

Shenzhen C&D Electronics Co.,Ltd

RF510B Datasheet

Model No.	RF510B
C&D part No.	A136RF510B0001

Customers :	
Model No.	
Approval No.	

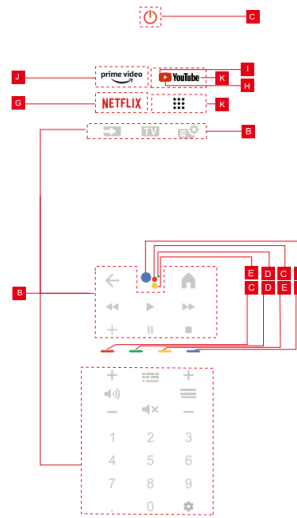
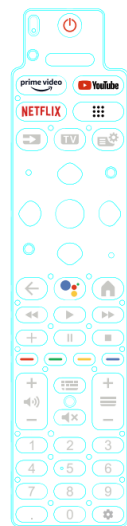
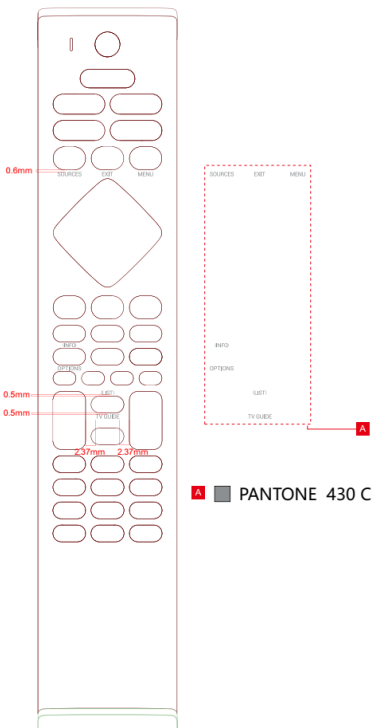
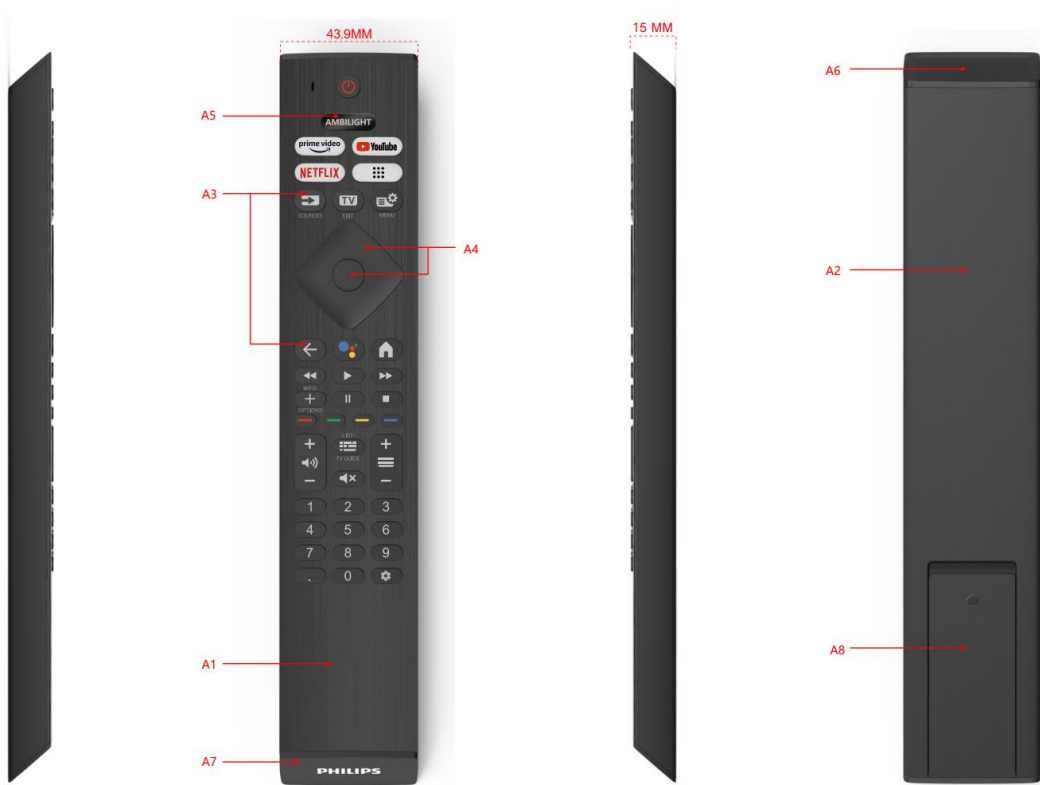
Change history					
Item	Date	Subject	Comment	Responsible / From	To
1	2022/10/25	First issue		C&D	
2	2022/11/8	V1.1	Update the functional descriptions as customer's requirements	C&D	
3	2023/1/14	V1.2	Update the SW version	C&D	
4	2023/1/24	V1.3	C&D part No. updated	C&D	

