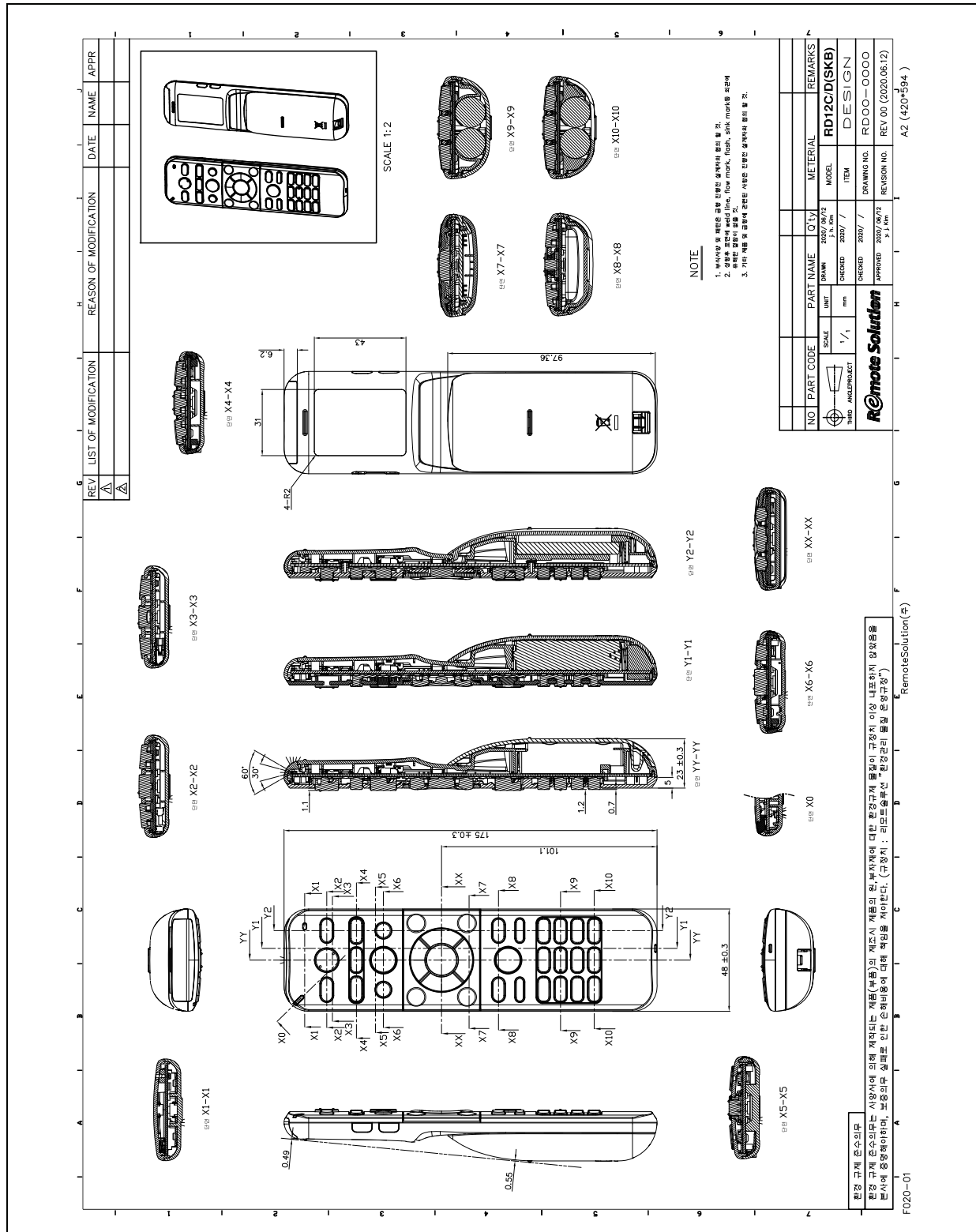
(TRANSMITTER REMOCON)

MODEL NO : 49

RD12C00

63

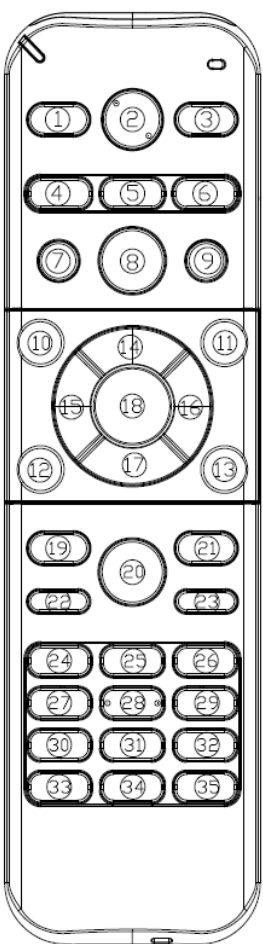
12. Assembling Specification



REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO :	50
REFORM :		RD12C00	63
DECISION :			

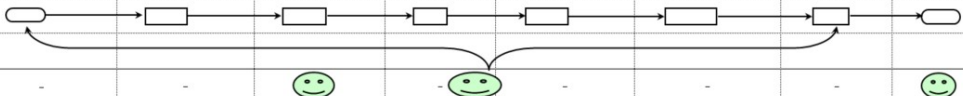
13. Rubber Tension Test

	NO.	Tension	Return	NO.	Tension	Return
	1	240	144	25	230	138
	2	240	144	26	240	144
	3	230	138	27	240	144
	4	220	132	28	230	138
	5	230	138	29	220	132
	6	240	144	30	240	144
	7	240	144	31	230	138
	8	230	138	32	230	138
	9	220	132	33	240	144
	10	250	150	34	220	132
	11	260	156	35	230	138
	12	250	150			
	13	250	150			
	14	260	156			
	15	250	150			
	16	260	156			
	17	250	150			
	18	280	168			
	19	240	144			
	20	240	144			
	21	230	138			
	22	240	144			
	23	230	138			
	24	230	138			
	Tension Spec :		Small Key : 220 ± 30gr			
			Large Key(10,11,12,13,14,15,16,17,18번 Key) : 250 ±30gr			

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 51	63
REFORM :			
DECISION :		RD12C00	

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

Customer	SKB	Process Flow Diagram				Document No	RS-200325-01	Sign	
Product	BT11					Date	2020. 03. 25	Review	권대걸
Model	RD12C					Part	SMD	Approval	
No.	Revision date	Content		Check	No.	Revision date	Content		Check
Process No		01	02	03	04	05	06	07	08
P r o c e s s	Outsourcing								
	MAIN								
	SUB								
	Personnel	-	-			-	-	-	-
Process	LOADER	SCREEN PRINTER	Worktable	CHIP MOUNTER	CHIP MOUNTER	REFLOW	UNLOADER	VISION Check	
Content	.PCB Loading	.Solder Paste Printing	.Spring insert	.Chip Mounting	.Chip Mounting	.Soldering	.PCB Unloading	.PCB Inspection (Solder, part's)	
Machine	LOADER	SCREEN PRINTER	-	CHIP MOUNTER	CHIP MOUNTER	REFLOW	UNLOADER	VISION Machine	
Tools	-	-	.Spring Insert Part's	-	-	-	-	-	
Inspection Machine	-	.3D Inspection machine	-	-	-	-	-	-	
Focused Management Item	.PCB Loading position	.Solder cream height	.Spring Reverse shovel Warning	.Coordinate value	.Coordinate value	.temperature control	.PCB Loading posit	.Inspection criteria	
RSC-200-001 (Rev. 0)									

RSC-200-001 (Rev.0)

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 52	63
REFORM :			
DECISION :		RD12C00	

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

Customer	SKB	Process Flow Diagram				Document No	RS-200325-01	Sign	
Product	BT11					Date	2020.03.25	Review	권태경
Model	RD12C					Part	PBA	Approval	
No.	Revision date	Content	Check	No.	Revision date	Content	Check		
Process No	01	02	03	04	05	06	07	08	
P r o c e s s	Outsourcing								
	MAIN								
	SUB								
	Personnel								
Process	Dome Sheet	Realtek Writing	leakage current test	IR operation test	date printing marking	Appearance inspection			
Content	Dome Sheet Attach	RTL8762CA Writing	leakage current test	IR operation test	date printing marking	Appearance inspection			
Machine	Dome Sheet jig	Writing jig,PC	PC	PC	marking machine				
Tools	Dome Sheet jig tool		asseter POWER Supply	asseter POWER Supply					
Inspection Machine									
Focused Management Item	Dome Sheet Attachment Check	Writing Firmware check	Nonconforming product management	Nonconforming product management	Check print status	Nonconforming product management			