	Drawn By	Checked By	Approved By
Name / Sign	Eason		
Date	2022.10.25		

1. General Information

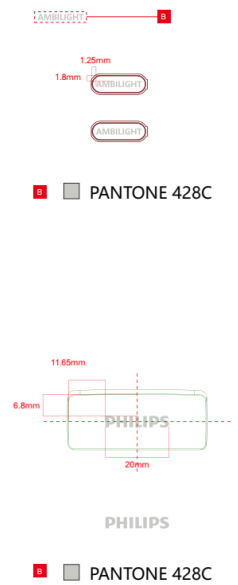
REMOTE RF ECO BASIC	Customer no.	2k23 R52-DB-LT
	Model no.	RF510B0002
	Frequency	TBD
	Number of buttons	45key
	Colour upper part	Black
	Colour lower part	Black
	Colour battery part	Black
	painting	No
	Hook(assemble to product or not)	No
	Backlight	YES
	Logo	No
	Certification	1, FCC ID 2, ANATEL, 3, ENACOM, 4, SUBTEL, 5, MTC 6, CONATEL 7, URSEC
	R&TTE report No.	No
	Software version	R52DLC_T301FFv.01.15
	Test software	TBD
	Testing instruction PCBA	No
	Testing instruction remote	No
	Weight of the remote	118g(Without Battery)
	Size	223*44*14.5*mm
	Label product	TBD
	Label white box	TBD
	Manual/Issue date	No
	Magnet or Metal plate	No
Technology of key pad	Metal dome	
Key press force	2.5N±0.5N	

2. ID



- B** ■ PANTONE 428C
- C** ■ PANTONE 179 C
- D** ■ PANTONE 2257 C
- E** ■ PANTONE 7549 C
- F** ■ PANTONE 2173 C

- G** ■ PANTONE 1795 C
- H** ■ PANTONE WHITE
- I** ■ PANTONE 485 C
- J** ■ PANTONE 432 C
- K** ■ PANTONE BLACK C



3. Electrical parameter

No.	Description
Key quantity	45 Key
Transmission intermediary	BT 5.3 BLE
power	$\geq -15\text{dBm}$
Carrier frequency	BT: $2.442\text{GHz} \pm 50\text{KHz}$ /
Dimension	223.2*44.08*14.5*mm
Working distance	<ul style="list-style-type: none"> ■ BT transmission distance: $\geq 10\text{m}$; ■ Speech transmission distance: $\geq 8\text{m}$; ■ IR transmission distance: $\geq 8\text{m}$, the effective operation Angle is positive and negative 23degrees in the horizontal direction of the receiver center line, and the vertical direction is positive and negative 22 degrees
IR function	Infrared learning is not supported
The voice function	Built-in MIC to support voice input Voice support for 16K (16bit) sampling rate
OTA	Support OTA, The remote control version can online upgrade
Pairing performance	<ul style="list-style-type: none"> ▪ 长按组合键 “【back+home】或 source 键” 3S 进入配对模式，发起广播并进行配对 ▪ RCU 与 TV 连接，按解除配对组合键 “【Digital 0+Mute】”3s 以上，RCU 与 TV 端断开连接,RCU 清除配对信息，OK、Voice 键发红外码。 long press the key combination 【back + home】 or the source button 3 s in pairing mode, Initiate the broadcast and pairing. RCU connected to the TV, press cancel the pairs " 【Digital 0+Mute】 more than 3s, RCU disconnects from TV,RCU clears pairing information, and sends infrared code with OK and Voice keys.
Working voltage	2.2V~3.6V
Battery quantity	2PCS
Battery type	AAA #7
Battery life	6 months
Working current	Long button working current is no more than 25m The working current of voice communication is no more than 15mA;
dormant current	The dormant current does not exceed 10uA
Temperature cycle, high and low temperature range	$-10 \sim +50^{\circ}\text{C}$
Store temperature	$-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$
Package	Reference for package drawing

4. RC Key Codes

If the Voice key is pressed:

If RC is paired and connected, BLE: According to Google V1.0 specs
 If RC is not paired, upon key release, the RC transmits will transmit (000.184) command (transmit only 1 RC frame code)

If the Source key is pressed:

- For less than 3.0s (short key press), upon key release, the RC transmits the Source(000.056) command (transmit only 1 RC frame code)
 - For longer than 3.0s (long key press), upon key release, the RC transmits the PAIR (000.183) command (transmit only 1 RC frame code)
 No code is transmitted as long as the key is pressed.