RSC-200-001(Rev.0)

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 53	63
REFORM :		RD12C00	
DECISION :			

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

Customer	SKB	Process Flow Diagram				Document No	RS-200325-01	Sign	
Product	BT11					Date	2020.03.25	Review	권태걸
Model	RD12C					Part	Assembly	Approval	
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 CASE Assembly	TOP CASE Assembly	TOP CASE Assembly	TOP CASE Assembly	Assembly	attaching protective film	IR CODE Test	PCB FMC TEST	
Content	.Indicator LED Insert .SIDE KEY insert	.Mesh Attach	.Side key insert .Rubber insert	.PCB Cutting & Insert	.IR Window insert .Assembly	.IR Window attaching protective film	.IR CODE TEST .Back Label attach .SIDE KEY TEST	.Pairing TEST .Rssi TEST .Voice TEST .BACK LIGHT CHECK	
Machine					Assembly machine		.4IN1 Test machine	PC	
Tools								.Pairing Dongle	
Inspection Machine								.Monitor .darkroom box	
Focused Management Item	.Scratch	.Scratch	.Scratch	.Scratch	.Assembly Status check	.Check Attacheent Status	.IR CODE Check .LED Check	.Rssi Test .PAIRING Test .Voice Test .Unpairing Test	
Process No	09	10							
Process	Outsourcing								
	MAIN								
	SUB								
Personnel									
Process	Appearance Inspection	Package							
Content	.BATTERYCOVER inset .Appearance inspection	.PE BAG Package .Passed Label attach .Insert Battery							
Machine									
Tools									
Inspection Machine									
Focused Management Item	.BATTERYCOVER inset .Appearance inspection	.packing quantity							

RSC-200-001 (Rev.0)

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 54	63
REFORM :		RD12C00	
DECISION :			

15. Manufacturing Control Plan (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 : 2019.12.06
Proto	Model	SK Broadband AI BOX RCU (BT111)	△						
Pre-MP	Part Number	RD12C00	△						
MP	CFT	PM(DW Kim), R&D(JH Kim, YT Ahn, H Hong, GH Kim), Prod.(YR NaKH Noh), Prod.Tech(HB Jang), QC(SG Son, SM Kim), Purchase(GJ Woo), Sale(GH Lee)	△	2020.04.03	Delete A2DP (Sapphire) audio feature				
VENDOR CODE Customer technical acknowledge/date (when required):									
No.	Process	Equipment	NO	Products	Process	Standard	How to check	Cycle	Management Plan
10	Raw material inventory	Visual, Text film	1	Raw materials	Supplier (warehouse)	Vendor Input			
		Vermer caliper	2	Raw materials	The dimensional check	In line with the structure drawings - length size management	measurement Data	Sampling	Inspection specification
		Tension Gauge	3	Raw materials	Characteristics of check	In accordance with specifications of the structures	measurement Data	Sampling	Inspection specification
		Visual	4	Raw materials	Combined inspection	After the merger is not allowed to produce abnormal	The assembly	Sampling	Inspection specification
		Chamber	5	Raw materials	Reliability Test	Reliability test no abnormalities	measurement Data	once a month	Test specification
		EA 1000A III	6	Raw materials	Harmful material inspection	Hazardous substances management benchmark	measurement Data	Once a week	Hazardous substances management
20	Materials Warehousing/ releasing	A material cart	1	Raw materials	FIFO	Confirm materials specifications FIFO management	Now product labeling	Every Lot	ERP P/G(SAP)
51	Prevention of static electricity	Static Electricity Checker	1	Static Electricity	Management of static Electricity	Should be within Good Zone	Electrostatic tester	once a day	Check Sheet
52	Stirring solder cream	Solder paste mixer (DMS200)	1	Solder cream	Storage of Solder cream	In cold storage with 5±3℃	Thermometer	once a day	Measurement sheet of temperature
			2	Solder cream	Stirring of Solder cream	45 sec	Timer	Before using	Management register of Stock and Delivery
			3	Solder cream	Leaving room temperature	25±5℃, 2Hr (Food_proof)	Timer	Before using	Management register of Stock and Delivery
30	Supplying PCB	Vacuum Loader (SBSF-200)	1	PCB	Sorting status	For direction to sort out	Visual inspection	1/Lot	-
			2	PCB	PCB The installation	PCB Pick up After drop phenomenon	Visual inspection	1/Lot	-
40	Cleaning PCB	PCB Cleaner (PCC-4000)	1	PCB	Cleaning PCB's dirt	Location of brush and Air should be fine	Visual	1/Lot	
50	Spreading Solder cream	Screen Printer (HP-520S)	1	Solder Cream	Squeeze pressure	14-16kgf	Check Equipment	1/Lot	Equipment checklist
			2	Solder Cream	Squeeze speed/angle	35 ~ 100mm/sec, 60± (Normal : 70~80mm/sec)	Check Equipment	1/Lot	Equipment checklist
		Maintain a constant temperature device (HTC-1380)	3	Solder Cream	Condition of printing solder cream	Tin less, Tin over, No blockage	Visual Inspection (Manifest)	1/Lot	At the beginning, middle, end
			4	Solder Cream	Keeping internal fixed temperature	23 ~ 27 degrees	Set Display	once a day	-
			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
53	Solder 3D measurement	3D measuring machine (SPI2500)	1	Solder Cream	Solder thickness measurement UE878 IC	Coating amount management by metal mask thickness a.13T: 155±35µm b.10T: 125±20µm No overpayment, nonpayment, distortion	Check Equipment	Every Time	3D measurement sheet
60	SMD components patch	Chip component s	1	Chip Mount	Nozzle pressure	Air : 0.45 ~ 0.55 lbf Nozzle : -80 ± 10 mmHg	Pressure gauge	1time/daily	Equipment work sheet
		Chip component s	2	Chip Mount	PMC specification is consistent	Feeder List (MONITOR) *To prevent the mixing system	Visual inspection	When the mode changes	Record the account
		Chip component s	3	Chip Mount	Part a Pick up location	5~25% of component area	Equipment to confirm	When the mode changes	Equipment work sheet
		이형 Mount (SM421)	4	Chip component s	Air/Nozzle pressure	Air : 4.5 ~ 5.5 lbf Nozzle : -100 ± 10 mmHg	Pressure gauge	1 time/ monthly	equipment work sheet
		Chip component s	5	Chip Mount	Part a Pick up location	5~25% of component area	Equipment to confirm	When the mode changes	equipment work sheet
70	Spring assembly	Manual work	1	SMD products	Insert the spring (+/-)	Meet standard of BOM	Visual	When receiving material	System (SAP)
80	Reflow Soldering	SMD products	1	SMD products	Preheat interval	Temperature : 150 ~ 200℃ Soldering time : 90 ~ 130sec	Preheating temperature Check Preheating temperature Check	1time/ daily	Reflow Profile
		SMD products	2	SMD products	Soldering	Temperature : 200℃ 이상 (peak 235~250℃) - PCB 1.2t / FR-4 Soldering time : 40 ~ 70sec	Profile Check	1time/ daily	Reflow Profile
		SMB-220	1	SMD products	cool down	PCB finishing impeded (not allowed)	Visual inspection	All	equipment
100	visual inspection	Image tester (MV-3L)	1	SMD products	Confirm the part soldering condition	- no tin, tin, less skewed, plug, inverse interpolation, not advanced - part control within 1/3 of the scope of	equipment	All	work sheet
54	Analysis nonconforming 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

REMOTE SOLUTION CO., LTD.

INSTITUTION : 2020.04.22	SPECIFICATION (TRANSMITTER REMOCON)	MODEL NO : 55	63
REFORM :		RD12C00	
DECISION :			