If the Options key is pressed:

- For less than 2.0s (short key press), upon key release, the RC transmits the List(000.064) command (transmit only 1 RC frame code)
 - For longer than 2.0s (long key press), upon key release, the RC transmits the Info (000.015) command (transmit only 1 RC frame code)
 No code is transmitted as long as the key is pressed.

If the Guide key is pressed:

- For less than 2.0s (short key press), upon key release, the RC transmits the Guide(000.204) command (transmit only 1 RC frame code)
 - For longer than 2.0s (long key press), upon key release, the RC transmits the List (000.210) command (transmit only 1 RC frame code)
 No code is transmitted as long as the key is pressed.

If the OK key is pressed:

- See Slide on OK key behaviour

#If the Back + Home key is pressed >3s:

RC transmits the PAIR (000.183) command (transmit only 1 RC frame code)

#Google Debug Feature:

If the Back + OK key is pressed for >3s:

If RC is not connected to TV, transmit 000.157 as long as these 2 keys are pressed.
 If RC is connected to TV, transmit 0x0EC via BT command (Consumer Control HID 0x0C)

#Google Talkback feature:

If the Back + DOWN key is pressed for >7s:

If RC is not connected to TV, the RC transmits will transmit 000.114 command (transmit only 1 RC frame code)
 If RC is connected to TV, transmit 0x0ED via BT command (Consumer Control HID 0x0C)

2 key press behaviour

Pressing first key (IR Start sending) -> Then press 2nd key (IR Stop sending) -> Release of first/second key (Start sending the key still being pressed)
 (Exceptions - 2 key press defined by # above)

All codes are RC6 mode 0 based (DEC)

Power 000.012			
Ambilight 000.143			
Amazon 000.186		Youtube 000.121	
NETFLIX 000.118		APPS 000.128	
Source 000.056	TV 000.159	Quick Menu 000.087	
^ 000.088			
< 000.090	OK 000.092	> 000.091	
v 000.089			
Back 000.010	Voice (BLE key)	Home 000.084	
Rewind 000.043	Play 000.044	FFwd 000.040	
Options 000.064	Pause 000.048	Stop 000.049	
RED 0.109	GREEN 0.110	YELLOW 0.111	BLUE 0.112
Vol + 000.016	Guide 000.204	CH+ 000.032	
Vol - 000.017	MUTE 000.013	CH- 000.033	
1 000.001	2 000.002	3 000.003	
4 000.004	5 000.005	6 000.006	
7 000.007	8 000.008	9 000.009	
. 000.217	0 000.000	Dashboard 000.191	