15. Manufacturing Control Plan (2/2)

No.	Process	Equipment	Manage the project		SPC	Management Criteria				Division		Corrective Action	Remark
			NO	Products		Standard	How to check	Cycle	Management Plan	PD	QC		
110	Attaching Metal Dome sheet	MetalDome sheet M/C	1	Raw Materials	Attaching Metal Dome sheet	Adhesion shall be good.	Equipment	All	work sheet	○		Identification, Isolation, Repair	
120	Realtek IC Writing	Writing M/C	1	Main PCBA	Realtek IC Writing (RTL8762CA)	Writing(Programming) should be fine - RS / Test Program	Equipment	All	work sheet	○		Identification, Isolation, Repair	
130	Leakage current Inspection	Function Test M/C	1	Main PCBA	Leakage current Inspection	Current should be fine (satisfied with the spec)	Equipment	All	work sheet	○		Identification, Isolation, Repair	
140	IR/RF Power & Operating current Inspection	Function Test M/C	1	Main PCBA	IR/RF Operating (Low voltage:2.3V input)	No defect on IR/RF Operating	Equipment	All	work sheet	○		Identification, Isolation, Repair	
150	Marking	Marking M/C	1	PCB Assy	Criteria management	Nondefect - Marking manufacture date Defect - Attach nonconforming label	Equipment	All	work sheet	○		Identification, Isolation, Repair	
160	Packing	Magazine	1	PCB Assy	Product Packaging	No model mixing Identification confirmation	Visually	All	equipment	○		Re packing	
53	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	
170	Top Case Assembly	Handwork	1	Top Case, Keypad, Main PCBA	Top Case + Keypad	Keypad and Main PCBA should not be lifted when seated	visually	All	work sheet	○		Isolation, Repair	
180	Assembling	Handwork	1	Top Assy, Bottom Cover, Filter	Assembling, Top Case Assy + Bottom Cover	There should be no deviations, gaps or gaps in spring Check the filter combination After the provisional match, the full match Be careful not to damage the phone jack during temporary molding	visually	All	work sheet	○		Isolation, Repair	
190	Learning test	Handwork	1	Finished	Checked RCU Learning + IR Filter part protective skin attach IR operation	No abnormality in learning function Check the condition after attaching the IR Filter part protective skin	Visually	All	work sheet	○		Identification, Isolation, Repair	
200	IR Operating Inspection	4IN1 Inspection JIG	1	Finished	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	
210	RF Operating Inspection	RF Inspection JIG	1	Finished Barcode	Pairing	Check pairing status and buzzer sound Check RSSI value, SW, FW version Voice and leakage current check Version label (manufacture date)	Visually	All	work sheet	○		Containment, repair	
220	PE-BAG fusion	fusion JIG	1	finished	Pfusion of PE-BAG batteries	No abnormality of PE-BAG fusion	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	Manual, PE-Bag	No manual missing or tearing	Visually	All	work sheet	○		Containment, repair	
56	Analysis nonconforming products and repair	Handwork	1	finished	분석 및 해체	Management of equipment and poor performance, Caution and confirmation of parts damage	Visually/ Identification label	Nonconforming	Nonconformity Management ledger	○		Re-inspection after repair, Disposal	
250	OQC	Pairing Dongle, Inspection P/G, JIG, Power Supply, Curmnt 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 G-II, 0.65	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. Operating voltage: TBD	Power Supply, curmnt meter	Sampling n=5, c=0	Standard document of test, Inspection Manual	○		Sorting, Rework, Releasing nonconforming	
			4	finished	Overhaul	Pattern Open/Short, 동박돌림, 냉납, 소납, 내부이물, 부품 미삽, 파손 등이 없을 것	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	
57	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)				

※ 기호 설명

No	기호	의미
1	가공	원자재나 반제품을 가공적으로 처리하여 새로운 제품을 만든
2	방향지시	원자재, 반제품, 완제품이 공정에 따라 흐르는 이동하는 과정
3	저장	원자재, 반제품, 완제품이 공정에 따라 저장하는 과정
4	수량검사	원자재, 반제품, 완제품의 개수를 개량하여 그 결과 확인하는 과정
5	검사	원자재, 반제품, 완제품의 품질 특성을 시험하고 합격, 불합격을 판정하는 과정
6	수입출하검사	원자재의 품질 특성을 시험하고 합격, 불합격을 판정하는 과정
7	수리 공정	공정 불량품에 대해 수리하여 양품, 불량률을 판정하는 과정

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16. TV Brand List (1/4)

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

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16. TV Brand List (2/4)

Maker(Brand)Name	Code number (3 digit) List
알파스캔(ALPHASCAN)	306 203 345
야마카시(YAMAKASI, 바이텍코리아)	343 346 347 348 349
자비오씨앤씨(XAVVIO)	354
티베라(TVERA)	355
스카이워스(SKYWORTH)	353
오리온정보통신(TOPSYNC)	351 330 357 306
한스정보(HANSJUNGBO, HANS TOUCH)	356
샤오미(XIAOMI)	361
디스플레이파크(DISPLAY PARK)	227
스마트홈 일렉트로닉스(SMART HOME ELECTRONICS)	362 363
주연테크(JOOYON)	302 346 373
대유위니아(WINIADAEWOO, WINIADIMCHAE)	338
아낙(ANAC)	345
매직뷰(MAGICVU)	355
모넥스(MONEX)	302
엘디케이(LDK)	226 206
와사비망고(WASABIMANGO)	227
하이메이드(HIMADE)	227 072
인트로스(INTROS)	227 355
삼화디스플레이(SAMHWA)	227
아도니스 (ADONIS)	355
큐닉스 (QNIX)	370 371 372
와이드뷰 (WIDE VU)	373 360
벡셀 (BEXEL)	350
폴라로이드 (POLAROID)	072
클라인즈 (KLEINZ)	373
아인즈 (EINZ)	373
티비스타 (TVSTAR)	355
더함 TV (THEHAM)	072
이엔티비 (ENTV)	374
MOZEE	373
시네아이(DLT) -시네EYE	373
ZEPA	373
젠티뷰(ZENTVIEW)	356 373
FIDES	226 072
프리투스 (FREETOSS)	226
CACC	072
제네시스 (GENESIS)	226
이노스 (INNOS)	072
스마트뷰 (SMART VIEW)	418
이스트라(ESTRA)	419 351
COOCAA	353
티지앤크퍼니(TG&Co.)	332
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

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16. TV Brand List (3/4)

Maker(Brand)Name	Code number (3 digit) List
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
INKEL	209 353 163
INSIGNIA	411
JBL	068
JCPENNY	052 092 089
JVC	058 066 092 070 071 226
KENWOOD	058 070 415
KLOSS	082
KMC	092 154 206
KTV	053 092 154 250
LUXMAN	051 150
LXI	151 167 037 068 090
MAGNAVOX	001 150 154 167 037 068 206 185 081 082 085
MARANTZ	068 108
MATSUI	068
METZ	408
MGA	150
MITSUBISHI	074 075 076 105 150
MTC	052 150 163
NAD	090
NEC	005 014 042 105 150 151 152 413
NIKEI	053
ONKING	053
ONTEC	053
ONWA	053
ORION	111 101 227
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
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
TEAC	407

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16. TV Brand List (4/4)

Maker(Brand)Name	Code number (3 digit) List
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	050 084 227
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
GROUP 02	엘지(LG,금성,GOLDSTAR)	227 236 206 192 186 193 175 178 185 224 201 092 183 003 002
		030 164 168 032 072 031 094 096 417
GROUP 03	대우(DAEWOO)	014 231 043 190 177 217 176 159 166 233 029 158 150 206 178
		185 216 165 169 156 152 155 151 228 195 153 170 188 198 038
		160 189 039 199 182 235 092 050 053 202 047 051 179 344 375
	대우루컴즈(DAEWOO LUCOMS)	327 335 350 351 352 353 226
GROUP 04	아남(ANAM)	204 174 234 018 019 223 193 180 171 053 220 222 161 095 221
	아래전자(ERA)	210 211 122 158 049 054 055 069 099 302 357 374
	디지털 디바이스(DIGITAL DEVICE)	004 006 007 008 011 012 013
	디지털스트림테크놀로지(DIGITAL STREAM)	301 312
	삼보컴퓨터(TRIGEM COMPUTER)	351 360
	삼보컴퓨터(삼보컴퓨터)	332
	코리아데이터시스템즈(KDS)	033 073
	티디에스(TDS)	103
	트라이뷰(TRIVIEW)	302
	프리즘 테크놀로지(PRISM TECHNOLOGY)	303 355 227
	한국전자(KEC)	053 206
	현대아이티(현대이미지퀘스트)	022 017 107 108 309
	현우 맥 플러스(MCPLUS)	206
	휴리프(HULIF)	104
	쿠메스전자(QUMES)	106
	다오코리아(DaoKorea)	304
	모뉴엘(Moneual) - 롯데마트	305 306 307 326
	드림뷰(DreamView) - 이마트	308 332
	노브랜드(No Brand) - 이마트	308
	제이엘통상(XPEER) - 홈플러스	321
	우성엔터프라이즈(WeCube) - 홈플러스	322
	티바(TIVA, 스피드테크놀로지)	324
	스카이미디아(Vishom)	325 330 336
	동양전자(DONGYANG)	068
	비티씨정보통신(BTC)	316
	씨마디지털(CIMADIGITEC)	318 319 227
	LS전자(LS ELECTRONICS)	313
	모티브씨엔씨(MOTV)	311
	시그마TV(SIGMACOM)	310
	유니크로(UNIKRO)	100 317
	보임틀(VOIMTLE)	304
	보림전자(BOLIM)	028 315 323
	삼인디스플레이(XSTIM)	104 320 329
	유투스(케이엘전자 UTUS)	314
	인디텍(VIEWPIA)	107
	재원전자(JAEWON)	333
	지피엔씨(GPNC)	327 306
	제노스미디어(ZENOS)	303 328
	제이아이케이솔루션(LEGRAND)	342
	파인포스(FINEFORCE)	306
	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
	스카이워스(SKYWORTH)	353
	오리온정보통신(TOPSYNC)	351 330 357 306