5. Functional Requirements

RC functions	Function Description	LED Behaviour
1 Pairing	<ul style="list-style-type: none"> Long press (3s) 'SOURCES' or 'BACK+HOME' key. BT Pairing Advertising must only start at 3s. BLE RC pairing name - PHLRC RC to stay in pairing mode for 60s. Press any key to cancel pairing mode (See Cancel Pairing) RC to store pairing info upon successful pairing. RC will only pair to 1 TV. Pairing info will be erased if user enter pairing mode again. <p><u>Exceptions:</u></p> <ol style="list-style-type: none"> Ignore Long press (3s) 'SOURCES' key in Pairing mode. Long press (3s) 'SOURCES' key WILL NOT have any function when RC is in pairing mode (no sending of PAIR IR code, no restarting of Pairing mode). When RC is in pairing mode, if 'BACK + HOME' key is pressed: <ol style="list-style-type: none"> RC should detect either 'BACK' or 'HOME' key as first pressed. RC will exit pairing mode, and send the IR code for detected first key pressed. When the 'BACK + HOME' key are detected to be pressed together, continue sending IR code for the first key pressed. Start 3s timer <ol style="list-style-type: none"> If user release either BACK or HOME key, stop sending IR, stop 3s timer -> DO NOT GO TO Step 'd'. If user press both keys and 'BACK + HOME' key is detected again to be pressed together, go to Step 'b'. If user release both BACK and HOME key, stop sending IR, stop 3s timer -> DO NOT GO TO Step 'd'. Timer At 3s <ol style="list-style-type: none"> Stop sending IR, delay 200ms and transmit Pair IR Code (000.183) (1 RC frame), Stop 3s timer Go to BT Pairing and flash blue LED 	At 3s, Blue LED blinks (2Hz) until pairing mode exits (60s or Cancel Pairing). Blue LED stays on for 3s if pairing successful.
2 Cancel Pairing	<ul style="list-style-type: none"> If RC is in Pairing mode, pressing any key will cancel/exit Pairing process and stop Blue LED blink. <p><u>Exceptions:</u> (Refer to Exceptions in "Pairing" Function)</p>	Stop Blue LED blink
3 Erase pairing	<ul style="list-style-type: none"> Long Press (3s) 'MUTE+DIGIT 0', OR Press and hold the 'BACK' key (>3s) while inserting batteries Pairing info (if any) will be erased. 	Blue LED blinks 3 times (1Hz) upon successful erase
4 Voice	<ul style="list-style-type: none"> Google Voice over BLE spec 1.0 	Blue LED turns on for the duration of audio transmission.
5 OK, DPAD	<ul style="list-style-type: none"> Transmit key command according to RC key code table BLE Advertising and Reconnection to TV. Maximum BLE advertising time - 3s. RC goes to sleep mode if not connected to TV. 	NA
6 All other keys	<ul style="list-style-type: none"> Transmit key command according to RC key code table 	Ambilight key - White LED lights up at press and remains lighted up for 5sec after key release.
7 RC BLE connection time	<ul style="list-style-type: none"> RC to maintain BT connection for 60s. RC to disconnect and go to sleep mode after 60s. RC sends LL_TERMINATE_IND(Error code 0x13) <p>(Error code (0x13) :REMOTE USER TERMINATED CONNECTION indicates that the user on the remote device terminated the connection.)</p>	NA
8 BLE Connection paramaters	<ul style="list-style-type: none"> Normal use: Interval – 10 ms, Slave latency – 99, Timeout – 4000 ms OTA: Interval – 10 ms, Slave latency – 99, Timeout – 4000 ms 	NA
9 • OTA	<ul style="list-style-type: none"> Trigger from TV UI SW naming convention: R52DL?_T301FFv.AA.bb L - LATAM ? – 'H': Huitong, 'S': Seneasy, 'C': C&D T3 – 2k23 RC AA – (01-99) Major revision bb – (01-99) Minor revision – Odd (Official sw), Even (OTA test sw) RC SW can only be updated to the respective RC hardware based on RC supplier. Checks must be in place to prevent RC SW updated to the wrong RC hardware. 	<ul style="list-style-type: none"> Blue LED blinks (1Hz) until OTA terminates.
10 • Low battery	<ul style="list-style-type: none"> Press any key and RC will check for low battery (See slide on Low Battery Behavior) 	<ul style="list-style-type: none"> Blue LED blinks (2Hz) for 2sec after key release
11 • Key stuck	<ul style="list-style-type: none"> Press any key >30sec, RC will go to sleep mode 	<ul style="list-style-type: none"> NA

8.1 Low Battery Behavior

No.	Battery Voltage	Action Upon Button Press
1	> 2.4V	1. Do normal operation (Fire IR,..Send ADV_IND).
2	2.2V < V =<2.4V	1. Do normal operation (Fire IR,..Send ADV_IND). 2. Transmit IR/BLE low battery message: Case 1: RC is virgin (RC not paired with any TV) Send battery low key via IR key code =..... per 10 key presses. Case 2: RC is paired, paired TV is not connected Send battery low key via IR key code =..... per 10 key presses. Case 3: RC is paired, paired TV is connected. Send battery low via IR & BT HID alternatively every 10 key presses. example: -10 th key send IR battery Low keycode -20 th key send BT HID battery low. -30 thIR -40 thBT HID.
3	=< 2.2V	1. Fast blink (2Hz) LED for 2s to indicate battery low 2. Do not send ADV_IND to reconnect. Do not fire IR.

	RC battery service report
V > 3V	100%
V > 2.8V	90%
V > 2.6V	70%
V > 2.4V	40%
V > 2.2V	10%
V <= 2.2V	0%

8.2 OK Key Behavior

Case	Use Case	Description
Case 1-N	Normal daily used	RC is in "normal mode". Paired TV is nearby and turn on. RC is disconnected with TV. 1. Press OK key, RC use ADV_DIRECT_IND for reconnection for 50ms. 2. RC and TV reconnected, RC send OK key to TV via HOGP (0x0C,0x41).
Case 2-N	In case RC is used to control other TV	RC is in "normal mode". Paired TV is not nearby. RC is disconnected with TV. 1. Press OK key, RC send ADV_DIRECT_IND for reconnection for 50ms. 2. No connection established after 50ms of ADV_DIRECT_IND. 3. RC send OK key via IR. RC send ADV_IND for reconnection for 3s. 4. Mark RC as "Fall back" mode.
Case 3-F	In case RC is used to control other TV	RC is in "Fall back" mode, Paired TV is not nearby, RC is disconnected with TV. 1. Press OK key 2. RC send OK key via IR. RC send ADV_IND for reconnection for 3s.
Case 4-F	RC was bring back to original paired TV, and Paired TV still remember RC	RC is in "Fall back" mode, Paired TV is nearby and ON. 1. Press OK key 2. RC send OK key via IR. RC send ADV_IND for reconnection for 3s. 3. Paired TV reconnect back with RC. -> Mark RC as "normal mode"

Warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

* RF warning for Portable device:

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

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