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17. Grouping brand list (2/4)

	Maker(Brand)Name	Code number (3 digit) List
	한스정보(HANSJUNGBO, HANS TOUCH)	356
	샤오미(XIAOMI)	361
	디스플레이파크(DISPLAY PARK)	227
	스마트홈 일렉트로닉스(SMART HOME ELECTRONICS)	362 363
	주연테크(JOOYON)	302 346 373
	대유위니아(WINIADAEWOO, WINIADIMCHAE)	338
	아낙(ANAC)	345
	매직뷰(MAGICVU)	355
	모넥스(MONEX)	302
	엘디케이(LDK)	226 206
	와사비망고(WASABIMANGO)	227
	하이메이드(HIMADE)	227 072
	인트로스(INTROS)	227 355
	삼화디스플레이(SAMHWA)	227
	JAMOS	358
	CAMEL	366
	아도니스(ADONIS)	355
	큐닉스(QNIX)	370 371 372
	와이드뷰 (WIDE VU)	373 360
	백셀 (BEXEL)	350
	폴라로이드 (POLAROID)	072
	클라인즈 (KLEINZ)	373
	아인즈 (IEINZ)	373
	티비스타 (TVSTAR)	355
	더함 TV (THEHAM)	072
	이엔티비 (ENTV)	374
	MOZEE	373
	시네아이(DLT) -시네EYE	373
	ZEPA	373
	젠티뷰(ZENTVIEW)	356 373
	FIDES	226 072
	프리투스 (FREETOSS)	226
	CACC	072
	제네시스 (GENESIS)	226
	이노스 (INNOS)	072
	한성(HANSUNG)	378 414
	스마트뷰 (SMART VIEW)	418
	이스트라(ESTRA)	419 351
	COOCA	353
	티지엘컴퍼니(TG&Co.)	332
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	058 066 092 070 071 226
	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	026 066 120 150 154 167 203 037 068 206 236 178 185 081 082 085 086 087 312
	하이얼(HAIER)	033 077 078 302 333 345
	HISENSE	368
	ZENITH	050 084 227
	CANDEL	150 081
	EMERSON	359 026 038 053 092 111 135 154 206

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17. Grouping brand list (3/4)

	Maker(Brand)Name	Code number (3 digit) List
	GE	042 167 037 049 067 071
	GRUNDIG	401
	MAGNAVOX	001 150 154 167 037 068 206 185 081 082 085
	A MARK	092 154 193 206
	PENNEY	150 163 167
GROUP 08	에이텍(ATEC)	031
	3S DIGITAL	028
	뉴컴월드(NEWCOMMWORLD)	219
	디지털 싸이노스(DIGIAL CYNOS)	016
	새찬전자(SAECHAN)	028 041 044
	AOC	193 404
	AUDIOVOX	038
	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
	덱트론(DECTRON)	033
	디보스(DIBOSS)	015 109
	ELECTROHOME	038 092
	FUNAI	053 359
	FUTURETECH	053
GROUP 09	INFINITY	068
	INKEL	209 353 163
	INSIGNIA	411
	JBL	068
	JCPENNY	052 092 089
	KENWOOD	058 070 415
	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
	MGA	150
	MTC	052 150 163
	NAD	090
	NIKEI	053
	ONKING	053
	ONTEC	053
	ONWA	053
	ORION	111 101 227
	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
	RUNCO	416

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17. Grouping brand list (4/4)

	Maker(Brand)Name	Code number (3 digit) List
	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
	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